Critical Care and Critical Health Issues

P95 - Linoleic Acid in Enteral Feeding and Acute Kidney Injury in Critically Ill Patients

Ivan Saraiva, MD, MS[1]; Xinlei Chen, MS[1]; Dennis Simon, MD[1]; Michael Pinsky, MD, CM, Dr hc, FCCP, MCCM[1]; Hernando Gomez Danies, MD, MPH[1]

[1]University of Pittsburgh, Pittsburgh, Pennsylvania

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Background: Linoleic acid (LA), the most important dietary omega-6 polyunsaturated fatty acid, has been associated with inflammation and chronic illnesses, but studies in acute settings are lacking. The goal of this study was to investigate the effect of LA administration, as a component of enteral feeds, on development of acute kidney injury (AKI) in a critically ill adult population.

Methods: We performed a retrospective cohort study in adult critically ill patients, admitted to any of the 16 hospitals within the University of Pittsburgh Medical Center network in Pennsylvania, between January 2010 to June 2018. Only the first encounter was considered if a patient had multiple visits. Enteral feeding formulas were obtained, and total amounts were calculated for individual products daily for the first 7 days of hospital stay. LA content was obtained for each product based on manufacturer's publicly available nutrition information data. AKI was defined in accord with the Kidney Disease: Improving Global Outcomes (KDIGO) guidelines. Persistent severe AKI was defined as KDIGO stage 3 lasting for at least 72h. Analyses were adjusted for demographic characteristics, total energy administered in enteral nutrition, comorbidities and severity of illness scores.

Results: A total of 23,536 patient encounters were eligible and included in the final analysis. Mean age was 63.5 (SD 16.2), 10,531 (44.7%) were female, and 6,864 (29.2%) had diabetes. Sepsis was present on 13,071 (55.5%), with 9,724 (41.3%) of patients having vasopressor-dependent shock. Mean energy in Kcal administered in the first 7 days was 3,230 (SD 4,120). LA administered mean was 22.3g (SD 27.6) in 7 days. LA was independently associated with AKI (OR 1.61, 95% CI 1.37-1.91, $p < 0.001$), renal replacement therapy (OR 1.49, 95% CI 1.26-1.76, $p < 0.001$), persistent severe AKI (OR 2.62, 95%CI 2.16-3.16, $p < 0.001$), and intensive care unit length of stay (OR 1.10, 95%CI 1.06-1.15, $p < 0.001$). LA was not significantly associated with 28-day mortality or in-hospital mortality. Sensitivity analyses did not substantially modify above results.

Conclusion: LA was associated with the development of persistent severe AKI, need for renal replacement therapy, and intensive care unit length of stay. These results agree with prior findings from our group associating LA plasma levels with AKI in sepsis in a different cohort.

P96 - Prevalence and Predictors of L-Carnitine Deficiency in Critically Ill Adults: A Retrospective Analysis

Jennifer Gordon, DCN, RD-AP, CNSC[1]; Rebecca Brody, PhD, RD, LD, CNSC[2]; Hamed Samavat, PhD, RD[3]; Mireille Hamdan, DCN, RDN, LDN[4]; Alexander L. Colonna, MD, MSCI, FACS[5]; Jason B. Young, MD, PharmD, FACS[5]; Laura D. Byham-Gray, PhD, RDN, FNKF[6]

[1]University of Utah Hospital, Bountiful, Utah; [2]Rutgers Health, School of Health Professions, Newark, New Jersey; [3]Department of Clinical and Preventive Nutrition Sciences, School of Health Professions, Rutgers, The State University of New Jersey, Newark, New Jersey; [4]Mayo Clinic, Jacksonville, Florida; [5]University of Utah Hospital, Salt Lake City, Utah; [6]Department of Clinical and Preventive Nutrition Sciences, School of Health Professions, Rutgers University, Newark, New Jersey

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Background: Critical illness is a risk factor for L-carnitine deficiency due to the catabolic state. L-carnitine deficiency may result in serious medical complications and poor clinical outcomes. This study aimed to identify the prevalence and potential predictors of L-carnitine deficiency.

Methods: This was a retrospective analysis of cross-sectional data collected from 144 patients, aged $\geq$ 18 years, who received care in the surgical or cardiovascular intensive care units between 2022 and 2024, for whom carnitine data were available. Binary logistic regression models were constructed to explore potential predictors of L-carnitine deficiency, which was defined as a free serum carnitine level < 36mmol/L.

Results: The mean age of patients was 56.5 years; 41.7% of the sample had L-carnitine deficiency, as illustrated in Figure 1. Females were 2.4 times more likely to develop L-carnitine deficiency than males (OR = 2.44; 95% CI = 1.24, 4.81). For each unit increase in body mass index, the

odds of developing L-carnitine deficiency decreased by 5% compared to maintaining normal free carnitine status (OR = 0.95; 95% CI = 0.91, 0.99). Those prescribed continuous renal replacement therapy (CRRT) were 2.7 times more likely to develop L-carnitine deficiency than those not on CRRT (OR = 2.70; 95% CI = 1.36, 5.34), and chronic kidney disease was associated with a 3.16 times higher likelihood of L-carnitine deficiency compared to those without chronic kidney disease (OR = 3.16; 95% CI = 1.33, 7.49). These associations are summarized in Table 1.

Conclusion: L-carnitine deficiency was prevalent in this sample of critically ill adults. CRRT, sex, chronic kidney disease, and BMI were significant predictors of L-carnitine deficiency.

Table 1. Potential predictors of L-carnitine deficiency

Potential predictor	Univariable Model[b]	
	OR (95%CI)	*P*-value
Sex, female	2.44 (1.24, 4.81)	**0.010**
BMI (kg/m^2)	0.95 (0.91, 0.99)	**0.030**
CRRT therapy prescribed, yes	2.70 (1.36, 5.34)	**0.004**
PN therapy prescribed, yes	0.71 (0.37, 1.39)	0.322
Length of hospital stay (days)	1.00 (0.98, 1.02)	0.985
History of CKD, yes	3.16 (1.33, 7.49)	**0.009**

a. Reference category for L-carnitine deficiency is normal free carnitine status. Statistically significant P-values ≤ 0.05 are bolded.

Abbreviations: BMI = body mass index; CI = confidence intervals; CKD = chronic kidney disease; CRRT = continuous renal replacement therapy; OR = odds ratio; PN = parenteral nutrition.

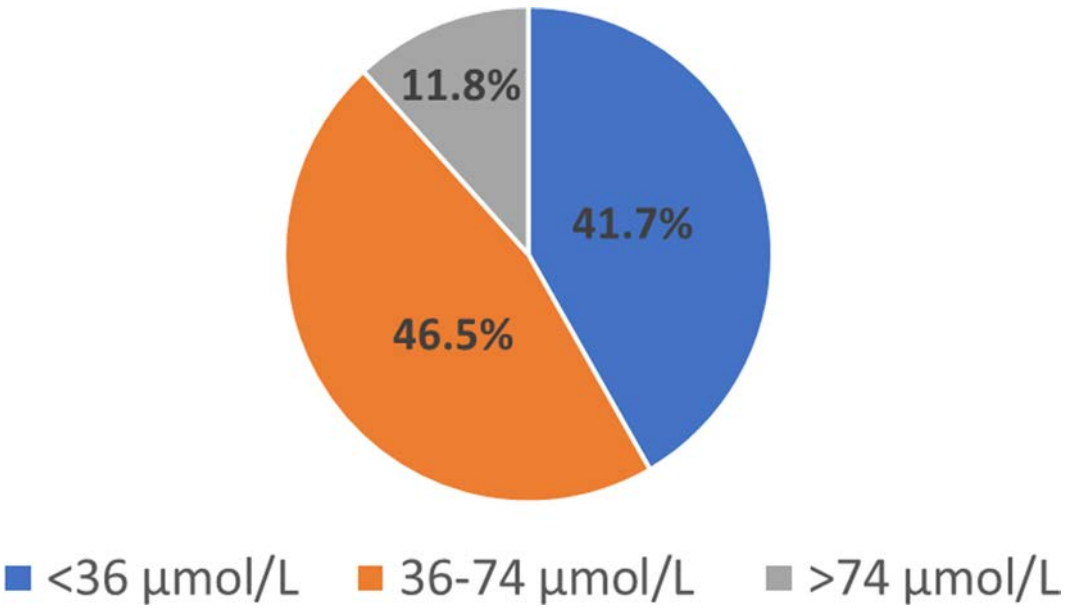

Figure 1. L-Carnitine status by free carnitine level

P97 - Nutrition Management for a Patient With Sleeve Gastrectomy and Severe Malnutrition on Extracorporeal Membrane Oxygenation

Kristine Kittridge, MS, RD, LD, CNSC[1]; Rebecca Brody, PhD, RD, LD, CNSC[2]
[1]MaineHealth Maine Medical Center Portland, Lewiston, Maine; [2]Rutgers Health, School of Health Professions, Newark, New Jersey

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P98 - Assessing Caloric Needs for an Adult With Severe Burns and Cerebral Palsy in a Trauma Intensive Unit - A Case Report

Jing Zuo, MS, RD, CNSC[1]
[1]Harborview Medical Center, Seattle, Washington

Financial Support: None Reported.

Background: Severe burn injuries are hypermetabolic with resting metabolic rate up to two times higher than healthy individuals.[1] Metabolic disarrangements vary based on the extent of the injury, medical therapy, infection, and surgical interventions. No predictive equation has been proven to accurately estimate caloric need of burn patients. Indirect calorimetric (IC) remains the gold standard. Cerebral palsy (CP) is a brain disorder affecting muscle movement and posture. Caloric needs for CP patients vary based on muscle tone and activity level. Predictive equations can overestimate caloric need for CP patients by 20%.[2] This is a case study highlighting the challenges of estimating caloric needs for an adult CP patient with a 41% total body surface area (TBSA) burn and third-degree inhalation injury in a Trauma ICU. The patient is a 30-year-old male who used a wheelchair and has a baclofen pump for muscle relaxation at baseline. He was intubated at admission. He required left below knee amputation (BKA) on day 1 and right BKA on day 9 of admission. His clinical course was complicated by acute respiratory distress syndrome (ARDS), requiring the use of paralytics and high dose Propofol. He also developed acute kidney injury requiring continuous renal replacement therapy (CRRT). This patient started enteral nutrition (EN) on day 0. His caloric goal of 46 kcal/kg was based on his actual weight after initial BKA using Harris Benedict equation with an injury factor of 1.9. Due to his unstable respiratory condition, he did not initially meet the criteria for IC. Monitoring for overfeeding using standard indicators—such as hyperglycemia, hypertriglyceridemia, and azotemia—was challenging due to the confounding effects of CRRT, high-dose Propofol, and a pronounced inflammatory response. With the concern for rising artery blood gas PCO_2 levels possibly related to overfeeding, caloric goal was reduced to 38 kcal/kg on day 8 based on the assumption of lower metabolic demand in CP patients (Table 1). Despite adjustments of caloric intake, ventilator settings, and other medical interventions, patient's PCO_2 remained high. On day 17, caloric goal was further reduced to 31.6 kcal/kg. However, due to unexpected colonic distension, this patient received only 13-17 kcal/kg from day 17 to 19. He received about 30 kcal/kg daily for three days from day 20 to 23. After one week of lower caloric intake (day 17 to 23), this patient's CO_2 and minute ventilation (MV) had significantly improved. IC on day 24 showed daily caloric need of 2288 kcal (46.7 kcal/kg). EN was increased accordingly. Patient's respiratory condition continued to improve. He received tracheostomy on day 28. The second IC conducted on day 38 showed daily caloric need of 1855 kcal (37.9 kcal/kg) (Figure 1). No delayed wound healing was reported. Both overfeeding and underfeeding are likely in adults with CP and severe burns, and each carries serious risks. The hypermetabolic response to burn injury typically peaks between one week and one month (Figure 2). The first IC result on day 24 represented his highest caloric demands. This case suggests Harris-Benedict equation using actual body weight times 1.9 injury factor accurately predicted this patient's caloric need (Table 2). It can be used when IC is not readily available. Adults with CP and severe burns need similar calories as those without CP. Although the extent to which caloric intake contributed to his excessive CO_2 production is unclear, transient low caloric intake appears to correlate with reductions in PCO_2 and MV, without exerting a significant effect on wound healing.

Methods: None Reported.

Results: None Reported.

Conclusion: None Reported.

Table 1. The change of arterial PH, PCO2, minute ventilation (MV), and actual caloric intake over 30 days of admission

Admission Day	PH, ART	PCO2 (mmHg)	MV (L/min)	Actual Intake (Kcal/kg)
1	7.24	27.0	7.9	18.8
2	7.18	67.0	10.6	7.7
3	7.48	33.0	10.7	35.2
4	7.31	47.0	8.9	32.5
5	7.47	46.0	12.4	49.4
6	7.33	72.0	12.2	48.1
7	7.25	88.0	11.9	46.6
8	7.29	71.0	10.8	34.0
9	7.27	58.0	12.1	33.9
10	7.29	55.0	13.2	45.0
11	7.29	62.0	10.9	35.2
12	7.18	70.0	12.2	38.8
13	7.21	62.0	12.0	40.9
14	7.14	74.0	10.2	38.0
15	7.17	67.0	10.0	39.3
16	7.17	70.0	9.2	39.4
17	7.24	62.0	10.6	17.4
18	7.32	46.0	9.1	11.9
19	7.4	45.0	10.8	13.0
20	7.38	45.0	9.5	30.7
21	7.34	44.0	7.4	31.6
22	7.31	46.0	8.1	27.9
23	7.32	38.0	10.3	19.8
24	7.27	45.0	11.3	33.6
25	7.27	45.0	11.4	43.6
26	7.54	40.0	8.7	39.4
27	7.39	52.0	9.1	28.9
28	7.45	60.0	8.6	16.6
29	7.51	52.0	8.6	46.3
30	7.47	52.0	11.6	44.1

Abbreviations: ART = arterial; PCO2 = partial pressure of carbon dioxide; MV = minute ventilation; Reference range for PH = 7.35-7.45; PaCO2 = 33-48 mm [Hg]; MV = 5-8 L/min.

Table 2. Method to estimate adults with burns based on TBSA

Burn Area	Harris Benedict Equation x Injury Factor
35 - 40% TBSA	1.9 x BEE
40 - 45%+ TBSA	2.0 x BEE

** Use dry weight for calculating BEE.

Abbreviations: TBSA = total body surface area; BEE = basal energy expenditure.

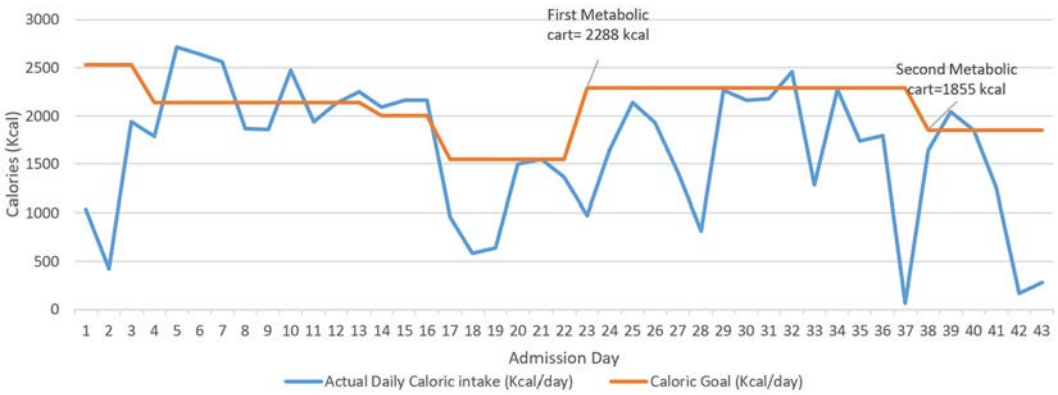

Figure 1. Comparison of actual caloric intake to caloric goal during admission

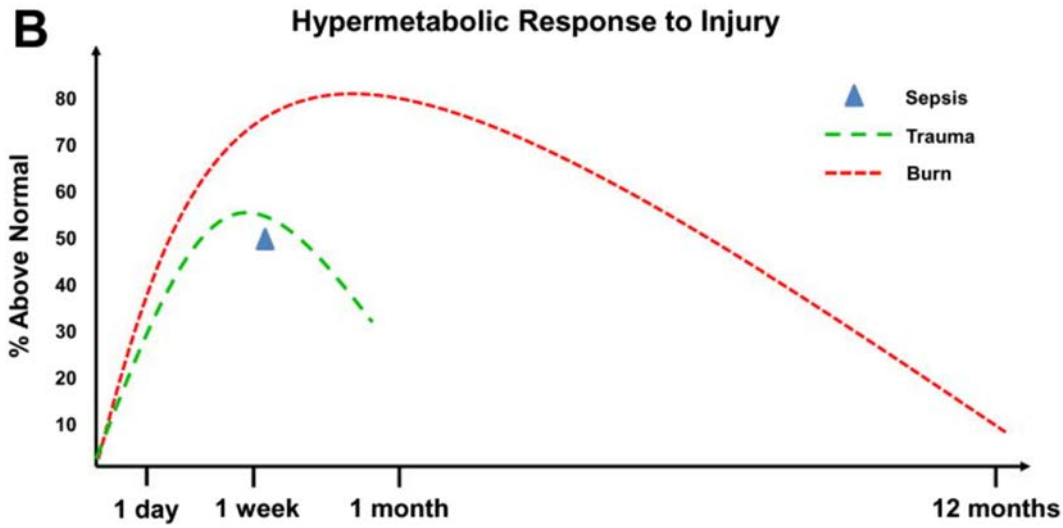

Figure 2. Hypermetabolic response to injury over time

Image credit from Porter C et al. The metabolic stress response to burn trauma: current understanding and therapies. Lancet. 2016 Oct 1;388(10052):1417-1426. doi: 10.1016/S0140-6736(16)31469-6. PMID: 27707498; PMCID: PMC5753602.

P99 - Association Between Blood Selenium Increase and Mortality in Burn Patients Receiving Selenium Supplementation: A Retrospective Cohort Study

Jeongsoo Park
[1]Hallym University Hangang Sacred Heart Hospital, Incheon, Inch'on-jikhalsi

Financial Support: None Reported.

Background: Selenium is a trace element known for its antioxidant and immunomodulatory properties. In burn patients, oxidative stress is heightened, and selenium supplementation has been proposed as a potential adjunctive therapy. However, clinical outcomes related to selenium level changes remain under-investigated. We aimed to evaluate the association between the change in blood selenium levels and mortality in burn ICU patients treated with selenium between 2022 and 2025.

Methods: This retrospective cohort study included burn patients who received selenium supplementation during their ICU stay. Patients were categorized into two groups based on blood selenium concentration changes: increased or decreased. Logistic regression models were used to assess the association between selenium level changes and mortality, adjusting for total body surface area burned (TBSA), age, and presence of inhalation injury.

Results: Among 154 selenium-treated patients, 110 (71.4%) had increased blood selenium levels, while 44 (28.6%) did not. The mortality rate was significantly lower in the selenium-increased group (9.1%) compared to the selenium-decreased group (39%, $p < 0.001$). A rise in blood selenium was independently associated with reduced mortality (OR 0.144, 95% CI 0.046–0.409, $p < 0.001$) after adjustment for TBSA, age, and inhalation injury. TBSA and age were positively associated with mortality (OR per 1% TBSA: 1.08, 95% CI 1.04–1.12; $p < 0.001$, OR per year of age: 1.08, 95% CI 1.03–1.13; $p = 0.002$). Inhalation injury showed a trend toward higher mortality but did not reach statistical significance ($p = 0.080$).

Conclusion: These findings suggest that in burn patients receiving selenium supplementation, an actual increase in blood selenium levels is significantly associated with reduced mortality. The therapeutic response to selenium may depend not just on the dose administered but on the patient's capacity to achieve increased circulating selenium levels. Further prospective studies are needed to clarify mechanisms and optimize supplementation protocols.

P100 - Pressure Injuries and Micronutrient Gaps: A Retrospective Review of Inpatient Adults

Kiah Graber, RDN, LD, CNSC[1]; Andrea Morand, MS, RDN, LD, CNSC[1]; Alison Brantner, MS[1]; Audrey McKinney, MS[1]; Samantha Toy, MS[1]; Osman Mohamed Elfadil, MBBS[1]; Manpreet Mundi, MD, FASPEN[1]
[1]Mayo Clinic, Rochester, Minnesota

Financial Support: None Reported.

Background: The prevalence of pressure injuries (PI) in the United States is estimated to be 2.2% of the population, with cost to the health care system reaching over $26 billion. Nutritional considerations such as increased calorie and protein intake as well as adequate fluid intake are understood to play a pivotal role in PI healing and prevention. Vitamins and minerals are also thought to play an influential part in wound healing due to their influence on inflammation, oxidative stress, protein and collagen synthesis, and cell proliferation. Despite these benefits, focus on nutrition support including assessment and supplementation of micronutrients remains variable across various practices.

Methods: A retrospective descriptive cohort study was carried out to examine the nutrition and demographic profile of a single-center, adult, inpatient population with pressure injuries and to evaluate the frequency of micronutrient assessment and prevalence of deficiency.

Results: Our cohort included 121 patients (42% female) with mean age of 60 ± 19 years. Deep tissue or stage 2 injuries were noted in 67.8% (n = 82) patients while the remaining population had stage 3 (7.4%, n = 9), stage 4 (5%, n = 6), or unstageable (19.8%, n = 24) wounds (Table 1). The median of initial surface area of the wounds was 1.3(IQR: 0.35, 4.14) cm and had an average total Bates-Jensen Wound Assessment Tool score of 26 ± 8. Some form of enteral nutrition was provided to 31.9% (n = 20/119) of patients while 9% received parenteral nutrition (n = 11/119). Oral nutrition supplements were prescribed in 46.9% (n = 53/113) of patients however wound specific nutrition supplements with conditionally essential amino acids were prescribed in only 18% (n = 21/115). Of the cohort, 95% (n = 115/121) received a dietitian consult and 33% (n = 33/121) of the cohort was followed by a multidisciplinary nutrition support service. Vitamin or mineral supplementation was ordered for 75.3% of the cohort (n = 91/121). Overall, the assessment of micronutrients was low ranging between 0% for Vitamin B6 (pyridoxal 5-phosphate) and 45.5% for zinc levels. Despite the low number of patients who underwent an assessment of micronutrients, the prevalence of deficiency was high. More than half of patients had zinc, vitamin D, and vitamin A deficiency. Of note, 17% of the cohort with zinc (n = 6/34) and vitamin A deficiencies (n = 4/23) had normal albumin levels. When stratified wound severity, micronutrient deficiencies occurred in all pressure injury stages. High prevalence of deficiencies also occurred at less severe stage 2 PIs with vitamin C (42.9%, n = 3/7), vitamin D (46.2%, n = 6/13), zinc (64.3%, n = 9/14) and iron(75%, n=9/12) (Table 2).

Conclusion: The current single-center cohort study highlights a significant gap between the recognized importance of micronutrients for PI management and the actual clinical practice of assessment and supplementation. Despite high rates of dietitian involvement and general vitamin supplementation, targeted wound supplementation and evaluation of specific micronutrient levels remains low. The true prevalence of wound related micronutrient levels is difficult to ascertain from the current study given low prevalence of assessment. However, it is notable that deficiencies were prevalent across all stages of PIs, less severe stage injuries, and with normal albumin levels, a confounding factor due to many micronutrients binding to albumin. Our results underscore the need for standardized protocols to improve micronutrient screening and individualized nutrition support in this high-risk patient population, which may enhance wound healing and reduce health care burden. Further research is needed to determine the relationship between micronutrient status, supplementation, PI recovery, and health outcomes.

Table 1. Baseline demographics and clinical characteristics

Variables n (%); mean ± SD; median (IQR: 25th,75th)	**n=121**
Age, year	60 ± 19
Gender	
• Male	70 (57.9)
• Female	51 (42.1)
BMI at admission	28 ± 8.2
Wound/Pressure injury stage	
• Deep tissue injury	38 (31.4)
• Stage 2	44 (36.4)
• Stage 3	9 (7.4)
• Stage 4	6 (5)
• Unstageable	24 (19.8)
Co-morbidities prevalence	
• Diabetes Mellitus (Type I or II)	38 (31.4)
• Peripheral artery disease/Vascular insufficiency	37 (30.5)
• Chronic kidney disease	36 (29.7)
▪ Stages 1-4	21 (17.4)
▪ Stage 5 on dialysis	15 (12.4)
• Cancer	21 (17.3)
• Post-bariatric/post-GI surgery status	17 (14)
• Alcohol abuse disorder	5 (4.1)
• Smoking (active or cessation within 1 year)	17 (14)
• No co-morbidity	20 (16.5)
The presence of a wound vacuum during the admission	25 (22.1)
Hospitalization	
• Length of hospitalization, days	17 (9,42)
• Re-admission within 3 months	68 (56.2)
• Re-admission related to wound complication	5 (4.1)

Table 2. Micronutrients and albumin

Micronutrient n (%)	**Normal reference range (adult)**	**Checked n=121 (%)**	**Deficiency (% of checked)**	**Deficiency (% of checked)**				
				Stage 2	**Stage 3**	**Stage 4**	**Unstageable**	**Deep Tissue**
Ascorbic Acid	0.4-2.0 mg/dL	34 (28.1)	10 (29.4)	3/7 (42.9)	0/5 (0)	2/4 (50)	5/10 (50)	0/8 (0)
Vitamin B12	180-914 ng/L	28 (23.1)	0	0/10 (0)	0/3 (0)	0/3 (0)	0/6 (0)	0/6 (0)
Folate	≥4.0 mcg/L	17 (14.1)	0	0/6 (0)	0/3 (0)	0/1 (0)	0/2 (0)	0/5 (0)
Vitamin B6 (pyridoxal 5-phosphate)	5-50 mcg/L	0	—	—	—	—	—	—
Vitamin E	5.5-17.0 mg/L	26 (21.5)	3 (11.5)	1/7 (14.3)	0/2 (0)	0/3 (0)	1/8 (12.5)	1/6 (16.7)
Vitamin A	32.5-78.0 mcg/dL	42 (34.7)	23 (54.8)	2/12 (16.7)	0/3 (0)	0/4 (0)	1/11 (9.1)	4/12 (33.3)
25-hydroxy Vitamin D	20-50 ng/mL (optimum levels)	35 (28.9)	21 (60)	6/13 (46.2)	0/2 (0)	0/3 (0)	4/8 (50)	5/9 (55.6)
Vitamin K	0.10-2.20 ng/mL	2 (1.6)	0	0/1 (0)	—	—	—	0/1 (0)
Zinc	60-106 mcg/dL	55 (45.5)	30 (54.5)	9/14 (64.3)	3/4 (75)	3/4 (75)	13/16 (81.3)	10/17 (58.8)
Copper	73-129 mcg/dL (Male) 77-206 mcg/dL (Female)	41 (33.8)	3 (7.3)	0/7 (0)	1/4 (25)	0/4 (0)	1/13 (7.7)	0/13 (0)
Selenium	110-165 mcg/L	8 (6.6)	6 (75)	0/3 (0)	0/2 (0)	—	0/1 (0)	0/2 (0)
Iron	50-150 mcg/dL (Male) 35-145 mcg/dL (Female)	34 (28.1)	22 (64.7)	9/12 (75)	1/3 (33.3)	2/2 (100)	(62.5) 5/8	6/9 (66.7)
Ferritin	31-409 mcg/L (Male) 11-328 mcg/L (Female)	37 (30.6)	0	0/14 (0)	0/3 (0)	0/2 (0)	0/8 (0)	0/10 (0)
Ceruloplasmin	19.0-31.0 mg/dL (Male) 20.0-51.0 mg/dL (Female)	0	—	—	—	—	—	—
Albumin	3.5-5.0 g/dL	101 (83.5)	77 (76.2)	30/36 (83.3)	6/8 (75)	4/5 (80)	17/20 (85)	25/32 (78.1)

P101 - Challenges of Abdominal Trauma in a Bariatric Surgery Patient Requiring Multidisciplinary Management

Emily McCoy, DO[1]; Katrina Swedberg-Hall, DO[2]; Sanjiv Gray, MD, FACS, FASMBS, DABOM, DABS-FPMBS[2]
[1]Lakeland Regional Health, Plant City, Florida; [2]Lakeland Regional Health, Lakeland, Florida

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Background: Abdominal trauma in patients with prior bariatric surgery presents a unique challenge. The altered anatomy complicates hemorrhage control, resection, and reconstruction while increasing the risk of nutrient deficiencies leading to poor wound healing, infectious complications, and catabolism. This is a case of a 41-year-old female who presented as a trauma alert as the restrained passenger in an interstate rollover. Her past surgical history, which was unknown at the time, included a biliopancreatic diversion/duodenal switch (BPD/DS). Upon presentation to the trauma bay, she was hypotensive and had abdominal pain. She was found to have a mesenteric bucket handle injury, Morel-Lavallee degloving lesion, grade 1 splenic laceration, mediastinal hematoma, multiple fractures, and a prior sleeve with BPD/DS anatomy. As a part of her initial resuscitation, she had 2 units of whole blood and 4 units of PRBC, cryoprecipitate, and platelets and was taken emergently for a damage control laparotomy. In her initial surgery, we resected two de-vascularized ileal segments. After she was stabilized, she was brought back to the operating room for definitive reconstruction with a Roux-en-Y revision. In this case, a forensic EGD was performed to give the surgeon a direct visualization of the sleeve gastrectomy anatomy. Duodenal switch anatomy was identified; a 90 cm alimentary limb was identified and attached approximately 200 cm distal to the ligament of Treitz. In an effort to reduce the risk of malabsorption, the biliopancreatic limb was moved more proximally and re-anastomosed approximately 50 cm from the ligament of Treitz. This left approximately 160 cm of common channel to the ileocecal valve. She recovered well without complications and was discharged home on hospital day 11. Patients who undergo a malabsorptive bariatric surgery, such as a BPD/DS, are at risk for nutritional deficiencies, including vitamin A, D, E, calcium, and parathyroid hormone, especially if the common channel is shorter than the ideal length of 200 cm. These deficiencies can be exacerbated after a trauma when nutritional requirements increase. This can put patients at risk for wound complications and anastomotic breakdown. In this patient population, it is important to use an individualized nutrition plan. In our patient, we set a goal of 30 kcal/kg/day and 1.5-2.0 g of protein/kg/day. In addition to her standard meal trays, she was given high-protein oral nutritional supplements. She was also given bariatric vitamins, vitamin A, D, E, and K. It is important to recognize the malnutrition that could ensue if an inadequate alimentary length or common channel were maintained. A close working relationship between the trauma team, bariatric surgery, and the dietitian with knowledge of post-bariatric surgery nutritional requirements is important to optimize care and reduce complications. EGD in bariatric surgery is a crucial adjunct to help clarify post-surgery anatomy and identify acute or chronic pathology. In this patient, an EGD was used to confirm the sleeve anatomy of the stomach and the patency of the duodenoileal anastomosis. Through a staged damage control to definitive reconstructive approach–meticulously addressing altered BPD/DS anatomy and mesenteric defects–combined with aggressive, micronutrient-focused nutritional support, the patient achieved hemodynamic stability, successful bowel continuity, and progressive mobilization without anastomotic or wound complications. This case underscores the importance of multidisciplinary planning and personalized nutrition in post-bariatric abdominal trauma management.

Methods: None Reported.

Results: None Reported.

Conclusion: None Reported.

P102 - Intramuscular Adipose Tissue and Resting Energy Expenditure in Patients With COVID-19: Implications for Precision Nutrition

Megan Beyer, MS, RD, LDN[1]; Paul Wischmeyer, MD, EDIC, FCCM, FASPEN[1]; Jeroen Molinger, MS[2]; Mara Serbanescu, MD[1]; Krista L. Haines, DO, MD[1]
[1]Duke University School of Medicine, Durham, North Carolina; [2]Duke University School of Medicine- Department of Anesthesiology, Durham, North Carolina

Financial Support: None Reported.

Background: Intramuscular adipose tissue, reflecting fatty infiltration of skeletal muscle, is an emerging marker of muscle quality relevant to nutritional status in critically ill patients. Elevated intramuscular adipose tissue has been linked to impaired muscle function and adverse outcomes. However, the relationship between intramuscular adipose tissue, resting energy expenditure, and nutritional needs in COVID-19 patients, many admitted to surgical intensive care units, is poorly understood. Understanding these interactions is essential for optimizing precision nutrition strategies in this complex population.

Methods: This cross-sectional study analyzed 35 COVID-19 patients enrolled in a prospective nutrition cohort admitted to various intensive care units, predominantly surgical. Intramuscular adipose tissue was quantified via bedside ultrasound of the rectus femoris muscle, with bilateral short and long axis indices expressed as percentage adipose tissue per square centimeter. Resting energy expenditure was measured by indirect calorimetry within 72 hours of intensive care unit admission. Body mass index was calculated from admission anthropometrics. Spearman correlations, group comparisons, and multivariate regression were performed to examine associations among intramuscular adipose tissue, resting energy expenditure, body mass index, age, and sex.

Results: Patients had a mean age of 57.2 years, 60 percent were male, and mean body mass index was 31.5 kilograms per meter squared (Table 1). Mean resting energy expenditure was 1,932 kilocalories per day with a standard deviation of 497, consistent with a hypermetabolic state. Intramuscular adipose tissue indices ranged from 2.5 to 4.1 percent adipose tissue per square centimeter. Correlations between intramuscular adipose tissue and resting energy expenditure were minimal, ranging from negative 0.13 to negative 0.03, and associations with body mass index were weak and inconsistent, ranging from negative 0.18 to 0.16. Intramuscular adipose tissue did not differ significantly by sex but showed a weak positive correlation with age. Higher intramuscular adipose tissue tended to occur in obese patients, though without statistical significance. Multivariate models showed intramuscular adipose tissue was not an independent predictor of resting energy expenditure. Left and right intramuscular adipose tissue measurements were highly correlated, supporting measurement reliability.

Conclusion: In COVID-19 patients, intramuscular adipose tissue is an independent measure of muscle quality that represents long term body composition and resilience which does not correspond with metabolic demand or body mass index. These results highlight that precision nutrition should incorporate both metabolic assessments for and muscle quality evaluation to better understand how to tailor interventions of energy deliver and rehabilitation strategies to improve outcomes. Recognizing muscle adiposity alongside energy needs may better guide protein-energy delivery and rehabilitation, potentially improving outcomes. Future research should investigate longitudinal changes in intramuscular adipose tissue to optimize nutrition and functional recovery in critical illness.

Table 1.

COVID- 19 Demographics	n=35
Age, mean, years [range]	57.2 (25-88)
Male sex, n (%)	21 (60)
Female sex, n (%)	14 (40)
BMI (kg/m²) mean, [range]	31.5 (17.4-50.3)

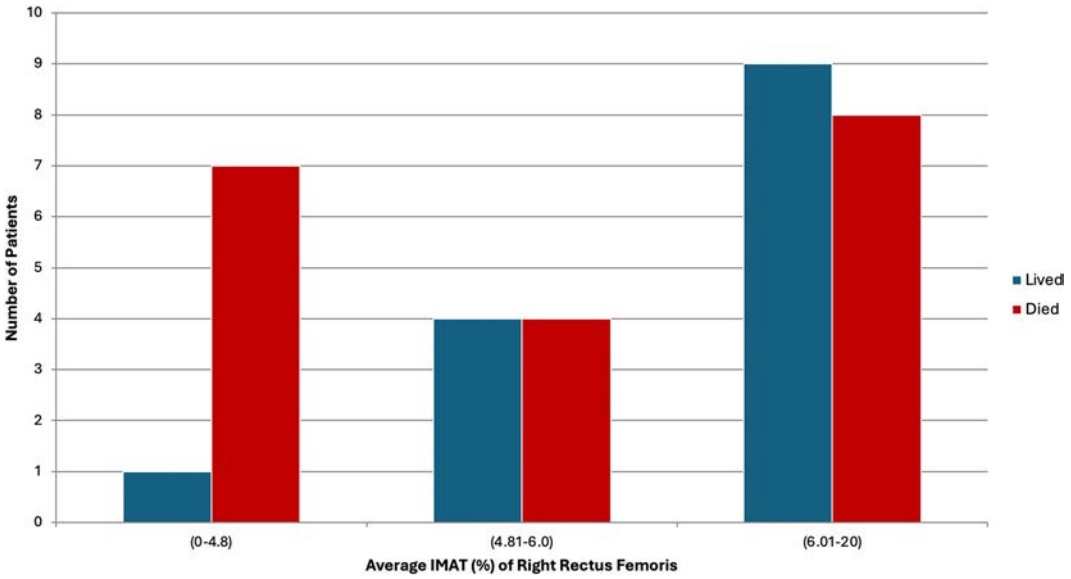

Figure 1. Distribution of deceased patients by intramuscular adipose tissue (IMAT)

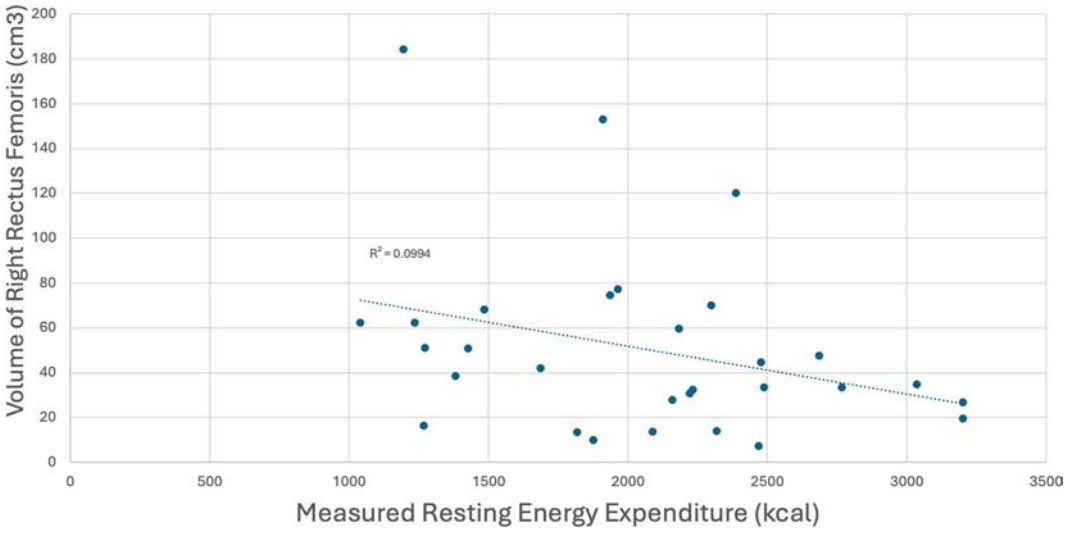

Figure 2. Association between resting energy expenditure and rectus femoris muscle volume

P103 - Clinical Nutrition Outcomes in Adult Patients Receiving Extracorporeal Membrane Oxygenation Therapy

Jordyn Bey, MS, RDN, LD[1]; Osman Mohamed Elfadil, MBBS[1]; Taylor Dale, MS, RDN, LD[1]; Kelly Hastings, MPH, RDN, LD[1]; Qiushi Fan, MMN, MB, RD, LDN[2]; Manpreet Mundi, MD, FASPEN[1]; Vidit Jogani, MBBS[1]
[1]Mayo Clinic, Rochester, Minnesota; [2]Clinical Nutrition, Mayo Clinic, Rochester, Minnesota

Financial Support: None Reported.

Background: Extracorporeal membrane oxygenation (ECMO) is an advanced therapeutic intervention employed in management of life-threatening cardiac and pulmonary failure. Patients undergoing ECMO are often among the most critically ill, facing challenges such as unstable hemodynamics, systemic inflammation, and elevated metabolic demands. These factors contribute to increased risk of nutritional decline and prolonged hospitalization. While oral intake can be restricted, enteral nutrition (EN) is safe and recommended for most ECMO patients, as it provides essential nutrients, supports gut function, and may reduce mortality risk. Initiating EN within 48 hours of ECMO onset is preferred. Despite the clinical significance of nutrition in this patient population, existing literature on their nutritional trajectory and associated outcomes is limited. This study aims to provide an overview of the prevalence and progression of malnutrition, the duration and tolerance of nutritional support, and the incidence of dysphagia with diet advancement in the setting of ECMO therapy.

Methods: This is a single-center, retrospective study evaluating nutritional outcomes in adult patients who received ECMO between January 1st, 2025 and July 31st, 2025. In addition to demographics and baseline clinical characteristics, variables of interest include nutritional history, support, and outcomes. Descriptive analysis was performed.

Results: Sixty-four patients are included in this analysis (mean age 57.3 ± 14.6 years; 70.3% male, mean BMI 29.5±5.6). This cohort received ECMO therapy for a median of 6.4 (2.2, 14.9) days (Table 1). Patients stayed in the ICU for a median of 5 (5,37.5) days. Fifty-seven patients (89.1%) were transferred out of the ICU to a progressive care unit (PCU) for a median length of stay of 7 (1,20) days. In-hospital mortality occurred in 24 patients (37.5%). Regarding nutritional history and outcomes, malnutrition was documented during initial nutrition assessment in 17 (26.6%) patients, ruled out in 22 (34.4%) patients, while not assessed in 25 (39%) patients. Noteworthy, a nutrition support service consultation was requested only in 12 patients (18.8%). Oral intake was allowed after decannulation in 48 (75%) patients and EN was utilized during and after ECMO in 49 (76.6%) patients, whereas only 6 patients (9.4%) received parenteral nutrition (PN) (Table 2). Despite nutrition support, patients lost a median of 5.7 (0.8,12,8) % of their admission weight from time of ECMO cannulation to time of discharge. EN was provided relatively late and slowly within a median of 3 (2,10) days after admission to the ICU with the goal rate reached in a median of 4 (3,8) days. Enteral feeding intolerance (EFI) was prevalent in this cohort with the most common symptoms reported including nausea and/or vomiting in 22 (44.9%) patients and diarrhea in 14 (21.9%) patients. A variety of enteral formulations

were utilized with majority of patients starting on semi-elemental formulations (56%), followed by specialized renal formulas (25%), standard polymeric formulas (11%), and high-protein formula (8%).

Conclusion: Malnutrition was common among adults undergoing ECMO, yet formal nutritional assessment and early dietetic involvement were infrequent. Enteral nutrition was frequently associated with EFI. These findings highlight a critical gap between nutritional best practices and real-world ECMO care, underscoring the need for standardized early nutrition protocols, routine malnutrition screening, and targeted interventions to optimize recovery and outcomes in this high-risk population.

Table 1. Baseline demographics and clinical characteristics

Variables n (%); mean ± SD; median (IQR: 25^{th},75^{th})	n=64
Age (at admission), year	57.3 ± 14.6
Gender	
• Male	45 (70.3)
• Female	19 (29.6)
Anthropometrics	
• Weight at admission, kg	88.2 ± 18.8
• Weight at ECMO initiation, kg	86.49 ± 21.6
• Weight at discharge, kg	82.30± 19.8
• BMI at admission, kg/m^2	29.4 ± 5.6
• BMI at ECMO initiation, kg/m^2	29.4 ± 5.8
• BMI at discharge, kg/m^2	28 ± 6.5
ECMO continuity	
• Continuous	56 (91.8)
• Intermittent	5 (8.2)
ECMO duration, days	6.4 (2.2, 14.9)
Co-morbidity	
• Hypertension	30 (46.8)
• Diabetes Mellitus (Type 1 or 2)	17 (26.5)
• Obesity (BMI>30)	22 (34.3)
• Acute kidney injury (AKI)	27 (42.2)
• End stage renal disease (ESRD)	1 (1.6)
Diagnosis of dysphagia	
• Documented and dysphagia was diagnosed	16 (25)
• Documented and dysphagia was not diagnosed	28 (43.8)
• Not checked	20 (31.2)
Concomitant need for Continuous Renal Replacement Therapy (CRRT)	28 (43.8)
Hospitalizations and Mortality	
• In-Hospital Mortality	24 (37.5)
• ICU Lenth of stay, days	15 (5,37.5)
• PCU Lenth of stay (n=57), days	7 (0,20)

Table 2. Nutrition support and outcomes

Variables n (%); mean ± SD; median (IQR: 25th,75th)	n=64
Nutrition support service was consulted	
• Yes	12 (18.8)
• No	52 (81.2)
Initial malnutrition assessment	
• Malnutrition criteria not met	22 (34.4)
• Moderate	13 (20.3)
• Severe	4 (6.2)
• Not assessed	25 (39.1)
Route of nutrition used throughout hospitalization	
• Oral	48 (75)
• Enteral Nutrition	49 (76.6)
• Parenteral Nutrition	6 (9.4)
Diet type	
• Regular diet (IDDSI level 7)	42 (65.6)
• Clear liquid diet	4 (6.2)
• Full liquid diet	2 (3.1)
• Pureed diet (IDDSI level 4)	5 (7.8)
• Minced and moist diet (IDDSI level 5)	1 (1.5)
• Soft and bite-sized diet (IDDSI level 6)	4 (6.2)
• Mechanical soft	6 (9.3)
• Thin liquids (IDDSI level 0)	30 (46.8)
• Mildly thick liquids (IDDSI level 2)	4(6.2)
• Extremely thick liquids (IDDSI level 4)	1(1.5)
• Easy to chew (IDDSI level 7)	1(1.5)
Enteral nutrition data (n=49)	
• EN started before ECMO cannulation	44 (89.8)
• EN continued beyond ECMO	32 (65.3)
• Duration before starting EN after admission, days	3 (2,10)
• Duration until EN goal rate was reached, days	4 (3,8)
• Duration after ECMO until EN was resumed, days	2 (1,4)
• Enteral feeding intolerance	22 (44.9)
Parenteral nutrition data (n=6)	
• PN continued beyond ECMO	3 (50)
• Number of total days on PN	19 (5,33)
• PN complications	0

P104 - Nutrition Management of Children With Acute Necrotizing Pancreatitis Following Asparaginase: A Case Series

Jodie Greear, MS, RDN, CSO[1]; Lauren Steele, MS, RDN[1]; Seth Karol, MD, MSCI[1]; Nickhill Bhakta, MD[1]; Hope Swanson, PharmD[1]; Karen Smith, RD[1]; Hiroto Inaba, MD, PhD[1]; Ching-Hon Pui, MD[1]

[1]St. Jude Children's Research Hospital, Memphis, Tennessee

Encore Poster

Previous Publication: Greear J, Steele L, Swanson HD, et al. Nutrition management of children with acute necrotizing pancreatitis following asparaginase: a case series. JPGN Rep. 2025;6:549-555. doi:10.1002/jpr3.70078.

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Background: Asparaginase is a critical component of modern therapy for ALL. Although its use has improved cure rates, asparaginase therapy can be complicated by significant toxicities including pancreatitis, which can be severe and result in life-threatening or fatal complications. We describe five cases of severe asparaginase-induced necrotizing pancreatitis in children receiving therapy for ALL. This case series highlights clinical features associated with the intolerance of EN and highlights the need for early TPN in such patients.

Methods: We retrospectively reviewed the medical records of five patients diagnosed with asparaginase-induced acute necrotizing pancreatitis who required TPN. All patients were admitted to the ICU of St. Jude Children's Research Hospital between June 2019 and January 2022. The study aim was to identify clinical characteristics present at the time of ICU admission that predicted the failure of EN, thereby necessitating early initiation of TPN.

Results: All five patients presented to the ICU with hemodynamic instability and respiratory distress or failure. Pitting edema, abdominal distention, and elevated blood glucose levels were present in all five patients within the first seven days, suggesting significant abdominal inflammation and EPI. Four patients experienced acute kidney and/or liver injuries. This group was critically ill, with end-organ dysfunction requiring ICU support, frequently progressed to multiorgan dysfunction, including GI impairment (Table 1). The high degree of support required by these patients was observed in only approximately 10% of patients in a large multi-group study, underscoring the severity of their illness. Each patient's nutrition plan and barriers to the safe initiation (or advancement) of oral diet, EN, and TPN were discussed during daily interdisciplinary patient care rounds. TPN was initiated if patients were not expected to meet more than 50% of their nutrition requirements in the first week. Estimated nutrition requirements were calculated by RDs using ASPEN guidelines. The Metabolic Infusion Support Services Team considered each patient's clinical condition and nutrition status when dosing calories, protein, fluid, and micronutrients. Early EN was not possible for all patients at the time of admission due to bowel injury, ileus, or hemodynamic instability. The median time from ICU admission to the initiation of TPN was 3 days, while the median time to the initiation of EN was 13 days. EN was initiated with an elemental or peptide-based formula due to pre-existing GI symptoms or documented bowel injuries. On average, it took 2.4 attempts for patients to establish tolerance and progress to feeding beyond 50% of their total estimated nutrition requirements. Line access challenges, organ dysfunction, electrolyte derangement, hyperglycemia, acid base imbalances, and lipid shortages were barriers to quickly meeting nutrition requirements once TPN was initiated (Table 2). No patient was meeting their full caloric needs and three patients were meeting their full protein needs by day 14.

Conclusion: This study details the challenges of providing nutrition support to patients with severe asparaginase induced acute necrotizing pancreatitis. The severity of clinical characteristics in all five cases appear to predict inability to initiate EN within 72 hours of ICU admission. Providers should be aware of these severe features in patients with severe asparaginase-associated AP as some may require TPN to align with published clinical guidelines which recommend meeting two-thirds of energy requirements and full protein requirements via EN or TPN within the first week of ICU admission.

Table 1. Clinical characteristics of patients with pancreatitis during first week of ICU admission

Case	Patient I	Patient II	Patient III	Patient IV	Patient V
Diagnosis	B-cell ALL	T-cell ALL	B-cell ALL	B-cell ALL	T-cell ALL
Total Therapy Risk arm	Standard	Standard (Induction)	Standard (Induction)	Standard (Induction)	Standard
Therapy initiation to ICU admission (days)	258	31	26	24	280
Age (y) at ICU admission	8.3	10.5	14.2	14.3	17.8
BMI centile for Age	96	> 97	34	84	> 97
Sex	F	M	M	M	M
ICU admission diagnoses	Seizures, hypertensive crisis, febrile neutropenia, diffuse abdominal pain, mucositis, sinusitis	Hypotensive shock, lactic acidosis, acute pancreatitis, multiorgan system failure	Severe acute pancreatitis, hypovolemic shock, DIC	Pancreatitis, intestinal pneumatosis, septic shock, non-occlusive mesenteric bowel ischemia	Hypovolemic shock, acute pancreatitis, third spacing, acute kidney injury, altered mental status
ICU days	92	56	9	45	60
NPO for hemodynamic instability	Yes	Yes	Yes	Yes	Yes
Days until hemodynamically stable	3	5	2	7	1
Respiratory support	Intubated	Intubated	HFNC	Intubated	BiPAP
Pseudocyst	No	No	No	Yes	No
Imaging during first week of ICU admission	Abdominal inflammation, necrotic pancreatitis, retroperitoneal fluid collection hepatomegaly	Large ascites, colonic wall thickening, abdominal compartment syndrome	Large abdominal and pelvic ascites, ileus, duodenal and jejunal wall thickening	Severe AP, non-occlusive mesenteric ischemia (duodenum to the splenic flexure)	Large volume bowel gas
Max amylase/lipase (units/L) *(0-91)/(0-60)	72/141	1801/1480	809/1270	170/633	550/854
Max CRP (mg/dL) *(0.0-1.0)	3.4	13.2	12.2	12	37.6
Max TG (mg/dL) *(0-149)	666	602	340	79	N/A
Max TBil (mg/dL) *(0.0-1.0)	1.5	7.8	9	18.1	3.6
Max AST/ALT (units/L) *(0-40)/(0-40)	40/31	6188/2063	136/130	196/262	94/119
Max BG (mg/dL) *(70-125)	260	278	351	229	418
Abdominal Distention	Yes	Yes	Yes	Yes	Yes
Pitting Edema	Yes	Yes	Yes	Yes	Yes

*Reference range. ALL = acute lymphoblastic leukemia; ICU = intensive care unit; DIC = disseminated intravascular coagulation; NPO = nothing by mouth; CRP = c-reactive protein; TG = Triglycerides; T Bil = total bilirubin; AST = aspartate transferase; ALT = alanine transaminase; BG = blood glucose.

Table 2. Characteristics of TPN and EN initiation

Case	Patient I	Patient II	Patient III	Patient IV	Patient V
Days from ICU admit to oral diet	3	46	13	24	4
Days from ICU admit to TPN initiation	2	5	Same day (poor nutritional reserve)	3	12
TPN days	47	35	19	692*	38
Days from ICU admit to EN attempts	13 (NGT) 20 (NGT) 22 (NJT)	9 (NJT) 18 (NJT)	13 (NGT)	20 (NGT) 68 (NGT) 81 (NJT) 90 (NJT) 97 (NJT)	46 (NGT)
EN attempts	3	2	1	5	1
Documented reasons for EN intolerance	Voluminous emesis and diarrhea, NGT and NJT repeatedly displaced during emesis, heart failure	Voluminous diarrhea	N/A	Abdominal pain, nausea, vomiting, diarrhea, intestinal failure	Patient pulled tube out and refused replacement
Days to goal rate	18	32	8	N/A	N/A
Kcal/protein needs met via EN + PN on day 7 (%)	88/100	72/80	50/73	56/50	0/0
Kcal/protein needs met via EN + PN on day 14 (%)	77/100	56/80	87/100	62/50	51/100
Pancreatic elastase-1 (Reference range > 200 mcg/g)	<15	< 15	< 10	< 10	13
Pancreatic enzymes utilized	Yes	Yes	Yes	Yes	Yes
Required insulin	No	Yes	Yes	Yes	Yes
Formula	Peptide-based, Elemental	Peptide-based, Elemental	Elemental	Elemental	Elemental

*Patient requested discontinuation of TPN shortly before his death due to long term complications of pancreatitis and associated organ toxicity. ICU = intensive care unit; TPN = total parenteral nutrition; EN = enteral nutrition; NGT = nasogastric tube; NJT = nasojejunal tube; Kcal = kilocalorie.

P105 - Is There a Role for Routine Supplemental Parenteral Nutrition (SPN) in ECMO Patients?

Mary Kronik, RD, LD, CNSC[1]; Diane Nowak, RD, LD, CNSC[1]; Anthony Zaki, MD[1]; Jean Deschamps, MD[1]; Mary Rath, MEd, RD, LD, CNSC[1]
[1]The Cleveland Clinic, Cleveland, Ohio

Encore Poster

Previous Presentation: The Food and Nutrition Conference and Expo, October 2025, Nashville, TN.

Previous Publication: Kronik M, Nowak D, Zaki A, Deschamps J, Ratliff A, Rath M. Is There a Role for Routine Supplemental Parenteral Nutrition (SPN) in ECMO Patients? Journal of the Academy of Nutrition and Dietetics. 2025;125(10):A28. https://doi.org/10.1016/j.jand.2025.06.084.

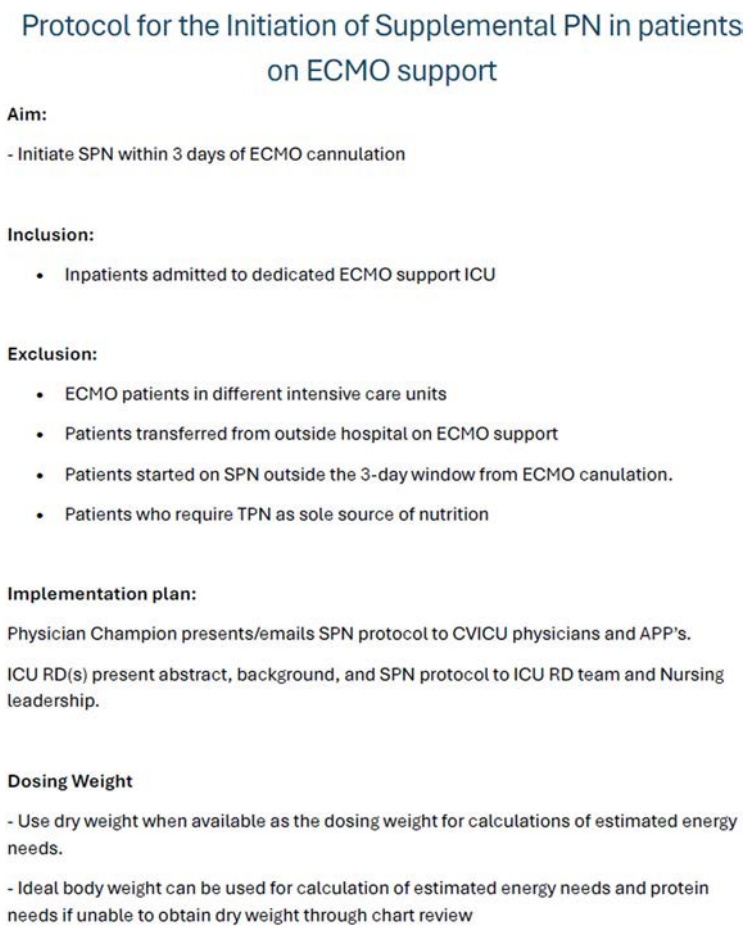
Financial Support: None Reported.

Background: Patients on extracorporeal membrane oxygenation (ECMO) are prone to recurrent interruptions in enteral nutrition (EN).

Methods: Using the Solutions for Value Enhancement (SOLVE) process, interruptions in feeding were reviewed for 152 patients requiring ECMO support from Jan 1, 2023, through December 31, 2023. Out of 152 patients, 60 were on ECMO for a minimum of 7 days and were dependent on EN. Intakes were calculated for the first 7 days after ECMO insertion and compared to estimated energy requirements using kcal/kg of dosing weight. Malnutrition diagnosis on nutrition assessment at cannulation was compared to malnutrition diagnosis on reassessment 10-14 days later.

Results: After cannulation, 50 patients (83%) met less than 60% of their estimated energy requirements at day 7. Of these, 41 patients (68%) were assessed as no malnutrition/mild malnutrition, 8 patients (13%) as moderate malnutrition and 1 patient (2%) as severe malnutrition. At nutrition reassessment, 29 patients (48%) were assessed as having no malnutrition/mild malnutrition, 13 patients (22%) as moderate malnutrition, and 8 patients (13%) as severe malnutrition. Moderate-severe malnutrition increased from 15% to 35% on reassessment 10-14 days later.

Conclusion: Root cause analysis revealed frequent interruptions in EN delivery were related to hemodynamic stability, fasting for procedures, frequent return to OR, delayed enteral access, or no reason identified. Per the 2021 ASPEN/SCCM critical care guidelines, SPN is recommended if unable to meet > 60% of energy needs after 7 days. Further investigation is needed to determine if SPN in addition to EN would benefit this patient population.



Protocol for the Initiation of Supplemental PN in patients on ECMO support

Aim:

- Initiate SPN within 3 days of ECMO cannulation

Inclusion:

- Inpatients admitted to dedicated ECMO support ICU

Exclusion:

- ECMO patients in different intensive care units
- Patients transferred from outside hospital on ECMO support
- Patients started on SPN outside the 3-day window from ECMO canulation.
- Patients who require TPN as sole source of nutrition

Implementation plan:

Physician Champion presents/emails SPN protocol to CVICU physicians and APP's.

ICU RD(s) present abstract, background, and SPN protocol to ICU RD team and Nursing leadership.

Dosing Weight

- Use dry weight when available as the dosing weight for calculations of estimated energy needs.

- Ideal body weight can be used for calculation of estimated energy needs and protein needs if unable to obtain dry weight through chart review

Figure 1. Supplemental PN protocol, pg 1

Estimated Energy Needs Calculation

- Calculate estimated energy needs using calories/kg dosing weight.
  - Update dosing weight and estimated energy needs when appropriate.
- Utilize the guidelines below or per RD clinical judgement:
  - BMI <25: 30-45 kcals/dosing kg
  - BMI >25-29.9: 25-30 kcals/kg
  - BMI >30-34.9: 20-25 kcals/kg
  - BMI >35: 15-20 kcals/kg

SPN Dextrose Content

- Calculate SPN to meet 80% of total calories as per SCCM/ASPEN critical care guidelines using the low end of estimated energy needs
  - Consider EN intake
- Titrate SPN dextrose calories towards goal pending stable electrolytes and glycemic control. Blood gases and ECMO gas flow should be monitored and discussed with ICU staff to avoid respiratory acidosis or an increase in ECMO sweep.
  - In critically ill patients, especially those supported with ECMO, nutritional strategies must be carefully tailored due to the complex interplay between metabolism and gas exchange.
  - Aggressive caloric intake can lead to increased carbon dioxide (CO_2) production, a byproduct of substrate metabolism, particularly carbohydrates.
  - In patients on ECMO—especially those with reduced native lung function and minimal mechanical ventilation—this increased CO_2 burden may not be easily cleared via the lungs. Consequently, the extracorporeal circuit must compensate for CO_2 elimination, primarily through adjustments in sweep gas flow.
  - An increase in sweep gas flow may reflect a higher CO_2 load, which can be driven in part by nutritional excess. Recognizing this, clinicians must balance the patient's metabolic needs with their ventilatory and extracorporeal gas exchange capacities.

Figure 2. Supplemental PN protocol, pg 2

SPN Protein Content

- SPN to meet the lower end of estimated protein needs
- Dose protein as renal function and urine output allows; to range of 1.5-2.5 gm/kg dosing weight

SPN Lipid Content

-Hold Intravenous Lipid Emulsion (ILE) while on significant amounts of propofol

-Utilize triglyceride trends to dose ILE

-Hold ILE for at least 72 hours with + yeast blood cultures

Enteral Nutrition

- Advance the enteral nutrition regimen, with aims to achieve the upper end of estimated energy needs, as tolerated.
- Monitor for tube feed tolerance and provision

Discontinuation of PN

- Discontinue SPN when enteral nutrition regimen meets ≥60% of upper calorie and protein targets consecutively; for at least 1-2 days.

Periodic Evaluation of Countermeasure

- A monthly meeting will be held to discuss triumphs, limitations, and barriers.
- Updates to the Excel spreadsheet for upcoming data analysis.

Figure 3. Supplemental PN protocol, pg 3

P106 - Pit Stop in the Duodenum: An Unexpected Detour on the Car-T Highway

Austin Hoeg, MD, MPH[1]; Sara Bonnes, MD, MS, FASPEN[2]; Ryan Hurt, MD, PhD[1]; Manpreet Mundi, MD, FASPEN[1]; Jithinraj Edakkanambeth Varayil, MD[1]; Bradley Salonen, MD[1]
[1]Mayo Clinic, Rochester, Minnesota; [2]Mayo Clinic, Elgin, Minnesota

Financial Support: None Reported.

Background: Immune effector cell (IEC)-associated enterocolitis is a recognized yet incompletely characterized complication of chimeric antigen receptor T-cell (CAR-T) therapy. While gastrointestinal (GI) toxicities most often occur early post-infusion, delayed presentations can be severe, prolonged, and resistant to standard immunosuppression. Severe mucosal injury can lead to profound malabsorption, requiring measures beyond anti-inflammatory therapy alone. Here, we describe a protracted course of IEC-associated enterocolitis in which parenteral nutrition (PN) played a pivotal role in facilitating the patient's recovery, enabling nutritional repletion, weight restoration, and eventual return to oral intake.

Methods: A 68-year-old woman with relapsed multiple myeloma (MM) underwent lymphodepleting chemotherapy followed by CAR-T infusion. Though her early post-treatment course was unremarkable, she developed watery diarrhea, abdominal pain, and progressive weight loss by Week 5. At her initial visit, physical exam findings were notable for diffuse abdominal tenderness without peritoneal signs. Labs revealed hypoalbuminemia, electrolyte disturbances, and deficiencies in magnesium, copper, and zinc. Infectious stool studies were negative, and abdominal CT imaging was unremarkable. Initial esophagogastroduodenoscopy and colonoscopy demonstrated diffuse, mildly erythematous pyloric mucosa and numerous superficial, non-bleeding duodenal ulcers, with pathology demonstrating lamina propria lymphocytosis, consistent with a graft-versus-host-disease-like immune-mediated insult. Despite dietary adjustments, antimotility agents, and corticosteroids, she experienced persistent high-volume diarrhea and continued weight loss to a nadir of 94 pounds (BMI < 17). Given poor enteral tolerance and ongoing GI losses, inpatient PN was initiated to provide bowel rest while meeting caloric, protein, and trace element needs.

Results: Over several weeks, her stool output decreased, electrolytes normalized, and micronutrient deficiencies were corrected. She was discharged on home PN (HPN), which continued for 16 weeks with a gradual caloric taper as oral tolerance improved. Over the next four months, her weight increased to 117 pounds (BMI > 20), and her diarrhea resolved. Repeat endoscopy demonstrated slightly altered villi in the duodenum but was otherwise normal. Subsequent pathology revealed intraepithelial lymphocytosis, near-total villous atrophy, and increased crypt apoptosis—findings compatible with IEC-associated enterocolitis. While pathologic change persisted, PN was discontinued with improved stool caliber and frequency on adjunctive loperamide and increased oral intake on a low osmolality, low fiber diet.

Conclusion: IEC-associated enterocolitis after CAR-T immunotherapy can lead to severe, prolonged gastrointestinal sequelae that may jeopardize nutritional status and recovery. In this case, PN functioned as a bridge to recovery by providing complete nutritional repletion, despite ongoing GI fluid and electrolyte losses, by correcting caloric, macronutrient, and micronutrient deficiencies that may have otherwise impaired healing. Although reports of PN use in IEC-associated enterocolitis are sparse, evidence from inflammatory bowel disease and radiation enteritis supports its role in reducing enteric stimulation, promoting mucosal healing, and preventing malnutrition.PN may serve as a critical adjunct in managing refractory IEC-associated enterocolitis. Both inpatient PN and extended HPN enabled physiologic stabilization, reversal of malnutrition, and a safe transition back to full oral nutrition in our patient, underscoring the potential of this therapy as a bridge to recovery in cases of immune-mediated insult following CAR-T therapy.

P107 - A Case Report on a Patient Supported on Veno-Venous ECMO: An Examination of the Relationship Between Metabolism and Gas Exchange

Diane Nowak, RD, LD, CNSC[1]; Taylor Barry, BSN, RN, CCRN[1]; Eunie Yook, DO[1]
[1]The Cleveland Clinic, Cleveland, Ohio

Financial Support: None Reported.

Background: For precise measurement of energy expenditure, the combination of conventional indirect calorimetry (IC), which captures ventilator-derived gas exchange, with Extracorporeal Membrane Oxygenation (ECMO) gas exchange calculations based on pre- and

post-oxygenator blood gases and total circuit flow, provides a more accurate estimate of total energy expenditure than predictive equations. This integrated method can be especially useful for customizing nutrition, preventing overfeeding, reducing carbon dioxide (CO_2) accumulation, and optimizing metabolic support during ECMO therapy.

Methods: A case study.

Results: 36-year-old male with past medical history of pseudomyxoma peritonei (Summer 2020) from appendicular origin who underwent multiple operative procedures, hyperthermic intraperitoneal chemotherapy (HIPEC), stem cell infusion x 3, total parenteral nutrition (TPN) dependence and isolated intestinal transplant (3 years after diagnosis) who developed extensive right pleural tumor burden with entrapped lung. Five months after transplant the patient underwent an extended right thoracotomy, pleurectomy, decortication, fulguration of remnant tumor, intraoperative HIPEC of right pleural space. Pt was admitted to the ED at an outside hospital (OSH) 18 days after surgery with septic shock and left sided pneumococcal pneumonia requiring vasopressor support, intubation, continuous renal replacement therapy (CRRT) and Veno-Venous ECMO (V-V ECMO). The patient was transferred to our hospital 2 weeks after OSH admit for further management. TPN was started Hospital Day #2 (HD) and infused initially 24 hours a day during the patient's initial V-V ECMO support phase HD# 1-30, which was defined by increased liver enzymes, respiratory acidosis, and metabolic acidosis with TPN cycling that began on HD #5. Initial TPN provided 30 calories/kg (1950 calories/day); the addition of lipid injectable emulsion (ILE) increased this to 35 calories/kg (2275 calories/day). After learning from the spouse that the patient's weight was 53.6 kg (BMI 16.5 kg/m2), calorie and protein requirements were revised. TPN plus ILE were increased to 45 calories/kg (2395 calories/day). Due to concerns with rising pCO2, which was partly due to an acid-base imbalance from TPN infusion, requiring ECMO sweep titration, TPN was uncycled on HD #23 and adjusted with reduced dextrose content and modified electrolytes. This modification improved pCO2, pH, and ECMO sweep, allowing ECMO weaning to continue. Daily adjustments were implemented by closely monitoring the patient's calorie intake, acid-base status, and ECMO settings. Ultimately, the patient was successfully decannulated from ECMO, and the resulting TPN plus ILE providing 30 calories/kg (1608 calories/day). After being transferred to the surgical ICU on HD #33, the patient required re-cannulation to V-V ECMO support HD #68 due to another septic shock event. The patient succumbed on HD #79.

Conclusion: Nutrition support options for critically ill ECMO patients must be carefully analyzed due to the intricate interaction between metabolic processes and gas exchange. Increased caloric provision, especially dextrose, may lead to increased CO_2 generation and gas exchange problems. Clinicians must combine metabolic needs with ventilatory and extracorporeal capacity to prevent the negative effects of suboptimal nutrition support.

P108 - Feasibility of Personalized Nutrition Therapy Using Indirect Calorimetry and Respiratory Quotient for Critically Ill Patients

Takayuki Irahara, MD, PhD[1]; Ryusuke Katsuki, MD[1]; Yuka Kajita, MD, PhD[1]; Tsuguaki Terashima, MD, PhD[1]; Subaru Tanabe, MD, PhD[1]; Yuuji Hirayama, MD[1]; Mitsuaki Nishikimi, MD[1]; Takayuki Kai, MD[1]; Dai Oishi, MD[1]; Kosuke Kato, MD[1]; Yuuji Kuge, MD[1]; Seina Osakabe, MD[1]; Hiro Suseki, MD[1]; Takanosuke Esaki, MD[1]; Masanobu Tsuda, MD, PhD[1]; Eizo Watanabe, MD, PhD[1]
[1]Aichi Medical University, Nagakute, Aichi

Financial Support: None Reported.

Background: Indirect calorimetry is recommended for acute-phase nutritional therapy in critically ill patients; however, its specific application remains unclear. This study aims to examine the acute-phase metabolic alteration of critically ill patients using indirect calorimetry and investigate its usage for personalized nutritional therapy.

Methods: The subjects were patients aged 18 years or older admitted to our hospital's emergency ICU, who underwent mechanical ventilation for seven days or more. Indirect calorimetry was performed using a calorimeter attached to the ventilator during the acute phase (days 3–5) and subacute phase (days 7–10). Changes in inflammatory markers and metabolic data were analyzed.

Results: 14 patients were included (sepsis: 2, trauma: 6, others: 6), consisting of 10 males and 4 females with an average age of 51.4 years. Analysis of inflammatory markers showed that procalcitonin (PCT) significantly decreased from the acute to subacute phase ($p = 0.007$), while C-reactive protein (CRP) showed no consistent trend. Regarding metabolic data, energy expenditure (EE) did not change significantly, but

respiratory quotient (RQ) increased significantly from an average of 0.73 to 0.84 (p = 0.0002). Carbohydrate oxidation (CHO) increased significantly (p = 0.001), while fatty acid oxidation (FAO) decreased significantly (p = 0.003).

Conclusion: The inverse correlation between PCT and RQ suggests that the increase in RQ is associated with passing the peak of inflammation, transitioning from fat metabolism to carbohydrate metabolism. An RQ value of approximately 0.75–0.8 may represent a turning point in nutritional therapy, shifting from a conservative to an aggressive energy administration. Utilizing RQ as an indicator of inflammation peak out and external energy utilization could benefit personalized nutrition therapy.

P109 - High-Protein Enteral Nutrition in a Pediatric Patient With Severe Traumatic Brain Injury

Konstantinos Boukas, MD[1]; Jennifer Nguyen, MPH[1]; Carla Caminos, RDN, LD[2]; Upulie Nawaratne, MD[1]
[1]Division of Critical Care Medicine, Department of Pediatrics, McGovern Medical School at UTHealth Houston, Houston, Texas; [2]Children's Memorial Hermann Hospital, Houston, Texas

Financial Support: Nestlé Health Science.

Background: Nutritional support is essential in the treatment of critically ill children, particularly those at high risk of malnutrition due to hypermetabolism and catabolic stress. In the pediatric intensive care unit (PICU), early initiation of enteral nutrition (EN) has been associated with improved clinical outcomes, including enhanced recovery during ICU stays. High-protein (HP) formulas may further support increased metabolic demands seen during the acute phase of critical illness.

Methods: This case study describes the nutritional management of a 9-year-old male admitted to the PICU following a motor vehicle collision. Diagnoses included severe traumatic brain injury (TBI), left basal ganglia hemorrhage (L. BGH), intracerebral hemorrhage (ICH), and a left mandibular fracture. On admission, the patient's height was 140 cm and weight was 48 kg, with a BMI-for-age z-score of 2.01. His hospital course included 15 days of mechanical ventilation, open reduction and internal fixation of the mandible, and placement of tracheostomy and gastrostomy tubes on day 11. The total PICU length of stay (LOS) was 18 days, while the total hospital LOS was 46 days. EN was initiated 60 hours post-admission using a high-protein, peptide-based formula (Peptamen Junior® HP, Nestle Health Science, US) designed for critically ill patients. The formula included enzymatically hydrolyzed 100% whey protein, 16% calories from protein, and 60% of fat as medium-chain triglycerides to optimize absorption and meet the protein needs of pediatric trauma patients. This regimen was maintained for 14 days.

Results: Indirect calorimetry conducted on days 5 and 11 revealed persistent hypermetabolism (Figures 1 AND 2). Measured resting energy expenditures (MREE) were 1,198 kcal and 1,156 kcal, respectively—both exceeding caloric intake (1,070 kcal and 864 kcal). Calculated energy expenditure was 1,585 kcal/day. Respiratory quotient (RQ) remained consistent at 0.86 in both studies, indicating mixed substrate utilization and an optimal metabolic state. A decrease in the coefficient of variation from 10% to 5% suggested improved metabolic stability over time. Weight declined from 48 kg to 43.5 kg during the acute phase, likely due to fluid shifts and catabolism, before rebounding to 46 kg at discharge (net loss: 2 kg). A 4.1% weight loss was reflective of metabolic stress and early nutritional challenges, and the absence of a malnutrition diagnosis at discharge was notable given the high risk in similar cases. Blood urea nitrogen (BUN) trended from 15 → 1 → 25 → 11 mg/dL, indicating initial dilution from fluid resuscitation, followed by diuresis, catabolic stress with increased protein intake, and then improved nitrogen balance and metabolic stability. Albumin fluctuations from 2.0 → 2.6 → 3.2 → 2.5 g/dL were consistent with an acute-phase response rather than nutritional status. Prealbumin was not measured. Gastrointestinal intolerance was mild and transient, with diarrhea on days 2, 5, 6, and 9 that resolved without formula change. No emesis was reported.

Conclusion: The patient experienced hypermetabolism, negative nitrogen balance, and weight loss during the acute phase of severe TBI. Early initiation of high-protein EN contributed to partial weight recovery and metabolic stabilization, as evidenced by indirect calorimetry findings and laboratory trends. The HP formula was well tolerated and provided balanced macronutrient support without overfeeding. The patient was discharged to a rehabilitation facility on a tracheostomy collar and enteral feeds. This case highlights the importance of early, targeted nutritional intervention in pediatric patients with severe TBI. The goal is to prevent malnutrition and to aid neurologic recovery, restore lean body mass, and promote catch-up growth.

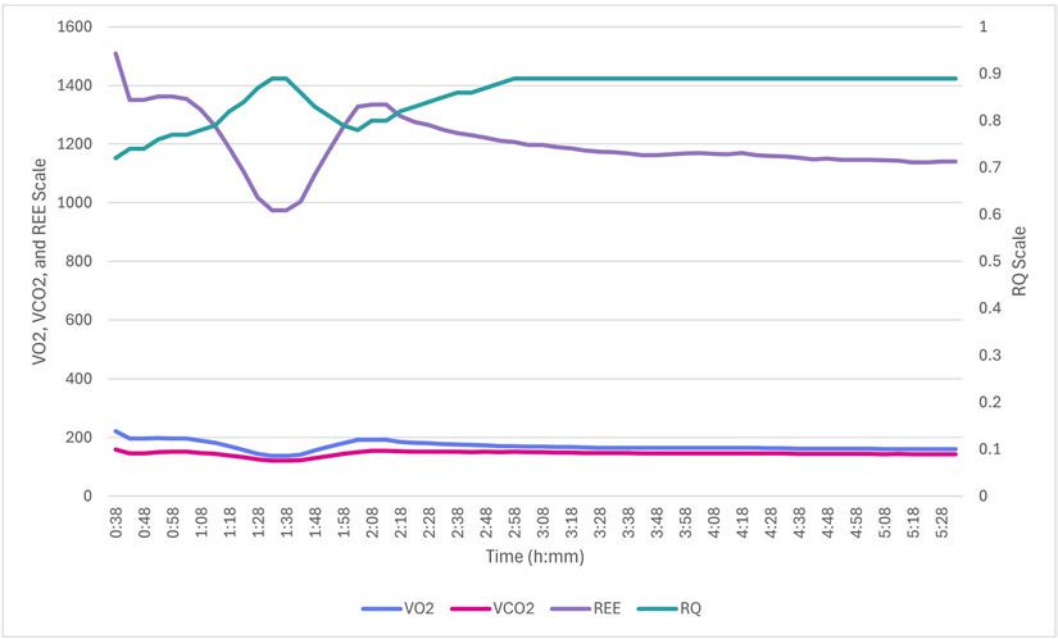


Figure 1. Indirect calorimetry findings on day 5

VO2 (mL/min) = oxygen consumption; VCO2 (mL/min) = carbon dioxide production; REE (kcal/day) = resting energy expenditure; RQ = respiratory quotient.

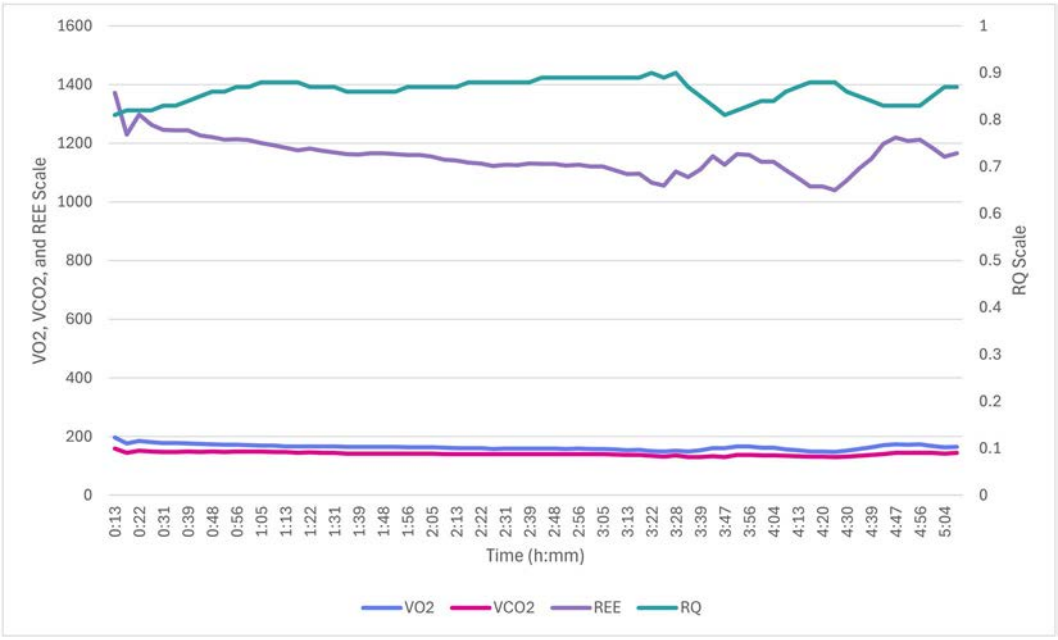


Figure 2. Indirect calorimetry findings on day 11

VO2 (mL/min) = oxygen consumption; VCO2 (mL/min) = carbon dioxide production; REE (kcal/day) = resting energy expenditure; RQ = respiratory quotient.

P110 - Gastrointestinal Dysfunction is Associated With Length of Stay in Critically ill Patients Undergoing Aortic Surgery

Jacob Cruz-Sánchez, MSc[1]; Ivan Osuna-Padilla, PhD[2]; Guillermo Ceballos, PhD[3]; Gustavo Rojas-Velasco, MD[1]; Carla Aguilar-Rodríguez, BSc[1]; Malinalli Brianza-Padilla, PhD[1]; Francisco González-Ruiz, MD[4]; Francisco Baranda-Tovar, MD[1]

[1]Instituto Nacional de Cardiología Ignacio Chávez, Ciudad de Mexico, Distrito Federal; [2]National Institute of Respiratory Disease, Mexico City, Distrito Federal; [3]National Polytechnic Institute (IPN), Ciudad de Mexico, Distrito Federal; [4]Instituto Nacional de Cardiología Ignacio Chávez, Tlalpan, Distrito Federal

Financial Support: None Reported.

Background: Aortic surgery is a high-risk procedure often requiring postoperative intensive care. In this setting, gastrointestinal (GI) dysfunction is a recognized complication linked to increased morbidity and mortality. However, its prevalence and impact on patients undergoing aortic surgery have not been evaluated. This study aimed to assess the incidence and clinical impact of GI dysfunction in critically ill patients undergoing aortic surgery, and to explore its association with ICU and hospital length of stay and duration of invasive mechanical ventilation (IMV).

Methods: We conducted a prospective observational study including adult patients admitted for more than 48 hours to the cardiac surgery intensive care unit. GI dysfunction was assessed daily using the Gastrointestinal Dysfunction Score (GIDS) during the first 7 days of ICU stay. For the analysis, the maximum GIDS obtained within this period was considered. Nutritional risk was evaluated using the modified NUTRIC score (mNUTRIC). Categorical variables were compared between groups using the chi-square test, while quantitative variables were analyzed using the Kruskal–Wallis test. A p-value < 0.05 was considered statistically significant.

Results: Thirty patients were included; 53% were male, with a median age of 43 years (IQR 35–54). Overall, 37% were overweight or obese, 53.3% underwent elective aortic surgery, and 50% had valvular disease. A maximum GIDS-1 score was recorded in 30% of patients, while 23.3% reached a maximum GIDS-2 score. Patients at high nutritional risk according to the mNUTRIC were more likely to present with GIDS-2 scores compared with those at low risk (85.7% vs. 14.3%; p = 0.048). Compared with patients in the lower GIDS categories, those with a GIDS-3 score had significantly more extended hospital stays (p = 0.016), longer ICU stays (p = 0.017), and more days under IMV (p = 0.026).

Conclusion: GI dysfunction is a frequent complication in critically ill patients undergoing aortic surgery during the first week of ICU stay. Higher GIDS scores were significantly associated with increased nutritional risk and with worse clinical outcomes, including prolonged ICU and hospital stays and extended duration of IMV. These findings highlight the importance of systematic GI function monitoring in this population, as early identification and targeted management may contribute to improving postoperative recovery and reducing complications.

Table 1. Baseline, intraoperative, and hemodynamic characteristics of patients according to maximum gastrointestinal dysfunction score (GIDS) during ICU stay

Variables	Overall (n = 30)	GIDS 0 (n = 7)	GIDS 1 (n = 9)	GIDS 2 (n = 7)	GIDS 3 (n = 7)	p-value
Demographic and clinical characteristics						
Age, years	43 (35, 54)	45 (39, 52)	36 (34, 43)	43 (38, 60)	47 (38, 58)	0.4
Male sex, (n, %)	16 (53)	4 (57)	5 (56)	4 (57)	3 (43)	> 0.9
Diabetes, n (%)	6 (20)	2 (29)	2 (22)	1 (14)	1 (14)	> 0.9
BMI (kg/m^2)	23.3 ± 4.2	24.7 ± 4.4	23.1 ± 4.2	22.2 ± 4.3	23.2 ± 4.4	0.7
Intraoperative variables						
Surgery time (min)	450 (376, 608)	368 (318, 593)	433 (406, 540)	450 (373 (600)	532 (418, 688)	0.6
Cardiopulmonary bypass time (min)	218 (164, 275)	221 (146, 334)	233 (188, 266)	195 (155, 203)	250 (182, 308)	0.3
Aortic cross-clamp time (min)	164 (127, 207)	199 (135, 215)	169 (145, 197)	143 (104, 171)	177 (123, 215)	0.6
Hemodynamic and circulatory support						
MAP (mmHg)	61 (58, 68)	62 (59, 67)	60 (58, 61)	61 (59, 66)	62 (60, 72)	0.8
Norepinephrine equivalents (µg/kg/min)	0.45 (0.30, 0.84)	0.30 (0.23, 0.94)	0.35 (0.25, 0.60)	0.56 (0.34, 0.75)	0.55 (0.45, 0.70)	0.8
VA-ECMO, n (%)	8 (27%)	0 (0%)	3 (33%)	2 (29%)	3 (43%)	0.4

Data are shown as mean ± SD, median (IQR), or n (%). Comparisons between groups were performed using the chi-square test for categorical variables and the Kruskal-Wallis test for continuous variables. BMI = Body Mass Index; MAP = Mean Arterial Pressure; VA-ECMO = Veno-arterial extracorporeal membrane oxygenation.

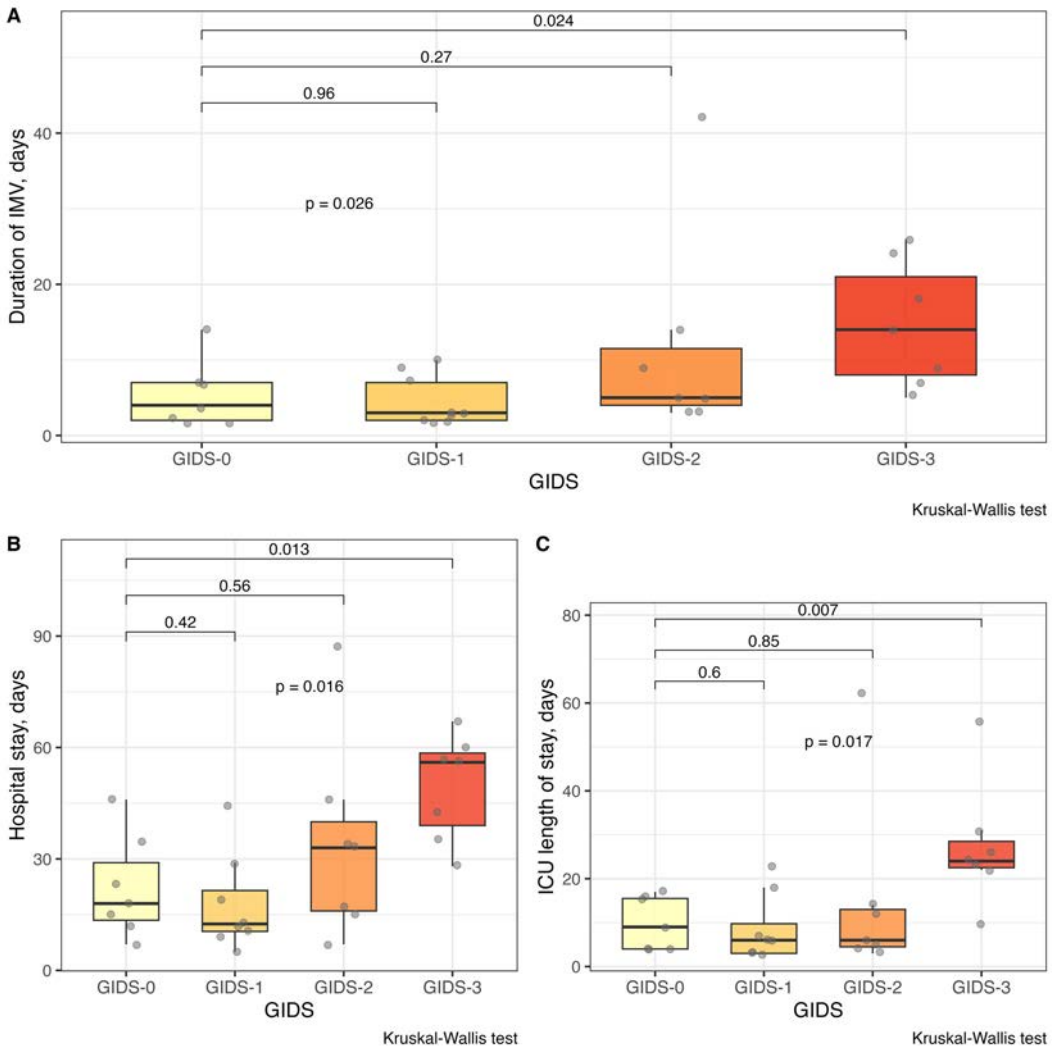


Figure 1. GIDS score and its relationship with mechanical ventilation, hospital stay, and ICU stay

P111 - The Association Between Precision Nutrition and Muscle Mass Change in Adults on ECMO: A Retrospective Pilot Study

Stacy Pelekhaty, RD, LDN, CNSC[1]; Eliezer Eizenstat[2]; Devon Baer, RD, LDN, CNSC[3]; Julie Gessler, RD, LDN, CNSC[3]; Kimberly Boswell, MD[4]; Raymond Rector, CCP, LP[3]; Alison Grazioli, MD[4]; Aakash Shah, MD[4]; Michael Plazak, PharmD[3]; Allison Lankford, MD[4]; Leonid Belyayev, MD[4]; James Brown, MD[4]; Bartley Griffith, MD[4]; Deborah Stein, MD, MPH[4]; Thomas Scalea, MD[4]; Joseph Rabin, MD[4]

[1]University of Maryland Medical Center, Annapolis, Maryland; [2]Touro University, New York, New York; [3]University of Maryland Medical Center, Baltimore, Maryland; [4]University of Maryland School of Medicine, Baltimore, Maryland

Financial Support: None Reported.

Background: Critically ill adults lose 2% of their muscle mass every day over the first week in intensive care. Patients supported with extracorporeal membrane oxygenation (ECMO) have multiple risk factors for developing malnutrition and often present with lower baseline muscle mass. The purpose of this pilot study was to investigate the association between the amount of indirect calorimetry guided nutrition support received and the severity of skeletal muscle loss in this population.

Methods: Adult patients with a recorded indirect calorimetry measurement while on ECMO between November 2023 and December 2024 were screened. Individuals with computed tomography (CT) imaging including the lumbar spine at least 7days apart and within 3-days of cannulation and de-cannulation were included. The volume (mm2) and density in Hounsfield Unit (HU) of right and left psoas muscle were measured at the 4th lumbar vertebra, and average psoas muscle volume indexed to height (PMI; cm2/m2) was calculated. Indirect calorimetry calculations, nutrition prescriptions, and all sources of kilocalorie and protein intake were recorded for the first 14-days of ECMO, or until decannulation or death if that occurred prior to ECMO day 14. Energy and protein deficits, and the proportion of nutrition needs received were calculated. Data are summarized as median (range) and counts (frequencies). Correlations between nutrition deficits and muscle mass changes were assessed with Kendall's Tau.

Results: A total of 64 patients were screened. CT images at cannulation and decannulation were available in 9 patients,55.5% of whom were male with body mass indices ranging from 23 to 49.6. In-hospital mortality was 33%. Additional patient demographics and ECMO data are reported in Table 1. Energy targets ranged from 1034-2039 kcal/day (11-30 kcal/kg) and protein targets ranged from 114-222.8 g/day (1-2.4 g/kg/day). In 7 patients, exclusive enteral nutrition beginning 1-3 days after ECMO cannulation, and parenteral nutrition was employed in the remaining 2 patients. Nutrition data and muscle mass measurements are reported in Table 2. At cannulation, PMI was 3.15 cm2/m2 (1.61 cm2/m2 - 6.12 cm2/m2) and muscle density was 48.4 HU (27-61.8 HU). At decannulation, PMI was 2.16 cm2/m2 (1.22 cm2/m2 - 4.85 cm2/m2). Patients lost a median of 16.1% (0.8%-45.3%) of psoas muscle volume per day on ECMO. Muscle density declined in some and increased in others, which may reflect changes in intramuscular fluid accumulation. Aa demonstrated in Figure 1, reduced energy deficit was associated with improved muscle retention. Given the small sample size, this association did not reach statistical significance (tau 0.44, p=0.095). No association between protein delivery and muscle volume was observed in this cohort (tau 0.06, p = 0.83). Survivors had lower caloric deficits (-1,369 kcal vs. −5,602 kcal) and lower daily muscle loss (-14.3% vs. −20.3%) than non-survivors.

Conclusion: Adults supported with ECMO are at risk for significant muscle mass loss. Future research focused on mitigating skeletal muscle loss in this population should incorporate precision nutrition and employ strategies to minimize caloric deficits as this pilot study suggests a potential direct relationship between caloric debt over the first 2-weeks of ECMO and muscle mass loss.

Table 1. Precision nutrition and muscle mass change in ECMO

Table 1. Demographics, outcomes, and ECMO characteristics of included patients	
Sample size, n	9
Sex, male	5 (55.5%)
Age, years	54 (25—69)
Weight, kg	86 (68-143.8)
Body Mass Index, kg/m^2	27.4 (23-49.6)
Sequential Organ Failure Score	10 (8-14)
Mortality	3 (33.3%)
Cannulation type	
Veno-arterial	6 (66.7%)
Veno-venous	2 (22.2%)
Veno-arterial-venous	1 (11.1%)
Primary indication for ECMO	
Cardiac arrest	5 (55.5%)
Right ventricular failure	1 (11.1%)
Cardiomyopathy	1 (11.1%)
Acute respiratory distress syndrome	2 (22.2%)
Duration of ECMO, days	11 (8-38)

Data reported as median (range) or count (frequency), unless otherwise stated
ECMO: extracorporeal membrane oxygenation, kg: kilogram; m: meter; n: number

Table 2. Precision nutrition and muscle mass change in ECMO

Table 2. Muscle mass measurements and nutrition data on the full cohort and after stratification by survival

Cohort	Overall n=9	Survivors n=6	Non-survivors n=3
Nutrition Data			
Prescribed Energy			
Kcal/day	1,668 (1,034-2,039)	1,594 (1,034-2,039)	1668 (1,592-1,875)
Kcal/kg	18.8 (11-30)	20.6 (11-30)	17.8 (13-18.8)
Delivered Energy			
Kcal/day	1,314 (650-2,041)	1,165 (650-1,948)	1,314 (1,132-2,041)
Kcal/kg	13.6 (8.7-22.6)	14.3 (8.7-22.6)	13.3 (9.1-21.7)
Energy balance, kcals	-2,820 (-14,341 to +2,239)	-1,369 (-1,4341 to +368)	-5,062 (-7,854 to +2,239)
Prescribed Protein			
g/day	170 (114-223)	146.5 (114-223)	200 (170-200)
g/kg/day	1.99 (1.03-2.42)	1.98 (1.03-2.42)	2.00 (1.39-2.13)
Delivered Protein			
g/day	88 (33-177)	75 (33-140)	116 (73.5-177)
g/kg/day	0.91 (0.28-1.89)	1.10 (0.28-1.62)	0.87 (0.80-1.89)
Protein balance, g	-731 (-1,179 to –136)	-726 (-1,050 to –243)	-1,062 (-1,179 to –136)
Muscle Mass Data			
Initial psoas muscle index, cm^2/m^2	3.15 (1.61-6.12)	3.20 (1.61-6.12)	3.09 (2.13-3.52)
Initial muscle density, HU	48.4 (27-61.8)	51 (45.8-61.8)	27.6 (27-48.4)
Follow-up psoas muscle index, cm^2/m^2	2.16 (1.22-4.85)	2.09 (1.22-4.85)	2.68 (1.24-2.79)
Follow-up muscle density, HU	37.4 (23.9-56.5)	43.6 (37.4-56.5)	30.5 (23.9-37.2)
Average change in cross-sectional muscle area per day on ECMO, %	-16.1 (-0.8 to –45.3)	-14.3 (-0.8 to –45.3)	-20.3 (-14.1 to –25.4)
Average change in muscle density per day on ECMO, %	-1.5 (-3.0 to +3.4)	-1.4 (-3.0 to +0.7)	-1.5 (-2.9 to +3.4)

Data reported as median (range)

Energy and protein balance refer to the administered compared to the prescribed amount over the duration of ECMO up to day 14

cm: centimeter; ECMO: extracorporeal membrane oxygenation; g: grams; HU: Hounsfield units; kcal: kilocalories, kg: kilogram; m: meter

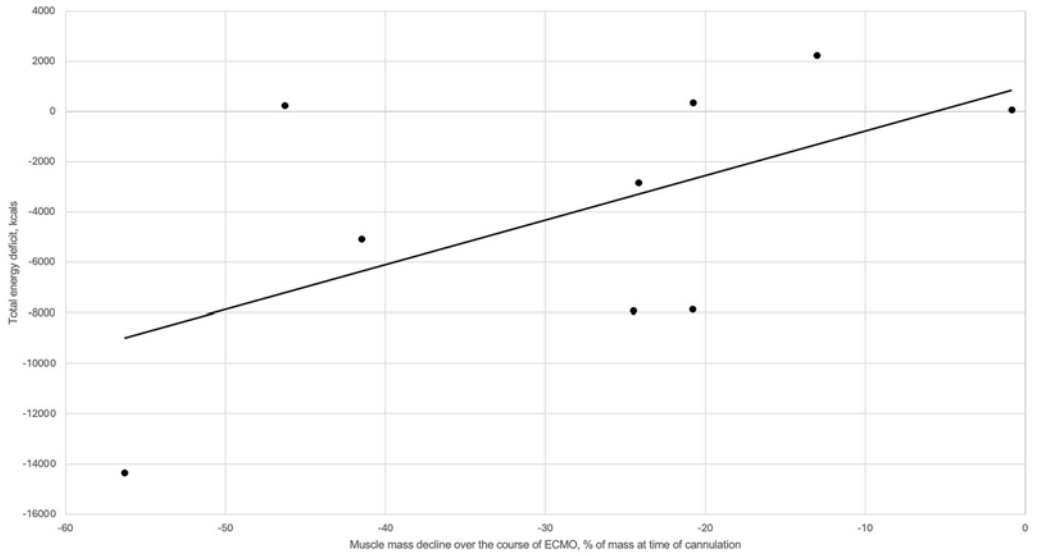


Figure 1. The association between caloric adequacy guided by indirect calorimetry and change in muscle mass volume during extracorporeal membrane oxygenation

Figure 1. Precision nutrition and muscle mass in ECMO

P112 - Prevalence of Concurrent Respiratory Infections in Children With Intestinal Failure Admitted With Central Line-Associated Bloodstream Infections

John Kincaid, MS, MPhil[1]; Jennifer McClelland, MS, RN, FNP-BC[2]; Jonathan Salazar, MD[3]; Enju Liu, MD, PhD[4]; Christopher Duggan, MD, MPH[4]; Alexandra Carey, MD[5]

[1]Harvard Medical School; Boston Children's Hospital, Cambridge, Massachusetts; [2]Boston Children's Hospital, Boston, Massachusetts; [3]Connecticut Children's, Hartford, Connecticut; [4]Harvard Medical School, Boston, Massachusetts; [5]Boston Children's Hospital, Harvard Medical School, Boston, Massachusetts

Financial Support: None Reported.

Background: Pediatric intestinal failure (IF) necessitates specialized parenteral nutrition (PN) support though central venous catheters (CVCs). PN-associated complications, including central line-associated bloodstream infection (CLABSI), are common and associated with a high risk of morbidity and mortality. Prompt diagnosis and management of CLABSI are of utmost importance to mitigate risk. However, management of suspected CLABSI differs across institutions. While guidelines recommend IF patients with CVCs who present with fever have blood cultures drawn, receive broad-spectrum antibiotics, and be admitted to the hospital, these are adapted variably. Some providers ascribe fever in patients with CVCs to viral infections, leading to outpatient supportive care only. We therefore examined the diagnostic approach for suspected CLABSI in IF patients, as well as the potential role of concomitant respiratory viral infections in diagnosis and management. By evaluating the prevalence of respiratory viral infections in PN-dependent pediatric patients with IF and confirmed ambulatory CLABSI, our overall aim was to offer insights and identify potential gaps in current practices for the management of CLABSI in this population.

Methods: We performed a retrospective single-institution analysis of 183 confirmed cases of ambulatory CLABSI, as defined by the CDC's National Healthcare Safety Network, in a cohort of 80 patients with IF receiving care at Boston Children's Hospital (BCH) Home Parenteral Nutrition and Center for Advanced Rehabilitation Programs from October 12, 2011, to May 23, 2024. Data were collected and managed using REDCap. Study approval was obtained from the BCH Institutional Review Board (IRB-P00044595). Given the retrospective nature of the study and use of de-identified data, the requirement for informed consent was waived.

Results: The study included 80 pediatric patients with IF, of whom 53 (66.3%) were male. The mean (SD) age at the time of CLABSI diagnosis was 7.4 (7.8) years. Underlying IF diagnoses included midgut volvulus (n = 13), necrotizing enterocolitis (n = 10), and gastroschisis (n = 10). Over half of the patients (n = 47) had a single CLABSI presentation, while 33 had ≥ 2 episodes, totaling 184 instances of CLABSI. Of the 184 episodes, 105 (57.1%) had a respiratory viral panel (RVP) obtained, and of those tests 10 (9.5%) were positive, thus indicating a concomitant respiratory viral infection. Respiratory pathogens identified included rhinovirus (n = 6), parainfluenza (n = 2), COVID-19 (n = 1), and RSV (n = 1). Of those with concurrent respiratory infections, 4 patients underwent CVC removal while 6 had their lines salvaged.

Conclusion: In this study of CLABSI in a population of PN-dependent patients with IF at a large, quaternary children's hospital, we sought to assess the rate of concurrent respiratory viral infection diagnosed by RVP. Of those tested, we found that 9.5% of patients with CLABSI had a concomitant infection. Despite the relatively high prevalence of viral co-infection, just over one-half of patients (57.1%) underwent viral testing in the diagnostic work-up. Our results highlight the existence of a small but clinically significant prevalence of concurrent respiratory viral infection in this population. Future prospective studies are needed to better delineate diagnostic and management strategies for patients with IF and PN dependence who present with fever in the setting of a respiratory viral illness.

Trainee Award

P113 - Plasma Amino Acid Profiles Reveal Metabolic Signatures of Mortality and Infection in Critically ill Surgical Patients

Lucia Gonzalez Ramirez, MCN[1]; Donghai Liang, PhD[1]; Kirk Easley, MS[1]; George Cotsonis, MS[1]; John Galloway, MD[1]; Mengyuan Ren, MS[1]; Daniel Griffith, RPh[2]; Nisha Dave, PharmD[2]; Paul Wischmeyer, MD, EDIC, FCCM, FASPEN[3]; Dean Jones, PhD[1]; Henry Blumberg, MD[1]; Jessica Alvarez, PhD, RD[1]; Thomas Ziegler, MD[1]

[1]Emory University, Atlanta, Georgia; [2]Emory University Hospital, Atlanta, Georgia; [3]Duke University School of Medicine, Durham, North Carolina

Financial Support: None Reported.

Background: Patients in the surgical intensive care unit (SICU) face high rates of adverse outcomes and mortality. Plasma amino acid (AA) profiles may offer insights into underlying pathophysiology and help identify patients who may benefit from tailored medical nutrition therapy. We investigated whether plasma AA concentrations are related to post-surgical mortality and hospital-acquired infections in adults requiring SICU care and parenteral nutrition (PN).

Methods: This secondary analysis used data from a completed, Phase 3, randomized, controlled, double blind multicenter trial comparing clinical outcomes in critically ill adults receiving isonitrogenous, isocaloric, glutamine dipeptide-supplemented PN with standard glutamine-free PN following cardiac, vascular, or GI surgery. Plasma concentrations of 21 AAs were measured at three time points after study entry (baseline, day 3, and day 7) in 148 participants using a Beckman amino acid analyzer. At each time point, the relationship between AAs and clinical outcomes was evaluated via generalized linear models that included strategies to address overfitting and multicollinearity among amino acid predictors. Mortality and new hospital-acquired infections were monitored daily. All hospital-acquired infections were adjudicated using CDC case definitions. Covariates included age, sex, APACHE II score at SICU entry, days in the SICU before enrollment, treatment group (glutamine vs. standard PN), and morning serum glucose and IL-6 concentrations. Supervised machine learning models (linear and non-linear) were applied to evaluate the classification potential of selected AAs with outcomes at 28 days after study entry.

Results: At 28 days, a total of 22 (15%) participants had died, 25 (17%) developed one or more bloodstream infections, 22 (15%) developed pneumonia, and 50 (34%) developed any infection (including BSI, pneumonia, and other types). In multivariable linear models, higher plasma concentrations of aspartic acid, histidine, isoleucine, leucine, methionine, phenylalanine, and proline were associated with mortality ($p < 0.05$, $q < 0.20$). These AAs demonstrated good classification performance for mortality at baseline and day 3 timepoints (AUC > 0.71; sensitivity 0.60; specificity 0.65), but reduced performance by day 7 (AUC = 0.64; sensitivity 0.50; specificity 0.65). Among participants with BSI, pneumonia, or any infection at 28 days, selected AA were lower. At baseline, BSI cases were best classified by alanine, glutamate, glutamine, and lysine levels (AUC 0.70; sensitivity 0.60; specificity 0.72). In those with any infection, baseline levels of glutamine, glycine, lysine, proline, serine, threonine, and valine had good classification performance (AUC 0.75; sensitivity 0.70; specificity 0.65). For pneumonia, day 7 AAs including cystine, methionine, ornithine, threonine, and valine provided the best classification potential (AUC 0.73; sensitivity 0.60; specificity 0.80). At this timepoint, methionine concentrations were higher in those with versus without pneumonia.

Conclusion: Increased levels of several AAs, mostly essential, were consistently linked to SICU mortality; in contrast, lower concentrations of various essential and non-essential AAs (except methionine) were linked to hospital-acquired infections. These AAs are involved in key metabolic pathways, including muscle metabolism (i.e., branched-chain AAs), the Krebs cycle, antioxidant defense, one carbon-metabolism, and immune regulation. Larger studies are needed to confirm these associations and elucidate the amino acid disturbances underlying adverse outcomes in SICU patients. This is pertinent to critically ill adults receiving specialized nutrition support, with the eventual goal of informing individualized medical nutrition therapy.

P114 - Utility of the NUTRIC Score in Patients With Septic Shock

Fernanda Lopez-Alcala, R2[1]; Carlos Jimenez Correa, MD[2]; Kenia Gonzalez Perales, MD[3]
[1]Mexican Institute of Social Security National Medical Center of Bajio, Colima; [2]Mexican Institution of Social Security National Medical Center of Bajio, Leon, Guanajuato; [3]Mexican Institution of Social Security National Medical Center of Bajio, Leon, Guanajuato

Financial Support: None Reported.

Background: Malnutrition is a serious and very common problem in the Intensive Care Unit (ICU). The NUTRIC score is associated with mortality in patients with sepsis. Furthermore, it is known that shock itself also worsens the patient's prognosis. Therefore, establishing risk stratification protocols can help identify timely interventions in the management of these patients, including early nutrition, which can improve their clinical prognosis. We wanted to evaluate the usefulness of the NUTRIC score in patients with septic shock.

Methods: After protocol approval, a longitudinal, prospective, analytical study was conducted on patients treated for sepsis in the ICU of the High Specialty Medical Unit of the National Medical Center of Bajio in Leon, Guanajuato. Interleukin-6 was sampled. Patients presentation of risk factors associated with septic shock, survival, or death was recorded. A total of 31 patients who met the inclusion criteria during the study period were included. Non-probability sampling based on consecutive cases.

Results: According to the study analysis, 31 patients diagnosed with sepsis were included, recruited from June to August 2025. The average age of participants was 43 years, with a range of 18 to 89 years. 59% of patients were men and 41% were women. 25.8% of patients had type 2 diabetes (T2D), and 41% had systemic arterial hypertension (SAH). The most common cause of sepsis was pulmonary (35%), followed by abdominal (16%) and urinary (15%). Other etiologies included central nervous system (12%), soft tissue (9%), and hematologic (6%) infections. A total of 26 patients (83%) were on mechanical ventilation (MV), and 100% of the patients who died had required invasive MV. The mean $PaFiO_2$ ratio was 249 mmHg. The mean severity scale scores were: APACHE II 13 points and SOFA 5.77 points. The mortality rate was 35%, with 11 deaths recorded. The mean age of deceased patients was 49 years, compared to 39.8 years in survivors (p = 0.021). The use of two vasopressors was more prevalent in the group with higher mortality (p = 0.0017). Furthermore, non-surviving patients had a mean arterial pressure (MAP) of 60 mmHg, significantly lower than that of survivors (67.5 mmHg) (p = 0.017). The NUTRIC score predicted a higher risk of mortality (AUC: 0.87, 95% CI: 0.72–0.97), with a cutoff point established with the Youden index of ≥4 points (sensitivity: 81.8%, specificity: 85%). The average NUTRIC nutritional risk score was 3.7 points. A significant association was found between a higher NUTRIC score and mortality (p=0.00015). Similarly, interleukin-6 levels predicted a higher risk of mortality in septic patients (AUC: 0.82, sensitivity: 72.7%, specificity: 94.7%). An association was observed between higher IL-6 levels and mortality (average: 1612 pg/mL in the death group, p = 0.000001).

Conclusion: The NUTRIC score and interleukin 6 values in our study obtained during ICU admission provided a predictive cut-off point for mortality even lower than recommended, and the biomarker value was higher in those who died than generally described, although there are factors associated with this.

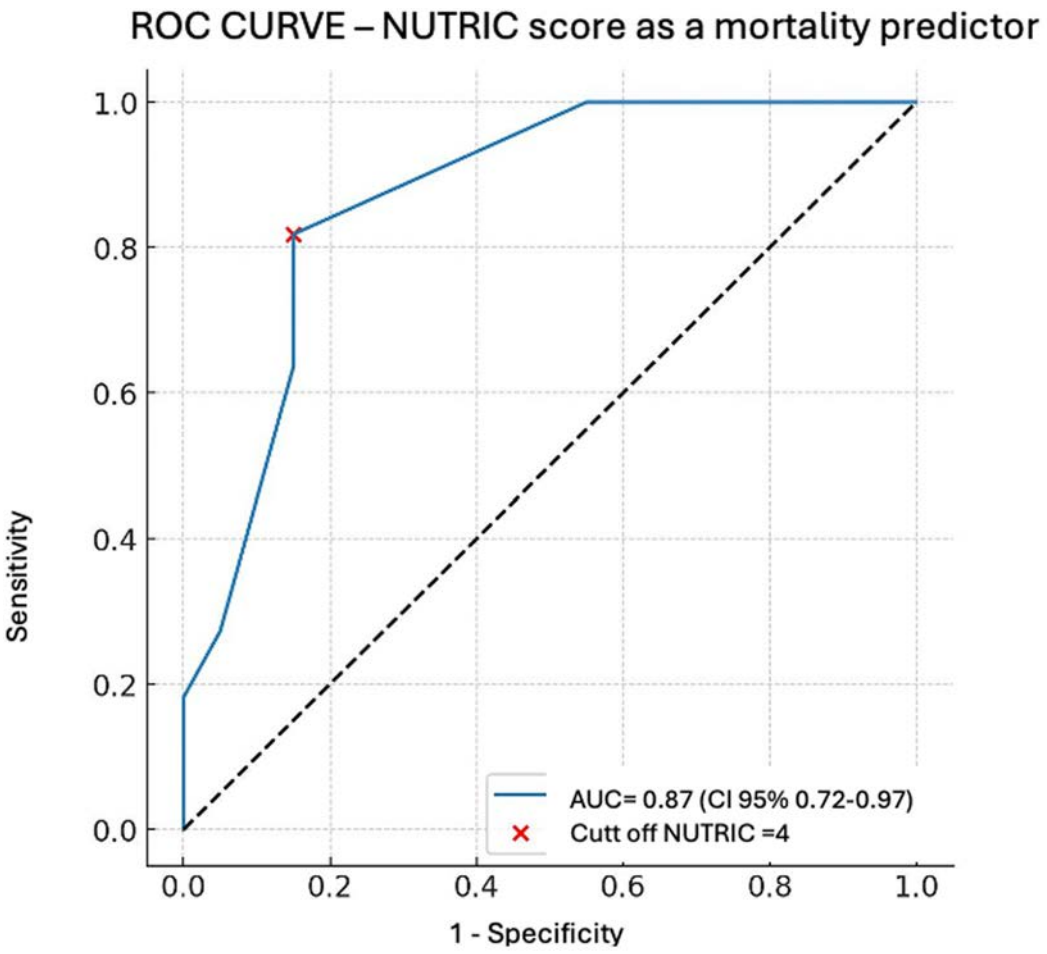


Figure 1.

NUTRIC score relationship with mortality (AUC = 0.87, 95% CI: 0.72–0.97) with an established Youden index cutoff of ≥ 4 points (Sensitivity = 81.8%, Specificity = 85%).

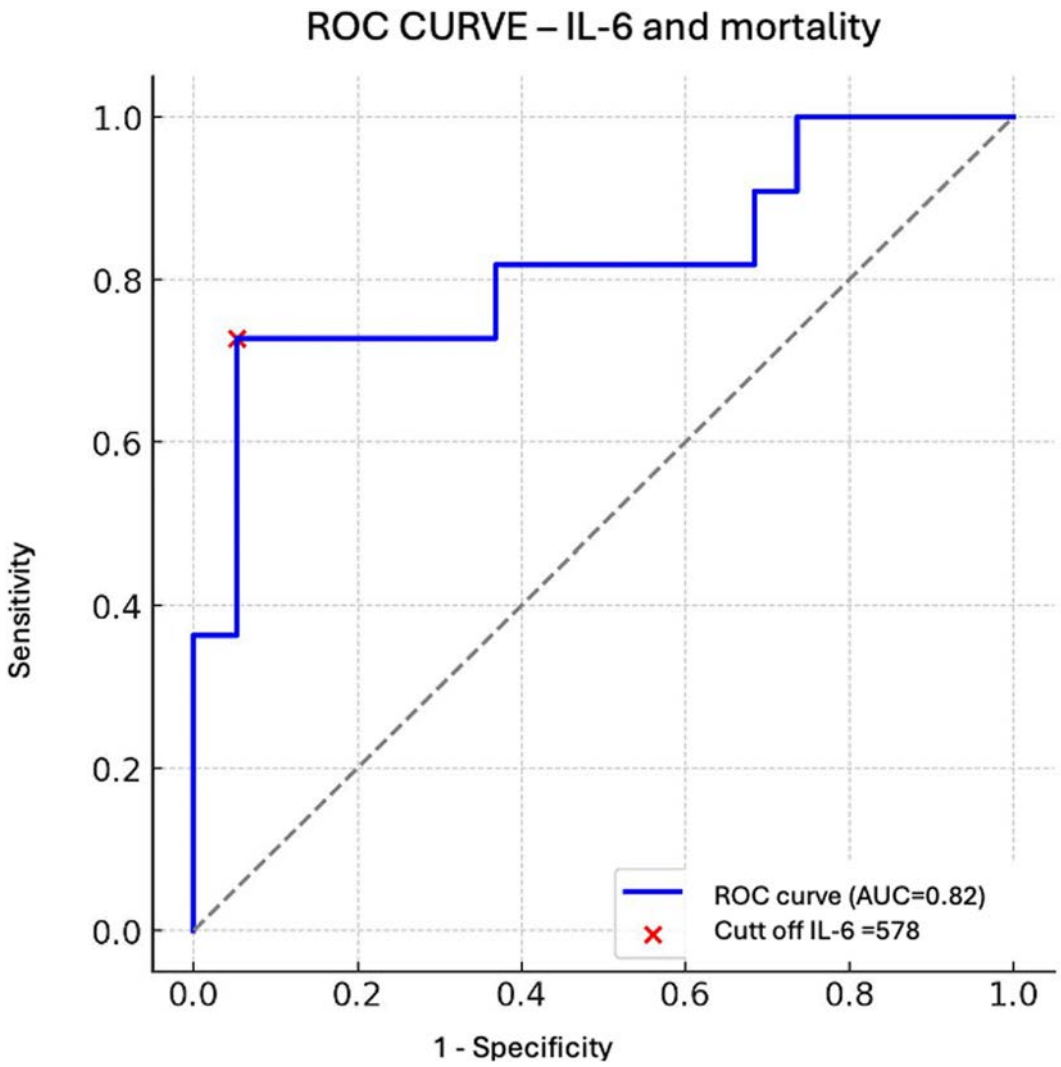


Figure 2.

Interleukin-6 levels and relationship with mortality (AUC = 0.82, Sensitivity = 72.7%, Specificity = 94.7%).

P115 - Complexity-Informed Nutrition: Nonlinear Respiratory Variability and Energy Needs in Critical Illness

Jeroen Molinger, MS[1]

[1]Duke University School of Medicine- Department of Anesthesiology, Durham, North Carolina

Financial Support: Baxter International.

Background: The relationship between nonlinear characteristics of respiratory and metabolic time series and resting energy expenditure (REE) in critically ill, mechanically ventilated patients with COVID-19 was investigated. A total of 23 patients (6 women and 17 men), with an average age of 62.8 years (± 14.8) and a mean body mass index (BMI) of 27.7 (± 7.0), were included. The primary aim was to determine whether advanced, nonlinear analyses of high-frequency ventilator and gas-exchange data could reveal information about REE that is not captured by traditional mean-based metrics. Mechanical ventilation provides a unique opportunity to continuously collect detailed physiological signals, such as oxygen consumption (VO2), carbon dioxide production (VCO2), ventilatory parameters, and gas fractions. These signals, when analyzed over time, may exhibit complex dynamic patterns that standard summary statistics overlook. Understanding how these patterns relate to metabolic demands could improve the assessment of energy needs and inform nutritional strategies for patients in critical care settings.

Methods: An individualized time series was constructed for each patient using data derived from indirect calorimetry. A suite of nonlinear analytical techniques was applied to these signals, including Poincaré plot indices (SD1 and SD2), approximate entropy (ApEn), detrended fluctuation analysis (DFA), and the Higuchi fractal dimension (HFD). Each of these metrics quantifies different aspects of variability and complexity within the physiological signals. The association between each nonlinear feature and the patient's average REE was assessed using Pearson correlation. To determine whether these associations were independent of major linear determinants of metabolism and cardiorespiratory function, partial correlations were calculated, controlling separately for mean VO2, mean VCO2, mean O2 Pulse, and mean heart rate (HR).

Results: Nonlinear features derived from excess VCO2 (Exces_VCO2) Poincaré plots, particularly SD2 and SD1, showed the strongest positive correlations with average REE. Moderate associations were also observed for SD1 and SD2 from other signals, such as CHOoX, VCO2, VO2, O2-Pulse, and HR, suggesting that the structure of variability in multiple physiological domains is linked to energy expenditure. Notably, after adjusting for mean VO2, several HFD-based measures, including airway gas fractions and ventilatory equivalents, maintained positive partial correlations with REE, indicating that the complexity of these signals provides information beyond oxygen uptake alone. Across all models, the repeated prominence of Exces_VCO2 SD1 and SD2 highlights a robust relationship between the geometry of gas-exchange variability and REE, independent of mean values of VO2, VCO2, O2-Pulse, or HR.

Conclusion: This demonstrates that nonlinear dynamics of respiratory and metabolic signals are strongly and consistently associated with REE in mechanically ventilated COVID-19 patients, even after accounting for conventional mean-based measures. These findings suggest that both the magnitude and complexity of physiological variability contain valuable information for metabolic phenotyping. While the study is limited by its small, single-center cohort and variable data completeness, it provides a compelling rationale for incorporating nonlinear analyses into bedside REE estimation. Future research should validate these findings in larger, more diverse ICU populations, assess the stability of these metrics over time, and explore their integration into predictive models for personalized nutrition and clinical outcomes.

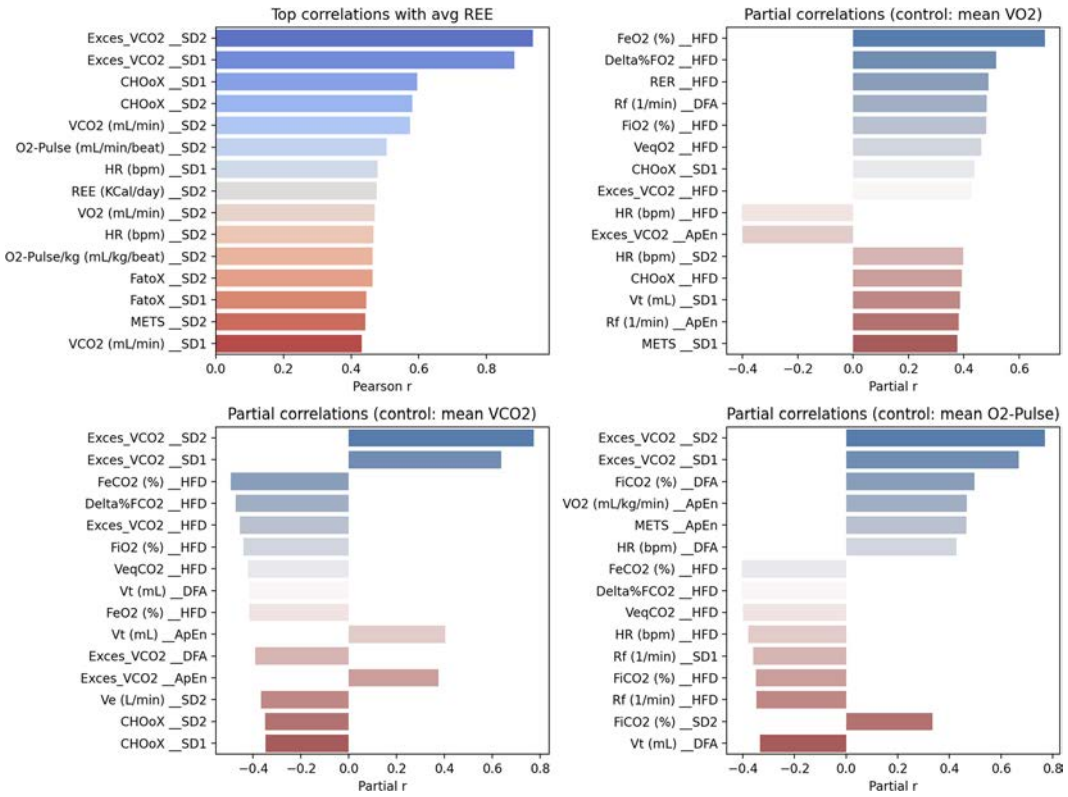


Figure 1. Correlation and partial-correlation panels summarizing associations with average REE

P116 - Bacteroides Caccae-Derived Propionate Facilitates Anti-PD-1 Therapy by Modulating CD8+ T Cell Lipid Metabolism in Gastric Cancer

Shijie Wang[1]; Ruowen Li[1]; Xinying Wang[2]
[1]Nanjing University, Nanjing, Jiangsu; [2]Medical School of Nanjing University, Nanjing, Jiangsu

Financial Support: None Reported.

Background: The gut microbiota plays a crucial role in tumor immunotherapy, yet its crosstalk with the tumor immune microenvironment (TME) remains poorly understood.

Methods: Prospectively collected patients with gastric cancer who received immunotherapy, and through multi-omics research, analyzed the specific mechanisms between the gut microbiota and immunotherapy.

Results: In present study, we report that Bacteroides caccae abundance in patients with gastric cancer was positively correlated with the responsiveness of anti-PD-1 therapy. Supplementation with B.caccae or its metabolite propionate can enhance the efficacy of $CD8^+$ T cell-mediated aPD-1 immunotherapy. Mechanistically, B.caccae-derived propionate promotes the expression of SLC27A1 on $CD8^+$ T cells by increasing the acetylation modification of H3K27. This facilitates the competitive uptake of fatty acids by $CD8^+$ T cells from the nutrient-restricted TME, which in turn improve fatty acid oxidation (FAO) and mitochondrial function—key for sustaining $CD8^+$ T cell effector function.

Conclusion: In conclusion, our findings define a novel microbiota metabolite-immunomodulatory pathway and suggest a potential microbiota-based adjuvant strategy to enhance the sensitivity of gastric cancer patients to immunotherapy.

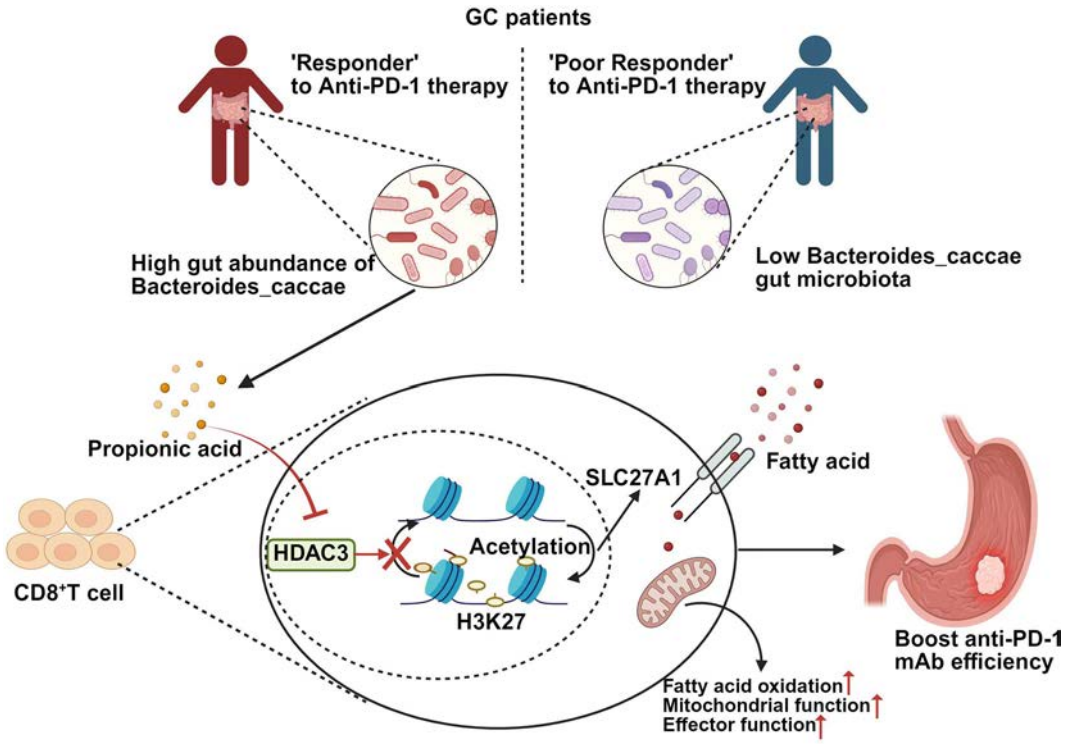


Figure 1. Mechanism diagram

P117 - Perceptions and Utilization of Meal and Grocery Delivery Services Among Older Trauma Patients Following a Nutrition Intervention

Alyssa King, MS, RD, LDN[1]; Carrie Dombeck, MA[2]; Amy Corneli, PhD, MPH[2]; Kenneth Schmader, MD[2]; Trevor Sytsma, MD[2]; Jamilah Taylor, BA[2]; Paul Wischmeyer, MD, EDIC, FCCM, FASPEN[2]; Krista L. Haines, DO, MD[2]

[1]Duke University Hospital, Durham, North Carolina; [2]Duke University School of Medicine, Durham, North Carolina

Financial Support: Study supported by the NIH + Duke's OAIC: Duke Aging Center's Pepper Center. Investigator initiated funding with Abbott.

Background: Older adult trauma survivors often face nutritional vulnerability following hospital discharge. While nutrition interventions may support recovery, the role of meal and grocery delivery services in this context remains unclear. Understanding how patients perceive and utilize these services can inform support strategies and improve nutritional outcomes. We hypothesized that despite receiving goal-directed nutrition during hospitalization and early recovery, many older adults would remain reluctant to use delivery-based meal supports due to perceptions of self-sufficiency, concerns about quality, or lack of familiarity.

Methods: Telephone interviews were conducted with 20 older trauma patients, age 60 and above, from the SeND Home intervention arm of a pilot randomized controlled trial (n = 40). The intervention included goal-directed nutrition via indirect calorimetry and oral supplements for one month post-hospital discharge. This qualitative analysis focused on participants' experiences with delivery services, including community programs, insurance-supported meals, and paid grocery or restaurant deliveries. Interview questions addressed awareness, usage patterns, perceived quality, and reasons for use or non-use of these services.

Results: Almost all (19) participants reported familiarity with various meal or grocery delivery services. Many participants (n = 16) had not used these types of services, primarily because they did not perceive a personal need due to self-sufficiency or age, or had simply never considered these options. Some expressed distrust in others' food selection or cooking standards, concerns about cost, or disinterest in available restaurant or grocery store options. Among the few who utilized delivery services (6 participants), experiences included online grocery shopping, Meals on Wheels, insurance-provided frozen meals, and paid restaurant delivery. Although the food quality was generally rated as suboptimal, recipients appreciated the support these programs provided during times of need.

Conclusion: Meal delivery services were underutilized in this cohort, despite recent hospitalization and participation in a structured nutrition intervention. Perceptions of independence and skepticism about service quality appeared to limit uptake. These findings suggest that discharge planning for older adult trauma patients should include proactive education on the benefits and reliability of meal support services, as well as reframing their use as an extension of self-care rather than a loss of autonomy.

GI, Obesity, Metabolic, and Other Nutrition-Related Concepts

P118 - Sources and Trust in Nutrition Information Among Older Trauma Patients: Implications for Dietary Adherence and Clinical Practice

Alyssa King, MS, RD, LDN[1]; Carrie Dombeck, MA[2]; Amy Corneli, PhD, MPH[2]; Kenneth Schmader, MD[2]; Trevor Sytsma, MD[2]; Jamilah Taylor, BA[2]; Paul Wischmeyer, MD, EDIC, FCCM, FASPEN[2]; Krista L. Haines, DO, MD[2]
[1]Duke University Hospital, Durham, North Carolina; [2]Duke University School of Medicine, Durham, North Carolina

Financial Support: Study supported by the NIH + Duke's OAIC: Duke Aging Center's Pepper Center. Investigator initiated funding with Abbott.

Background: Older adults recovering from trauma face unique challenges in maintaining adequate nutrition, which is critical for healing and long-term health. Despite the growing availability of nutrition education resources, little is known about where this population seeks information and how these sources influence behavior. This analysis explored where this population obtains nutrition information, how much they trust those sources, and how this influences their dietary choices and adherence to recommendations. We hypothesized that although healthcare providers would be considered the most trustworthy sources, participants would more frequently rely on informal or easily accessible outlets, and that emotional and habitual factors would limit adherence even when nutrition knowledge was present.

Methods: Telephone interviews were conducted with 20 older trauma patients, age 60 and above, from the SeND Home intervention arm of a pilot randomized controlled trial (n = 40). The intervention provided goal-directed nutrition via indirect calorimetry and oral supplements for one month post-discharge. Qualitative interviews addressed various topics on nutrition and recovery; this analysis focuses specifically on participants' sources of nutrition information, their trust in these sources, and how this knowledge influences their eating behaviors and adherence to dietary recommendations.

Results: Participants reported obtaining nutrition information from a variety of sources, with the most commonly cited being media (n = 19), family and friends (n = 18), and medical providers (n = 11). Online sources were often favored for their immediacy and convenience. Less frequently mentioned sources included food labels, schools, advertising, and personal experiences. While over half (n = 11) participants viewed medical providers (including nutritionists) to be a trustworthy source, several participants admitted to disregarding their advice, expressing skepticism about frequent changes in nutrition guidelines. Trusted friends and family members were also considered as reliable sources, while commercial advertising and dietary fads were generally distrusted. Although most participants demonstrated a strong understanding of nutritional principles, this knowledge did not translate to self-reported dietary adherence. While many participants (n = 15) reported trying to eat a healthy diet, efforts were often challenged by emotional or cultural ties to food, social settings, and lifelong habits (e.g., "clean your plate" mentality). Most participants (n = 17) specifically reported difficulty resisting junk food because of its taste and convenience, even when they recognized its potential harm to their health.

Conclusion: Among older adult trauma patients, trust in nutrition information is highest when it is delivered by healthcare professionals or trusted friends/family. However, even with a strong understanding of nutrition from vetted sources, persistent barriers often undermined their ability to consistently follow recommended dietary guidance. These findings suggest that nutrition interventions in this population must go beyond information provision. For optimal impact, strategies should integrate behavioral reinforcement, personalized support, and sensitivity to cultural or emotional attachments to food.

P119 - Ehler's Danlos Syndrome and Common Co-Morbidities: A Retrospective Review

Barbara Main, RD[1]; Sandra Kless, BS Pharm, PharmD, BCNSP[2]; Lisa Zimmerman, PharmD, BCPS, BCNSP, BCCCP, FCCM, FCCP[2]; Olaf Kroneman, MD, CNSC[3]; Ann Christina, NP, CNSC[4]
[1]Corewell Health Home Infusion, Royal Oak, Michigan; [2]Corewell Health William Beaumont University Hospital, Royal Oak, Michigan; [3]Corewell Health Home Infusion, Birmingham, Michigan; [4]Corewell Health William Beaumont University Hospital, Birmingham, Michigan

Financial Support: None Reported.

Background: Ehlers–Danlos syndrome (EDS) is a group of related connective tissue disorders consisting of 13 subtypes, each with its own unique phenotypic and genetic variation. The overlap of symptoms and multitude of EDS variations can make it difficult for patients to achieve a diagnosis. The disorders of connective tissue, result from underlying abnormalities in the synthesis and metabolism of collagen, characterized by joint hypermobility and susceptibility to injury/arthritis, skin and vascular problems, cardiac mitral valve prolapse, musculo-skeletal problems and

disorders of gut-brain interaction. The most common sub-type of EDS, hypermobile EDS (hEDS) is known to potentially disrupt all regions of the gastro-intestinal tract. Little is known about the extent of nutritional impairment of EDS and related conditions and varies widely depending upon the severity of the symptoms and presence of co-morbidities. We sought to identify the most common co-morbidities and the need for nutrition support in individuals diagnosed with EDS.

Methods: A retrospective chart review of records from 2019 -2024 was undertaken to identify comorbid conditions that would potentially impact the requirements for supplemental nutrition or hydration in individuals diagnosed with EDS. Electronic health records for patients receiving care at Corewell Health's 22 hospital system, with a diagnosis of EDS were reviewed for comorbid conditions and requirements for nutrition support, including IV hydration, enteral and/or parenteral nutrition. GI dysfunction, medications impacting nutrition, behavioral health concerns and other health conditions were also tracked.

Results: Records review identified 836 records and 712 were found to be usable, with more than an 'incidental' encounter. Table 1 characterizes comorbidities identified during chart review. The most common comorbid conditions were gastrointestinal 62.9% (GERD, gastroparesis, IBD and constipation), food and/or medication allergies 71.8% and behavioral health concerns 63.6% (anxiety and depression). Mast Cell Activation Syndrome (MCAS) and Postural orthostatic tachycardia syndrome (POTS) were also frequently noted as co-morbid conditions (53% and 14% respectfully). Home IV hydration, enteral and parenteral nutrition were identified in less than 15% of the records reviewed. Significant complications were associated with enteral nutrition support.

Conclusion: EDS is a connective tissue disorder which can cause disruption of normal GI tract function. In a retrospective chart review, we identified a strong association between EDS and GI tract dysfunction, primarily GERD, gastroparesis and IBS. In addition to GI tract dysfunction, behavioral health issues and allergies to food and/medications were strongly associated with EDS. Surprisingly, there was only very limited use of nutrition support therapies. Enteral nutrition was associated with a high number of complications (formula intolerance and tube dislodgement) warranting further investigation as to the best strategies for providing nutrition support.

Table 1. EDS patient characteristics and comorbidities

Patient characteristics N=712	n (%)
Legal Sex, female	632 (88.8)
GI issues	448 (62.9)
Gastroesophageal reflux disease or Gastroparesis	239 (33.6)
Constipation/chronic constipation	106 (48.8)
Irritable Bowel Syndrome	115 (53)
Postural Orthostatic Tachycardia Syndrome (POTS)	103 (14.4)
Mast Cell Activation Syndrome (MCAS)	182 (53)
POTS and MCAS	72 (10.1)
Behavioral health concerns	455 (63.6)
MTHFR (methylenetetrahydrofolate reductase) mutation	20 (2.8)
Presence of allergies (food and/or medications)	511 (71.8)
Antihistamine use	297 (41.7)
Chiari malformation	20 (2.8)
Nutrition Support	
Required supplemental IV Fluids	32 (4.4)
Required ENT	30 (4.2)
Failed ENT	13 (43)
Required parenteral nutrition	23 (3.2)

Poster of Distinction Award

P121 - Addressing Gaps in Pediatric Resident Education on the Management of Intestinal Failure: Creation and Implementation of a Targeted Curriculum

Sirine Belaid, MBBS, MPH, MS[1]; Maeve Reidy, MB BCh BAO, MRCPI[2]; Kimberly Ackerman, MSN, RN, CPNP-PC/AC[2]; Tracey Campagna, MSN, RN, CPNP-PC/AC[2]; Sarah Fox, RN, MSN, CWON[2]; Feras Alissa, MD[2]; Jeffrey Rudolph, MD[2]; Vikram Raghu, MD, MS[2]
[1]UAB, Birmingham, Alabama; [2]UPMC, Pittsburgh, Pennsylvania

Financial Support: None Reported.

Background: Pediatric residents at our institution manage patients with intestinal failure (IF), but report associated anxiety due to clinical inexperience and lack of formal education in this field. This pilot study aimed to identify knowledge gaps and address them through a targeted educational intervention.

Methods: A needs assessment survey was distributed to all pediatric residents via QR codes and email. The survey included Likert-scale, multiple-choice, open-ended, and rating questions to assess confidence in IF-related care. Survey results informed a targeted curriculum that addressed key deficit areas through an in-person lecture, workshops, and a reference guide aligned with residents' preferred learning formats. A post-intervention survey, modeled after the initial assessment, was distributed five months later to evaluate the curriculum's impact.

Results: Of the 131 residents, 40 (31%) completed the initial survey. Residents reported lowest confidence ($\leq$ 4/10) in calculating and ordering home Total Parenteral Nutrition (TPN) and TPN-like fluids, understanding remaining anatomy, managing central access loss and poor catheter blood flow, identifying signs of D-lactic acidosis and small intestinal bacterial overgrowth (SIBO), and ensuring proper stoma care. Conversely, they felt more confident managing feeding intolerance and central line-associated infections (5-6/10), and signs of shock ($\geq$ 7/10). Five months post-implementation, twenty residents (15%) completed the post-intervention survey, showing improved confidence in managing IF patients, particularly in TPN management ($p = 0.0083$) and enteral/stoma care ($p = 0.0393$). Interest in IF education increased from 64% to 85%.

Conclusion: The needs assessment highlighted critical gaps in resident IF education. A targeted, resident-informed curriculum improved confidence and engagement. Next steps include refining the curriculum prior to national dissemination.

Table 1. Pre- and post-intervention comparison of resident confidence levels (1–10 scale) across 23 tasks related to the care of patients with intestinal failure and short bowel syndrome

Questions	Tasks	Pre-Intervention Scores[a]		Post-Intervention Scores[a]		*p*
		Median	Mean (SD)	Median	Mean (SD)	
Question 1	**Finding TPN sheets on Cerner**	2	2.64 (3.12)	8	7.5 (3.09)	**.0000**
Question 2	**Calculate TPN-like fluids**	1	1.77 (2.06)	6	5.95 (3.15)	**.0000**
Question 3	**Order TPN-like fluids on Cerner**	2	3.21 (3.26)	8.5	7.15 (3.17)	**.0002**
Question 4	**Order home TPN**	1	2.79 (3.25)	8	7.4 (2.74)	**.0000**
Question 5	Identify proper antibiotics for CLABSI rule out	5	5.23 (2.92)	7	6.2 (2.55)	.2550
Question 6	Order proper dose of antibiotics for CLABSI rule out	6	5.28 (3.01)	7	6.75 (2.55)	.0732
Question 7	Order proper interval of antibiotics for CLABSI rule out	6	5.26 (2.87)	7	6.5 (2.74)	.1065
Question 8	Order appropriate blood cultures required for CLABSI rule out	7	6.08 (3.26)	7.5	7.2 (2.48)	.2481
Question 9	**Identify proper steps when central access is lost**	3	3.05 (2.71)	6	5.9 (2.59)	**.0004**
Question 10	**Manage poor blood return from central line**	3	3.51 (3.02)	5.5	5.6 (2.35)	**.0082**
Question 11	**Identify signs of hypovolemic shock**	7	6.31 (2.70)	8	7.6 (2.44)	**.0497**
Question 12	**Manage hypovolemic shock**	6	5.62 (2.80)	8	7.55 (2.48)	**.0028**
Question 13	**Identify signs of septic shock**	7	6.31 (2.50)	8	7.65 (2.25)	**.0221**
Question 14	**Manage septic shock**	6	5.90 (2.35)	8	7.7 (2.11)	**.0040**
Question 15	**Identify appropriate steps for feeding intolerance**	5	4.26 (2.89)	7	6.35 (2.32)	**.0067**
Question 16	**Identify signs of D-lactic acidosis**	1	1.74 (1.83)	5	4.4 (2.70)	**.0002**
Question 17	**Identify signs of bacterial overgrowth**	1	1.95 (1.86)	5	4.35 (1.98)	**.0001**
Question 18	**Manage suspected bacterial overgrowth**	1	1.38 (1.55)	4.5	3.9 (2.17)	**.0000**
Question 19	**Effectively understand their remaining bowel anatomy**	2	2.15 (2.21)	5	4.45 (1.70)	**.0001**
Question 20	**Identify barrier cream for enteral/stoma care**	2	2.72 (2.58)	4	4.35 (1.81)	**.0039**
Question 21	Order barrier cream for enteral/stoma care	4	3.95 (3.07)	5	5.4 (1.98)	.0600
Question 22	**Contact colostomy nurse to assist me in patient care**	4	4.13 (3.23)	5	5.9 (2.85)	**.0390**
Question 23	**Use educational resources to assist me in patient care**	8	7.54 (2.40)	9	8.75 (1.37)	**.0455**

[a] Rated on a 10-point scale (1 = not confident, 10 = very confident).

Abbreviations: SD = standard deviation; TPN = total parenteral nutrition; CLABSI = Central line-associated blood stream infections.

Table 2. Comparison of resident confidence levels (1–10 scale) in managing TPN-related tasks between TPN workshop attendees and non-attendees

Questions	Tasks	TPN workshops[a]		No TPN workshops[a]		*p*
		Median	Mean (SD)	Median	Mean (SD)	
Question 1	Finding TPN sheets on Cerner	9	7.64 (3.10)	7.5	7.17 (3.31)	.7121
Question 2	**Calculate TPN-like fluids**	**8**	7 (3.01)	4.5	3.5 (1.97)	**.0083**
Question 3	Order TPN-like fluids on Cerner	9	7.29 (3.17)	7.5	6.83 (3.43)	.8211
Question 4	Order home TPN	8	7.36 (2.76)	8	7.5 (2.95)	.9622

[a] Rated on a 10-point scale (1 = not confident, 10 = very confident).

Abbreviations: TPN = total parenteral nutrition; SD = standard deviation.

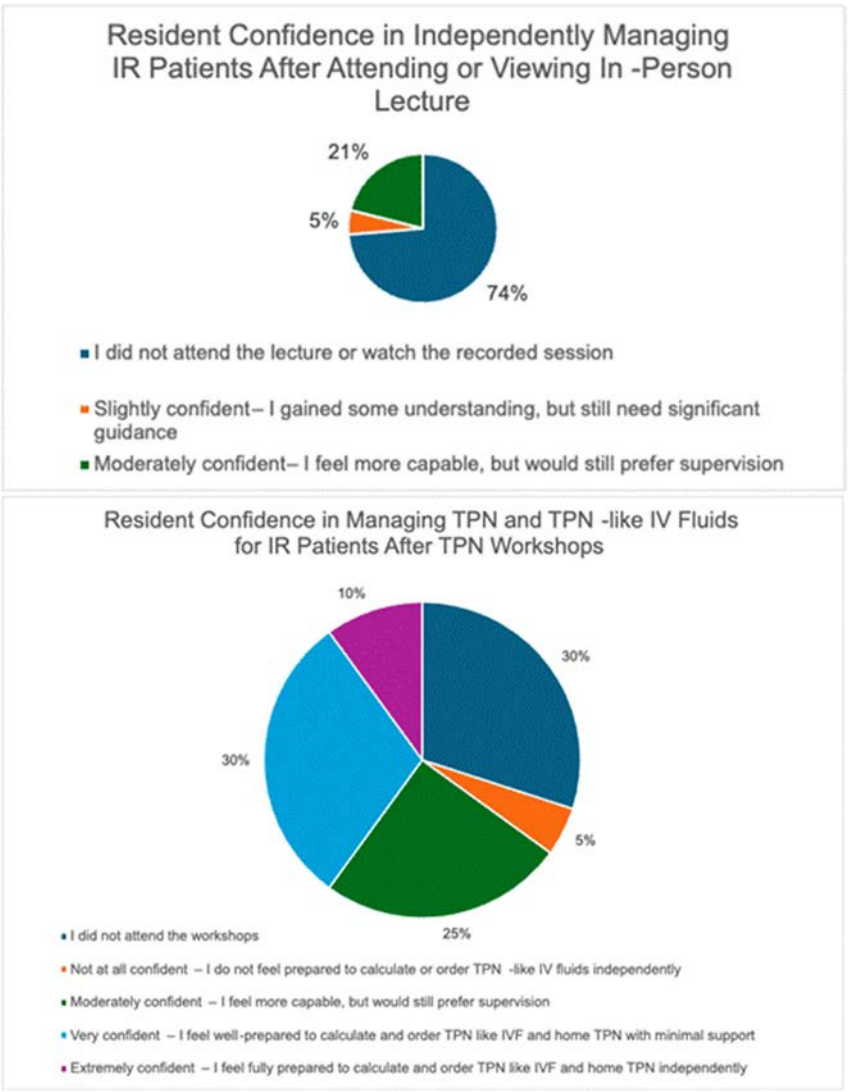


Figure 1. Self-reported resident confidence in managing IR patients following the in-person lecture and TPN workshop interventions, respectively

IR = intestinal rehab; TPN = total parenteral nutrition; IV = intravenous.

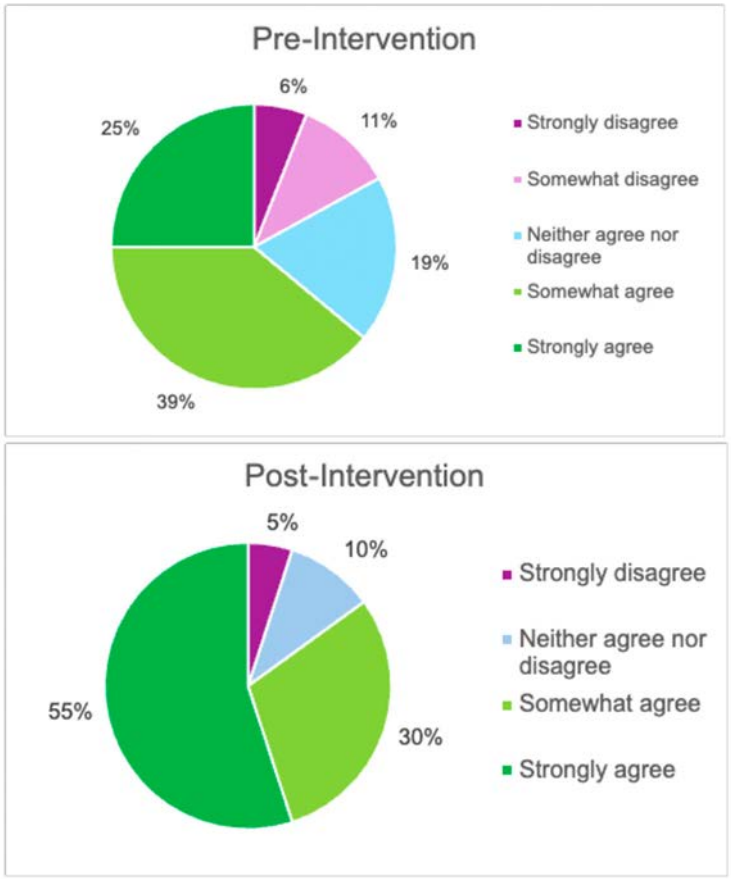


Figure 2. Percentage of residents pre- and post-intervention who perceive managing patients with intestinal failure as educationally valuable for pediatric training

P122 - Prevalence of Sarcopenic Obesity in Asian Population May Vary Depending on Different Parameters

Veeradej Pisprasert, MD, PhD[1]; Kongphob Chuntim, MD[1]; Thunchanok Kuichanuan, MD[1]; Sornwichate Rattanachaiwong, MD[1]; Pranithi Hongsprabhas, MD[1]

[1]Khon Kaen University, Muang, Khon Kaen

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Background: Sarcopenic obesity is a double burden condition since it is a coexistence of obesity and sarcopenia. Diagnosis requires evaluation of skeletal muscle functional parameters and body composition measurement. However, there is limited information regarding the proper parameter and prevalence of sarcopenic obesity in Asian population.

Methods: A cross-sectional study was conducted in the obesity clinic at Srinagarind Hospital, Khon Kaen, Thailand. Obese patients with age above 18 and BMI above 25.0 kg/m^2 were enrolled. Skeletal muscle functional parameters were assessed by handgrip strength (HGS) and five time sit to stand test (FTSST). Body composition parameters including fat mass (FM), fat-free mass (FFM), skeletal muscle mass (SMM), and appendicular skeletal muscle mass (ASM) were measured by bioelectrical impedance analysis (BIA). Sarcopenic obesity was diagnosed when increased fat mass combined with abnormal muscle function (low HSG or prolonged FTSST) and low muscle mass.

Results: A total of 219 adults with BMI above 25.0 kg/m^2 were enrolled, of which 63% were females. Baseline characteristics were shown in Table 1. Two hundred and eight patients (95%) had the percentage of body fat compatible with obesity (male > 25%, female > 35%). Table 2 showed diverse prevalence of abnormal low muscle mass measured by ASMI, ASM/W, FFMI, and SMM/W, ranging from 0.5 to 62.5%. This finding resulted in varied in prevalence in sarcopenic obesity, from 0.5 up to 36.1%. Muscle mass normalized by body weight in form of ASM/W and SMM/W tended to be associated with abnormal muscle function.

Conclusion: Prevalence of sarcopenic obesity in Asian population may vary depending on different parameters. ASM/W and SMM/W tended to be useful since they were related to impaired muscle function. Further research, particularly in Asian participants, with long-term clinical follow up may be required to support usefulness and practicability of these parameters.

Table 1. Baseline characteristics of 219 participants

Characteristics	Mean (SD)
Age (year)	43.6 (15.72)
Body weight (kg)	101.7 (25.98)
Height (cm)	163.1 (9.13)
BMI (kg/m^2)	38.1 (8.53)
Waist circumference (cm)	111.3 (18.94)
Handgrip strength (kg)	31.7 (10.03)
Five time sit to stand test (FTSST, sec)	11.7 (3.31)
Fat mass (kg)	46.1 (19.03)
Percent of body fat (%)	44.1 (9.03)
Skeletal muscle mass (SMM, kg)	31.4 (6.91)
SMM/W	31.0 (5.03)
Appendicular skeletal muscle mass (ASM, kg)	22.6 (6.06)
Appendicular skeletal muscle mass index (ASMI, kg/m^2)	8.4 (1.65)
ASM/W	22.5 (4.38)
Fat-free mass (FFM, kg)	55.7 (11.94)
Fat-free mass index (FFMI, kg/m^2)	20.7 (2.74)

Table 2. Parameters indicating impaired muscle function, low muscle mass, and sarcopenic obesity

Parameter	Cut-off value		Percentage of subjects with abnormality
	Male	Female	
Abnormal handgrip strength	<26 kg	<18 kg	9.10%
Abnormal sit to stand test	>12 sec	>12 sec	54.30%
Low muscle mass	ASMI <7 kg/m^2	<5.7 kg/m^2	4.30%
	ASM/W <25.7%	<19.4%	42.30%
	FFMI <17 kg/m^2	<15 kg/m^2	0.50%
	SMM/W <35.7%	<30.7%	62.50%
Sarcopenic obesity defined by abnormal muscle function and			
- ASMI			1.90%
- ASM/W			23.10%
- FFMI			0.50%
- SMM/W			36.10%

ASM = appendicular skeletal muscle, ASMI = appendicular skeletal muscle index; FFMI = fat-free mass index; SMM = skeletal muscle mass.

P123 - Health-Promoting Ready-To-Eat Meals Improve Metabolic Health and Protein Intake in Thai Older Adults: an 8-Week Intervention Study

Sanit Wichansawakun, MD, PNS[1]; Wanwipa Srikhajonjit, RD[2]; Pornpimon Nunthanawanich, PhD, RD[3]; Prapasri Theprugsa, PhD[2]; Suteera Vatthanakul, PhD[2]; Bootsrapa Leelawat, PhD[2]; Awanwee Petchkongkaew, PhD[2]; Peamsuk Suwannakoot, PhD[2]; Supattra Supawong, PhD[2]; Phatthira Sakamut, PhD[2]; Benjarat Tepsongkroh, PhD[2]

[1]Faculty of Medicine, Thammasat University, Bangkolerm, Krung Thep; [2]Thammasat University, Klonglaung, Pathum Thani; [3]Mahidol University, Klonglaung, Pathum Thani

Financial Support: This study was supported by the National Research Council of Thailand (NRCT).

Background: Thai older adults often face challenges in meeting dietary recommendations due to physical limitations, lack of nutrition support, and limited access to appropriate foods. This contributes to increased risk for non-communicable diseases (NCDs). Health-promoting food

products (HFPs), designed as ready-to-eat meals tailored to older adults' needs, may offer a sustainable solution to improve dietary intake and metabolic health. An objective of this study was to evaluate the effects of culturally tailored, nutrient-dense HFPs as meal replacements on anthropometric, biochemical, and dietary outcomes in older adults with chronic conditions.

Methods: A single-group pre-post intervention study was conducted in Thai older adults aged 60–80 years with at least one NCD (diabetes, hypertension, dyslipidemia, or cardiovascular disease). Participants consumed one main meal and one snack of HFP at least four times per week for 8 weeks. A total of 33 participants (mean age: 65.4 ± 4.6 years; 66.7% female) completed the study. Nine HFPs were developed, emphasizing high protein, fiber, and calcium, while reducing saturated fat, sugar, and sodium. Dietary intake was assessed via 3-day food records. Anthropometry and fasting biochemical markers were measured at baseline and post-intervention.

Results: HFP consumption significantly increased daily protein intake from 0.75 ± 0.22 to 1.07 ± 0.29 g/kg/day ($p < 0.001$), meeting recommended intake levels for sarcopenia prevention. Sugar and saturated fat intake decreased by 44.3% and 30.4%, respectively (both $p < 0.001$). Biochemical outcomes improved, with reductions in fasting blood glucose (-8.7%, $p = 0.0008$), total cholesterol (-7.3%, $p = 0.0027$), and triglycerides (-13.4%, $p = 0.0281$). No significant changes were observed in weight, BMI, or muscle mass.

Conclusion: Ready-to-eat HFPs significantly improved dietary quality and metabolic markers in older Thai adults over 8 weeks. These culturally appropriate, nutrient-rich foods may help prevent NCD complications and support healthy aging. Further long-term studies are warranted.

Table 1. Comparison of biochemical measurements in pre- and post-intervention participants (n = 33)

Biochemical Parameters	Pre-intervention (Mean ± SD)	Post-intervention (Mean ± SD)	CI 95% Interval	*P*-value
BUN (mg/dL) Normal range: 8–20 mg/dL	15.4 ± 4.7	15.4 ± 4.1	(-0.94, 0.94)	1.0000
Cr (mg/dL) Normal range: 0.72–1.18 mg/dL	0.9 ± 0.2	0.8 ± 0.2	(-0.01, 0.08)	0.0833
HbA1C (%) Normal range: < 5.7 %	6.4 ± 0.7	6.3 ± 0.6	(-0.03, 0.20)	0.1310
Fasting Blood Sugar (mg/dL) Normal range: <100 mg/dL	115.5 ± 22.5	105.5 ± 19.5	(4.51, 15.48)	0.0008*
Total Cholesterol (mg/dL) Normal range: 0–200 mg/dL	194.5 ± 46.1	180.3 ± 42.1	(5.31, 23.11)	0.0027*
Triglyceride (mg/dL) Normal range: 0–150 mg/dL	139.0 ± 52.5	120.4 ± 53.8	(2.13, 35.02)	0.0281*
LDL (mg/dL) Normal range: 0–100 mg/dL	108.2 ± 33.7	99.9 ± 33.9	(-1.90, 18.41)	0.1074
HDL (mg/dL) Normal range: 0–40 mg/dL	63.8 ± 20.6	64.6 ± 16.8	(-7.59, 6.00)	0.8134
CRP (mg/dL) Normal range: 0.3-1 mg/dL	2.4 ± 3.7	2.4 ± 3.0	(-0.49, 0.54)	0.9236
Alkaline phosphatase (U/L) Normal range: 44-147 (U/L)	78.5 ± 20.7	76.4 ± 19.9	(-0.93, 5.06)	0.1706
Albumin (g/dL) Normal range: 3.5–5.2 g/dL	4.3 ± 0.2	4.3 ± 0.2	(-0.10, 0.06)	0.5697

BUN: blood urea nitrogen, Cr: creatinine, HbA1C: Hemoglobin A1C, LDL: low-density lipoprotein, HDL: high-density lipoprotein, CRP: C-reactive protein, mg/dL: milligrams per deciliter, g/dL: grams per deciliter, U/L:Unit per liter, CI: confidence interval, *SD: Standard Deviation,*

*$p < 0.05$ indicates a significant difference within the group compared to pre-intervention.

Mean ± SD values for key biochemical parameters in 33 older adults before and after an 8-week HFP intervention. Significant reductions were observed in fasting blood sugar, total cholesterol, and triglycerides ($p < 0.05$).

Table 2. Comparison of dietary measurements in pre- and post-intervention participants

Dietary Parameters	Pre-intervention (Mean ± SD)	Post-intervention (Mean ± SD)	CI 95% Interval	*P*-value
Energy intake (kcal/day)	1,109.7 ± 249.7	1,130.8 ± 278.4	(-121.40, 79.36)	0.6726
Protein intake (g/day)	42.1 ± 12.5	60.2 ± 14.5	(-23.68, -12.39)	<0.001*
SFA (g)	14.22 ± 9.32	9.90 ± 5.67	(2.51, 6.12)	<0.001*
Cholesterol (mg)	186.8 ± 123.1	149.5 ± 123.3	(-9.35, 83.96)	0.1132
Sodium (mg)	1,701.4 ± 946.3	1,713.2 ± 1062.0	(-466.98, 443.30)	0.9581
Dietary fiber (g)	8.2 ± 6.3	7.3 ± 3.6	(-1.52, 3.34)	0.4523
Carbohydrate (g)	153.9 ± 44.3	155.1 ± 48.1	(-22.69, 20.45)	0.9163
Sugar (g)	49.8 ± 34.4	27.7 ± 18.6	(9.95, 34.28)	<0.001*

SFA: saturated fatty acid, g: grams, mg: milligrams, CI: confidence interval, *SD: Standard Deviation,*

*$p < 0.05$ indicates a significant difference within the group compared to pre-intervention.

kg: calculated by using ideal body weight with body mass index at 22.9 kg/m^2

Comparison of macronutrient intake before and after the 8-week intervention. Participants significantly increased protein intake and reduced sugar and saturated fat consumption ($p < 0.001$).

P124 - Effect of Continuous Energy Restriction Combined With Probiotic Supplementation on Serum Testosterone Levels of Adult Men Living With Obesity: A Randomized, Double-Blind, Placebo-Controlled Trial

Filipa Carrilho[1]; Camila Marques[2]; Catarina Ferracini[1]; Lila Oayama[2]; Glaice Lucin[2]; Gabriela Mendes[2]; Ana Carolina Magalhães[2]; Fernanda Nakamoto[1]; Leonardo Álvares[1]; Raphael Ferreira[3]; Sandra Silva[1]; Ronaldo dos Santos[4]; Marcus Quaresma[1]

[1]Centro Universitário São Camilo, São Paulo; [2]Universidade Federal de São Paulo, São Paulo; [3]Centro Universitário São Camilo, São Paulo; [4]Universidade Federal de São Paulo, Santos

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Background: Men living with obesity are more likely to have low serum testosterone levels due to increased visceral adipose tissue (VAT). Continuous energy restriction (CER) is known to reduce VAT through weight loss, thereby improving serum testosterone levels. In recent years, probiotics have been proposed as a strategy to reduce body fat through modulation of the gut microbiota, potentially enhancing the effects of CER. Thus, we aimed to verify the effect of CER combined with probiotic supplementation on serum testosterone levels of adult men living with obesity.

Methods: A 12-week, double-blind, placebo-controlled randomized clinical trial was conducted with adult men (25 to 44 years) living with obesity (BMI between 30-39.9 kg/m^2). A 30% CER, based on total daily energy expenditure (TDEE), was calculated from resting energy expenditure, the thermic effect of food (10%), and physical activity level (1.5), with macronutrient distribution set at 50% carbohydrates, 30% fat, 20% protein, and fiber intake fixed at 30 g per day. Participants were randomized and assigned to either the CER with probiotic (CERPRO) or CER with placebo (CERPLA). Probiotic supplementation was administered using two 1 g sachets, each containing a formulation of 1 x 10^9 CFU of Lactobacillus acidophilus NCFM, Lactobacillus rhamnosus HN001, Lactobacillus paracasei Lpc-37 and Bifidobacterium lactis HN019. Baseline and post-intervention serum concentrations of testosterone, TNF-α, and IL-6 were determined. Body composition was assessed by bioelectrical impedance analysis. Fecal samples were collected before and after the intervention, and gut bacterial diversity parameters were assessed, including ACE, Chao1, Faith's phylogenetic diversity, Shannon, and Simpson indices. ANOVA with Bonferroni post hoc was applied; significance set at p £ 0.05.

Results: A total of 331 individuals were enrolled, 49 were randomized, but only 38 completed the intervention. Data were analyzed using a per-protocol approach. Firstly, total serum testosterone levels did not change after the intervention (F = 1.84; p = 0.184), nor were there differences between groups (F= 0.29; p= 0.596). There was a reduction in absolute body fat (F = 91.77; p < 0.001; -6.33 kg), and VAT (F = 48.22; p < 0.001; -16.11 cm^2) after 12 weeks of intervention in both groups, with no significant differences between them (all p-values > 0.05). IL-6 levels decreased over time (F = 4.65; p = 0.042; -0.40 pg/mL), with no differences between groups (p = 0.220). TNF-α levels, however, did not change in response to CER after 12 weeks (F = 0.82; p = 0.375; -0.80 pg/mL) and did not differ between groups (F = 2.67; p = 0.116). No correlations were observed between diversity indices and testosterone levels after the intervention (ACE: r = –0.42, p = 0.136; Chao1: r = –0.42, p = 0.136; Faith's PD: r = 0.30, p = 0.29; Shannon: r = 0.073, p = 0.80; Simpson: r = 0.007, p = 0.98).

Conclusion: CER combined with probiotic supplementation, although effective in reducing body fat, did not affect serum testosterone levels in adult men with obesity.

Table 1. Body composition and blood parameters at baseline and after 4, 8 e 12 weeks of continuous caloric restriction with and without probiotic supplementation (n= 38)

Variables	Groups	Timepoints				p-value (η^2p)		
		Baseline (n= 49) Mean (IC 95%)	Week 4 (n= 42) Mean (IC 95%)	Week 8 (n= 38) Mean (IC 95%)	Week 12 (n= 38) Mean (IC 95%)	Time	Group	Interaction
Energy intake (kcal)	CERPRO	2696 (2437 – 2955)	-	-	1952 (1809 – 2096)	**< 0.001 (0.674)**	0.501 (0.013)	0.356 (0.024)
	CERPLA	2768 (2517 – 3018)	-	-	1942 (1799 – 2086)			
Body mass (kg)	CERPRO	109 (102.9 – 116)	107 (99.6 – 114)^a	107 (98.7 – 114)^{a,b}	106 (97.9 – 113)^{a,b}	**< 0.001** (0.712)	0.425 (0.018)	0.368 (0.029)
	CERPLA	108 (103.6 – 113)	104 (98.4 – 109)^a	103 (96.8 – 108)^{a,b}	101 (95.6 – 107)^{a,b}			
BMI (kg/m^2)	CERPRO	34.7 (33.5 – 35.8)	33.8 (32.5 – 35.0)^a	33.5 (32.2 – 34.9)^{a,b}	33.2 (31.9 – 34.6)^{a,b}	**< 0.001** (0.727)	0.554 (0.010)	0.279 (0.035)
	CERPLA	34.8 (33.8 – 35.8)	33.5 (32.4 – 34.6)^a	33.0 (31.8 – 34.1)^{a,b}	32.5 (31.3 – 33.7)^{a,b}			
Body fat (kg)	CERPRO	38.4 (35.0 – 41.8)	35.9 (32.5 – 39.3)^a	35.1 (31.1 – 39.0)^a	34.2 (30.2 – 38.1)^{a,b}	**< 0.001** (0.718)	0.586 (0.008)	0.753 (0.011)
	CERPLA	38.1 (35.9 – 40.2)	35.2 (32.6 – 37.9)^a	34.0 (31.3 – 36.7)^a	32.6 (29.8 – 35.4)^{a,b,c}			
Body fat (%)	CERPRO	35.1 (32.9 – 37.3)	33.7 (31.2 – 36.1)^a	32.9 (30.2 – 35.6)^a	32.3 (29.6 – 35.1)^a	**< 0.001** (0.560)	0.987 (0.000)	0.768 (0.010)
	CERPLA	35.1 (33.8 – 36.4)	33.9 (32.1 – 35.6)^a	33.1 (31.4 – 34.8)^a	32.2 (30.3 – 34.0)^{a,b}			
Visceral fat (cm^2)	CERPRO	169 (157 – 180)	163 (152 – 174)^a	160 (148 – 172)^a	157 (145 – 168)^a	**< 0.001** (0.573)	0.818 (0.001)	0.506 (0.021)
	CERPLA	170 (162 – 179)	163 (152 – 174)^a	156 (146 – 167)^{a,b}	153 (142 – 165)^{a,b}			
IL-6 (pg/mL)	CERPRO	1.37 (0.64 – 2.11)	-	-	1.20 (0.60 – 1.80)	**0.042** (0.168)	0.855 (0.001)	0.220 (0.065)
	CERPLA	1.52 (0.74 – 2.30)	-	-	0.89 (0.60 – 1.18)			
TNF-α (pg/mL)	CERPRO	23.1 (18.3 – 27.9)	-	-	22.9 (18.2 – 27.6)	0.375 (0.034)	0.116 (0.104)	0.474 (0.023)
	CERPLA	20.0 (15.7 – 24.3)	-	-	17.8 (14.1 – 21.5)			
Total testosterone (ng/mL)	CERPRO	1.36 (1.085 – 1.64)	-	-	1.22 (0.852 – 1.59)	0.184 (0.055)	0.596 (0.009)	0.899 (0.001)
	CERPLA	1.27 (0.843 – 1.69)	-	-	1.15 (0.847 – 1.44)			

Legend: kg: kilograms; m^2: square meter; cm: centimeter; cm^2: square centimeter; BMI: Body Mass Index; Data presented as mean and 95% confidence interval. Repeated measures ANOVA with Bonferroni post hoc; a = different from baseline; b = different from week 4; c = different from week 8; bold p-value < 0.05.

Total testosterone (ng/mL).

Table 2. Correlation between the difference in testosterone and the difference in gut bacterial alpha diversity indices

	Gut microbiota alpha diversity indices				
Rho de Spearman	Δ index Ace	Δ index Chao-1	Δ index Faith	Δ index Shannon	Δ index Simpson
Total testosterone	-0.419	-0.419	-0.301	-0.073	-0.007
p-value	0.136	0.136	0.295	0.808	0.988

P125 - Vitamin D Supplementation Ameliorates Visceral Fat Deposition in Adults With Hypovitaminosis D and Overweight/Obesity: A Randomized Placebo-Controlled Trial

Qian Ren, PhD[1]; Jianqin Sun[2]; Peizhan Chen[3]

[1]Department of Clinical Nutrition, Shanghai Sixth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai; [2]Shanghai Elderly Nutrition and Health Quality Control Center, Shanghai; [3]Clinical Research Center, Ruijin Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai

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Background: Poor vitamin D status was reported to be associated with increased body fat deposition; however, it is inconclusive whether vitamin D supplement can reduce the body fat deposition.

Methods: This randomized, double-blind, placebo-controlled trial was conducted in Shanghai, China (Figure 1). Participants were randomly assigned (1:1) into vitamin D group (5000 IU first dose then 1200 IU/d, n = 57) and control group (placebo, n = 50) and received 8-weeks intervention. The physical examination, body composition analysis examined by bioelectrical impedance analysis and FibroScan of liver were performed, and serum fasting glucose, insulin, cholesterol, triglyceride, low-density lipoprotein-cholesterol, and high-density lipoprotein-cholesterol were detected. The primary endpoint was the changes of body fat percentage during 8 weeks in the intention-to-treat population. This study is registered with the Chinese clinical trials registry, ChiCTR2400081676.

Results: The remaining 99 participants (n = 54 in the vitamin D group and n = 45 in placebo) completed the study (Figure 2). Mean increments in 25(OH)D at week 8 were 12.59 ± 6.97 ng/mL in the vitamin D group and 0.57 ± 5.97 ng/mL in the placebo group ($p < 0.001$). After stratified by gender, it was found that vitamin D_3 supplementation for 8 weeks significantly reduces body fat percentage (-2.33 ± 1.73 % vs. -1.13 ± 1.89 %, $p = 0.017$), visceral fat areas (-16.29 ± 11.39 cm^2 vs.-9.62 ± 12.57 cm^2, $p = 0.042$) and visceral fat deposition (-29.90 ± 3.64 dB/m vs. -5.73 ± 32.08 dB/m, $p = 0.014$) in females, but not males (-1.98 ± 1.54 % vs. -2.54 ± 1.98 %, $p = 0.990$; -13.90 ± 9.38 cm^2 vs. -16.36 ± 11.64 cm^2, $p = 0.042$; -27.86 ± 42.5 dB/m vs. -34.53 ± 38.02 dB/m, $p = 0.603$) (Figure 3); however, it shows no significant improvement in glucolipid metabolic parameters in both sexes.

Conclusion: Our data show that in women with overweight or obesity, maintaining adequate vitamin D levels is beneficial for reducing body fat percentage and visceral fat deposition. However, more investigation remains necessary to determine the exact mechanism by which vitamin D prevents body fat deposition.

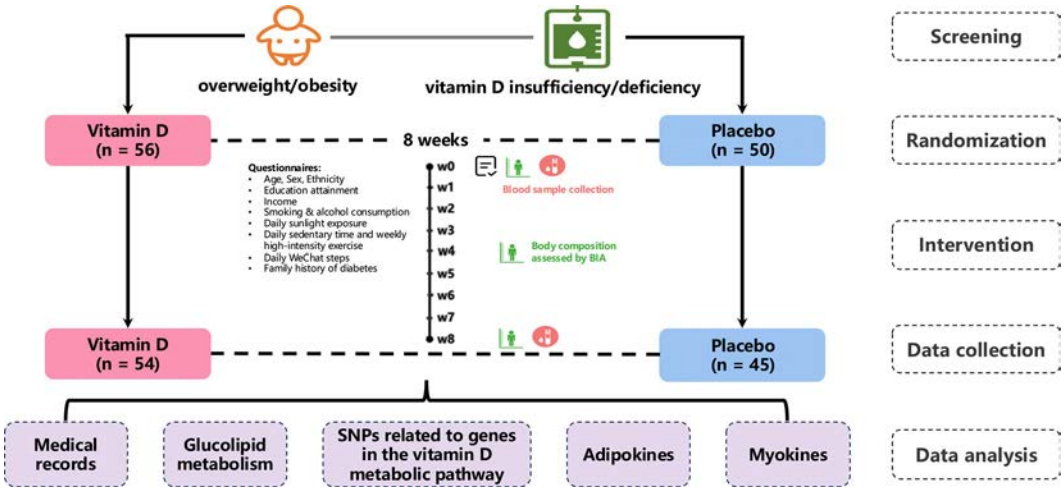

Figure 1. The design of the study

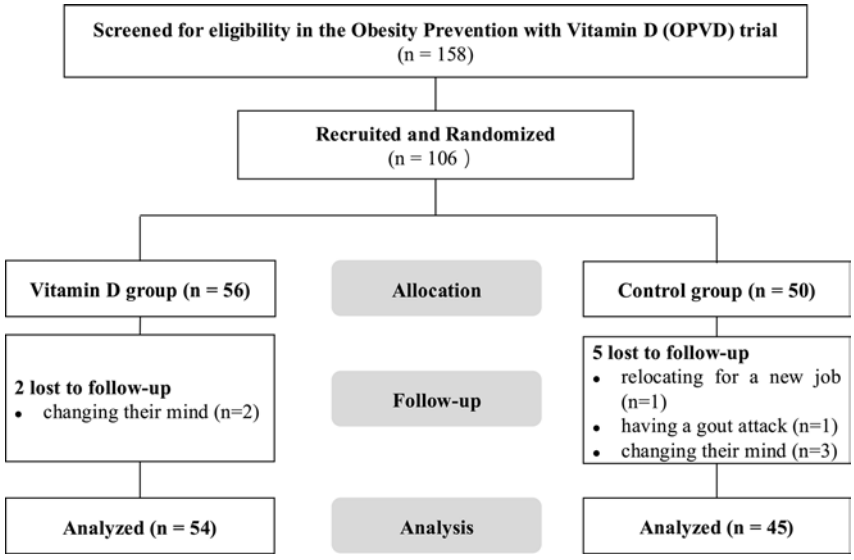

Figure 2. The flow chart of the study

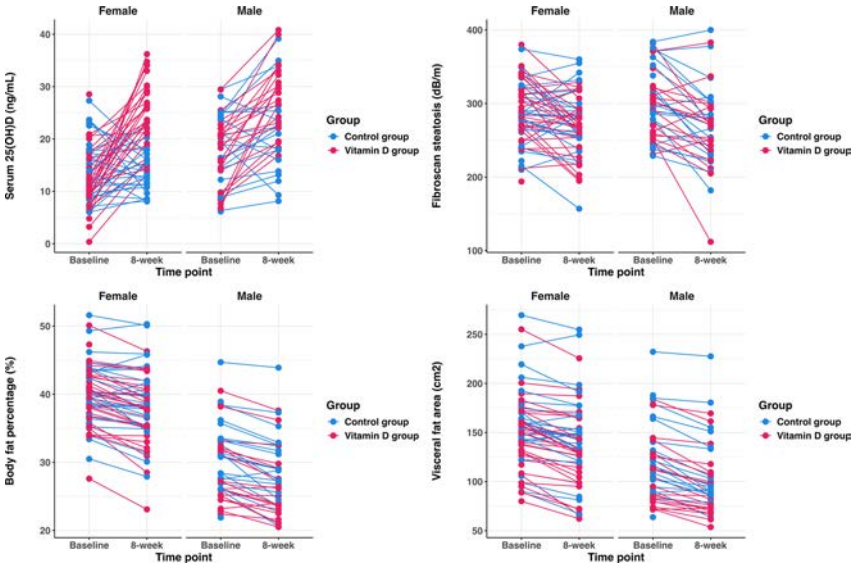

Figure 3. The changes of serum 25OHD, Fibroscan steatosis, body fat percentage and visceral fat area after 8-week intervention of vitamin D

P126 - Prevalence and Predictors of Hypovitaminosis D Among Adult Patients With Cancer Undergoing Acute Inpatient Rehabilitation

Jegy Tennison, MD[1]; Minxing Chen, MS[2]; Eduardo Bruera, MD[2]

[1]The University of Texas MD Anderson Cancer Center, Houston, Texas; [2]The University of Texas at MD Anderson Cancer Center, Houston, Texas

Financial Support: None Reported.

Background: Hypovitaminosis D has been linked to numerous medical conditions, including cancer. It is associated with frailty, decreased physical performance, and in advanced cancer states with anorexia. A meta-analysis reported that higher vitamin D levels are associated with lower cancer incidence, and several analyses, including another meta-analysis, have noted lower cancer mortality with higher vitamin D levels. Furthermore, evaluation for hypovitaminosis D and supplementation to optimize rehabilitation outcomes have been suggested because of

vitamin D on musculoskeletal and neurological function. The prevalence and predictors of hypovitaminosis D among patients with cancer undergoing inpatient rehabilitation remain underexplored. This study aimed to determine the prevalence of hypovitaminosis D in adult patients with cancer undergoing acute inpatient rehabilitation and to identify multidimensional predictors associated with hypovitaminosis D.

Methods: This was an observational, retrospective, cohort study conducted at a tertiary care hospital affiliated with a National Cancer Institute-designated cancer center. The study included all consecutive adult patients with cancer admitted to the inpatient rehabilitation service from December 1, 2023, to May 24, 2024, directly from the hospital. Patients with readmissions during the study period were excluded to avoid duplication of patient characteristics. The serum vitamin D, 25-hydroxyvitamin D (25(OH)D), was categorized as deficient (< 20 ng/mL), insufficient (21–29 ng/mL), or sufficient (≥ 30 ng/mL) following the Endocrine Society's Practice Guidelines. The endpoints included the frequency of hypovitaminosis D upon inpatient rehabilitation admission and identification of its associated demographic, clinical, laboratory, and functional risk factors. When comparing patients with and without hypovitaminosis D, a threshold of $p < 0.05$ was adopted to identify statistically significant differences.

Results: Among 126 patients with cancer undergoing inpatient rehabilitation over 6 months, 62% were found to have hypovitaminosis D with either vitamin D deficiency or insufficiency. Specifically, 41.27% were deficient, 20.63% were insufficient, and 33.33% had sufficient levels; 4.76% had no documented level. At 3- and 6-month post-discharge, 48.41% and 38.89% of patients, respectively, were still on vitamin D supplementation. Significant predictors of hypovitaminosis D (vitamin D < 30 ng/mL) included younger age ($p = 0.006$), lower median serum calcium ($p = 0.042$), and the presence of neurogenic bladder/bowel ($p = 0.024$). Other variables, such as malnutrition ($p = 0.572$), serum albumin levels ($p = 0.321$), mobility status ($p = 0.402$), cancer stage ($p = 0.146$), or cancer treatment goal ($p = 0.420$), showed no significant associations. Complications from vitamin D supplementation were minimal, with three cases of hyperphosphatemia and two cases with nephrology consultations.

Conclusion: Hypovitaminosis D was noted to be highly prevalent among patients with cancer admitted to acute inpatient rehabilitation. Despite the high supplementation and low complication rate during inpatient rehabilitation, continuation of supplementation post-discharge declined at 3 and 6 months after discharge. These findings support the significance of vitamin D screening and supplementation for patients with cancer undergoing inpatient rehabilitation and with risk factors identified for hypovitaminosis D for this cohort. Further larger, prospective studies are warranted to validate risk factors, assess long-term outcomes, and establish standardized guidelines for vitamin D management in this at-risk population for hypovitaminosis D.

Table 1. Outcomes

Table 1: Outcomes Related to Vitamin D Levels and Supplementation

Detailed Outcomes	N=126	%
Vitamin D level, upon admission to inpatient rehabilitation		
Deficient (< 20 ng/mL)	52	41.27
Insufficient (21-29 ng/mL)	26	20.63
Sufficient (≥ 30 ng/mL)	42	33.33
Unavailable	6	4.76
On vitamin D supplementation, 3 months after inpatient rehabilitation		
Yes	61	48.41
No	53	42.06
Unable to confirm	12	9.52
On vitamin D supplementation, 6 months after inpatient rehabilitation		
Yes	49	38.89
No	48	38.10
Unable to confirm	29	23.02

Table 2. Comparison of groups

Table 2. Risk factors comparison between the groups with and without hypovitaminosis D (N=120)

Characteristics	Vit D <30ng/mL (N=78)		Vit D >=30ng/mL N=42		p-value[a]
	Median (Min-Max)		Median (Min-Max)		
Age	66.0 (22.0 - 87.0)		71.5 (40.0 - 91.0)		**0.006**
Laboratory[b] values, IPR[c] admission					
Albumin (ref range 3.5-4.7 gm/dL)	3.3 (2.0 - 4.7)		3.3 (2.1 - 4.7)		0.321
Calcium (ref range 8.2-10.2 mg/dL)	8.9 (6.0 - 10.4)		9.1 (8.4 - 10.4)		**0.042**
Phosphorus (ref range 2.5 - 4.5 mg/dL)	3.4 (1.6 - 5.8)		3.2 (1.6 - 5.4)		0.572
Prealbumin (ref range 20-40 mg/dL)	18.0 (4.6 - 39.0)		19.0 (5.0 - 40.4)		0.895
	N	(%)	N	(%)	
Male sex	53	67.9	21	50.0	0.054
Race					0.556
Asian	6	7.7	2	4.8	
Black or African American	6	7.7	2	4.8	
White or Caucasian	63	80.8	34	81.0	
Other	3	3.8	4	9.5	
Hispanic ethnicity	6	7.7	4	9.5	0.739
Married or significant other	51	65.4	27	64.3	0.904
Latitude, home address					0.307
0-10	0	0.0	1	2.4	
21-30	47	60.3	29	69.0	
31-40	29	37.2	12	28.6	
41-50	2	2.6	0	0.0	
Number of hospital admissions, within 1 year before IPR admission					0.864
0	24	30.8	10	23.8	
1	14	17.9	9	21.4	
2	13	16.7	8	19.0	
≥3	27	34.6	15	35.7	
Primary neoplasm type					0.299
Bones & joint	12	15.4	2	4.8	
Brain & other nervous system	12	15.4	7	16.7	
Breast	3	3.8	1	2.4	
Digestive system	6	7.7	5	11.9	
Endocrine System	1	1.3	1	2.4	
Eye & orbit	1	1.3	0	0.0	
Genital system	3	3.8	2	4.8	
Hematologic & lymphatic	23	29.5	12	28.6	
Oral cavity & pharynx	3	3.8	2	4.8	
Respiratory system	1	1.3	4	9.5	
Skin	2	2.6	4	9.5	
Soft tissue	4	5.1	1	2.4	
Urinary system	7	9.0	1	2.4	
Cancer stage					0.146
Localized	11	16.9	4	11.1	
Regional	13	20.0	14	38.9	
Distant	41	63.1	18	50.0	
Cancer treatment goal					0.420
Curative	18	24.3	9	24.3	
Life prolongation	48	64.9	27	73.0	
Palliative	8	10.8	1	2.7	
AM-PAC[d] Basic Mobility, IPR admission					0.402
Limited mobility (-11.95-33)	10	12.8	9	21.4	
Limited mobility indoors (34-51)	67	85.9	33	78.6	
Moving around indoors (52-65)	1	1.3	0	0.0	
AM-PAC Daily Activity, IPR admission					0.431
No independent tasks (-2.73-40)	69	88.5	35	83.3	
Daily tasks are a struggle (41-52)	9	11.5	7	16.7	
Body mass index					0.709
Underweight	2	2.6	2	4.8	
Healthy	22	28.2	15	35.7	
Overweight	29	37.2	14	33.3	
Obese	25	32.1	11	26.2	
Comorbidities					
Osteoporosis	6	7.7	4	9.5	0.739
Chronic kidney disease	7	9.0	9	21.4	0.056
Inflammatory bowel disease	1	1.3	1	2.4	1.000
Hyperparathyroidism	1	1.3	2	4.8	0.280
History of fall	21	26.9	18	42.9	0.075
Bony metastases	27	34.6	13	31.0	0.685
Amputation	5	6.4	1	2.4	0.664
Cognitive deficits	14	17.9	8	19.0	0.882
Fracture	3	3.8	3	7.1	0.421
Hemiplegia/paresis	9	11.5	5	11.9	0.952
Myopathy	2	2.6	0	0.0	0.541
Paraplegia/paresis	11	14.1	5	11.9	0.736
Tetraplegia/paresis	1	1.3	1	2.4	1.000
Malnutrition					0.572
Moderate	15	30.0	10	29.4	
Severe	17	34.0	15	44.1	
Does not meet criteria	18	36.0	9	26.5	
Medications					
Antiepileptic	57	73.1	31	73.8	0.931
Corticosteroids	66	84.6	32	76.2	0.255
Antifungal	26	33.3	18	42.9	0.302
Antihypertensive	56	71.8	32	76.2	0.604
Antineoplastic	25	32.1	10	23.8	0.343
Bile acid sequestrant	1	1.3	1	2.4	1.000
Opioid	72	92.3	41	97.6	0.419

[a] Two-sample t-test or Wilcoxon rank-sum test/Kruskal-Wallis rank test for continuous variables and Pearson's chi-square or Fisher's exact test for categorical variables.
[b] Laboratory values were obtained the day before admission to inpatient rehabilitation, except for albumin, which is from the closest day within 3 weeks before admission. Values were unavailable as follows: phosphorus & prealbumin in 1, calcium in 3, and albumin in 4 patients.
[c] IPR = inpatient rehabilitation
[d] AM-PAC = Activity Measure for Post-Acute Care functional stage, with higher scores indicating higher function

P127 - Evolution of Symptoms Frequency and Severity Related to Histamine Intolerance Through a Low-Histamine Diet and DAO Enzyme Supplementation

Adriana Duelo, MSc, RDN[1]; Sonia Sánchez-Pérez, PhD[2]; Oriol Comas-Basté, PhD[3]; M. Carmen Vidal-Carou, Prof. Dr.[2]; Mariluz Latorre-Moratalla, PhD[2]

[1]University of Barcelona, International Institute of DAO Deficiency, Barcelona, Catalonia; [2]University of Barcelona, Santa Coloma de Gramanet, Catalonia; [3]University of Barcelona, Santa Coloma de Gramenet, Catalonia

Financial Support: None Reported.

Background: Epidemiological data from the Global Burden of Disease indicate that active headache disorders affect over 50% of the worldwide population [1]. Additionally, the American Gastroenterological Association found nearly 40% of Americans had bowel symptoms interfering with daily life. Skin diseases affect almost one-third of the world's population [2]. These three symptom groups are common and often difficult to manage due to their multifactorial nature. When symptoms persist across two or more organ systems without a clear organic cause or established diagnosis, histamine intolerance due to diamine oxidase (DAO) deficiency should be considered [3]. Standard treatment includes a low-histamine diet and/or DAO supplementation[4]. Clinical studies investigating low-histamine diets and/or DAO supplementation report significant effectiveness, with symptom improvement rates ranging from 40% to 90%, depending on intervention and study design [5–15]. Two studies evaluating both treatment strategies in combination reported among the highest symptom relief outcomes [16,17]. However, most studies are limited by small sample sizes, short durations, and a tendency to focus on either diet or enzyme alone. Moreover, fewer than half assess the typical multi-organ symptoms of this intolerance simultaneously. The aim of this study was to evaluate the evolution of histamine-related symptoms over a three-month period of low-histamine diet combined with DAO supplementation.

Methods: A retrospective study was conducted involving 252 Caucasian patients presenting multi-systemic symptoms suggestive of histamine intolerance. Participants followed a low-histamine diet and took 3 mini-tablets of DAO enzyme daily (4.2 mg pig kidney protein extract, 0.3 mg of DAO). Symptom frequency and severity were assessed at baseline and after 3 months using a custom scale (0-3), the Bristol Stool Form Scale, and a visual analogue scale (VAS) for migraine intensity (0-10).

Results: At baseline, 92.5% of participants presented symptoms in ≥ 4 organ systems, with a mean of 12.2 ± 3.7 symptoms per patient. Gastrointestinal symptoms were most common (97.2%), particularly bloating, constipation, and diarrhea, followed by neurological (86.1%), especially headache and lack of concentration (Fig. 1). After 90 days of dietary intervention, the number of symptoms per patient dropped significantly to 5.3 ± 2.9 ($p < 0.001$), with notable improvements in bloating, pruritus and headache. In terms of severity, the dietary intervention significantly reduced symptoms across all systems, including severe cases. Gastrointestinal symptoms were the most severe at baseline (46% of participants rating them as "very intense"), decreasing from a mean severity score of 2.24 to 0.92 after three months of intervention (Fig. 2). In relation to stool patterns, they also improved significantly ($p = 0.016$), with the proportion of participants reporting normal type 4 stools increasing from 16.3% to 36.9%. Skin and neurological symptoms were more frequently reported as "intense" before the intervention, with both systems showing an improvement of more than 1 point in severity. Post-intervention scores corresponded to very low intensity levels. Among neurological symptoms, headache showed the greatest improvement: 50% of patients suffering from it reported complete remission, and 35% had shorter episodes (less than 24 hours). VAS scores measuring migraine intensity decreased from 7.8 ± 1.4 to 3.4 ± 3.6, and the use of stronger medication (e.g., tramadol, or triptans) declined in favour of milder options ($p < 0.001$). No adverse effects were reported.

Conclusion: These results suggest that a low-histamine diet combined with DAO supplementation may effectively reduce the frequency and severity of symptoms associated with histamine intolerance.

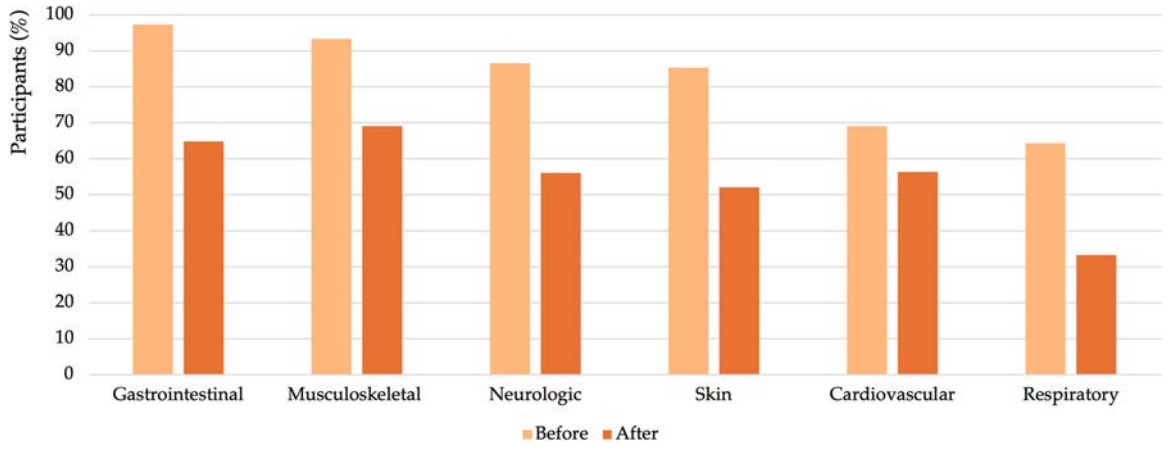

Figure 1. Organ/system affected before and after 3 months of dietary treatment

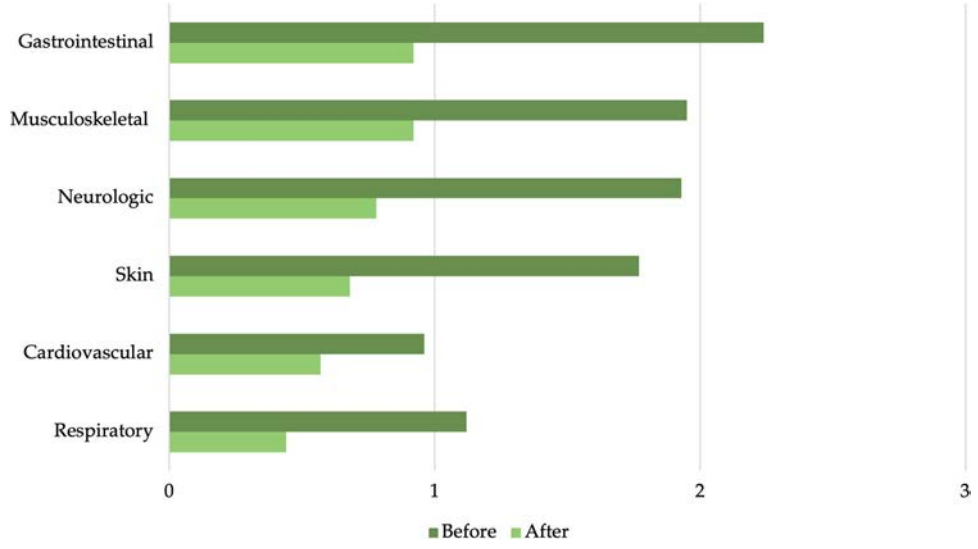

Figure 2. Mean severity score by organ/system before and after 3 months of dietary treatment

P128 - A Real-World Analysis of Recently Approved Short Bowel Syndrome (SBS) ICD-10 Codes: Adoption and Utilization Among SBS Patients Dependent on Parenteral Support in the USA

Kishore Iyer, MBBS, MSc, FRCS(Eng), FACS[1]; Vikram Raghu, MD, MS[2]; Jingwen Liu, PhD[3]; Mena Boules, MD[4]; Gail Mitchell[5]; Mohammed-Syed Jafri, MD[6]

[1]Icahn School of Medicine at Mount Sinai, New York, New York; [2]University of Pittsburgh School of Medicine (UPMC), Pittsburgh, Pennsylvania; [3]Ironwood Pharmaceuticals Inc, Boston, Massachusetts; [4]Ironwood Pharmaceuticals, Inc., Boston, Massachusetts; [5]Ironwood Pharmaceuticals Inc, Basel; [6]Henry Ford Health System, Detroit, Michigan

Encore Poster

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Previous Publication: Tu1013: A Real-World Analysis of Recently Approved Short Bowel Syndrome (SBS) ICD-10 Codes: Adoption and Utilization Among SBS Patients Dependent on Parenteral Support in the USA, Iyer, Kishore R. et al. l, Gastroenterology, Volume 169, Issue 1, S-1303.

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International Poster of Distinction Award

P129 - Exploring ApoB-48 as a Biomarker for Apraglutide Response in Short Bowel Syndrome and Intestinal Failure With Colon-in-Continuity

Astrid Verbiest, PhD[1,2]; Joran Tóth[1]; Palle Bekker Jeppesen, MD, PhD[3]; Francisca Joly, MD, PhD[4]; Tim Vanuytsel, MD, PhD[1,2]

[1]KU Leuven, Leuven, Belgium; [2]UZ Leuven, Leuven, Belgium; [3]Rigshospitalet and University of Copenhagen, Copenhagen, Denmark; [4]Hôpital Beaujon, Clichy, France

Encore Poster

Previous Presentation: UEGW, October 2025, Berlin; ESPEN, September 2025, Prague; CIIRTA, September 2025, Gothenburg.

Previous Publication: A. Verbiest, J. Tóth, P. Bekker Jeppesen, F. Joly, T. Vanuytsel, APOB-48: a promising biomarker for response to apraglutide in short bowel syndrome with intestinal failure and colon-in-continuity. (2025), UEG Week 2025 Poster Presentations. United European Gastroenterol J, 13: S803-S1476. https://doi.org/10.1002/ueg2.70036;

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Astrid Verbiest, Joran Tóth, Palle Bekker Jeppesen, Francisca Joly, Tim Vanuytsel, ApoB-48 as a potential biomarker for treatment response with apraglutide in short bowel syndrome, intestinal failure and colon-in-continuity, Intestinal Failure, Volume 6, Supplement 1, 2025, 100079, ISSN 2950-4562, https://doi.org/10.1016/j.intf.2025.100079.

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P130 - Apraglutide Improves Colonic Permeability in Short Bowel Syndrome With Chronic Intestinal Failure

Astrid Verbiest, PhD[1,2]; Joran Tóth[1]; Pauline Huyghe[1]; Lise De Meyere[1,2]; Lucas Wauters, MD, PhD1,[2]; Palle Bekker Jeppesen, MD, PhD[3]; Ricard Farré, PhD[1]; Francisca Joly, MD, PhD[4]; Tim Vanuytsel, MD, PhD1,[2]

[1]KU Leuven, Leuven, Belgium; [2]UZ Leuven, Leuven, Belgium; [3]Rigshospitalet and University of Copenhagen, Copenhagen, Denmark; [4]Hôpital Beaujon, Clichy, France

Encore Poster

Previous Presentation: CIIRTA, September 2025, Gothenburg; ESPEN, September 2025, Prague; UEGW, October 2025, Berlin.

Previous Publication: A. Verbiest, J. Tóth, P. Huyghe, L. De Meyere, L. Wauters, P. Bekker Jeppesen, R. Farré, F. Joly, T. Vanuytsel, Improved colonic permeability with the novel, long-acting GLP-2 analog apraglutide in short bowel syndrome with chronic intestinal failure, Clinical Nutrition ESPEN, Volume 69, 2025, Page 846, ISSN 2405-4577, https://doi.org/10.1016/j.clnesp.2025.07.083;

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P131 - Apraglutide Treatment is Associated With Changes in Mucosa-Associated and Luminal Microbiota in Patients With Short Bowel Syndrome With Intestinal Failure and Colon-in-Continuity

Astrid Verbiest, PhD[1,2]; Daniel Ekhlas, PhD[3]; Mira Stas[3]; Lise De Meyere[1,2]; Palle Bekker Jeppesen, MD, PhD[4]; Francisca Joly, MD, PhD[5]; Muriel Derrien, PhD[2]; Jeroen Raes, PhD[2]; Tim Vanuytsel, MD, PhD[1,2]

[1]KU Leuven, Leuven, Belgium; [2]UZ Leuven, Leuven, Belgium; [3]KU Leuven / VIB, Leuven, Belgium; [4]Rigshospitalet and University of Copenhagen, Copenhagen, Denmark; [5]Hôpital Beaujon, Clichy, France

Encore Poster

Previous Presentation: United European Gastroenterology Week (UEGW), October 2025, Berlin.

Previous Publication: A. Verbiest, D. Ekhlas, M. Stas, L. De Meyere, P.B. Jeppesen, F. Joly, M. Derrien, J. Raes, T. Vanuytsel, Changes in the mucosa-associated and luminal microbiota with the novel long-acting GLP-2 analog apraglutide in short bowel syndrome with intestinal failure and colon-in-continuity, (2025), UEG Week 2025 Moderated Posters. United European Gastroenterol J, 13: S189-S802. https://doi.org/10.1002/ueg2.70035.

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P132 - Energy Expenditure During Treatment for Prostate Cancer: A Case Study on the Effects of Hormonal and Radiation Therapy

Carol Ireton-Jones, PhD, RDN, CNSC[1]

[1]Good Nutrition for Good Living, Carrollton, Texas

Financial Support: None Reported.

Background: Prostate cancer is the second most commonly diagnosed cancer in men. Treatment includes hormone therapy (or androgen deprivation therapy) to lower testosterone levels, chemotherapy, radiation, and/or a combination. Diarrhea, inflammation in GI tract, lactose intolerance, nausea/vomiting, and fatigue are common side effects of radiation therapy. Weight gain is a common side effect of hormone therapy for prostate cancer. Nutrition care includes an initial nutrition assessment, and recommendations relate to the type of therapy and any side effects experienced. Measurement of energy expenditure can evaluate any changes in metabolism from both radiation or hormone therapy and forecast effects on body weight.

Methods: This is a case study of a 69-year-old male 16 months after prostatectomy referred for hormone and radiation therapy to mitigate a slight rise in prostate specific antigen (PSA) with a clear PMSA. Hormone therapy consisted of Lupron injection initially (Day 1) and oral Bicalutamide daily (starting Day 2). External beam radiation therapy was initiated on Day 91 and continued for 7.5 weeks. Lupron was not administered again and bicalutamide was discontinued when the radiation finished. Indirect calorimetry was used to measure energy expenditure (MEE) over a 9-month period prior to initiation of therapy (Day 1), during (Days 21, 35,55, 90,110,133, 144) and after completion of therapy (Day 183, 269) along with body weight and predicted energy expenditure (PEE).

Results: MEE ranged from 2030–1642 kcal/day with an average of 1823 kcal/day. PEE ranged from 1831-1734 kcal/day, average of 1794 kcal/day. Weight ranged from 212-203 lbs with an average of 206.2 lb. (Figure 1) From initial to the last measurement, MEE had decreased ~100 calories (6%) while weight had increased 5 pounds or 2 %. While MEE varied over time, the variations were minor. Weight varied during the study period with the lowest weight occurring midway through radiation therapy.

Conclusion: Although weight gain is a noted side effect of hormonal therapy in cancer therapy, and weight loss maybe a concern with radiation therapy, this case study demonstrated negligible changes in MEE and weight. This information provides data for patients and clinicians concerned about weight and metabolic changes during cancer treatment.

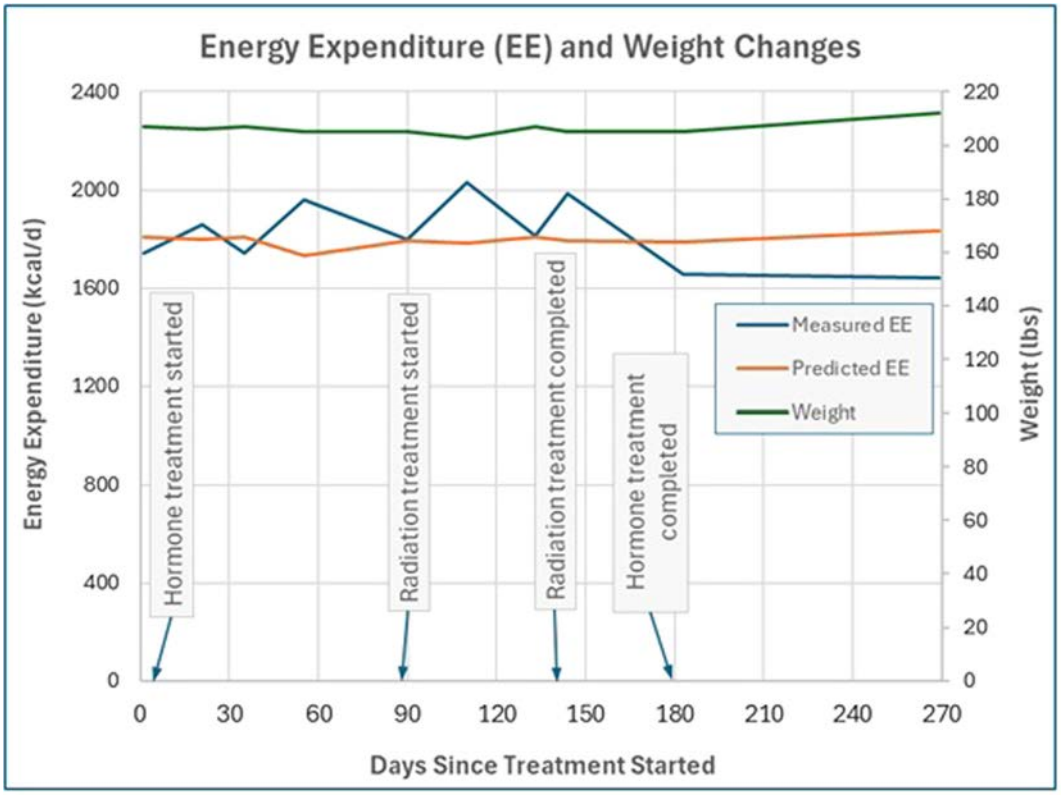

Figure 1. Energy expenditure (EE) and weight changes

MEE, PEE, Weight.

P133 - Real-World US Claims Analysis of ICD-10-CM Code Adoption for Short Bowel Syndrome and Intestinal Failure

Alan Buchman, MD, MSPH[1]; Bridgett Goodwin, PhD[2]; Kishore Iyer, MBBS, MSc, FRCS(Eng), FACS[3]; Felix Lam, MS[4]; Yiyan Liu, PhD[2]; David Mercer, MD, PhD, FRCS(C), FACS[5]; Abigail Silber, MPH[4]; Brian Terreri, PharmD[2]; Kelly Tappenden, PhD, RD[6]

[1]University of Illinois at Chicago, Glencoe, Illinois; [2]Takeda Pharmaceuticals USA, Inc., Lexington, Massachusetts; [3]Icahn School of Medicine at Mount Sinai, New York, New York; [4]Trinity Life Sciences, Waltham, Massachusetts; [5]University of Nebraska Medical Center, Omaha, Nebraska; [6]The University of Utah, Salt Lake City, Utah

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Background: Short bowel syndrome (SBS), defined as < 200 cm of residual small bowel, is a rare condition and the leading cause of intestinal failure (IF; i.e. the inability to maintain nutritional and fluid autonomy). SBS-associated IF (SBS-IF) is defined by the presence of SBS and the requirement for parenteral nutrition and/or intravenous fluids (PN/IV). Epidemiological data are limited for SBS and IF owing to the historical absence of specific International Classification of Diseases 10th Revision, Clinical Modification (ICD-10-CM) codes; however, these codes are now active as of October 1, 2023. Previously, proxy measures, including PN/IV use rates, were used to estimate the prevalence of SBS-IF. We assessed the adoption of these new ICD-10-CM codes for SBS-IF.

Methods: This retrospective, observational cohort study used the Komodo Healthcare Map claims database. Adults and children with claims between January 1, 2023 and October 30, 2024 were included in the prevalence cohort if they had an SBS/IF ICD-10-CM code, met predefined SBS/IF proxy criteria (Table 1), or both, during the study identification period. ICD-10-CM codes used to identify patients with SBS and IF included K90.821: SBS with colon in continuity (CIC); K90.822: SBS without CIC; K90.829: SBS, unspecified; and K90.83: IF (Table 2). To estimate ICD-10-CM code usage, the number of patients with an ICD-10-CM code was divided by the total number of patients identified (the sum of those identified by ICD-10-CM code, proxy criteria, or both; Figure 1). Patient demographics and baseline characteristics were described for patient cohorts with ICD-10-CM codes for SBS (overall and with or without CIC) and IF, and for those with a code for teduglutide use (National Drug Codes included 68875010201, 68875010102, 68875010301 [5 mg injection] and 68875010103, 68875010101, 68875010104 [10 mg/mL injectable solution]).

Results: Of 15,900 patients with SBS-IF who were included in the prevalence cohort, 13,396 patients were identified by proxy criteria and 4,412 patients were identified by ICD-10-CM codes (Tables 1 and 2), with an overlap of 1,908 patients who were identified by both (Figure 1). The proportion of patients identified by a new ICD-10-CM code among all identified patients was 28%. In an independent analysis including patients with at least one ICD-10-CM code for SBS/IF or with a code for teduglutide use, 4,560 patients had a code for SBS (K90.821: 1,606 [35.2% of all SBS]; K90.822: 962 [21.1% of all SBS]; K90.829: 3,587 [78.7% of all SBS]), 611 patients had a code for IF (K90.83), and 364 patients had both an SBS code and an IF code (59.6% of those with an IF code also had an SBS code). In total, 225 patients had a code for teduglutide (including patients with or without an ICD-10-CM code for SBS/IF). Teduglutide was received by 176/4,560 patients (4%) with an SBS code, 34/611 patients (6%) with an IF code, and 158/364 patients (43%) with both an SBS and IF code. Patient demographics are shown in Figure 2.

Conclusion: During the identification period, only 28% of patients were identifiable by ICD-10-CM codes, suggesting that ICD-10-CM codes have had low uptake for SBS/IF, or the population of patients with SBS/IF is substantially smaller than previously thought. The study conclusion is limited by a lack of specificity in the PN/IV code-based proxy criteria. Further studies are required to determine whether there is a lag in the adoption of new ICD-10-CM codes or whether the patient population is smaller than originally conceived. We also recognize the potential for miscoding, which may also lead to an overestimation of the patient population. The development of an educational program on the new codes may improve code uptake and correct code use.

Table 1. Proxy cohort inclusion criteria

Criteria type		Criteria	Patient #	% Attrition
Inclusion	1	Patients with a nutritional support code (43246, 43755, 43760, 49440, 49446, 49450, 96360, 96361, B4034, B4035, B4036, B4081, B4082, B4083, B4084, B4085, B4086, B4087, B4088, B4100, B4102, B4103, B4104, B4105, B4149, B4150, B4151, B4152, B4153, B4154, B4155, B4156, B4157, B4158, B4159, B4160, B4161, B4162, B4164, B4168, B4172, B4176, B4178, B4180, B4184, B4185, B4187, B4189, B4193, B4197, B4199, B4216, B4220, B4222, B4224, B5000, B5100, B5200, B9000, B9002, B9004, B9006, B9998, B9999, E0791, S9340, S9341, S9342, S9343, S9364, S9365, S9366, S9367, S9368, S9373, S9374, S9375, S9376, S9377, B4186, 3E0336Z, 3E0436Z) between 2023 and 2024 Q3, with ≥1 in 2023	1,920,018	100%
	2	Chronic nutrition: Patients with ≥2 nutrition codes (with at least one PN or hydration) that are between 6 and 12 months apart anytime from 2021 to 2024 Q3	450,445	23%
	3	Continuous nutrition: Patients with an average of ≥2 nutrition records a month (individual nutrition claims if ≥5 days apart) for ≥6 months Index date: first observed PN or hydration code date meeting this definition	23,102	5%
	4.1	Evidence of SBS/IF: Patients with ≥1 diagnosis or procedure prior to nutrition start: a. GI resection b. Postsurgical malabsorption or complications of bariatric procedure c. Specified congenital malformations or necrosis	21,479	93%
	4.2	Patients with visible diagnosed malabsorption in claims history	3,196	14%
Total	5	Total patients in inclusion (from 4.1 and 4.2)	21,479	93%
Enrolment	6	1 year of continuous enrolment during the period 2023 to Q3 2024	13,396	62%

GI = gastrointestinal; IF = intestinal failure; PN = parenteral nutrition; Q = quarter; SBS = short bowel syndrome.

Table 2. ICD-10-CM cohort identification criteria

Criteria type		Criteria	Patient #	% Attrition
Inclusion	1	≥1 newly available diagnosis code i.e., K90.821, K90.822, K90.829, K90.83	10,783	100%
	2	Patients with only IF-specific diagnosis code (K90.83)	571	5%
	2.1	For patients with only IF-specific diagnosis code (K90.83), patients were required to have ≥1 of the following diagnoses or procedures prior to index IF start: a. GI resection b. Postsurgical malabsorption or complications of bariatric procedure c. Specified congenital malformations or necrosis d. Visible diagnosed malabsorption in claims history	554	97%
	3	From (1) and (2.1) Patients should have at least ≥1 PN or hydration or additional nutritional support codes between 2021 and Q3 2024	7,168	66%
Total	4	Total patients in inclusion (with at least one nutritional code or diagnosis code in 2023)	7,043	98%
Enrolment	5	1 year of continuous enrolment during the period 2023 to Q3 2024	4,412	63%

The presence of nutritional support requirement in this definition helped to mitigate the lower specificity of only requiring ≥1 diagnosis codes. GI, = gastrointestinal ICD-10-CM = International Classification of Diseases 10th Revision, Clinical Modification; IF = intestinal failure; PN = parenteral nutrition; Q = quarter; SBS = short bowel syndrome.

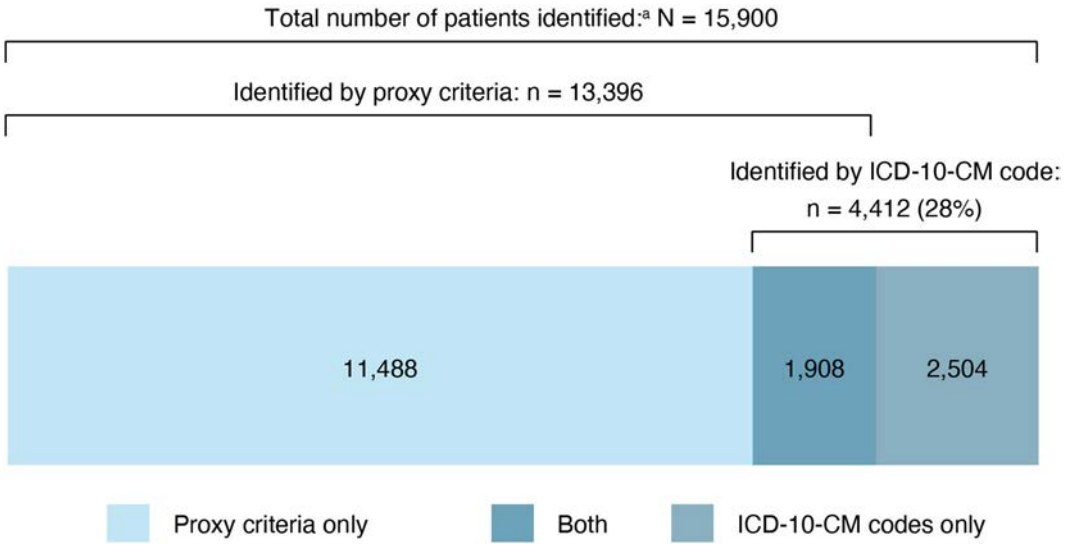

Figure 1. Patients with SBS-IF identified using proxy criteria and ICD-10-CM codes in the prevalence cohort

Patients who had at least 1 year of continuous enrollment during the identification period. ICD-10-CM = International Classification of Diseases 10th Revision, Clinical Modification; IF = intestinal failure; SBS = short bowel syndrome.

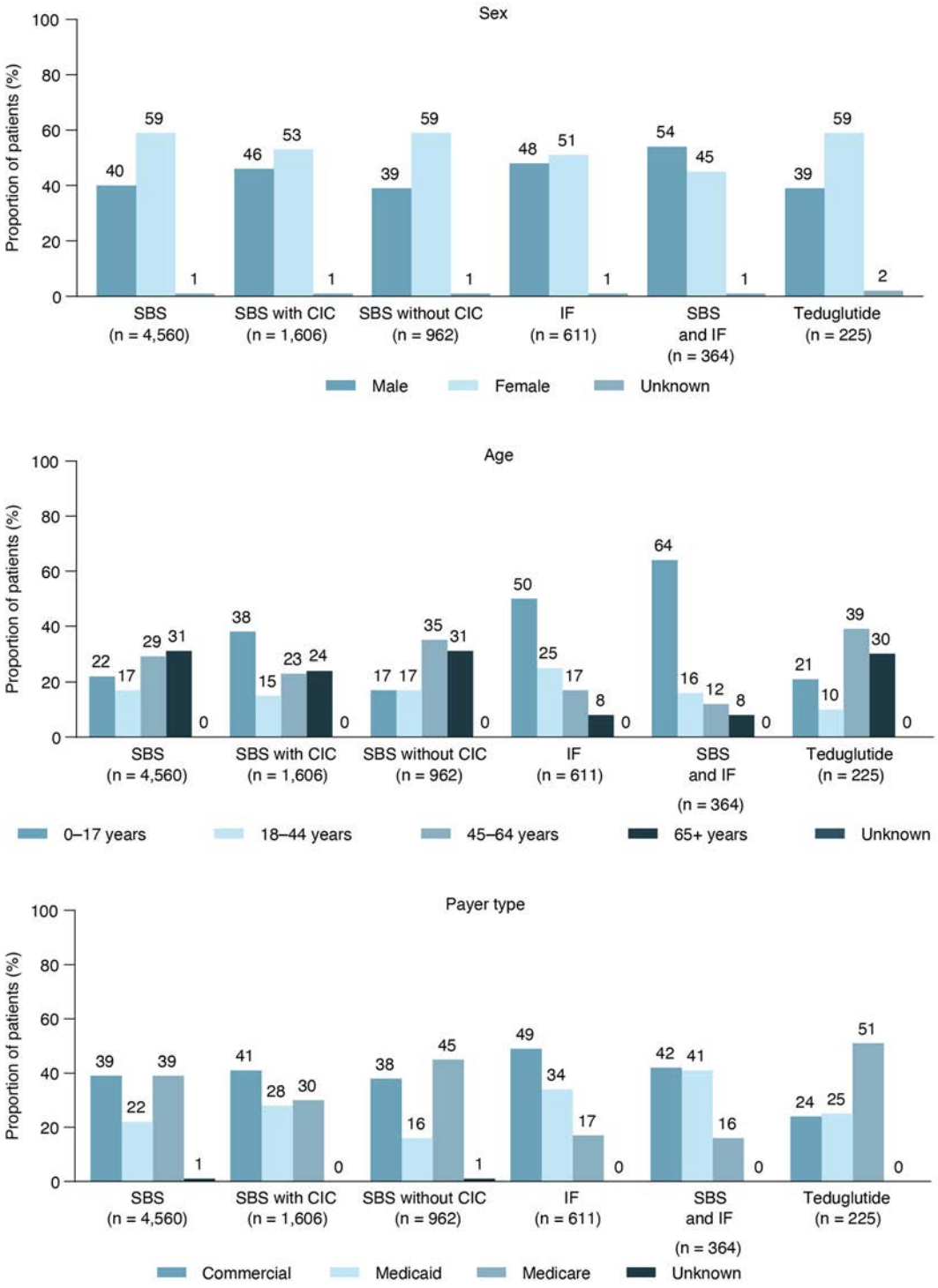

Figure 2. Demographics of patients identified by ICD-10-CM codes

SBS includes ICD-10-CM codes K90.821 (SBS with CIC), K90.822 (SBS without CIC), and K90.829 (SBS, unspecified). The ICD-10-CM code for IF is K90.83. SBS and IF includes ICD-10-CM codes K90.821, K90.822, K90.829, and K90.83. Proportions do not sum to 100% because patients may have more than one ICD-10-CM code recorded. CIC = colon in continuity; ICD-10-CM = International Classification of Diseases 10th Revision, Clinical Modification; IF = intestinal failure; SBS = short bowel syndrome.

P134 - Morbidly Obese to Malnourished: The Role of Registered Dietitians in Post-Bariatric Surgery PO-Intolerance Management

Juliana Turano, MS, RDN, CDN[1]
[1]Northwell Huntington Hospital, Huntington, New York

Encore Poster

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Background: While bariatric surgery is effective for weight loss and mitigating obesity-related comorbidities, it can sometimes cause PO-intolerance (e.g., dehydration, nausea, vomiting, abdominal pain, malabsorption). This may lead to micronutrient deficiencies, excessive weight loss, and protein-calorie malnutrition (Lupoli et al., 2017). Registered dietitians (RDs) are crucial in providing nutritional interventions like diet education and supplements. However, data on nutrition support for post-bariatric surgery patients with malnutrition stemming from PO-intolerance is limited. For these patients, parenteral nutrition (PN) should ideally be initiated within 3–5 days for at-risk individuals, or as soon as medically feasible for those meeting malnutrition criteria (Worthington et al., 2017).

Methods: A 2023-2024 retrospective chart review at a New York Community hospital examined post-bariatric surgery patients readmitted for PO-intolerance complications. Primary outcomes included readmission rates, RD assessments, PN initiation, and malnutrition diagnoses. Length-of-stay was a secondary outcome.

Results: Of 29 charts reviewed, 4% and 7% of patients were readmitted in 2023 and 2024, respectively. Of those readmitted, 33.3% (2023) and 7.1% (2024) received PN for PO-intolerance within guidelines. RDs assessed 86.7% (2023) and 85.7% (2024) of all patients, diagnosing malnutrition in 84.6% (2023) and 75.0% (2024) of those assessed. Three patients in 2023 and two in 2024 had multiple readmissions, averaging 4.6 and 2.5 days, respectively.

Conclusion: RDs are crucial for preventing and treating malnutrition in post-bariatric surgery patients with PO-intolerance. This small subset of patients is at risk of being overlooked and undertreated, particularly regarding PN initiation.

P135 - Health Economic Consequences of Diabetes Remission Using a Digitally Supported Nutritional Program: Preliminary Results From a Low-Calorie Diet With Digitally Enabled Behavior Support

Kirk Kerr, PhD[1]; Bjoern Schwander, PhD[2]; Suela Sulo, PhD, MSc[3]; Ricardo Rueda, MD, PhD[4]; Maria Camprubi-Robles, PhD[4]; Nicky Northway[5]; Carl Lumsden[5]; Louise Taylor, MA[5]
[1]Abbott Nutrition, Columbus, Ohio; [2]AHEAD GmbH, Bietigheim-Bissingen, Baden-Wurttemberg; [3]Abbott Nutrition, Chicago, Illinois; [4]Abbott Nutrition, Granada, Andalucia; [5]Changing Health, London, England

Financial Support: This study financially supported by Abbott.

Background: Type 2 diabetes (T2D) management and possible remission through structured nutritional programs may reduce disease burden, but its long-term health and economic impact remains uncertain. A low-calorie diet program using diabetes-specific nutrition formula meal replacement and a digitally enabled self-management and coaching program for weight loss and diabetes management was implemented. This health economic assessment evaluates the lifetime outcomes and cost-effectiveness of the low-calorie diet program for T2D remission induction.

Methods: A cohort-based state transition model (Markov) was built to simulate progression of patients with newly diagnosed T2D under active diabetes and remission states. Short-term intervention effects were informed by RESET (low-calorie diet) program data (e.g. weight,

HbA1c, SBP, T2D remission), mid-term relapse/remission from the DiRECT study, and long-term complication risks from UKPDS Outcomes Model 2. Costs included direct medical care (UK NHS) and indirect productivity loss (societal perspective). Outcomes included complications avoided, life-years (LYs), quality-adjusted life-years (QALYs), and incremental cost-effectiveness ratios (ICERs). Outcomes were compared to baseline level of patients entering low calorie diet program. Uncertainty was assessed via probabilistic and one-way deterministic sensitivity analyses.

Results: The lifetime model estimates that the low-calorie diet program resulted in 13 complications avoided, 24 incremental LY, and 153 incremental QALY per 1,000 patients. The low-calorie diet program was cost-saving in terms of costs per event avoided (-£33,677), incremental cost per LY gained (-£17,527), and cost per QALY (-£2,805). Cost-effectiveness acceptability curves indicated > 98% probability of the low-calorie diet program being cost-effective. Sensitivity analysis indicated that model results were most sensitive to participant age (at program start) and intervention costs.

Conclusion: Diabetes remission via the low-calorie diet program improves survival and quality of life, reduces complications, and is cost-saving to society. These findings support consideration of digitally supported nutrition programs for diabetes management and remission in health policy and reimbursement decisions.

P136 - Associations of Dietary Protein Intake With Metabolic and Musculoskeletal Health in Community-Dwelling Korean Older Adults

Jung-Eun Yim, PhD[1]; Ji-sook Park[1]
[1]Changwon National University, Changwon, Kyongsang-Namdo

Financial Support: None Reported.

Background: Greater life expectancy is increasing the proportion of adults aged 60 years and older worldwide. A recent study found that, in older adults, healthy dietary patterns were associated with better health-related quality of life in one or both physical and mental domains. Specifically, increased protein intake above the recommended dietary allowance (0.8 g/kg/day) has been suggested as a strategy to maintain muscle mass and physical function in older adults. It is widely believed that sufficient protein intake can help prevent the development of sarcopenia, frailty, fractures, and disability. Conversely, some research suggests that higher protein intakes may increase the risk of cardiometabolic conditions such as type 2 diabetes. These findings remain inconsistent. Therefore, we examined the association between dietary protein intake and health-related factors in a Korean community-dwelling older adults.

Methods: This cross-sectional study enrolled 79 community-dwelling older individuals aged 65 years and older who were independently capable of performing activities of daily living. Participants were categorized into three groups according to protein intake levels: low protein (< 0.8 g/kg/day), moderate protein (0.8–1.2 g/kg/day), and high protein (> 1.2 g/kg/day). Body composition was measured using bioelectrical impedance analysis (BIA). Dietary intake was assessed through a 24-hour dietary recall, and laboratory measurements were obtained from fasting blood samples.

Results: The average weight, and body mass index (BMI) were significantly higher in the low-protein intake group, and serum insulin levels were significantly lower in the low-protein intake group compared to the moderate- and high-protein intake groups ($p < 0.05$). Significant differences were also observed among the three groups in terms of carbohydrate, fat, and protein intake, as well as in macronutrient energy distribution ratios ($p < 0.01$). Although the energy intake in the low-protein group was the lowest, serum insulin levels were significantly elevated, suggesting that, in older adults, protein intake may play a more critical role than total energy intake in regulating glucose metabolism. In the low-protein intake group, protein intake was positively correlated with appendicular skeletal muscle mass (ASM), while in the high-protein intake group, protein intake showed a negative association with the triglyceride-glucose (TyG) index. These findings suggest that, under conditions of inadequate protein intake, even modest increases in protein consumption may contribute to the preservation of skeletal muscle mass, potentially counteracting age-related muscle loss. Furthermore, increased protein intake may offer metabolic benefits by enhancing insulin sensitivity.

Conclusion: This study provides insights into the differential metabolic and musculoskeletal responses to varying levels of protein intake in older adults. The findings suggest a nuanced interplay between protein consumption and markers of insulin resistance and muscle mass, emphasizing the need for individualized dietary strategies rather than a uniform protein guideline for the elderly. From a public health perspective, tailored nutrition interventions prioritizing protein quality and adequacy may contribute to healthier aging trajectories. However, further longitudinal and interventional studies are warranted to establish causal relationships and to determine optimal protein intake for maximizing metabolic and functional outcomes in older populations.

Table 1. Comparison of checklist for balance factor in participants

	High protein intake group (n = 29)	Moderate protein intake group (n = 25)	Low protein intake group (n = 25)	P value
Age (years)	75.79 ± 7.25	76.84 ± 6.43	76.44 ± 5.98	0.841
Height (cm)	154.57 ± 7.65	154.80 ± 6.90	155.88 ± 10.05	0.831
Weight (cm)	51.88 ± 7.47 [a]	55.44 ± 8.71 [a]	61.24 ± 10.28 [b]	0.001
Body mass index (kg/m^2)	21.70 ± 2.63 [a]	23.10 ± 3.11 [a]	25.43 ± 5.26 [b]	0.002
Waist hip ratio	0.92 ± 0.06	0.93 ± 0.12	0.92 ± 0.05	0.881
SMM (kg)	22.89 ± 4.49	22.67 ± 3.43	25.19 ± 6.76	0.250
ASM	17.36 ± 4.38	18.44 ± 3.19	19.47 ± 5.26	0.214
Muscle fat ratio	4.20 ± 4.79	3.29 ± 3.72	2.78 ± 3.83	0.450
FBS (mg/dL)	99.07 ± 9.55	111.96 ± 43.97	104.08 ± 16.18	0.223
Insulin (μ/mL)	3.48 ± 2.73 [a]	3.41 ± 1.79 [a]	5.08 ± 3.13 [b]	0.044
HOMA-IR	0.86 ± 0.68	0.93 ± 0.55	1.26 ± 0.76	0.080
Triglyceride (mg/dL)	112.40 ± 56.06	130.11 ± 105.97	100.63 ± 40.00	0.490
Total cholesterol (mg/dL)	106.37 ± 36.16	114.95 ± 39.02	97.34 ± 33.18	0.242
LDL-cholesterol (mg/dL)	52.86 ± 27.77	49.44 ± 23.51	43.55 ± 28.36	0.462
HDL-cholesterol (mg/dL)	38.46 ± 12.90	39.49 ± 8.61	37.74 ± 9.36	0.846
TyG	8.57 ± 0.62	8.69 ± 0.61	8.48 ± 0.42	0.418
Leptin	12.48 ± 5.13	12.48 ± 13.21	17.67 ± 17.58	0.551
Adiponectin	12.87 ± 8.54	11.56 ± 6.83	12.68 ± 7.95	0.827

Values are expressed as mean ± SD. The p-values were analyzed by one way analysis of variance.
[a,b,c] Different letters are significantly different between body mass index groups by Duncan's multiple range test. SMM, skeletal muscle mass; ASM, Appendicular Skeletal Muscle mass; TyG, Triglyceride-glucose index; HOMA-IR, Homeostasis Model Assessment of Insulin Resistance;

Table 2. Comparison of dietary intakes in participants

	High protein intake group (n = 29)	Moderate protein intake group (n = 25)	Low protein intake group (n = 25)	P value
Energy (kcal/day)	1822.34 ± 332.09 [a]	1448.94 ± 274.37 [b]	1226.53 ± 406.44 [c]	0.000
Carbohydrate (g)	273.74 ± 62.56 [a]	230.82 ± 50.76 [a]	213.47 ± 73.83 [b]	0.002
Fat (g)	44.18 ± 12.21 [a]	29.46 ± 11.72 [b]	20.14 ± 15.00 [c]	0.000
Protein (g)	77.76 ± 17.43 [a]	56.95 ± 10.64 [b]	39.34 ± 10.40 [c]	0.000
Protein/weight (g)	1.52 ± 0.35 [a]	1.02 ± 0.08 [b]	0.64 ± 0.13 [c]	0.000
Energy distribution				
Carbohydrate (%)	60.00 ± 7.17 [a]	63.83 ± 8.07 [a]	70.27 ± 8.88 [b]	0.000
Fat (%)	21.83 ± 4.73 [a]	18.26 ± 6.37 [b]	14.11 ± 6.31 [c]	0.000
Protein (%)	17.18 ± 2.71 [a]	15.90 ± 2.17 [b]	13.22 ± 2.2 [b]	0.000
Fiber (g)	24.19 ± 7.86	25.05 ± 8.72	24.11 ± 13.08	0.937
Vitamin A (μg/RAE)	268.87 ± 172.74	224.81 ± 121.10	277.97 ± 174.55	0.449
Vitamin D (μg)	1.06 ± 1.39	2.23 ± 2.43	1.73 ± 1.63	0.071
Vitamin C (mg)	82.86 ± 47.65	71.71 ± 44.52	67.53 ± 42.12	0.432
Calcium (mg)	580.90 ± 304.88	496.94 ± 215.85	554.15 ± 289.70	0.529
Phosphorus (mg)	947.00 ± 302.90	971.20 ± 251.19	1065.19 ± 182.47	0.366
Sodium (mg)	4056.66 ± 1452.16	4782.02 ± 1928.23	4577.97 ± 2462.61	0.376
Potassium (mg)	2822.34 ± 959.91	2747.95 ± 860.44	3119.97 ± 1458.91	0.459
Iron (mg)	10.69 ± 3.58	10.14 ± 2.83	12.43 ± 5.64	0.131
Zinc (mg)	5.89 ± 2.39	6.79 ± 3.16	6.45 ± 2.95	0.440

Values are expressed as mean ± SD. The p-values were analyzed by one way analysis of variance.
[a,b,c] Different letters are significantly different between body mass index groups by Duncan's multiple range test

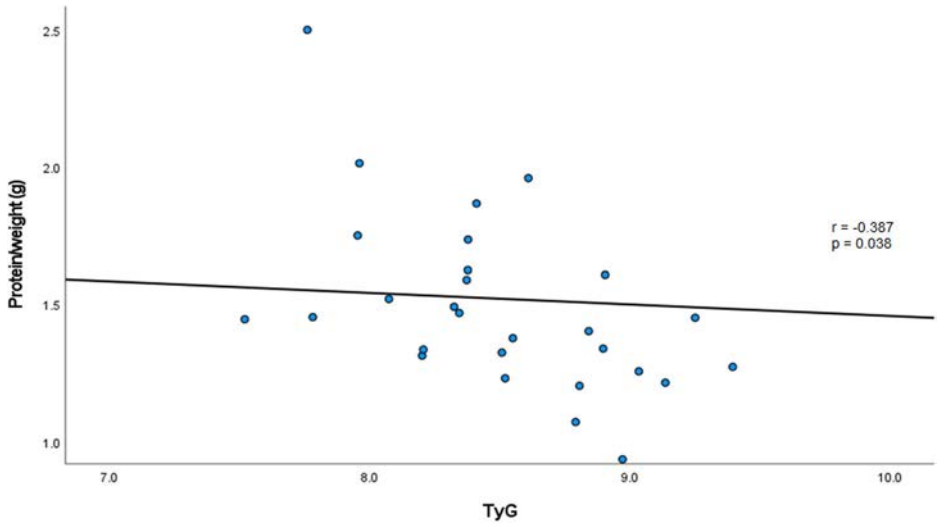

Figure 1. Correlation between protein intake per body weight and TyG in the high protein group

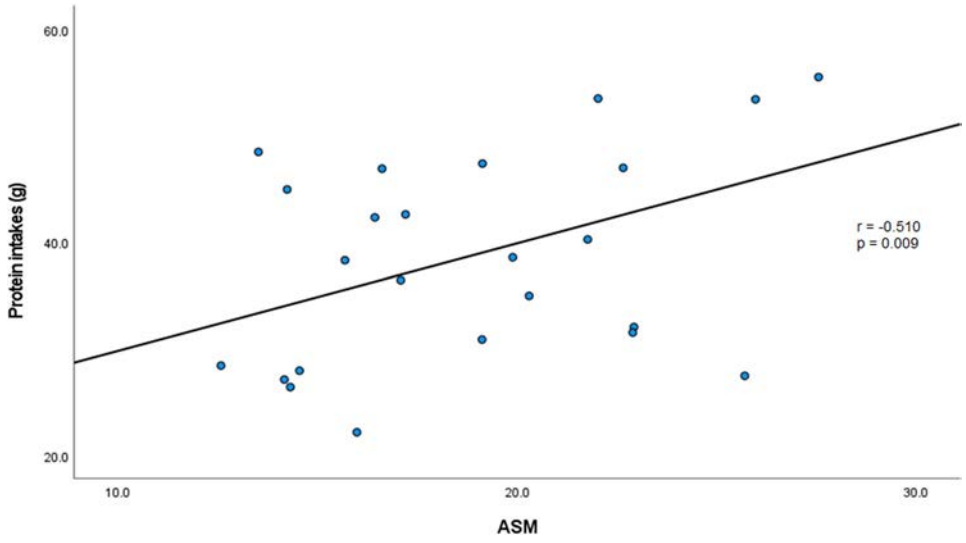

Figure 2. Correlation between protein intake and ASM in the low-protein group

P137 - Trauma Resuscitation With Rapid Glycemic Normalization and Weight Loss in a Patient With Class V Obesity Using Semaglutide and High-Protein Hypocaloric Nutrition

Sanjiv Gray, MD, FACS, FASMBS, DABOM, DABS-FPMBS[1]; Katrina Swedberg-Hall, DO[1]; Emily McCoy, DO[2]; Beatrice Dieudonne, MD, MPH[3]
[1]Lakeland Regional Health, Lakeland, Florida; [2]Lakeland Regional Health, Plant City, Florida; [3]Windermere, Florida

Financial Support: None Reported.

Background: Management of severe obesity and uncontrolled type 2 diabetes (T2D) sustaining trauma poses complex challenges. Evolving perioperative guidance supports the continued use of glucagon-like peptide-1 receptor agonists (GLP-1s) with appropriate risk mitigation and critical care nutrition societies endorse hypocaloric, high-protein regimens to preserve lean mass and optimize metabolic recovery. We describe a case of polytrauma in a patient with Class V obesity who achieved glycemic normalization and substantial weight loss using semaglutide and precision nutrition therapy.

Methods: A 40-year-old male (510 lb; BMI 63.7 kg/m²) with insulin-treated T2D (HbA1c 11.3%), OSA on BiPAP, hypertension, dyslipidemia, hypogonadism, vitamin D deficiency, iron-deficiency anemia, and MASLD presented after a T-bone MVC as an unrestrained driver. Injuries included

complex C2 fracture; grade IV left vertebral artery injury; left clavicle and 4 rib fractures; bilateral lower-extremity fractures with extensive soft-tissue loss; left first metacarpal fracture; and multiple open wounds. Over 10 weeks, he underwent 7 staged orthopedic, plastic, and wound procedures including bilateral I&D, external fixation, ORIF of tibial plateau and pilon fractures, rotational and free-flap reconstruction, STSG, and multiple VAC changes. The hyperglycemia was managed with IV insulin then basal/bolus therapy. Semaglutide was initiated and titrated to 2.0 mg weekly; metformin and empagliflozin were added early, with SGLT2 inhibitor stopped after glycemic normalization per perioperative safety guidance. GLP-1RA was continued through multiple anesthetics with 24-hour clear-liquid diet during high-risk phases. Weekly bariatric dietitian guidance supported a hypocaloric, high-protein plan per ASPEN/SCCM (>200 g/day protein, carbs < 90–120 g/day, hydration ≥64 oz/day, fiber ≥30–40 g/day). Bariatric shakes and arginine/HMB-enriched supplements were used peri-reconstruction; micronutrients were repleted; testosterone was replaced to reduce sarcopenia risk. Despite prolonged immobilization, the patient lost 99 lb, HbA1c decreased to 5.7%, and all glucose-lowering agents except semaglutide were discontinued. Limb salvage was achieved with satisfactory fracture healing.

Results: This case highlights the role of comprehensive obesity care in complex trauma. The early initiation of a GLP-1 coupled with therapeutic nutrition, allowed for rapid insulin withdrawal and substantial weight loss without compromising surgical or anesthetic safety. Multimodal pharmacotherapy (GLP-1RA + metformin ± SGLT2 inhibitor) targeted complementary mechanisms enhancing satiety, improving insulin sensitivity, and promoting glucosuria to accelerate glycemic normalization while reducing cardiovascular and infectious risk. From a nutrition standpoint, adherence to ASPEN/SCCM high-protein hypocaloric feeding supported preservation of lean mass, promoted wound healing, and met the elevated metabolic demands of polytrauma recovery. Layering arginine/HMB-enriched supplements during reconstructive phases reflected evidence-based adjuncts for enhancing flap integration and reducing dehiscence. The inclusion of anabolic hormone replacement in the context of hypogonadism addressed sarcopenia risk, seen in patients on GLP-1s This experience demonstrates that patient with obesity benefit from, a coordinated protocol to produce profound metabolic and wound-healing benefits that may be generalizable to other patients with obesity.

Conclusion: Inpatient GLP-1 therapy combined with hypocaloric, high-protein nutrition implemented through a multidisciplinary approach can yield substantial metabolic gains with improves glycemic control, and reduced perioperative risk and functional recovery in trauma patients with severe obesity.

P138 - Long-Term Effectiveness of Teduglutide in Adults With Short Bowel Syndrome and Intestinal Failure: Interim Analysis of the US Subpopulation From a Real-World, Global, Multicenter Registry Study

Palle Bekker Jeppesen, MD, PhD[1]; Joel Mason, MD[2]; Lauren Schwartz, MD[3]; Loris Pironi, MD[4]; Francisca Joly, MD, PhD[5]; Gabriel Gondolesi, MD[6]; Ulrich-Frank Pape, MD[7]; Brian Terreri, PharmD[8]; Pinggao Zhang, PhD[9]; Johane Allard, MD[10]; Yi Wen Huang, MD, PhD[9]

[1]Rigshospitalet and University of Copenhagen, Denmark, Copenhagen, Hovedstaden; [2]Tufts Medical Center and Tufts University, Boston, Massachusetts; [3]NYU Langone Medical Center, New York, New York; [4]University of Bologna, Bologna, Emilia-Romagna; [5]Hôpital Beaujon, Clichy, Île-de-France; [6]MedStar Georgetown Transplant Institute, Washington D.C.; [7]Asklepios Medical School and Charité University Medicine Berlin, Hamburg; [8]Takeda Pharmaceuticals USA, Inc., Lexington, Massachusetts; [9]Takeda Development Center Americas, Inc., Cambridge, Massachusetts; [10]Toronto General Hospital, Toronto, Ontario

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Background: Short bowel syndrome (SBS) is a rare disorder that is the leading cause of intestinal failure (IF) in adults. Patients with short bowel syndrome and intestinal failure (SBS-IF) depend on parenteral nutrition and/or intravenous fluids (PN/IV) to provide adequate nutrition. Teduglutide is indicated for patients with SBS who are dependent on PN/IV (ie, patients with SBS-IF). The SBS Registry is a global prospective multicenter study evaluating the long-term safety and effectiveness of teduglutide in patients with SBS-IF. Patients enrolled at US sites represent a large proportion of the SBS Registry, and health care in the USA is considered to be heterogenous. This interim analysis evaluated the long-term effectiveness of teduglutide and predictors of treatment response in the US subpopulation of adults with SBS-IF.

Methods: This interim analysis included data for adults enrolled at US sites in the SBS Registry (NCT01990040; EUPAS7973) from June 23, 2014 to June 30, 2024 (interim data cut-off). Data were analyzed using the per-protocol set (PPS), which included all enrolled, consenting patients who met the eligibility criteria. Patients were categorized as ever-treated (received at least one dose of teduglutide before or after enrollment) or never-treated (never received teduglutide before or during the study and had received PN/IV for ≥6 months before study entry). Predictors of change in PN/IV volume and frequency from baseline to the last assessment were evaluated using univariate and multivariate

analysis of covariance models with last observation carried forward. Change from baseline in PN/IV requirements for each study year, and time to reach enteral autonomy (as defined by the investigator) were also assessed.

Results: Of the 553 adults enrolled in the USA, 551 (39.2% of the SBS Registry) were included in the PPS. Mean (standard deviation [SD]) age at enrollment was 54.9 (15.14) years and 62.6% were women. Mean (SD) teduglutide exposure at follow-up was 47.7 (36.55) months. In the overall US population, univariate analysis identified teduglutide treatment (ever- vs. never-treated), longer duration of teduglutide exposure, and greater baseline PN/IV requirements (volume and frequency, accordingly) to be significantly associated with reductions in PN/IV volume and frequency (Tables 1 and 2). Male sex was significantly associated with a decrease in PN/IV volume, while receiving teduglutide at a dose < 0.05 mg/kg/day (vs ≥ 0.05 mg/kg/day) was significantly associated with an increase in PN/IV volume and frequency. In the multivariate analysis, longer duration of teduglutide treatment, and higher baseline PN/IV requirements (volume and frequency, accordingly) were significantly associated with reductions in PN/IV volume and frequency ($p < 0.0001$). Across all study years, ever-treated patients had reductions from baseline in mean PN/IV volume and frequency, with significant differences in least-squares mean observed between ever- and never-treated patients (volume: years 1–2, $p < 0.0001$; years 3–6, $p < 0.05$; and overall, $p < 0.0001$; frequency: years 1–4 and overall, $p < 0.01$). Ever-treated patients achieved enteral autonomy significantly more rapidly than never-treated patients ($p < 0.05$).

Conclusion: This interim analysis of US data from the ongoing SBS Registry identified predictors of reduced PN/IV requirements, including longer duration of exposure to teduglutide and higher baseline PN/IV requirements. Ever-treated patients had greater reductions in PN/IV volume and frequency, and achieved enteral autonomy more rapidly than never-treated patients. These findings support the long-term effectiveness of teduglutide in adults with SBS-IF. Data collection is ongoing.

Table 1. Predictors of change in PN/IV volume (L/week)

Univariate Analysis		
Variable	**Estimate (SE)**	***p* value**
Treatment (ever- vs never-treated)	−2.293 (0.638)	**0.0004**
Baseline PN/IV duration	−0.005 (0.005)	0.3047
Duration of exposure to teduglutide	−0.042 (0.011)	**0.0002**
CIC status (CIC vs non-CIC)	−0.313 (0.832)	0.7071
Length of remaining small intestine	0.006 (0.006)	0.3287
Age at onset or diagnosis of SBS	−0.014 (0.017)	0.4186
Sex (male vs female)	−1.323 (0.663)	**0.0474**
BMI	0.002 (0.067)	0.9745
Race (White vs all other races)	1.484 (0.782)	0.0591
Baseline PN/IV volume	−0.185 (0.043)	**<0.0001**
Length of remaining colon	−0.008 (0.028)	0.7689
Cause of major intestinal resection (Crohn's disease or intestinal ischemia vs all other causes)	−1.034 (0.693)	0.1370
Medical history of malignancy (yes vs no)	0.479 (0.735)	0.7778[a]
Medical history of malignancy (yes vs unknown)	1.004 (2.367)	
Number of days hospitalized[b]	−0.003 (0.003)	0.3527
Center type[c] (specialized vs nonspecialized)	−0.704 (0.854)	0.4112
Teduglutide dose (<0.05 vs ≥0.05 mg/kg/day)	3.409 (0.778)	**<0.0001**
Multivariate Analysis		
Variable	**Estimate (SE)**	***p* value**
Baseline PN/IV volume	−0.197 (0.044)	**<0.0001**
Duration of teduglutide exposure	−0.047 (0.011)	**<0.0001**

Univariate analysis represents a single variable logistic regression with PN/IV volume as the dependent variable; multivariate analysis represents a multivariate model with backward selection, utilizing a last observation carried forward approach. Positive estimate: predictor of increase in PN/IV volume; negative estimate: predictor of decrease in PN/IV volume. p values that were considered significant ($p < 0.05$) are indicated with bold text. ap value for the medical history of malignancy compares patients with a history of malignancy with those without and those with no data reported for this variable (yes vs. no and unknown). Defined as hospitalizations, visits to the emergency room, and physician visits. Specialized centers were defined as transplant centers and academic nontransplant centers, and nonspecialized centers were defined as community practices. BMI = body mass index; CIC = colon-in-continuity; PN/IV = parenteral nutrition and/or intravenous fluids; SBS = short bowel syndrome; SE = standard error.

Table 2. Predictors of change in PN/IV frequency (days/week)

Univariate Analysis		
Variable	**Estimate (SE)**	***p* value**
Treatment (ever- vs never-treated)	−0.662 (0.232)	**0.0047**
Baseline PN/IV duration	−0.003 (0.002)	0.1101
Duration of exposure to teduglutide	−0.019 (0.004)	**<0.0001**
CIC status (CIC vs non-CIC)	0.020 (0.298)	0.9454
Length of remaining small intestine	−0.000 (0.002)	0.9956
Age at onset or diagnosis of SBS	−0.001 (0.006)	0.8473
Sex (male vs female)	0.080 (0.241)	0.7419
BMI	−0.005 (0.025)	0.8561
Race (White vs all other races)	0.039 (0.286)	0.8906
Baseline PN/IV frequency	−0.300 (0.069)	**<0.0001**
Length of remaining colon	−0.002 (0.011)	0.8696
Cause of major intestinal resection (Crohn's disease or intestinal ischemia vs all other causes)	−0.252 (0.251)	0.3155
Medical history of malignancy (yes vs no)	0.601 (0.262)	0.0697[a]
Medical history of malignancy (yes vs unknown)	0.731 (0.849)	
Total number of days hospitalized[b]	0.001 (0.001)	0.6417
Center type[c] (specialized vs nonspecialized)	−0.130 (0.303)	0.6684
Teduglutide dose (<0.05 vs ≥0.05 mg/kg/day)	0.831 (0.277)	**0.0031**
Multivariate Analysis		
Variable	**Estimate (SE)**	***p* value**
Baseline PN/IV frequency	−0.300 (0.069)	**<0.0001**
Duration of exposure to teduglutide	−0.019 (0.004)	**<0.0001**

Univariate analysis represents a single variable logistic regression with PN/IV frequency as the dependent variable; multivariate analysis represents a multivariate model with backward selection, utilizing a last observation carried forward approach. Positive estimate: predictor of increase in PN/IV frequency; negative estimate: predictor of decrease in PN/IV frequency. p values that were considered significant are indicated with bold text. ap value for the medical history of malignancy compares patients with a history of malignancy with those without and those with no data reported for this variable (yes vs. no and unknown). Defined as hospitalization, visits to the emergency room, and physician visits. Specialized centers were defined as transplant centers and academic nontransplant centers, and nonspecialized centers were defined as community practices. BMI = body mass index; CIC = colon-in-continuity; PN/IV = parenteral nutrition and/or intravenous fluids; SBS = short bowel syndrome; SE = standard error.

P139 - Nutritional Support in Protein-Losing Enteropathy Secondary to Primary Intestinal Lymphangiectasia: A Case Report

Morrakot Suwannakarn, MD[1]; Veeravich Jaruvongvanich, MD[2]
[1]Bumrungrad International Hospital, Bangkok, Krung Thep; [2]Bumrungrad International Hospital, Wattana, Krung Thep

Financial Support: None Reported.

Background: Protein-losing enteropathy (PLE) causes excessive gastrointestinal protein loss, leading to hypoalbuminemia and malnutrition. Primary intestinal lymphangiectasia is one of the causes of PLE. Nutrition support is central to its management.

Methods: Case Presentation: A male patient presented with chronic diarrhea, accompanied by vomiting, fatigue, and clinical edema, with subsequent laboratory evaluation revealing profound hypoalbuminemia (0.84 g/dL). Laboratory tests revealed vitamin D and B12 deficiency, zinc and copper deficiency, dyslipidemia [low-density lipoprotein cholesterol (LDL-C) 222 mg/dL, triglycerides (TG) 327 mg/dL], and evidence of gastrointestinal protein loss, with low serum alpha-1 antitrypsin (85 mg/dL) and elevated stool alpha-1 antitrypsin (35.76 mg/dL). Endoscopy

showed erythematous nodular gastric and duodenal mucosa and cobblestone-like ileal mucosa, with biopsies confirming active ileitis and reactive lymphoid hyperplasia. A diagnosis of PLE from primary intestinal lymphangiectasia was suspected. Intervention: The patient was placed on a very low long-chain triglyceride diet with medium-chain triglyceride (MCT) supplementation and increased protein intake. Micronutrient deficiencies were treated with vitamin D, vitamin B12, zinc, copper, and B-complex supplementation. Pancreatic enzymes and cholestyramine were initiated to improve fat absorption and reduce bile acid–related diarrhea. Simple carbohydrates were replaced with complex sources, and dairy products were avoided. Pharmacotherapy to treat dyslipidemia initially included statin therapy; however, this was discontinued due to transaminitis with persistent hypertriglyceridemia, subsequently replaced by omega-3 fatty acids.

Results: After one month, the patient reported resolution of diarrhea, improved energy, and weight stabilization. Albumin rose to 2.4 g/dL, vitamin D normalized, and LDL decreased by 50%. Fatigue improved, though hypertriglyceridemia persisted, requiring ongoing therapy.

Conclusion: This case demonstrates the essential role of individualized nutrition support—including long-chain fat restriction, MCT supplementation, high protein intake, and treatment of multiple micronutrient deficiencies—in improving clinical outcomes in PLE due to primary intestinal lymphangiectasia.

P140 - Effects of Probiotic Supplementation on Postoperative Nutritional, Immune, and Inflammatory Outcomes After Gastrectomy in Gastric Cancer Patients: A Systematic Review and Meta-Analysis

Raziye Tahmasebi[1]; James Hebert, MSPH, ScD[1]
[1]University of South Carolina, Columbia, South Carolina

Financial Support: None Reported.

Background: Gastric cancer (GC) is a major global health concern, and gastrectomy, the main treatment for GC, often leads to postoperative complications such as malnutrition, inflammation, and immune dysfunction. Enteral nutrition (EN) is the standard of care after surgery, and probiotics have been studied as an adjunct because of their potential to support nutritional status and modulate immune function. Since results across studies remain mixed, this study aimed to systematically review and meta-analyze the effects of probiotic supplementation in addition to EN on postoperative nutritional, immune, and inflammatory markers in patients with GC undergoing gastrectomy.

Methods: We conducted a systematic review and meta-analysis in accordance with PRISMA guidelines. PubMed, Web of Science, and Scopus were searched for RCTs published up to July 2025. Eligible studies compared EN plus probiotics with EN alone in adults undergoing gastrectomy for gastric cancer. Primary outcomes were nutritional markers (albumin, prealbumin, total protein, hemoglobin). Secondary outcomes included immune markers (e.g., lymphocytes, neutrophils) and inflammatory markers (e.g., CRP, IL-6, TNF-α). Meta-analyses were conducted in R using random-effects models, with results expressed as pooled mean differences (MD) or standardized mean differences (SMD) and 95% confidence intervals (CI). Heterogeneity was assessed with the I^2 statistic, and prediction intervals (PI) and sensitivity analyses were performed.

Results: Nine RCTs met the inclusion criteria (Table 1). The number of studies contributing data varied depending on outcome availability. Meta-analysis showed that probiotics significantly improved total protein (MD = 5.06, 95% CI: 1.94–8.19) and hemoglobin (MD = 5.71, 95% CI: 2.08–9.35) compared with EN alone. No significant pooled effects were observed for albumin (MD = 1.65, 95% CI: −0.25 to 3.54) or prealbumin (MD = 7.00, 95% CI: −8.80 to 22.81). For immune markers, probiotics reduced neutrophil counts (SMD = −0.79, 95% CI: −1.48 to −0.10), while effects on lymphocytes were inconsistent (SMD = 0.57, 95% CI: −1.20 to 2.33). Detailed results are presented in Figures 2 AND 3. Inflammatory outcomes such as CRP, IL-6, and TNF-α could not be meta-analyzed due to limited data; however, results summarized in Table 1 indicate a general trend toward decreased inflammatory markers. Overall, heterogeneity was high for certain outcomes (albumin, lymphocytes, prealbumin) but low to moderate for others. In the case of albumin, where the number of studies permitted further analysis, both leave-one-out and subgroup analyses failed to explain the observed heterogeneity. Most included trials were judged to have a moderate risk of bias, mainly due to limited blinding and reporting details.

Conclusion: Probiotic supplementation in addition to standard EN after gastrectomy in gastric cancer patients appears to accelerate recovery of nutritional and immune markers, which normally decline after surgery and gradually return toward baseline. Although limited by the small number of available trials and moderate risk of bias, these findings suggest that probiotics may be a useful adjunct in postoperative nutrition strategies, and further high-quality studies are warranted.

Table 1. Characteristics of studies included in the systematic review

First author (Year)	Intervention/control (n)	Mean Age (SD)	Probiotic Intervention	Control group	Intervention Timing Relative to Operation Day	Main Outcomes
Zhao (2017)	40/40	65.03 (7.94)	*Bifidobacterium and lactobacillus* + Fiber	-	Day +1 to Dat +7	No differences in albumin, pre-albumin, and total lymphocyte
Xie (2018)	70/70	67.80 (9.89)	Not reported	-	Day +1 to Day +7/8	↓ IL-6, IL-8 and TNF-α.
Zheng (2019)	50/50	61.50 (10.43)	*Bifidobacterium infantis, Lactobacillus acidophilus, Enterococcus faecalis and Bacillus cereus*	placebo	Day +3/5 to Day +7/12	No differences in albumin, pre-albumin, and Hb ↓ leukocyte, ↑ lymphocyte, albumin, and total protein
Xu (2020)	30/30	59.10 (8.99)	Probiotics (strain not reported) + Glutamine	-	Day +1 to Day +7	↓ CRP No differences in albumin, pre-albumin, Hb and neutrophil
Zheng (2021)	50/50	56.00 (8.27)	*Lactobacillus plantarum, L. rhamnosus, L. acidophilus, Bifidobacterium animalis subsp.lactis*	placebo	Day +3 to Day +10	↓ leukocytes and neutrophils ↑ lymphocytes
Liu (2022)	33/33	63.68 (8.25)	*Bifidobacterium longum, Lactobacillus acidophilus, and Enterococcus faecalis*	placebo	Day -7 to Day +7	↓ CRP ↓ NEUT% ↓ leukocyte
Cao (2022)	45/47	65.25 (9.20)	*Clostridium butyricum*	placebo	Day +3/5 to Day +21	↓ Leukocyte, NEUT% , IL-1b, IL-6, and TNF-a ↑ lymphocyte, albumin, and total protein
Liu (2024)	45/45	62.68 (5.41)	*Bifidobacterium*	-	Day +1 to Day +21	↑ albumin, Hb, pre-albumin and total protein
Xiong (2024)	36/38	59.2 (7.28)	*Lactobacillus plantarum, L. rhamnosus, L. acidophilus, and Bifidobacterium animalis subsp.lactis*	placebo	Day –3 to Day 0, and from Day +3 to Day +7	↑ albumin, total protein, Hb, LYM% ↓ CRP, leukocyte, NEUT%

CRP = C-reactive protein; IL = Interleukin; TNF-α = tumor necrosis factor-alpha; Hb = hemoglobin; NEUT% = neutrophil percentage; LYM % = lymphocyte percentage. "Day" refers to days relative to the day of gastrectomy (Day 0).

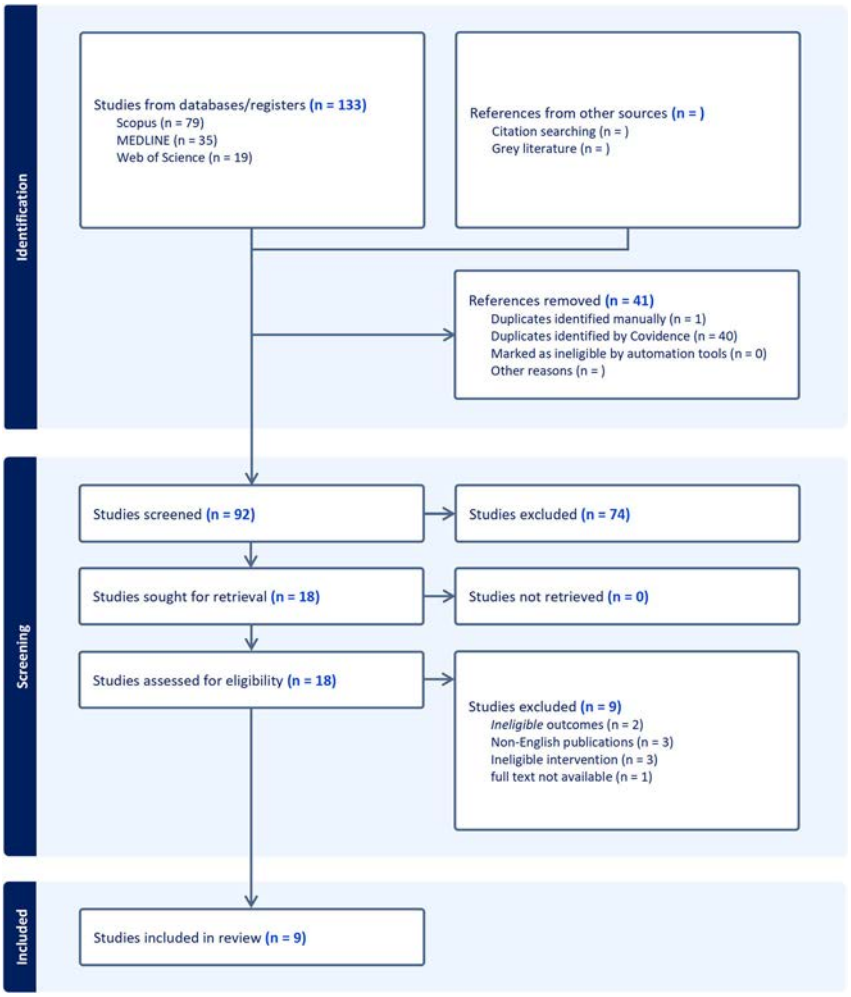

Figure 1. PRISMA flow diagram of study selection

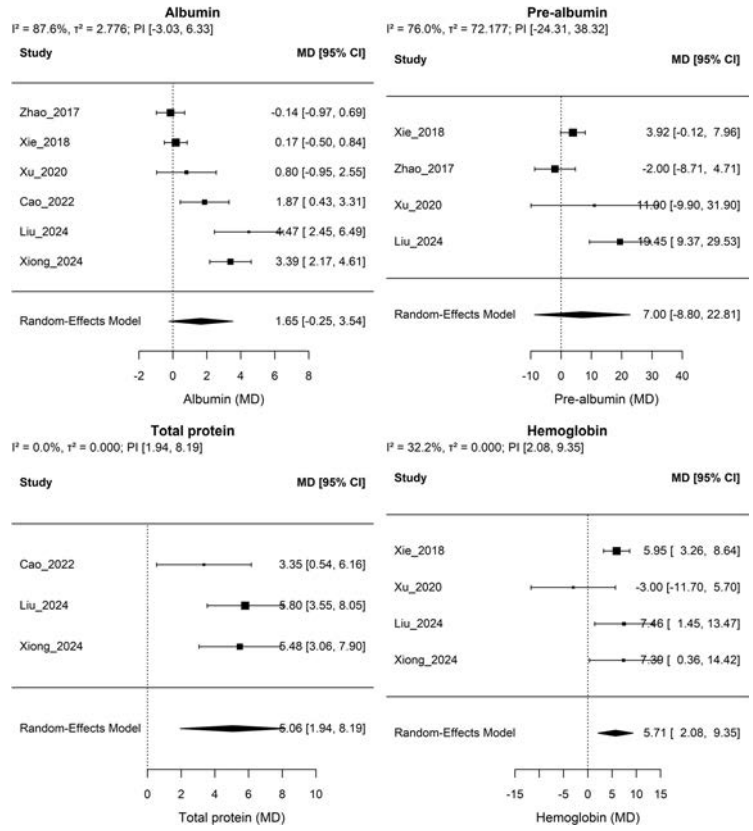

Figure 2. Meta-analysis of nutritional markers after probiotic supplementation in gastric cancer patients following gastrectomy

Random-effects meta-analyses (REML) for albumin, pre-albumin, total protein, and hemoglobin. Diamonds = pooled effects; bars = 95% CIs. Panel headers report heterogeneity (I^2, τ^2) and prediction interval (PI). MD = mean difference.

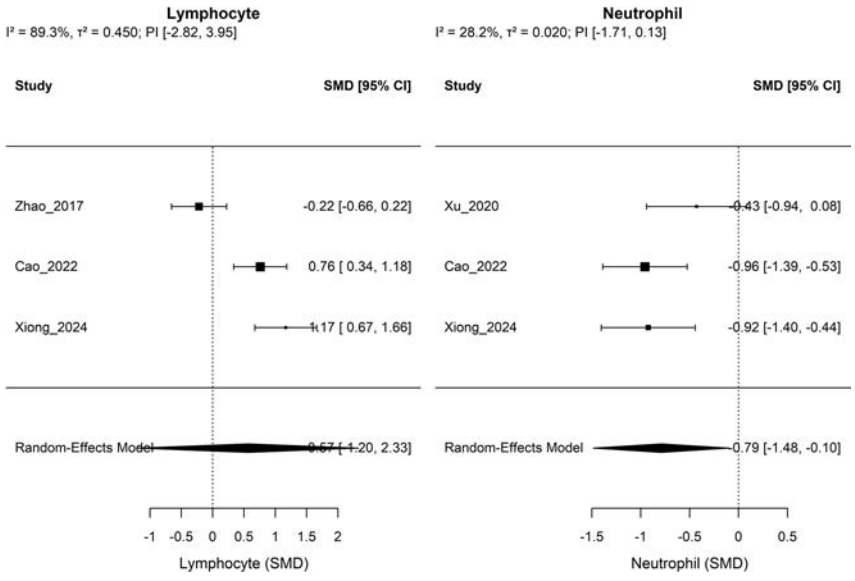

Figure 3. Meta-analysis of immune markers after probiotic supplementation in gastric cancer patients following gastrectomy

Random-effects meta-analyses (REML) for lymphocyte and neutrophil. Due to mixed units across trials, effects are pooled as SMD (Hedges g). Diamonds = pooled effects; bars = 95% CIs. Panel headers report I^2, τ^2, and PI.

P141 - Intake of Foods Containing Phytochemicals Was Associated With Benign Prostate Hyperplasia: A Long-Term Follow-Up Study

Tomiyo Nakamura, PhD, RD[1]; Akiko Shiotani, PhD, RD[2]; Chukako Yasui, PhD, RD[3]; Ikuko Takeyama, RD[4]; Hideki Ishikawa, MD[5]
[1]Ryukoku University, Otsu, Shiga; [2]Otemae University, Osaka; [3]Ritsumeikan University, Kusatsu, Shiga; [4]Soai University, Osaka; [5]Kyoto Prefectural University of Medicine, Osaka

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Background: Benign prostate hyperplasia (BPH) is a common condition that affects many middle-aged and older men. In men who have rapid increases in prostate volume (PV) or prostate-specific antigen levels, lower urinary tract symptoms worsen, and it significantly impairs their quality of life. Therefore, it is expected that preventive measures will be developed to prevent the progression of BPH. It has been hypothesized that an increase in estradiol, the most potent estrogen, together with a decrease in testosterone, contributes to the development of BPH. Plant foods contain phytochemicals with estrogen-like effects or anti-estrogenic activities. Therefor it has been thought that they could prevent or promote the development of BPH. No studies have examined the correlation between the intake of plant foods containing phytochemicals and BPH in a long-term follow-up study. Therefore, we aimed to figure out how various plant food intake is associated with the development of BPH using data from a long-term follow-up study.

Methods: We designed a long-term follow-up study using participants who had previously participated in an intervention study from 1993 to 1997. PV data was available for 120 individuals, with BPH defined as PV ≥ 30 mL. We obtained dietary data from the three-day dietary record methods at entry, and to obtain precise data, registered dietitians interviewed for an hour. Energy and nutrients were calculated, and foods were classified into food groups using Food Composition Table in Japan. Phytochemicals were calculated using values for functional component content provided by the National Agricultural Research Organization. Multivariate logistic regression analyses were conducted to identify independent risk factors for BPH using dietary data at entry. All reported p values are two-tailed. P values < 0.05 were significant. All statistical analyses were performed using SPSS, version 29.0, for Windows (IBM Corp, Armonk, NY, USA).

Results: During a median follow-up period of 24 years, the median age when subjects had maximum PV was 79 years in men without BPH (n = 62) and 76.5 years in men with BPH (n = 58). Multivariate analysis showed that the risk of development of BPH was significantly higher among men who had the highest intake of onion, daikon radish, or fruits compared to men who had the lowest intake. Additionally, multivariate analysis, not adjusted for other phytochemicals, showed that the risk of development of BPH was significantly higher among men who had the highest intake of β-carotene, quercetin, and lutein compared to men who had the lowest intake. Multivariate analysis adjusted for other phytochemicals showed that the risk of development of BPH was significantly higher among men who had the highest intake of β-carotene and quercetin, which exhibit estrogen-like effects, compared to men who had the lowest intake (OR4.80, 95% CI 1.11–20.81, p = 0.002, OR4.17, 95% CI 1.36–12.76, p = 0.012, respectively). However, the risk of development of BPH was significantly lower among men who had the highest intake of lycopene and soybean polyphenol, which exhibit anti-estrogenic effects, compared to men who had the lowest intake (OR0.27, 95% CI 0.08–0.95, p = 0.040, OR0.34 CI0.12-0.99, p = 0.049, respectively).

Conclusion: This study suggests that the intake of phytochemicals with estrogen-like effects could increase the risk of development of BPH and the intake of phytochemicals with anti-estrogenic effects could decrease the risk of the development of BPH. More research is needed to clarify the correlation between phytochemicals and BPH to prevent development of BPH.

P142 - Effect of Ramadhan Fasting on Body Composition and Metabolic Profiles of Healthcare Workers at Zamboanga City Medical Center: A Prospective Cohort Study

Karna Igasan, MD, FPCP, FPCMNP[1]; Afdal Kunting[2]; Norvie Jalani[2]; Solis Charmaine[2]; VIoli Magaso[2]; Sarah-Laida Isnani[2]; Fatiha Alamuddin[3]; Aeesha Pingli[2]
[1]Philippine Society of Parenteral and Enteral Nutrition, Zamboanga City, Zamboanga del Sur; [2]Zamboanga City Medical Center, Zamboanga City, Zamboanga del Sur; [3]Zambaonga City Medical Center, Zamboanga City, Zamboanga del Sur

Financial Support: None Reported.

Background: The effect of fasting on health is of major public health interest. Ramadhan fasting practiced once yearly by Muslims all around the world has different outcomes in terms of metabolic and body composition. Little is known as well about its affect among healthcare workers. Understanding how Ramadhan fasting affects weight, body composition and metabolic profiles of populations would lead to a better understanding of how Ramadhan fasting affects our health and well-being.

Methods: We used a cohort study which followed people over a particular time period. Healthcare workers who underwent Ramadhan fasting had their caloric intake, blood pressure, metabolic profiles and body composition examined. Initially, we enrolled 145 healthcare workers from Zamboanga City Medical Center who underwent Ramadhan fasting from March 2024-April 2024. However, due to incompleteness of their data, only 104 participants finished the study. Participants in this study were a random sample of healthcare workers who volunteered to participate in the study. They were given a 24-hour food recall form to write down their food intake before during and after Ramadhan. Metabolic profiles and body composition were also determined before and after Ramadhan. Data was gathered and encoded in Google Sheets.

Results: 104 healthcare workers were included in the study. Participants' caloric intake level decreased from the pre-Ramadhan period $p < 0.001$). The body composition of respondents decreased, with fat mass and visceral fat rating revealing a statistically significant decrease. Fat mass decreased from pre-Ramadhan ($p < .013$). Visceral fat rating decreased from pre-Ramadhan ($M = 8.42$, $SD = 11.142$) to post-Ramadhan ($p < .013$). The number of Obese decreased while the number of physiques rating with Standard increased. Underexercised remained the same. Hidden Obese and Standard Muscular increased after Ramadhan. Participant's systolic blood pressure decreased from pre-Ramadhan ($p < 0.022$). Diastolic blood pressure decreased from pre-Ramadhan ($p < .012$). The metabolic profile of respondents changed from pre-Ramadhan to post-Ramadhan. There is increased in fasting blood sugar, total cholesterol, LDL, triglycerides. HDL and very low-density lipoprotein decreased from pre-Ramadhan to post-Ramadhan.

Conclusion: The findings of this study showed that the caloric intake of the respondents showed statistically significant reduction post-Ramadhan period. The body composition of healthcare workers improved with statistically significant decrease in fat mass and visceral fat rating post-Ramadhan, period which is beneficial for overall health. The number of Obese and Solidly Built decreased. The number of Standards and Standard Muscular increased after Ramadhan fasting. Underexercised remained the same. Systolic and diastolic blood pressure showed statistically significant decreases, suggesting improved cardiovascular health during Ramadhan. The significant increase in fasting blood glucose may indicate a need for careful monitoring and management of blood sugar levels, especially for individuals at risk of diabetes. LDL, triglycerides and fasting blood glucose increased, which could be due to dietary changes with increased in simple sugars and may also be due to the decreased frequency of physical activity during Ramadan. There is also disruption of sleep cycle during Ramadhan which affects cortisol and growth hormone that could lead to gluconeogenesis causing increase fasting blood glucose which is evident in our study. However, HDL and very low-density lipoprotein decreased in our study. Decreased VLDL according to research has been shown to decrease the risk of Atherosclerotic cardiovascular disease.

Table 1. Paired sample test of body composition changes (fat%, fat mass, muscle mass, total body water %, basal metabolic rate, metabolic age, visceral fat rating, BMI and body weight) from pre-Ramadhan to post-Ramadhan among healthcare workers n=104, Zamboanga City Medical Center

Paired Samples Statistics

		Mean	N	Std. Deviation	P-Value
Pair 1	Before Ramadan FAT %	33.46	104	8.861	.246
	After Ramadan FAT%	32.94	104	8.158	
Pair 2	Before Ramadan FAT MASS (Kg)	24.30	104	11.142	.013
	After Ramadan FAT MASS(kg)	22.02	104	8.508	
Pair 3	Before Ramadan MUSCLE MASS	41.54	104	8.339	.512
	After Ramadan MUSCLE MASS	41.19	104	8.264	
Pair 4	Before Ramadan TBW%	47.49	104	4.418	.019
	After Ramadan TBW%	48.45	104	4.019	
Pair 5	Before Ramadan BMR	5441.41	104	961.460	.257
	After Ramadan BMR	5343.80	104	1099.202	
Pair 6	Before Ramadan METABOLIC AGE	48.45	104	13.336	.016
	After Ramadan METABOLIC AGE	47.25	104	13.334	
Pair 7	Before Ramadan VISCERAL FAT RATING	8.42	104	3.614	.040
	After Ramadan VISCERAL FAT RATING	7.98	104	3.533	
Pair 8	Before Ramadan BMI	25.97	104	4.677	.105
	After Ramadan BMI	25.51	104	4.155	
Pair 9	Before Ramadan WEIGHT	64.96	104	12.933	.683
	After Ramadan WEIGHT	64.72	104	13.010	

Table 4 shows reduction of the body composition of healthcare workers from pre-Ramadhan to post-Ramadhan periods except for TBW%. Fat mass, metabolic age, and visceral fat ratings reveals a statistically significant decrease.

Table 2. Paired sample statistics of metabolic profile changes before and after Ramadhan among healthcare workers, n = 104, Zamboanga City Medical Center

		Mean	N	Std. Deviation	P-value
Pair 1	Before Ramadan FBS	4.71	104	.855	.000
	After Ramadan FBS	5.03	104	1.038	
Pair 2	Before Ramadan Chole	5.13	104	1.228	.502
	After Ramadan Chole	5.20	104	.928	
Pair 3	Before Ramadan HDL	1.40	104	.493	.717
	After Ramadan HDL	1.38	104	.508	
Pair 4	Before Ramadan LDL	3.02	104	.935	.727
	After Ramadan LDL	3.05	104	.840	
Pair 5	Before Ramadan TG	1.51	104	.870	.595
	After Ramadan TG	1.55	104	.835	
Pair 6	Before Ramadan VLDL	.70	104	.589	.848
	After Ramadan VLDL	.69	104	.541	

Table 8 shows an increase in total cholesterol, LDL, triglycerides with FBS revealing a statistically significant increase. HDL and VLDL decreased.

Table 3. Physique rating changes of Healthcare workers from pre-Ramadhan to post-Ramadhan among Healthcare workers n=104, Zamboanga City Medical Center

Before Ramadan PHYSIQUE RATING	After Ramadan PHYSIQUE RATING
Obese 40 26 remained obese 7 converted to standard 4 converted to solidly built 2 converted to hidden obese 1 converted to standard muscular	Obese 34
Solidly Built 27 17 remained Solidly built 7 converted to obese 2 converted to standard 1 converted to standard muscular	Solidly Built 27
Standard: 22 18 remained standard 2 converted to Under exercised 1 converted to Obese 1 converted to standard muscular	Standard: 29
Underexcercised: 12 10 remained underexcercised 2 converted to standard	Underexcercised: 12
Hidden Obese: 2 Both remained Hidden Obese	Hidden Obese: 4
Standard Muscular: 1	Standard Muscular: 4

This table highlights the changes and conversion of physique ratings pre- and post- Ramadhan period. There is a decrease in the number of obese healthcare workers, while there is an increase in the number of Standards, Hidden Obese, and Standard Muscular. Solidly Built and under exercised remained the same.

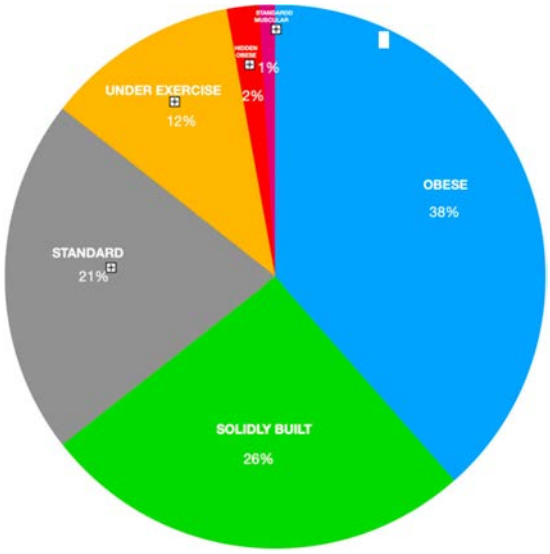

Figure 1. Physique rating distribution of healthcare workers before Ramadhan fasting

Figure 1 presents the distribution of physique ratings among healthcare workers before Ramadhan, which shows that majority of healthcare workers are obese at 38% followed by standard at 21%. Standard muscular comprise least physique rating.

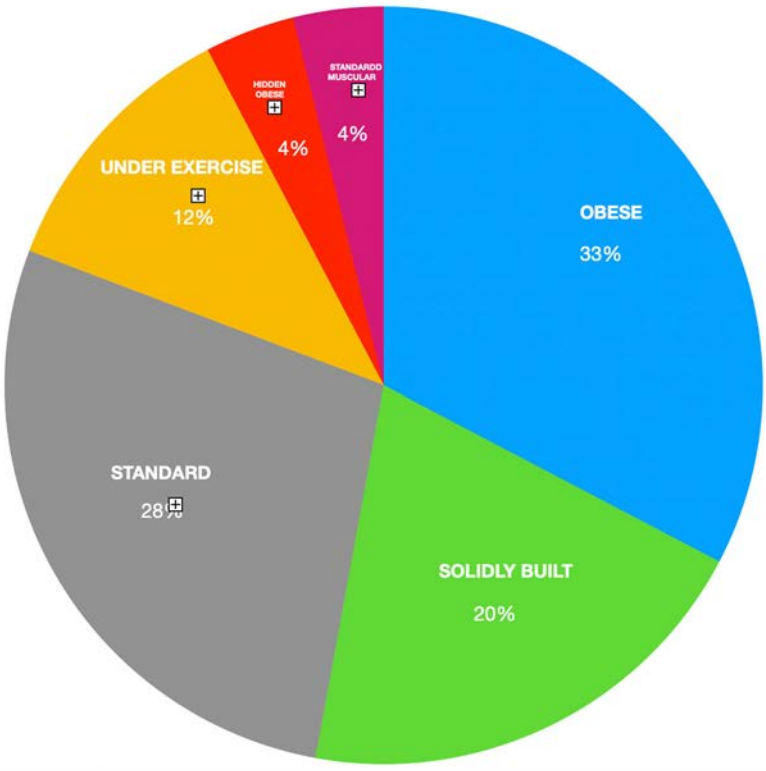

Figure 2. Physique rating distribution of healthcare workers after Ramadhan fasting

Figure 2 presents the distribution of physique rating among healthcare workers after Ramadhan, which shows decrease percentage of obese at 33% from 38% but still comprise majority of the physique rating of healthcare workers followed by standard, which increased to 28% from 21% but still remained second most common to obese.

P143 - Does Energy Adjustment Impact Dietary-Outcomes Associations After Roux-en-Y Gastric Bypass?

Ana Prudêncio, PhD[1]; Gabriela Lemos, MD[2]; Helena Menezes, BSc[3]; Letícia Fregona, BSc[1]; Chiara Pascon, MSc[4]; Renato Santos, BSc[5]; Raquel Torrinhas, PhD[1]; Dan Waitzberg, MD, PhD[1]

[1]Laboratory of Nutrition and Metabolic Surgery of the Digestive Tract (LIM 35), University of São Paulo School of Medicine-FMUSP, São Paulo; [2]Laboratory of Nutrition and Metabolic Surgery of the Digestive Tract (LIM 35), University of São Paulo School of Medicine-FMUSP, Brasília, Sao Paulo; [3]Laboratory of Nutrition and Metabolic Surgery of the Digestive Tract (LIM 35), University of São Paulo School of Medicine-FMUSP, Sorocaba, Sao Paulo; [4]Laboratory of Nutrition and Metabolic Surgery of the Digestive Tract (LIM 35), University of São Paulo School of Medicine-FMUSP, Americana, Sao Paulo; [5]Hospital do Coração (HCOR), São Paulo

Financial Support: None Reported.

Background: Weight loss and metabolic improvements after Roux-en-Y gastric bypass (RYGB) are accompanied by a drastic reduction in energy intake. This reduction can tamper with associations between dietary intake and target outcomes, potentially leading to misinterpretations. Energy adjustment can help isolate nutrient-specific effects, but its relevance in the context of RYGB remains unclear. In this study, we aimed to test whether energy adjustment influences the correlations between dietary intake and circulating lipid profile after RYGB.

Methods: Twenty-nine women with obesity from the SURMetaGIT study cohort (NCT01251016) were evaluated before and three months after RYGB. Nutrient and food group intakes were assessed using a 7-day dietary record (7dDR), and habitual intake was estimated with the Multiple Source Method (MSM). The nutrients evaluated included macronutrients, monounsaturated, polyunsaturated, and saturated fats, as well as trans fatty acids (TFA), total fiber, total cholesterol, and phytosterols. Two food groups were defined: fruits and vegetables (F&V) and foods high in fat, sugar, and salt (HFSS). Plasma lipid biomarkers were measured, including total cholesterol, HDL-C, LDL-C, VLDL-C, and triglycerides. The changes in nutrient and food group intake, as well as in lipid biomarkers, were assessed using paired t-tests or Wilcoxon signed-rank tests comparing pre- and postoperative time points. Associations between changes in dietary intake and lipid biomarkers were analyzed with the Pearson correlation coefficient. Analyses were performed before and after adjustment for total energy intake, employing the residual method.

Results: Raw and adjusted intake of all food groups and nutrients decreased three months after RYGB ($p < 0.050$). Adjusted HFSS and F&V intake consumption decreased by 75.5% and 18.7%, respectively (Figure 1), suggesting an improvement in diet quality. In parallel, circulating lipid profile improved, with a significant reduction in all lipid biomarkers analyzed ($p < 0.050$), except for HDL-c levels (pre-op: 44.4 ± 9.8 mg/dL; post-op: 42.1 ± 9.5 mg/dL; $p = 0.185$). Before energy adjustment, significant correlations were observed between one food group, one macronutrient, and one phytochemical with three lipid biomarkers. After adjusting for total energy intake, only the correlation between HDL-C and phytosterols ($r = 0.59$; $p < 0.010$) remained significant, while a new correlation emerged between trans fatty acids (TFA) and HDL-C ($r = -0.38$; $p < 0.04$).

Conclusion: Energy adjustment substantially influenced the associations between dietary intake and circulating lipid biomarkers three months after RYGB, eliminating most correlations observed in the unadjusted analysis and thereby changing data interpretation. The adjusted results suggest that, although diet quality improvement, early changes in lipid profile are largely independent of specific nutrient intakes. The persistence of the correlation between phytosterol and HDL-C after adjustment and the correlation of TFA and HDL-C suggests an energy-independent relationship that warrants further investigation.

P144 - Artificial Food Colorants and Gut Microbiota: A Systematic Review of Preclinical Evidence

Federica Di Domenico[1]; Justyna Godos, PhD[1]; Sebastiano Torrisi, PhD[1]; Gian Marco Leggio, PhD[1]; Evelyn Frias-Toral, MD[2]; Giuseppe Grosso, MD, PhD[1]

[1]Department of Biomedical and Biotechnological Sciences, University of Catania, Catania, Italy, Sicilia; [2]Escuela de Medicina, Universidad Espíritu Santo, Samborondón, Ecuador, Guayas

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Background: Food colorants are compounds added to foods to enhance/change naturally occurring colors or add color to colourless foods primarily for aesthetic purposes. Although their safety is assessed before authorisation for use, their effects on gut microbiota remain largely unexplored and potentially play a role in gastrointestinal disorders associated with highly processed industrial foods. The aim of this study was to systematically assess current preclinical evidence on the effects of artificial food colorants on gut microbiota.

Methods: A systematic database search was performed to identify studies on food colorants' effects on gut microbiota in rodent models. Exposure identification relied on a review of compounds classified as food colorants by international institutions. Included studies compared results to control groups using either different exposure concentrations, other compounds, or placebo. Outcomes included between-group/pre-post differences in gut microbiota abundance, diversity, and markers of gut and systemic functioning.

Results: From the initial pool of articles being examined, a total of 34 studies have been included in the systematic review. The retrieved eligible studies assessed the following colorants as exposure: E110 - Sunset Yellow FCF, E129 - Allura Red AC, E133 - Brilliant Blue FCF, E171 - Titanium dioxide, E173 - Aluminium, E174 - Silver, and E175 - Gold. The outcomes investigated included alterations in gut microbiota composition, diversity, and clinical symptoms. Some studies extended their analyses to both the animal model and its offspring. The most reported findings included dysbiosis and disrupted gut integrity and barrier function. Functionally associated gut microbiota alterations comprised elongated intestinal villi and irregular villus epithelium cell arrangement, microbiota-driven metabolic disruptions linked to intestinal toxicity and hepatotoxicity, and altered enteric neuron activity linked to reduced locomotion. Among other symptoms, colitis was the most consistently reported, while some studies also described systemic effects, including dysregulated glucose metabolism, systemic inflammation, and obesity. Overall, the quality of the studies reviewed was fair to good, indicating a relatively low risk of bias and a reliable level of evidence, although limited to animal models.

Conclusion: Certain food colorants may have detrimental effects on gut microbiota and related clinical conditions. The applicability of the retrieved results to humans is yet to be assessed, as further studies on human individuals are needed to determine the effects of artificial food colorants on human gut microbiota.

P145 - Intoxication From Within: A Case of Auto-Brewery Syndrome in a Short Bowel Patient

Rachael Levy, RD, CSP, LDN, CNSC[1]; Elizabeth Castle, DNP, CPNP-AC[1]; Jennifer McClelland, MS, RN, FNP-BC[1]; Alexandria Speakman, DO[1]; Alexandra Carey, MD[2]; Tom Jaksic, MD, PhD[1]; Daniel Kamin, MD[1]

[1]Boston Children's Hospital, Boston, Massachusetts; [2]Boston Children's Hospital, Harvard Medical School, Boston, Massachusetts

Financial Support: None Reported.

Background: Patients with short bowel syndrome (SBS) are at risk for malabsorption, dysbiosis, and small intestinal bacterial overgrowth (SIBO) which creates a favorable environment for fermentative organisms. Auto-brewery syndrome (ABS) is a rare form of microbial overgrowth wherein microorganisms convert dietary carbohydrates into ethanol, causing symptoms of alcohol intoxication in the absence of ingestion. Patients with SBS may have predisposing factors for ABS include impaired intestinal motility, antibiosis, as well as structural gastrointestinal abnormalities.

Methods: We performed a retrospective single-institution analysis of one patient receiving care at Boston Children's Hospital's Center for Advanced Intestinal Rehabilitation.

Results: A 24-year-old man with ultra-short bowel syndrome (SBS) was admitted from the emergency department on two occasions with acute mental status changes characterized by slurred speech, difficulty ambulating, hallucinations, aggressive behaviors, and unresponsiveness to commands. One month prior, he had been weaned to nightly dextrose-containing intravenous fluids (IVF) from 3 nights of parenteral nutrition (PN) and 4 nights of dextrose-containing IVF after demonstrating weight gain and improved enteral tolerance to oral and gastrostomy tube feeds. His overnight continuous enteral feeds had been increased to 4 cartons of peptide-based formula. He continued to consume his baseline oral nutrition supplement and an unrestricted oral diet. He received enteral trimethoprim / sulfamethoxazole for SIBO. Daily 70% ethanol locks were used for prevention of central line associated blood stream infection (CLABSI). During his first hospitalization he underwent an extensive neurological and metabolic workup, including standard electrolyte analyses, head MRI, electroencephalogram, lumbar puncture, toxicology screen, and D-lactic acid levels, all of which were normal. His baseline nutrition regimen was resumed, SIBO treatment was adjusted to include enteral vancomycin, and he was discharged home. He presented, 3 days later, with the same reported symptoms and was re-admitted for further work up. His physical exam was not consistent with micronutrient deficiencies; however, he was noted to have a 6.6% weight loss since

discontinuing PN. Micronutrient levels were checked, all were within the reference range apart from a slightly low copper level. Daily PN was resumed in the event that his symptoms were related to a poor response to PN discontinuation. The patient developed a witnessed sudden onset of nausea and unsteadiness. A blood ethanol level was sent and found to be elevated. He denied recreational substance use or alcohol intake. Based on these results, ABS was suspected, and recommendations were made for a low-carbohydrate diet, enteral fluconazole, and a minimized enteral formula regimen. Ethanol locks were transitioned to sodium bicarbonate locks for CLABSI prevention to avoid additional ethanol exposure. The patient became durably asymptomatic, and a blood ethanol level the next day was undetectable.

Conclusion: In patients with SBS who develop acute neurological symptoms, ABS should be considered in the differential diagnosis, especially in settings of high enteral carbohydrate loading. Ethanol-producing Candida species overgrowth is considered the most common cause of ABS, with simple carbohydrates their preferred substrate. ABS has been rarely reported in the literature as a complication of SBS and SIBO. Further systematic investigation might be warranted in this population.

P146 - Association Between the Changes in Food Intake and the Plasma Lipids After Roux-en-Y Gastric Bypass

Gabriela Lemos, MD[1]; Ana Prudêncio, PhD[2]; Renato Santos, BSc[3]; Helena Menezes, BSc[4]; Simone Kikuchi, RD[5]; Daniella Paiva, PhD[5]; Renata Lacerda Pessoa, RD[5]; Raquel Torrinhas, PhD[2]; Dan Waitzberg, MD, PhD[2]

[1]Laboratory of Nutrition and Metabolic Surgery of the Digestive Tract (LIM 35), University of São Paulo School of Medicine-FMUSP, Brasília, Sao Paulo; [2]Laboratory of Nutrition and Metabolic Surgery of the Digestive Tract (LIM 35), University of São Paulo School of Medicine-FMUSP, São Paulo; [3]Hospital do Coração (HCOR), São Paulo; [4]Laboratory of Nutrition and Metabolic Surgery of the Digestive Tract (LIM 35), University of São Paulo School of Medicine-FMUSP, Sorocaba, Sao Paulo; [5]Laboratory of Nutrition and Metabolic Surgery of the Digestive Tract (LIM 35), Department of Gastroenterology, University of São Paulo Medical School, São Paulo-SP

Financial Support: Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP).

Background: Dietary intake is a primary contributor to dyslipidemia, and dietary counseling has been reinforced in guidelines for managing cardiovascular disease. After metabolic and bariatric surgery (MBS), patients face profound changes in their food and total energy intake. Also, individuals experience weight loss, metabolic improvements, and a significant reduction in cardiovascular risk. Interestingly, the changes in the plasma cholesterol profile seem to be heterogeneous and have not been thoroughly explained yet. In this study, we aimed to evaluate the impact of consuming two groups of foods (fruits and vegetables =F&V; foods high in fat, sugar, and salt = HFSS) on plasma LDL-c and TG levels after RYGB. Additionally, we aimed to correlate changes in energy and macronutrient intake with changes in the lipid profile after surgery.

Methods: 29 adult diabetic female patients with a Body Mass Index (BMI) between 35 and 50 kg/m² who underwent Roux-en-Y gastric bypass (RYGB) in the Bariatric and Metabolic Surgery Unit of the HC-FMUSP from the SURMetaGIT study were included. Patients underwent the RYGB via laparotomy with a standardized technique. We assessed seven-day food records (7dFR) and the lipid profile (total cholesterol, HDL-c, LDL-c, VLDL-c, and triglycerides) before and 3 months after the surgical procedure. For qualitative dietary analysis, foods were categorized into two groups: a protective group (F&V), composed of fruits, non-starchy vegetables, and leafy greens; and a non-protective group (HFSS), formed by ultra-processed foods with high concentrations of sodium, added sugars, and saturated fats, according to criteria established by Brazilian nutritional labeling legislation. Total energy, macronutrient, and fiber intake were estimated using Nutrabem® software. The estimation of usual energy and nutrient intake was performed using the Multiple Source Method (MSM). All nutritional variables and food groups were adjusted for total energy intake using the residual method. RYGB-induced changes (post-operative/pre-operative average values) in nutrient and food group intake, as well as in lipid biomarkers, were assessed using paired t-tests or Wilcoxon signed-rank tests. Associations between changes in dietary intake and lipid biomarkers were analyzed with the Pearson correlation coefficient. A significance threshold of $p < 0.05$ was adopted.

Results: Following surgery, patients exhibited a significant decrease in the consumption of both food groups and all macronutrients analyzed (Table 1). All lipidemic biomarkers decreased, except for HDL-c (Table 2). The changes in plasma LDL-c and triglycerides did not correlate with the changes in consumption of either the food groups or the macronutrients analyzed. Regarding the remaining plasma lipid fractions, only HDL-c showed a positive correlation with phytosterol ($r = 0.59$, $p < 0.01$) and a negative correlation with trans fatty acid intake ($r = -0.38$, $p = 0.04$), respectively (Figure 1A AND 1B).

Conclusion: F&V and HFSS consumption do not appear to affect the plasma lipid profile after RYGB. On the other hand, phytosterols and trans fatty acids intake seem to exert a positive and negative influence on HDL-c levels after surgery, respectively. This finding warrants further exploration in studies. Furthermore, the mechanisms underlying the decrease in pro-atherogenic cholesterol fractions remain unclear.

Table 1. Food intake before and after RYGB

	Pre (29)	Post (29)	P value
F&V (g)	306.4 (108.6)	245.1 (87.2)	0.028
HFSS (g)	275.9 (101.2)	68.3 (31.2)	<0.001
Total lipids (g)*	49.9 (46.6; 57.3)	26.6 (23.3; 28.9)	<0.001
Protein (g)	73.4 (7.4)	53.8 (8.4)	<0.001
Carbohydrate (g)	199.4 (17.7)	107.7 (11.8)	<0.001
Fiber (g)	15.7 (3.9)	9.6 (2.0)	<0.001
Monounsaturated fatty acid* (g)	19.7 (17.6; 23.3)	10.0 (8.1; 11.0)	<0.001
Saturated fatty acid (g)*	19.8 (18.0; 21.6)	9.1 (8.2; 10.5)	<0.001
Trans fatty acid (g)*	0.7 (0.6; 0.8)	0.4 (0.3; 0.5)	<0.001
Cholesterol (mg)	247.5 (41.2)	160.9 (52.7)	<0.001
Polyunsaturated fatty acid (g)*	10.0 (8.5; 11.5)	4.8 (4.2; 5.3)	<0.001
Phytoesterols (mg)	28.0 (11.0)	16.2 (4.5)	<0.001

Values are expressed as mean and standard deviation or as median (*) and interquartile range.

Table 2. Lipid biomarkers before and after RYGB

	Pre (28)	Post (28)	P value
Total Cholesterol mg/dL	192.5 (175.2; 205.2)	149.5 (137.0; 166.2)	0.001
c-HDL mg/dL	44.4 (9.8)	42.1 (9.5)	0.185
c-LDL mg/dL	118.4 (34.7)	97.2 (37.9)	0.010
c-VLDL mg/dL	29.2 (9.3)	22.5 (9.6)	0.002
Triglycerides mg/dL	146.0 (108.8; 189.2)	104.5 (91.8; 128.5)	0.001
Não c-HDL mg/dL	143.0 (132.8; 165.0)]	109.5 (91.0; 131.0)	0.002

Values are expressed as mean and standard deviation or as median (*) and interquartile range.

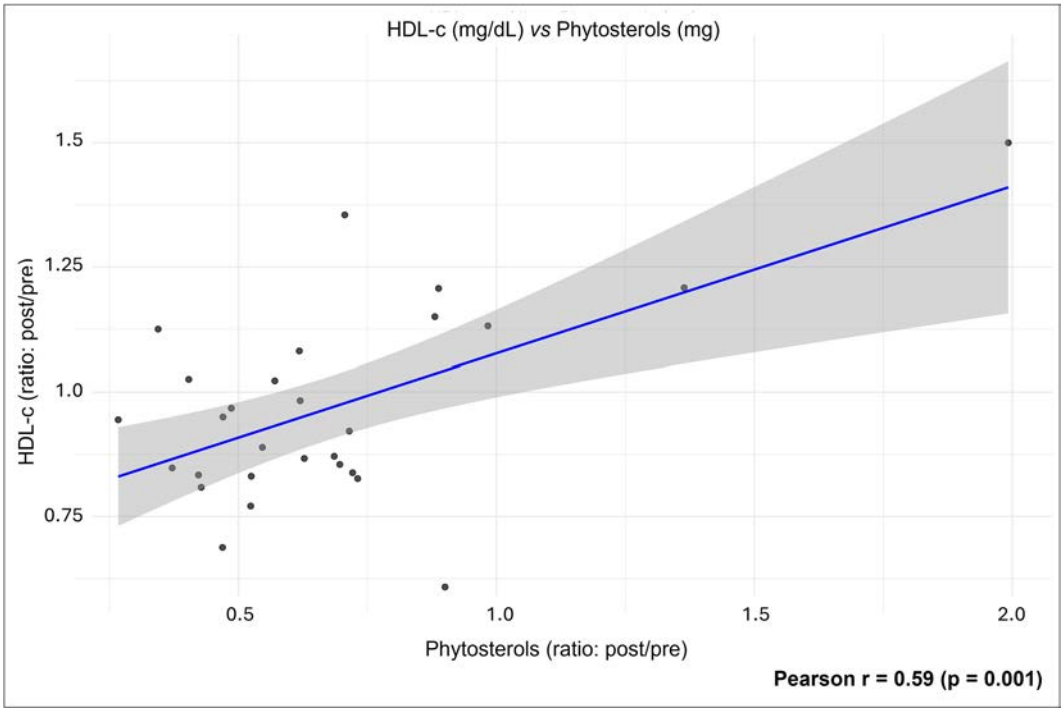

Figure 1. Correlation analysis of phytosterols intake and HDL-c

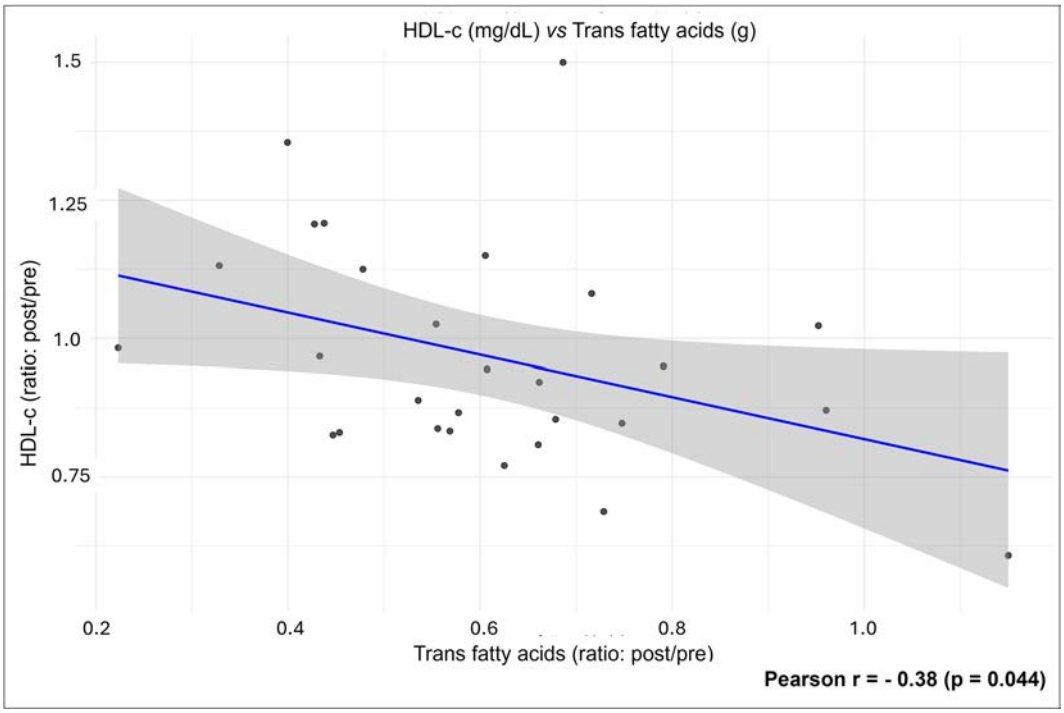

Figure 2. Correlation analysis of trans fatty acids intake and HDL-c

Poster of Distinction Award

P147 - The Use of Artificial Intelligence (AI) in the Creation of Blenderized Tube Feeding Recipes

Lisa Epp, RDN[1]; Danelle Johnson, MS, RD-AP, LDN, CNSC[2]; Osman Mohamed Elfadil, MBBS[1]; Sara Wolf, RDN[1]; Brenda Sanderson, RDN, MS[1]; Kelsey Ewert, RDN, MS[1]; Kelly Hastings, MPH, RDN, LD[1]; Kristin Eckert, MS, RD-AP, LDN, CNSC[3]; Angie Clinton, RDN, MS[1]; Jithinraj Edakkanambeth Varayil, MD[1]; Ryan Hurt, MD, PhD[1]; Manpreet Mundi, MD, FASPEN[1]

[1]Mayo Clinic, Rochester, Minnesota; [2]Mayo Clinic, Rochester, Minnesota; [3]Nutrition Support Service, Mayo Clinic, Rochester, Minnesota

Financial Support: None Reported.

Background: Blenderized tube feeding (BTF) has become a significant part of nutrition care over the last decade, with over half of adult HEN patients using BTF to meet some or all of their nutritional needs. BTF describes the process of blending whole food ingredients with liquids to a consistency that can be administered via an enteral access device (EAD). One of the major barriers cited by registered dietitian nutritionists (RDN) to using BTF in their practice is the time it takes to make individualized recipes. Recently, the use of artificial intelligence, particularly large language models (LLM), has been a paradigm shift in the care of patients, rapidly becoming an accepted tool for health care providers. We hypothesized that using various LLMs would create accurate BTF recipes in a fraction of the time it would take an RDN to create them.

Methods: Four different case scenarios were developed by an RDN with expertise in developing BTF recipes. Each case was followed by a prompt requesting the development of a BTF recipe with specific calorie and protein requirements (Table 1). These cases and requirements were given to 5 RDNs to create their own recipes using standard tools available to them in clinical practice. Additionally, the cases and recipe requirements were also entered into four commonly utilized LLMs, including Gemini (Google), CoPilot (Microsoft), ChatGPT 4.0 (OpenAI), and Open Evidence. The recipes generated by RDNs and LLM models were compiled in a blinded fashion and evaluated by 3 RDNs using Nutritionist Pro™, who remained blinded to the author of the recipe. In addition to assessing accuracy in macronutrient goals, the recipes were also assessed regarding whether they could be provided through EAD, met the criteria outlined in the clinical scenario, could be used in clinical practice, and whether they were created by LLM or RDN.

Results: In cases 1,3 and 4 LLMs failed to meet any of the criteria set in the clinical question. Likewise, none of these cases were appropriate for administration via EAD, would not have been recommended in clinical practice and it was obvious to the blinded RDN reviewer that the recipe

was generated by LLM. For case 2, only one of the AI models met the criteria set in the clinical question, two were able to be administered via EAD and only 2 would be used in clinical practice. For the dietitian-generated formulas the ability to administer the formula via EAD ranged from 1 in 5 in case 4 to 4 in 5 in cases 2 and 3. Likewise, successfully meeting the clinical criteria varied greatly among the RDN generated formulas. No RDN met the criteria for case one and 2-4 were able to meet the criteria for cases 2-4 (Table 2). In general, the four LLM models were able to come close to, or slightly under, the calorie goal. The protein amount was under the goal in general for all LLMs. The RDN generated formulas tended to be slightly over for the calorie goal but came very close to the protein goal for all cases (Table 3).

Conclusion: Our findings suggest that in their current iteration, LLMs do not accurately create recipes for BTF. A high level of expertise is needed to develop accurate BTF recipes and even RDNs in an academic medical center had difficulty in creating accurate BTF recipes. More research is needed to explore LLM application use in nutrition support practice but more importantly, more education is needed for dietitians in the area of creating BTF recipes.

Table 1. Case scenarios

Clinical Background	Clinical Question
Case 1: 25-year-old female with newly diagnosed tongue cancer, starting chemoradiation. She follows a plant-based diet and prefers whole foods, however, now needs a gastrostomy feeding tube due to dysphagia. She presents for assistance with a nutritionally complete recipe that can be administered via 16 French gastrostomy tube. Her current weight is 55 kg and height is 164 cm.	Please develop a 1900 calorie recipe with 60 grams of protein using plant-based foods to be provided as blenderized tube feeding through her gastrostomy tube.
Case 2: 66-year-old male with history of CAD (s/p stent placement x 2 and CABG last year), hypertension, hyperlipidemia, type 2 diabetes, and obesity with BMI of 35. He recently had a stroke, now has dysphagia and is dismissing from rehab on 20 French gastrostomy tube feeding. He does not have insurance for tube feeding formula at home and wants to use what his family eats. Current height is 172 cm and weight is 106 kg.	Please develop 3 recipes (Think breakfast, lunch and dinner) of blenderized tube feeding totaling 1800 calories, 100 g of protein per day to be provided through his gastrostomy tube.
Case 3: 64-year-old female with history treatment for tongue cancer 20 years ago now with dysphagia and 16 French gastrostomy. She has an allergy to fish and eggs and does not eat pork. Current height is 160 cm and weight of 60 kg.	Please develop a blenderized recipe targeting 1500 calories per day as well as 60 g of protein to be provided through gastrostomy tube.
Case 4: 52-year-old male with history of MVA, now with dysphagia and SIADH. Sodium is 130. He has an 18 French gastrostomy tube. Current height is 175 cm with weight of 104 kg.	Please develop a volume restricted blenderized tube feeding recipe focusing on 1900 calories, 90 g of protein. Goal final recipe should be less than or equal to 1500mL.

Table 2. Assessment of recipes

Variables		AI	Dietitians
% of reaching consensus		n=4	n=5
Case 1	• Administer via tube	0	3 (60)
	• Met Criteria	0	0
	• Use in practice	0	2 (40)
	• AI/Dietitian generated	4 (100)	3 (60)
Case 2	• Administer via tube	2 (50)	4 (80)
	• Met Criteria	1 (25)	4 (80)
	• Use in practice	2 (50)	1 (20)
	• AI/Dietitian generated	4 (100)	3 (60)
Case 3	• Administer via tube	0	4 (80)
	• Met Criteria	0	2 (40)
	• Use in practice	0	2 (40)
	• AI/Dietitian generated	4 (100)	3 (60)
Case 4	• Administer via tube	0	1 (20)
	• Met Criteria	0	2 (40)
	• Use in practice	0	1 (20)
	• AI/Dietitian generated	4 (100)	3 (60)

Table 3. Assessment of accuracy of the recipe comparing study groups

Variables		AI	Dietitians	*p*-value
Mean (SD)		n=4	n=5	
Accuracy % of target (Avg.)				
Case 1	Calorie	85.3 (19.4)	120.8 (23.3)	0.300
	Protein	102.2 (35.4)	98 (11.2)	0.407
Case 2	Calorie	111.2 (14.1)	106.9 (10.5)	0.280
	Protein	93.8 (12.2)	101.7 (6.4)	0.140
Case 3	Calorie	102.4 (23.7)	123.1 (32.3)	0.949
	Protein	101.5 (32.9)	103.2 (12.6)	0.359
Case 4	Calorie	84.7 (14.7)	153.6 (26.7)	0.194
	Protein	90.7 (6.8)	97 (4.6)	**0.004**
ANOVA	Calorie			0.460
	Protein			**0.001**

P148 - Personalized Nutrition, Education, Assessment, Real Organic Food, and Lifestyle Support (PEARL): Optimizing Outcomes for Autism Spectrum Disorder

Lynn Yeoman, PhD[1]; Daniel Stein, MD[2]; Robert Miller, CTN[3]; Stephan van Vliet, PhD[4]; Lori Varas, BS, CFHC[5]; Melissa Kindred, MSN, AGPCNP, RN[6]; Isolde van Oostenrijk, MS[6]; Diane Miller, BS[6]; Matthew Miller, MS[7]; Yvonne Lucchese, HHP[3]; Jeremy Malecha, BS, BME[8]; Eric Freiling, PhD[8]; Michael McNeill, PhD[9]; Carla Heiser, MS, LDN, FAAMFM, ABAAHP[6]

[1]Baylor College of Medicine, Houston, Texas; [2]Mosaic Diagnostics, Lenexa, Kansas; [3]NutriGenetic Research Institute, Ephrata, Pennsylvania; [4]Utah State University, Logan, Utah; [5]Research World, Chicago, Illinois; [6]Triada World, Chicago, Illinois; [7]NutrGenetic Research Institute, Ephrata, Pennsylvania; [8]Biocanic, San Diego, California; [9]Triada World, Algona, Iowa

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Background: Autism Spectrum Disorder affects 1 in 31 US children, far exceeding rates in other developed countries. This increase is accompanied by a male predominance, with boys diagnosed nearly 3.4 times more than girls. This multifactorial condition arises from complex interactions among genetic, environmental, immunological, and metabolic factors. Progress remains constrained by reductionist approaches that fail to address the systems-level complexity of ASD.

Methods: Thirty-five participants completed the study (mean age, 15 ± 6 years; 78% male). The intervention consisted of six education sessions based on the USDA MyPlate, prioritizing organic ingredients, weekly adherence monitoring, and a daily natural nutraceutical. We collected behavioral surveys, dietary recalls, and laboratory samples to analyze heavy metals, mycotoxins, environmental toxins, functional genomics, and food reactions using Wilcoxon Signed-Rank tests and logistic regressions. We developed personalized interventions incorporating comprehensive laboratory testing at baseline and 12 weeks to: (1) demonstrate feasibility through attendance, engagement, and satisfaction metrics; (2) improve nutrition quality while examining biomarkers; and (3) evaluate behavioral measures. We emphasized a family-wide, strategy-based approach. Caregivers were encouraged to adopt these same principles within their household systems, thereby reinforcing consistency. Approaches included: (1) Budget-conscious choices, demonstrating how to source and prepare clean ingredients. (2) Hydration support. (3) Fiber-rich foods were introduced to promote regularity and microbiome resilience. (4) Lifestyle integration, highlighting the role of sleep, rest, and relaxation. These non-restrictive strategies allowed participants to build practical habits that support long-term health without rigidity.

Results: Reductions occurred in tellurium ($p = 0.04$), sodium ($p = 0.05$), aflatoxin ($p = 0.05$), and ochratoxin ($p = 0.0001$). However, cadmium ($p = 0.008$), cesium ($p = 0.02$), and thallium ($p = 0.003$) increased, alongside monoethylphthalate ($p = 0.02$) and n-acetyl derivatives ($p < 0.0001$), while bisphenol-S decreased ($p = 0.05$). All participants exhibited polymorphisms in the following genes governing critical physiological systems: Detoxification & Oxidation = CAT, COMT, CBS, PON1, MTHFR C677T, NAT2, NFE2L2, NOS; Immune & Inflammatory Responses = IL6, HLA, NLRP3; Neurodevelopment & Behavior = OXTR, APOE; Cardiovascular & Metabolic Regulation = ACE, VKORC1, ABCB11, PEMT, FADS2. Additionally, 79% exhibited severe gluten reactivity, while 100% carried HLA DQ2/DQ8 polymorphisms, indicating a genetic predisposition to celiac disease. OTA levels exceeding the 95th percentile (> 7.5 ng/g creatinine) were observed in 86% of participants, indicating an extreme environmental toxin burden. Figure 1 illustrates the environmental exposures and genetic predispositions that drive neuroinflammation. It reveals the external insults and internal stressors through genetic vulnerabilities, leading to cellular breakdown and neuroimmune activation.

Conclusion: These findings demonstrate gene-environment interactions driving ASD pathophysiology, with vulnerabilities in detoxification, inflammation, and neurodevelopmental pathways. The intervention supports personalized approaches, modulating gene expression, enhancing nutrition, and reducing toxicological burden. This systems-based strategy offers potential for management through early interventions. Transforming food environments for school-age children and young adults requires a community-wide commitment. This approach ensures that participants do not become outliers but rather become part of a cultural shift toward accessible, practical nutrition that families can sustain long-term without rigidity.

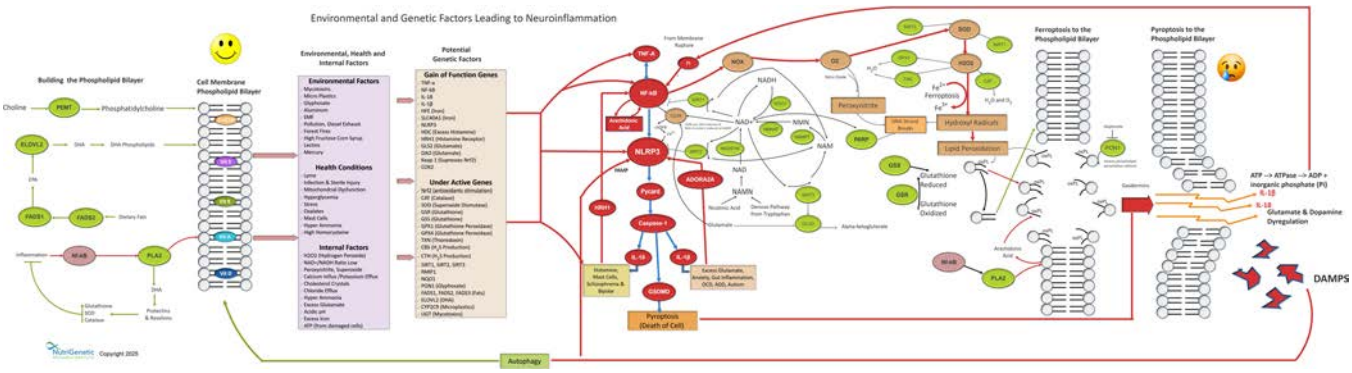

Figure 1. Genetic variance and inflammasome activation: detoxification, inflammation, and oxidative stress impacts

Poster of Distinction Award

P149 - Total Energy Expenditure Characterization in Adults With Cirrhosis and Obesity and its Relation to Energy Recommendations

Ana Limon-Miro, PhD[1]; Peter J. Walter, PhD[2]; Sarah Purcell, PhD[3]; Serena Isley, MSc[1]; Carminda Lamboglia, PhD[1]; John Spence, PhD, FCAHS[1]; Marsha Morgan, PhD, MD[4]; Carla M. Prado, PhD, RD, FCAHS[1]; Puneeta Tandon, MSc, FRCPC, MD[1]

[1]University of Alberta, Edmonton, Alberta; [2]National Institutes of Health, Bethesda, Maryland; [3]University of British Columbia, Kelowna, British Columbia; [4]University College London Institute for Liver & Digestive Health, London, England

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Background: Malnutrition is associated with poor health outcomes in adults living with cirrhosis and obesity, yet energy requirements for this population remain unclear. Although doubly labeled water (DLW) is the gold-standard method for measuring total energy expenditure (TEE) in free-living conditions, previous studies on cirrhosis using this technique were limited to 8 patients in the early 1990s. This study aims to characterize TEE in adults with compensated cirrhosis and obesity, and to compare measured TEE with energy recommendations.

Methods: Adults with compensated cirrhosis (Child-Pugh A), MASLD etiology, and BMI ≥30 kg/m^2, underwent resting energy expenditure (REE) by indirect calorimetry. TEE assessment by DLW was assessed over 14 days. Predicted TEE was calculated using cirrhosis guidelines and DRIs. Accuracy was evaluated using paired t-tests, Bland-Altman analysis, and the proportion of estimates within 10% of measured TEE.

Results: Twenty-one patients (M:F 10:11; age: 63.5 ± 10.3 y; BMI: 37.2 ± 6.1 kg/m^2) were included. TEE varied widely: 2848 ± 840 kcal/day (range: 1286–5249), or 27.04 ± 8.7 kcal/kg/day (range: 16.1–52.5), with a mean physical activity level of 1.56 ± 0.4. Cirrhosis-related energy recommendations were weakly correlated with TEE (r = 0.2–0.3, P = 0.3). All predictive approaches exhibited wide limits of agreement, with no proportional bias. Estimates were within 10% for less than 40% of cases.

Conclusion: Among adults with compensated cirrhosis and obesity, significant interindividual variability exists in TEE. Current guidelines have limited accuracy at the individual level, highlighting the need for further research to enhance energy recommendations for these patients.

Pediatric, Neonatal, Pregnancy, and Lactation

P150 - Seeing is Believing: The Use of Muscle Ultrasonography in the Nutrition Management of Pediatric Oncology Patients: A Case Report

Corey Hawes, DCN, RD, CSO, CNSC, LD[1]
[1]University of Kentucky, Kentucky Children's Hospital, Versailles, Kentucky

Financial Support: None Reported.

Background: There is a lack of evidence-based guidance on best-practices for managing nutrition-related complications during pediatric cancer treatment, which is in part due to the multitude of nutritional interventions, yet a paucity of knowledge on their impact on clinical status and patient outcomes. The objective of this case report is to provide evidence that muscle measurements via ultrasound (US) could be an effective, objective assessment tool in monitoring nutrition interventions and outcomes.

Methods: This case report followed an 8-year-old diagnosed with metastatic Wilm's Tumor throughout her cancer treatment; utilizing US to measure quadricep muscle layer thickness (QMLT) for assessment of her nutrition interventions to aid in management of her nutritional status.

Results: After the patient had lost 14.7% of her body weight during the initial cancer treatment, a QMLT US was conducted, which demonstrated a muscle thickness of 2.03cm. She then started on an appetite stimulant and demonstrated a 3.9kg weight gain after 2 months. Despite the weight gain, the QMLT demonstrated a loss of muscle thickness to 1.92cm (-5.4%) and subjectively demonstrated increased adipose deposition in the muscle. Subsequently, the patient transitioned from the appetite stimulant to enteral nutrition therapy with oral intake. After one month of enteral nutrition, she gained an additional 1.1kg but also demonstrated a significant increase in QMLT to 2.31cm (+20.3%). Moreover, her muscle quality had improved with reduced muscle adipose deposition.

Conclusion: This case report demonstrates that nutrition interventions can be monitored and tailored to patients utilizing objective assessment methods. Pilot funding for a randomized controlled clinical trial utilizing US in the management of nutrition therapy has been obtained to further this research.

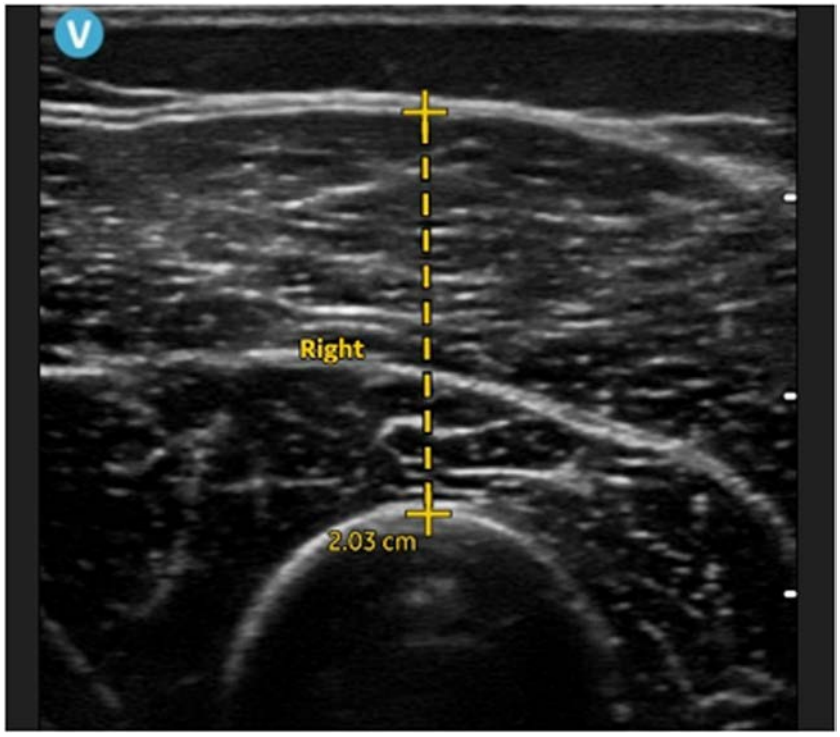

Figure 1. April US

First US conducted after 14.7% weight loss.

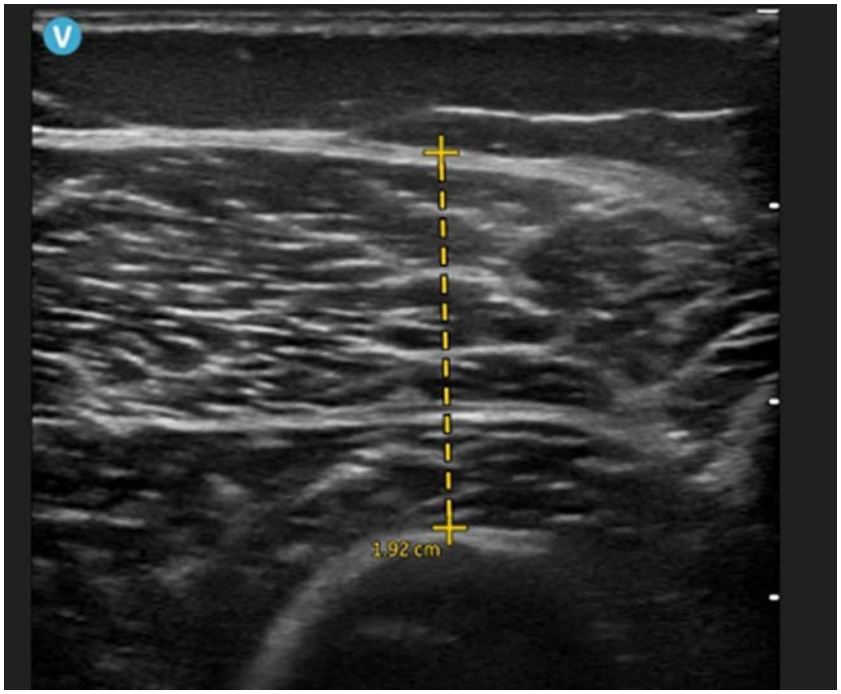

Figure 2. June US
Second US conducted after initiation of appetite stimulant.

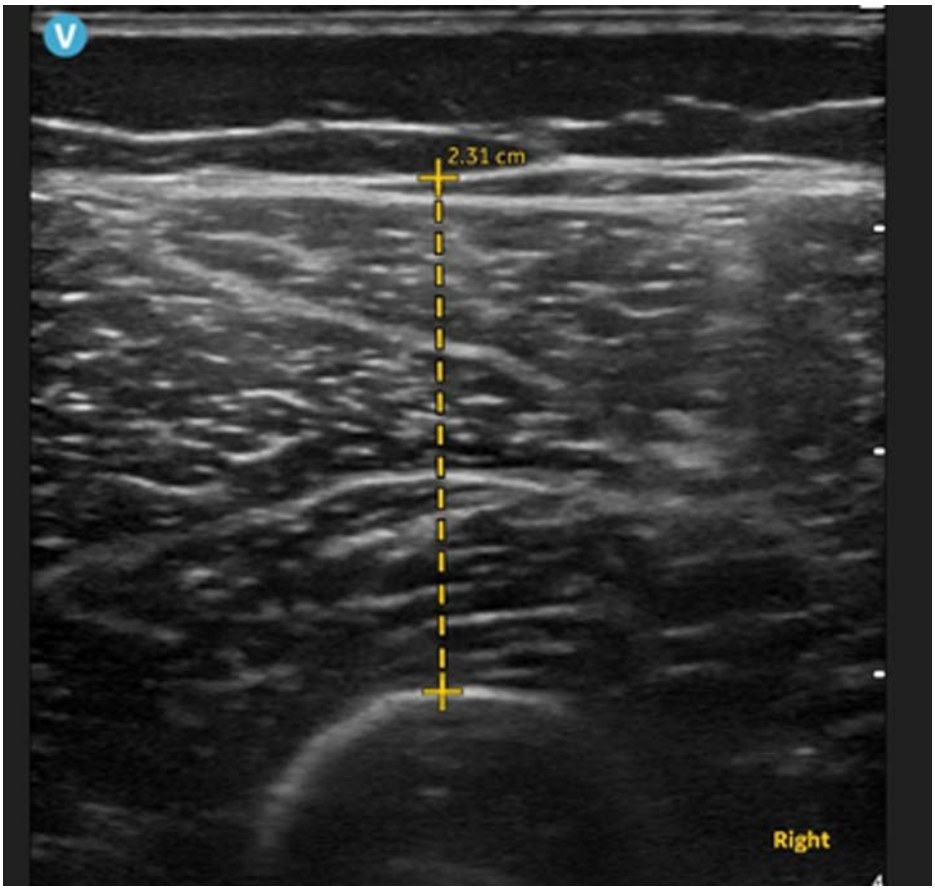

Figure 3. July US
Third US conducted after discontinuing appetite stimulant and initiation of enteral nutrition.

P151 - Can We Narrow Antibiotics Sooner? Evaluating Concordance of BCID2 With Blood Cultures in Pediatric Intestinal Failure Patients

Jacob Rotter, MD[1]; Sivan Kinberg, MD, MS, MA[2]; Irene Frantzis, MD[3]; Seth Younger, BA, MS[4]; Pratyay Datta, BS, MS, PhD[4]
[1]New York Presbyterian - Columbia Campus, Fort Lee, New Jersey; [2]Columbia University Irving Medical Center, New York, New York; [3]New York Presbyterian - Columbia Campus, New York, New York; [4]Columbia University, New York, New York

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Background: Pediatric intestinal failure (IF) requires the placement of a central venous catheter (CVC) for essential fluids and nutrients to sustain growth. While CVCs are life-sustaining, they are associated with morbidity and mortality, particularly due to central-line associated bloodstream infections (CLABSIs). Despite advances in central line care and an emphasis on CLABSI prevention, sepsis remains a major source of mortality in this population. The current standard of care for pediatric IF patients with fever is to evaluate for CLABSI with blood cultures and initiate broad-spectrum antibiotics for 48 hours prior to narrowing if cultures are positive. However, this approach results in repeated and prolonged exposure to broad-spectrum antibiotics, risk of development of resistant organisms, and increased length-of-stay. The Blood Culture Identification 2 Panel (BCID2), a multiplex PCR test was implemented throughout the United States in 2021. This test allows for more rapid identification of common pathogens compared to traditional blood cultures. The aim of this study was to determine whether BCID2 results correlated with conventional blood culture results. This would facilitate more timely narrowing of empiric antibiotic coverage, decrease length-of-stay and could potentially help preserve central access if organisms are detected earlier, allowing for faster clearance of cultures.

Methods: This was a retrospective chart review of all patients with a diagnosis of intestinal failure and a central line in place managed at a single pediatric center between October 2020-November 2024 who presented with fever or developed fever during admission. Demographic data, length-of-stay, blood culture result, and antibiotic data (including central vs. peripheral culture growth, empiric antibiotics started, time to culture positivity, and final antibiotic prescribed) were collected.

Results: 39 unique patients and 175 positive blood cultures were reviewed, with ages ranging from 6 months to 23 years old from October 2020 through November of 2024. The median length of stay was 14 days. Overall, 85% of blood cultures demonstrated concordance with BCID2 results. Among the 25 discordant cases, 21 positive cultures were either not detected by BCID2, or the blood culture grew additional organisms compared to BCID2. The other 4 discrepancies represented cultures where the BCID2 may have been overly sensitive, with organisms identified on BCID2 but not confirmed on the final blood culture.

Conclusion: The BICD2 panel represents a valuable opportunity to reduce antibiotic exposure in pediatric patients with intestinal failure who present with fever. The current standard of care recommends 48 hours of empiric broad-spectrum antibiotics while awaiting final blood culture results. Given that the BCID2's strong concordance with blood cultures in this study, this may support earlier narrowing of antibiotics, potentially leading to reduced overall antibiotic exposure, minimized risk of antimicrobial resistance, and decreased length-of-stay. However, approximately 15% of cases showed discordance between BCID2 and final cultures, most involving Gram positive organisms which are less comprehensively captured on the BCID2 panel compared to Gram negative organisms, which are well-represented on BICD2. These findings underscore the need for judicious interpretation of BICD2 results, as clinical decisions must balance the benefits of early antibiotic narrowing with the risk of missing potentially treatable infections. Larger, multi-center studies are needed to further investigate the accuracy of the BCID2 panel compared to blood cultures.

P152 - New Onset Diarrhea in a Medically Complex Patient

Emily Barlow, PharmD, BCPPS[1]; Michele Dicarlo, PharmD[2]
[1]Mayo Clinic, Byron, Minnesota; [2]Mayo Clinic, Rochester, Minnesota

Financial Support: None Reported.

Background: Pediatric medications are frequently provided in liquid forms for easy and customizable patient doses. Oftentimes, liquid medications are flavored and sweetened to optimize patient tolerance and overall adherence. This is accomplished by formulating liquid medications with sugars or sugar alcohols such as sorbitol, xantham gum, and glycerin. GI intolerance, specifically diarrhea, can often be associated with high quantities of liquid medications some patients require, as these often contain exorbitant amounts of sugar or sugar alcohol. Prolonged or severe GI intolerance in pediatric patients can lead to complications such as dehydration, electrolyte disturbances, and decreased absorption.

Methods: A 9-month-old infant with a complex medical history including trisomy 21, Tetralogy of Fallot, atrioventricular (AV) valve regurgitation, AV canal defect, right ventricular outflow tract obstruction, and congenital hypothyroidism was initially hospitalized for respiratory distress. Hospitalization was prolonged due to complications related to tracheostomy and gastrostomy tube placement, complete AV canal repair, complex chylothorax, TPN dependence due to NPO status, and iatrogenic withdrawal. Following completion of NPO treatment for chyle leak, the infant was able to achieve and tolerate goal enteral feedings. Five days after reaching goal feedings, it was noted on clinical review that the infant was experiencing increased diarrhea, documented as 7 to 9 large, watery stools per day over the prior 3 days. All medications were reviewed given this clinical change. Nine liquid medications were identified, contributing over 20 mL per day. Two-thirds of this medication volume correlated with scheduled morning medications and were noted to contain inactive ingredients like xantham gum, sorbitol, glycerin, and sucrose.

Results: Recommendations were made to adjust medication formulations from liquid to tablet(s) to reduce overall volume, osmolality, and sugar/sugar alcohol burden. Ultimately, five of the nine liquid medications were changed to tablets which were crushed, mixed with water, and administered via gastrostomy tube. These changes resulted in a liquid medication burden of only 10 mL per day rather than the previous > 20 mL per day. Following these changes, daily stool output decreased, ranging from 3 to 5 medium, soft stools per day.

Conclusion: When reviewing complex patients, it is vital to review clinical updates and any recent changes to medications or diet. Special consideration should be given to liquid medications, knowing their high osmolality and high sugar/sugar alcohol content are likely to increase GI intolerance symptoms. Minor changes such as these can have a considerable impact on a patient's stool output. Pharmacists should complete a comprehensive review of medications with special focus on volume, inactive ingredients in products being used, osmolality, and overall formulation tolerance. Consideration can be given to adjusting medication doses, schedule, or formulations to decrease volume burden and related irritation to the GI tract. Completing a focused pharmaceutical review of all prescribed medications can reduce unintentional irritation to the GI tract with the potential to improve patient outcomes, patient experience, decreased need for additional interventions, and improve overall absorption.

P153 - Improving Continuity of Care for Children Dependent on Enteral Nutrition Through a Multidisciplinary Approach

Namrata Patel-Sanchez, MD, MPH, FAAP[1]; Clarissa Rivas, LCSW[1]; Peggy Macy, LCSW[1]; Jennifer Duong, MD[1]; Bradley Green, MS, MPH[1]; Mala Setty, MD[1]

[1]University of California-San Francisco, Oakland, California

Financial Support: None Reported.

Background: Children with complex medical conditions, especially those with severe neurological impairment, often require intensive, sustained care across multiple specialties, which creates significant logistical and clinical challenges for families and healthcare providers. This complexity leads to numerous appointments, presenting challenges in maintaining sustainable, coordinated care and appropriate attrition rates in the clinical setting. Majority of these children depend entirely on enteral nutrition to prevent malnutrition and/or aspiration and experience gastrointestinal complications, therefore routine follow-up is vital to their well-being. Achieving both high-quality outcomes and continuity of care is particularly challenging and addressing these needs calls for innovative approaches to streamline care delivery and enhance patient engagement.

Methods: A quality improvement initiative was implemented to address attrition and scheduling inefficiencies in this patient population. In February 2024, we noticed that >90% of our established patients had been seen in the past 12 months but only ~67% had been seen in the past 6 months. With a goal of increasing the attrition rate of 6-month follow-up, a multidisciplinary team—comprised of physicians, advanced practice providers, dietitians, nurses, social workers, and office assistants—was invited to collaboratively manage care and engage in quality improvement initiatives. The first key intervention was the introduction of a structured weekly meeting, enabling systematic case review and appointment planning. Routine appointment reminders were sent either via the electronic medical record (EMR) system or text message from the social workers. After initial improvement, this was found unsustainable. We proceeded with a 2nd PDSA cycle. Through the use of an A3 methodology and the 5- Whys Tool, we established appointment scheduling to be a major barrier. This barrier was due language as our clinic serves patients with over 10 different primary languages and due to the cost of mobile devices/plans, limiting telecommunication between our scheduling staff and families via phone or EMR. We provided patients with appointment slips to be given at check-out and tracked our progress using run charts.

Results: While the institution of weekly multidisciplinary team meetings also allowed us to increase and sustain our 12 month attrition rate > 95% of established patients, the percent of established patients seen within 6 months improved from 63.6% to 69.7% the first month but then it dropped to 64.6% over the course of another 4 months. Though if observing 6 months ahead from PDSA #1 along with the adaptation of

PDSA #2, our 6-month attrition rate improved to 73.0%, much closer to our 75.0% target. The percent of patients who scheduled their subsequent follow-up appointment the same day increased from 7.5% median baseline prior to the interventions to 69%.

Conclusion: The implementation of a weekly multidisciplinary meeting including physicians, advanced practice providers, dietitians, nurses, social workers, and office assistants allowed for improved communication among different disciplines regarding the barriers to providing sustainable care for children with complex medical needs that depend on enteral nutrition. It allowed for sustaining a high 12-month attrition rate and improvement of 6-month attrition rate. The use of appointment slips strongly contributed to the efficiency of in-person scheduling over electronic scheduling for families with children with complex medical needs. This model shows promise for broader application in pediatric populations requiring coordinated, long-term care.

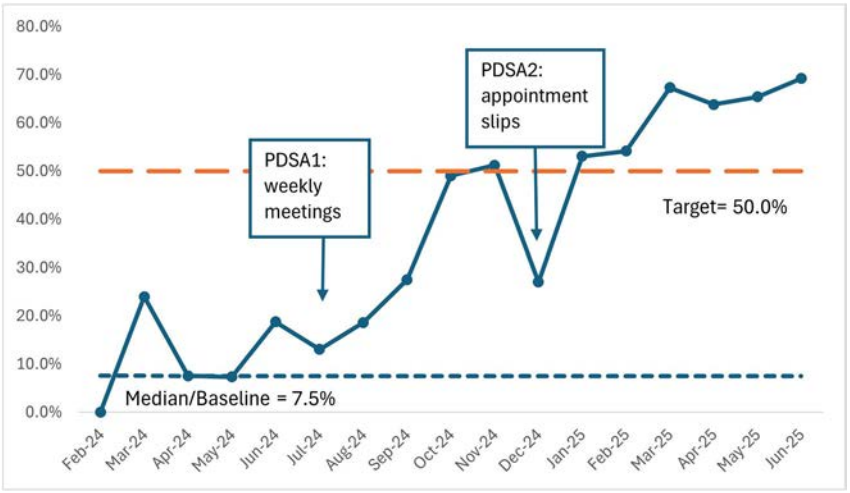

Figure 1. Percent of patients with follow-up appointments made same day

We increased our same-day follow-up appointment scheduling from 7.5% to 27.5% after PDSA #1 and up to 69.2% after PDSA #2.

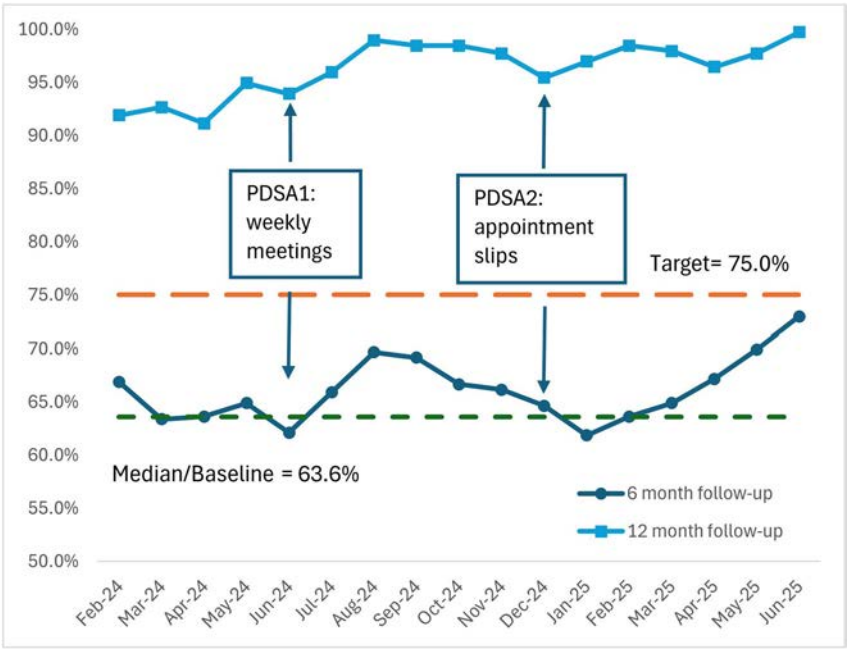

Figure 2. Percent of established patients seen within 6 and 12 months

We tracked the percentage of established patients who were evaluated in the past 6 and 12 months.

P154 - Impact of Portion Size Intervention on Energy Intake and Obesity Risk in School-Aged Children: A Systematic Review and Meta-Analysis

Salma Luthfiyah Sani, MSc[1]; Sara Alfaraidi, MSc, ANutr, RD[1]; Mu Yongqi, MSc[1]; Gideon Hot Partogi Sinaga, MD[2]; Atul Singhal, MD[1]
[1]Childhood Nutrition Research Centre, UCL Great Ormond Street Institute of Child Health, London, UK, England; [2]Faculty of Medicine, University of Indonesia, Jakarta, Indonesia, Jakarta Raya

Financial Support: None Reported.

Background: Childhood obesity is a major global public health challenge, whose prevalence has increased substantially over recent decades. This rise has paralleled an increase in the portion sizes of foods offered to children. The 'portion size effect,' a phenomenon where larger portions lead to greater energy intake, has been consistently demonstrated in adults and younger children. However, the impact of portion size manipulation interventions on dietary intake and risk of obesity in school-aged children has not been systematically examined. Therefore, this systematic review aimed to critically evaluate the evidence for the effects of portion size interventions on energy intake and risk of obesity in this age group.

Methods: A PICO framework was applied to identify relevant studies from Embase (Ovid), Medline (Ovid), and the Cochrane Library (from inception to 2025). Eligible studies were original English-language research involving children aged 5–17 years, using experimental or controlled designs, and reporting outcomes such as energy intake, body weight, or Body Mass Index (BMI). Risk of bias was assessed using the Quality Criteria Checklist.

Results: A total of 514 articles were identified, of which 10 studies involving 1,765 participants met the inclusion criteria. Eight studies reported that larger portion sizes increased food intake (g) and/or energy intake (kcal), one study found no effect of portion size on energy intake, and another focusing on fruit and vegetable portions reported inconsistent findings. Meta-analysis demonstrated that larger portion sizes were associated with significantly higher energy intake compared to reference portions (Mean Difference = 86.0 kcal/meal, 95% CI [62.2, 109.9], $p < 0.00001$).

Conclusion: Larger portion sizes increase children's energy intake, highlighting portion size as a critical modifiable factor influencing dietary behaviours in children. However, current evidence is largely limited to short-term, laboratory-based studies, and further longitudinal research is needed to determine the long-term effects of portion size interventions on energy intake and risk of obesity in childhood.

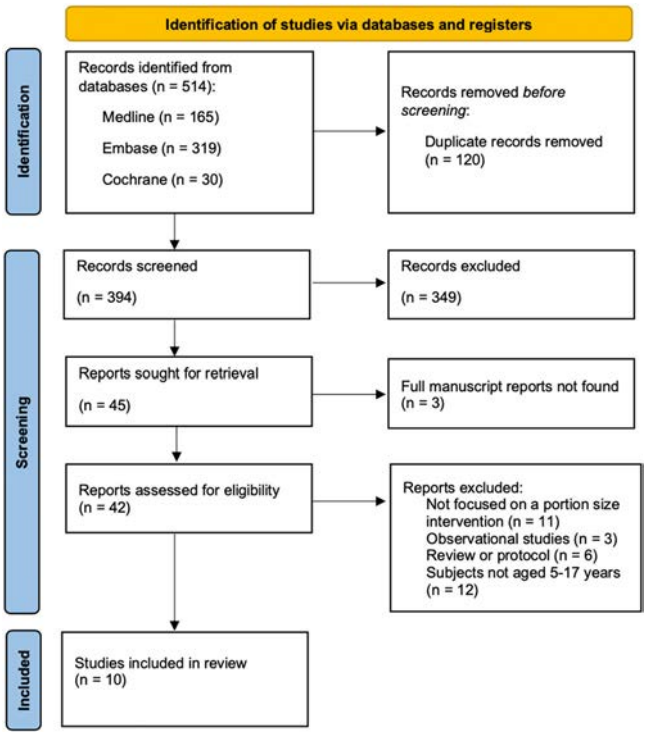

Figure 1. PRISMA flowchart for study selection

Flow diagram illustrating the selection process for studies included in the systematic review of portion size interventions in school-aged children.

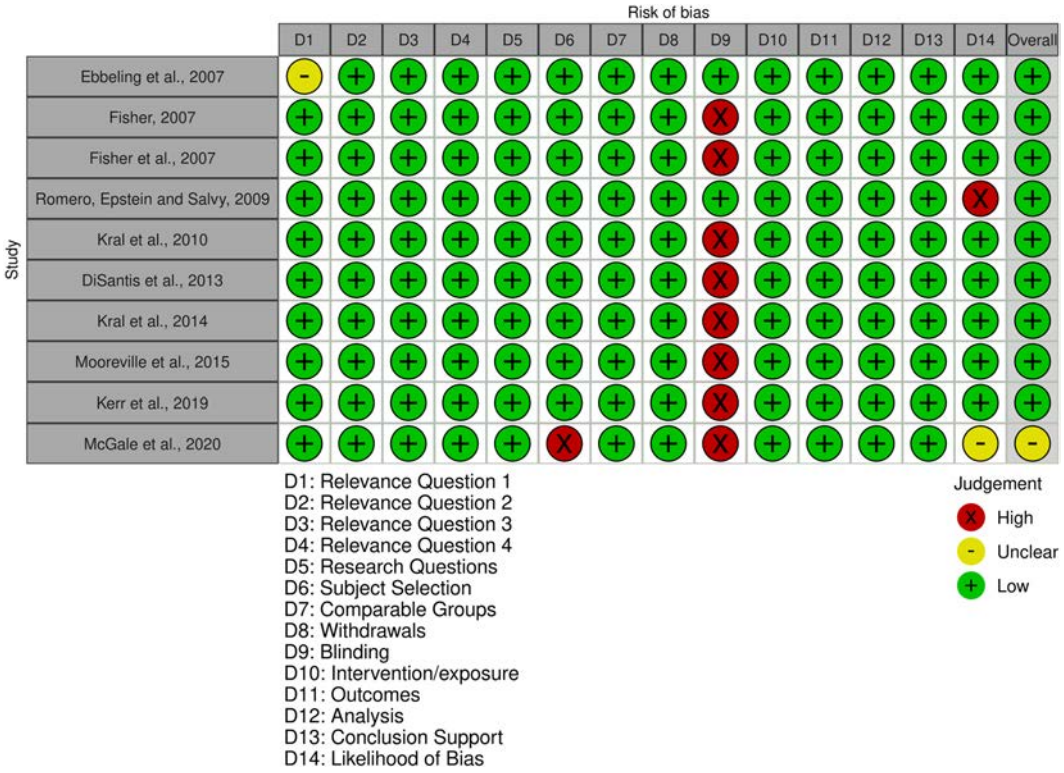

Figure 2. Results of quality assessment

Risk of bias assessment for included studies across 14 domains: Relevance Questions 1–4, Research Questions, Subject Selection, Comparable Groups, Withdrawals, Blinding, Intervention/Exposure, Outcomes, Analysis, Conclusion Support, and Likelihood of Bias.

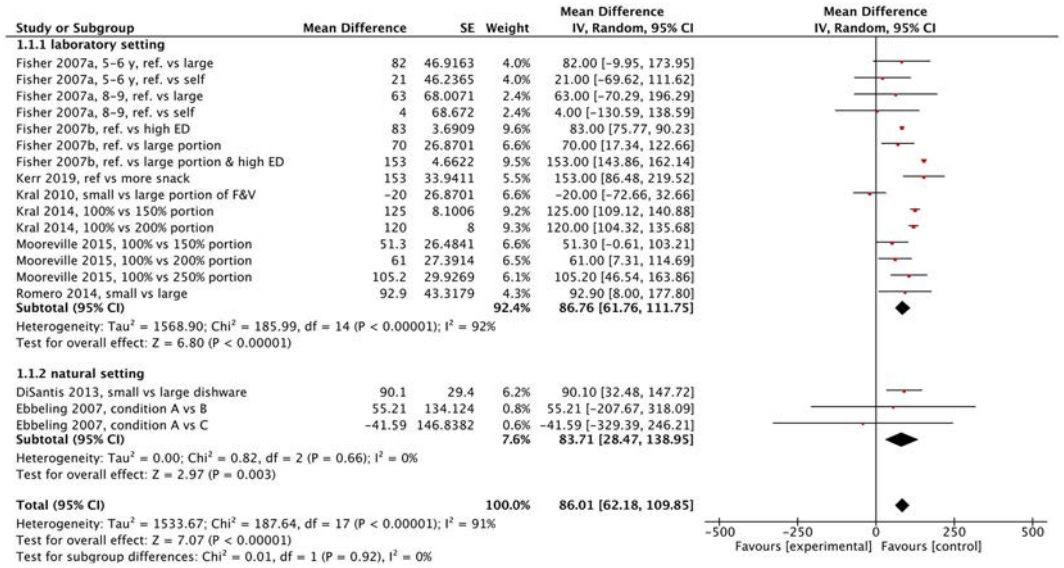

Figure 3. Meta-analysis of mean difference (kcal) in total energy intake between small (reference) and large portion size

The meta-analysis included 18 comparisons from nine studies that analysed the mean difference in total energy intake (kcal) between smaller and larger portions in school-aged children.

P155 - Individualized or Standardized Parenteral Nutrition? A Study on Prescriptive Variability in High-Risk Preterm Infants

Francesco Cresi, MD[1]; Eleonora Castellana, PharmD[2]; Elena Maggiora, MD[1]; Maria Rachele Chiappetta, PharmD[2]; Cecilia Capetti, MD[1]; Alessandra Coscia, MD[1]

[1]Neonatal Intensive Care Unit, University Department, Sant'Anna Hospital, Città della Salute e della Scienza di Torino University Hospital, University of Turin, Italy, Turin, Piemonte; [2]Hospital Pharmacy, Città della Salute e della Scienza di Torino University Hospital, University of Turin, Italy, Turin, Piemonte

Financial Support: None Reported.

Background: Parenteral nutrition (PN) is crucial for preterm and critically ill neonates, whose metabolic and nutritional requirements vary widely due to gestational age, birth weight, concurrent enteral nutrition, pharmacologic therapies, and comorbidities such as patent ductus arteriosus (PDA), renal insufficiency, and respiratory distress. Rapid shifts between acute, stabilization, and growth phases further alter fluid demands, nutrient utilization, and metabolic rates. While a personalized PN approach can meet these dynamic needs, major nutrition societies (ESPGHAN and ASPEN) recommend standardized PN bags to reduce infection risk, prescription errors, and preparation delays. Standard formulations, however, are rarely used in preterm or critically ill infants because they are perceived as insufficiently precise. To date, variability in personalized PN prescriptions among experts has not been systematically evaluated. This study aimed to quantify such variability and identify the clinical factors that influence it.

Methods: An observational survey was conducted among Italian neonatologists managing PN in neonatal intensive care units, recruited from 30 centers participating in multicentre trials (ENTARES and INCAS). Twenty-three neonatologists (response rate 76%) completed the survey, and 57% had over ten years of PN experience. Participants were asked to prescribe a personalized PN regimen—detailing volume and nutrient composition—for a hypothetical preterm neonate: a 27-week gestation infant, birth weight 1 000 g, weight 900 g on day 4 of life, with respiratory distress syndrome on non-invasive ventilation, PDA, jaundice, hyperglycemia, and specified enteral nutrition and therapies. They also rated (on a 1–5 scale) the influence of clinical factors such as weight change, urine output, PDA, gestational age, and ventilation mode on their prescriptions. Prescriptive variability was assessed by calculating the normalized interquartile range (IQR) overall and for each nutrient.

Results: Substantial variability emerged. The global normalized IQR of nutrient prescriptions was 17.02%. Variability was highest for amino acids, calcium, and phosphorus, and lowest for lipids, sodium, and potassium. Weight change, diuresis, and presence of PDA were significantly associated with variability ($p < 0.05$), whereas gestational age and ventilation mode had lesser impact. The distribution of weights assigned to clinical factors varied markedly among physicians, suggesting heterogeneous decision-making processes.

Conclusion: Even among experienced neonatologists dealing with the same clinical scenario, PN compositions differed widely. This heterogeneity underscores the challenge of determining a single "optimal" PN bag. Instead, consensus may lie in defining acceptable ranges for nutrient formulations. Such ranges—broad for amino acids, calcium, and phosphorus and narrow for lipids, sodium, and potassium—could serve as tolerance limits within which standardized PN bags might safely be used in high-risk preterm infants. Although limited by sample size and reliance on a single case, this study suggests a hybrid strategy: calculate an ideal individualized formulation based on patient-specific needs, then select the closest matching standard bag, defaulting to fully customized PN only if deviations exceed predefined thresholds. Future research should refine these tolerance limits and assess integrated prescribing models. Development of software tools for PN prescription and outcome monitoring could further enhance precision and consistency in clinical practice.

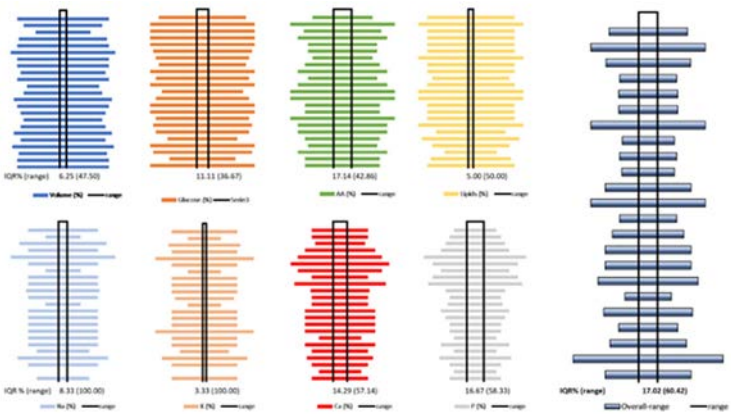

Figure 1. Prescriptive variability among experts

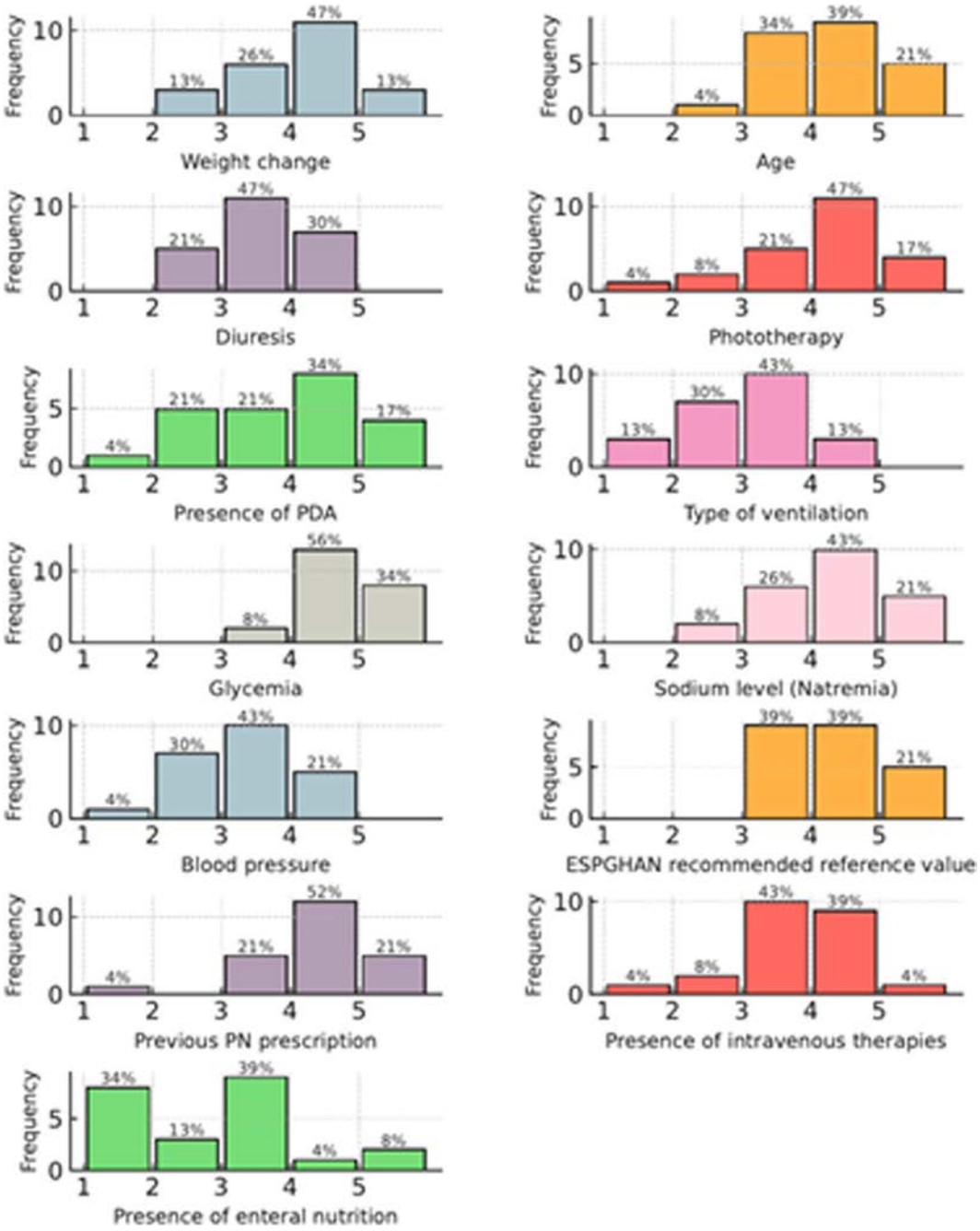

Figure 2. Variability in the weight assigned to each clinical factor in the formulation of parenteral nutrition

P156 - Characteristics of Young Children and Households Experiencing Stunting in Colombia: Cross Study

Amy Sharn, MS, RDN, LD[1]; Clara Rojas Montenegro, RD[2]; Carlos Hoyos Ponton, MS[3]; Nestor Lara Yanes, MEd[4]; Kristen Mallory, MPH[5]; Claudia Sanchez Franco, MD[6]; Monica Jimenez, MPH[7]; Omaira Valencia, PhD, MPH, MBA, RD[7]

[1]Abbott Nutrition, Columbus, Ohio; [2]Universidad del Rosario-Escuela de Medicina, Bogota, Cundinamarca; [3]Children International, Barran, Atlantico; [4]Children International, Santa Marta, Magdalena; [5]Children International, Kansas City, Missouri; [6]Abbott Nutrition, Bogota, Cundinamarca; [7]Fundación Santa Fe de Bogotá, Bogotá, Cundinamarca

Financial Support: Abbott Laboratories; HA70.

Background: Pediatric malnutrition affects more than a third of children under 5 worldwide. Nearly a third face malnutrition related to inadequate caloric and nutrient intake that can lead to growth complications such as underweight and stunting. However, UNICEF estimates do not provide a current glimpse into the prevalence of stunting and its risk within Colombia or surrounding Latin American countries, or the characteristics of children and families that are impacted by stunting. Thus, an innovative partnership with a non-governmental organization and healthcare industry partner was created to understand the characteristics of children and households experiencing stunting or malnutrition versus those who do not with the goal to support future development of a nutrition program to alleviate burden of stunting.

Methods: This mixed-methods observational study evaluated stunting among children aged 1 to 5 years as a multi-level crisis using the Socioecological Model (child, caregiver/household, community health workers, public health professionals, organizational, structures and systems) across 3 visits for 6 months. The study was conducted in 2 (Barranquilla, Cartagena) community centers in Colombia that have ongoing children's programming that serve children with malnutrition or its risk. Malnutrition or its risk was defined as height for age z-score (HAZ) ≤ -1 SD and/or mid-upper arm circumference z-score (MUACz) score ≤ -1 or ≥ +1. This abstract presents baseline characteristics only of children and caregivers/households; additional demographic and child nutritional intake data is forthcoming.

Results: 204 children and caregivers participated. Most children were male (52.9%, n = 108), with mean age 3.8 (± 1.0) years. Children in Cartagena were slightly younger ($p < 0.001$), though there were no other significant differences in characteristics among children ($p > 0.05$). Most children were born via Cesarean (56.9%, n = 116). Mean birth weight was 3284 (±413) grams, and gestational age was 39.1 (± 0.9) weeks. Most children completed deworming (81.9%, n=167) and had a completed age-appropriate vaccination schedule (93.6%, n = 191). Overall, more than half of children had malnutrition risk by HAZ or MUACz, 39.7% (n = 81) and 26.0% (n = 53), respectively. Most caregivers were female (80.4%), and the median number of individuals living in the home was 4 (IQR 4-5). Most households experienced moderate or extreme poverty, and children experiencing malnutrition risk had higher frequencies of food insecurity and poverty.

Conclusion: More than half of children aged 1 to 5 years were at malnutrition risk and lived in households experiencing food insecurity and/or poverty. Multi-sector partnerships are imperative to understand stunting as a multi-level crisis among children with the hope of developing and improving access to multi-level comprehensive nutrition-focused interventions that could support optimized nutrition status and overall health improvements.

P157 - Weight Trajectory for Infants Undergoing Cardiac Surgery Who Develop Chylothorax: A Case-Control Retrospective Cohort Study

Kaitlin Berris, RD[1]; Nicolas Mourad, BSc, MD(c)[2]; Nicholas West, MSc[3]; Cheryl Peters, MD[1]; Steven Rathgeber, MD[1]
[1]BC Children's Hospital, Vancouver, British Columbia; [2]University of British Columbia, Vancouver, British Columbia; [3]BC Children's Hospital Research Institute, Vancouver, British Columbia

Financial Support: None Reported.

Background: Chylothorax is a common postoperative complication, involving loss of nutrient-rich fluid from damage to the lymphatic system. Many infants with congenital heart disease require corrective surgery within the first year of life and, if chylothorax develops, require a fat-modified diet. This study's primary aim was to evaluate weight trend after heart surgery to determine if fat-modified formula impacted growth. The secondary aims were to 1) determine weight trend prior to surgery in those who developed chylothorax vs. those who did not and 2) evaluate the impact of short-term fat-modification on long-term weight trends up to 12 months post-surgery.

Methods: We conducted a retrospective cohort study of cases from 2017-2022 in children under 1-year-old and compared those who developed chylothorax and required a fat-modified diet with age- and procedure-matched controls. Collected data included: gestation age at birth, genetic conditions, sex, age at cardiac surgery, and weight-based growth parameters from birth to 12-months after surgery (Table 1). We examined the difference in weight-for-age z-score between groups using linear mixed effects models, accounting for repeated measures. Models estimated mean differences and 95% confidence intervals (CIs) between groups, both overall and at each time point (via a group: time interaction) and were adjusted for possible confounding variables.

Results: There were 22 patients per group (control vs. fat-modified diet). Mean ±SD birth weight z-score was 0.19 $\pm$1.02 vs. −0.37 $\pm$1.24 between groups. Mean ±SD age at surgery was 18.5 ±12.2 weeks. There was no significant difference in weight z-scores between groups during fat-modified treatment duration, with a mean (95%CI) z-score difference at 4 weeks post-surgery of −0.22 (-0.96 to 0.52), $p = 0.56$. Patients that ended up developing chylothorax more often had come into surgery having had developed moderate neonatal malnutrition with a mean (95%CI) weight z-score of -1.5 (-1.2 to -2), compared to patients who did not develop chylothorax who were more likely to enter surgery with mild

neonatal malnutrition, with a weight z-score of -1.1 (-0.8 to -1.2). Developing chylothorax did not impact growth over the long-term compared to control with a mean (95%CI) difference in weight z-score of 0.55, (-0.21 to 1.30), p =0.16 (Figure 1).

Conclusion: This study presents evidence that diet therapy with a fat-modified formula in infants with post-cardiac surgery chylothorax did not cause significant growth faltering compared to age- and procedure-matched controls. Malnutrition was often present at the time of the operation with children recovering birth weight-for-age z-score by 6- and 12-months follow-up. Development of moderate preoperative malnutrition may predict complications postoperatively and should be further evaluated.

Table 1. Patient demographics

Table 1. *Demographic data for patients who required a low-fat diet and the control group*

	Low Fat (*n=22*)	Control (*n=22*)	*p* value
Birth Anthropometrics			
Weight (Z)	-0.37 ± 1.24	-0.19 ± 1.02	0.63
Length (Z)	0.30 ± 0.79	-0.02 ± 1.42	0.44
Weight-for-length (Z)	-0.35 ± 1.41	-0.38 ± 1.22	0.96
Gestational Age at Birth, week	37.3 ± 3.0	39.0 ± 1.8	0.04*
Term Birth over 37w, n (%)	12 (60)	17 (81)	0.25 [a]
Male, n (%)	12 (54.5)	14 (63.6)	0.76 [a]
Genetic Condition Present, n (%)	6 (27.3)	5 (22.7)	0.50 [b]
Age at time of OR, week	18.6 ± 12.3	18.4 ± 12.1	0.95

Data expressed as mean ±SD, unless otherwise specified
Independent t-test performed unless otherwise specified, [a] Chi square test, [b] Fisher's exact Probability test
*Statistically significant value $p = <0.05$

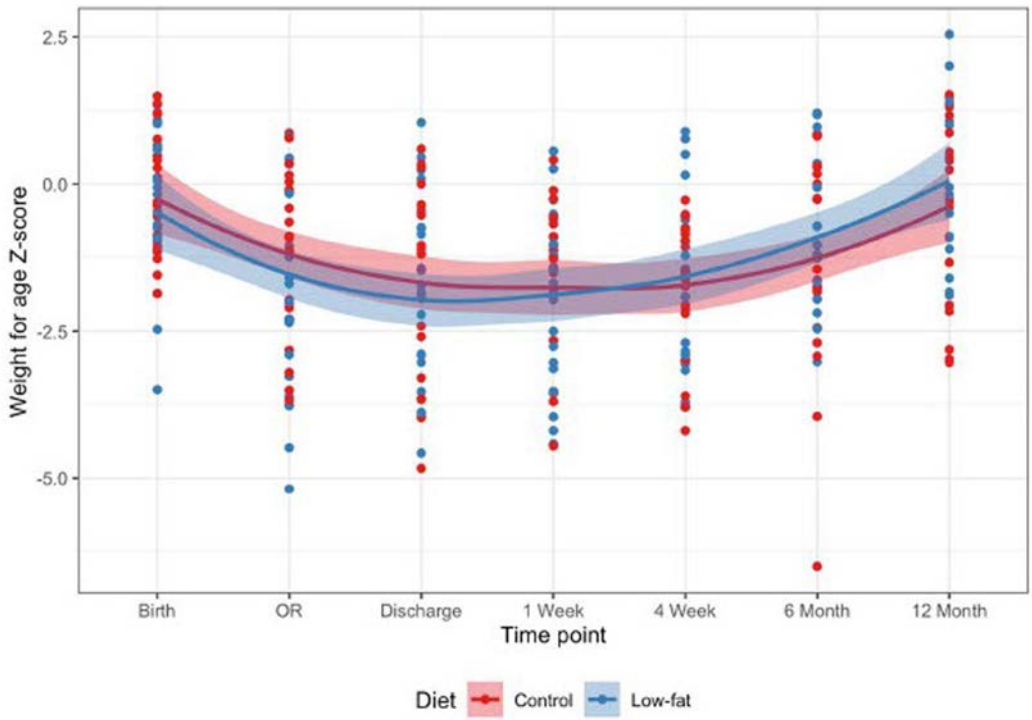

Figure 1. *Growth outcomes across time between low-fat and control groups.*

Figure 1. Growth across time points

International Poster of Distinction Award

P158 - Development of Home-Based Methods to Defat Human Milk for Infants With Chylothorax: An Experimental Study

Kaitlin Berris, RD[1]; Kendall Plant, MSc[2]; Frances Jones, RN[3]; Diego Marquez, MD[1]; Vicki Hsieh, RN[1]; Rajavel Elango, PhD[4]
[1]BC Children's Hospital, Vancouver, British Columbia; [2]BC Children's Research Institute, Vancouver, British Columbia; [3]BC Women's Provincial Milk Bank, Vancouver, British Columbia; [4]BC Children's Hospital Research Institute, Vancouver, British Columbia

Encore Poster

Previous Publication: Berris K, Plant K, Jones F, Marquez D, Hsieh V, Elango R. Development of home-based methods to defat human milk for infants with chylothorax: An experimental study. JPEN J Parenter Enteral Nutr. 2025 Aug;49(6):724-731. doi: 10.1002/jpen.2782. Epub 2025 Jun 23. PMID: 40551440; PMCID: PMC12319493.

Financial Support: Quintessence Foundation.

P159 - Experience from a Newly Formed Multidisciplinary Pediatric HPN Program: A Six-Year Retrospective Review

Megan Volk, RDN, LD, CNSC[1]; Emily Barlow, PharmD, BCPPS[2]; Beth Ruechel, RN[3]; Erin Alexander, DO, PNS[3]
[1]Mayo Clinic, Stewartville, Minnesota; [2]Mayo Clinic, Byron, Minnesota; [3]Mayo Clinic, Rochester, Minnesota

Financial Support: None Reported.

Background: Home Parenteral Nutrition (HPN) is a life-sustaining therapy for patients with intestinal failure and other conditions that preclude adequate oral and/or enteral nutrition. HPN allows patients to maintain their nutrition status outside the hospital setting. Pediatric HPN management requires a multidisciplinary approach due to the unique nutritional and developmental needs of children. In 2019, Mayo Clinic established a dedicated pediatric HPN team to improve the quality of care for these complex patients. The team consists of providers, registered dietitians, pharmacists and registered nurses. This retrospective review aims to describe the clinical characteristics, indications, and outcomes of pediatric patients managed by this newly formed team, offering insights into the evolution of a pediatric HPN program.

Methods: A retrospective chart review was performed for 32 patients aged 0-18 years who were followed by the home parenteral nutrition team over a six-year period. Patients who were not discharged from the hospital on parenteral nutrition were excluded. Data collected included HPN indication, catheter type, duration of HPN, provision of oral and/or enteral nutrition, and reasons for HPN discontinuation.

Results: Of the 32 patients reviewed, 25 received HPN at home under the care of the pediatric HPN team and characteristics are summarized in table 1. The duration of HPN ranged from 9 days to ongoing/lifetime. The most common indication for HPN was feeding intolerance and most of these patients were successfully weaned off HPN. Seven patients received HPN as part of end-of-life (EOL) care, with all but one having feeding intolerance as the primary indication. At the time of review, 80% of patients were no longer followed by the HPN team due to transition of care, progression to oral and/or enteral nutrition, changes in goals of care, or death. During HPN therapy, 64% of patients received a portion of their calories via oral and/or enteral nutrition. Central line types varied, with tunneled central venous catheters being the most commonly used.

Conclusion: The implementation of a dedicated pediatric HPN team has facilitated comprehensive, multidisciplinary care for children requiring long-term parenteral nutrition. The patient population was diverse in age and clinical indication. Some patients received support during EOL care, which is unique in the pediatric population. With the multidisciplinary team, many patients were able to transition off HPN through advancement of oral and/or enteral nutrition. These findings underscore the importance of specialized pediatric HPN teams in delivering coordinated care, supporting nutritional progression when possible, and addressing the needs of medically complex children.

Table 1. Characteristics of HPN patients

Characteristic	Number of Patients
Indication	
SBS	5 (20%)
Dysmotility	4 (16%)
Feeding intolerance	9 (36%)
Other IF	1 (4%)
Crohn's disease	1 (4%)
Other	5 (20%)
Line Type	
PICC	6 (24%)
Tunneled CVC	13 (52%)
Port	4 (16%)
Other CVC	2 (8%)
Length of HPN	
0-1 month	9 (36%)
1-6 months	3 (12%)
6-12 months	2 (8%)
1-2 years	3 (12%)
2+ years	1 (4%)
Ongoing/lifetime	7[1] (28%)
Reason for HPN Discontinuation[2]	
PO/EN advancement	11 (44%)
Transfer of care	3 (12%)
Deceased	5 (20%)
Goals of care	1 (4%)
Ongoing	5 (20%)
Receiving PO/EN During HPN	
Yes	16 (64%)
No	9 (36%)
End of Life TPN	
Yes	7 (28%)
No	18 (72%)

[1]Two patients no longer followed by HPN team
[2]Discharge from HPN team

Abbreviations: SBS = short bowel syndrome; IF = intestinal failure; PICC = peripherally inserted central catheter; CVC = central venous catheter; HPN = home parenteral nutrition; PO = by mouth (oral nutrition); EN = enteral nutrition; TPN = total parenteral nutrition.

P160 - Improving Pediatric Malnutrition Care: Exploring Barriers to Implementation of the P-INPAC Pathway

Tejas Desai, MD, MSc, FRCPC[1]; Zujaja Tul-Noor, BSc, MSc[2]; Romy Shenderey[3]; Sarah Tiessen, MScFN, RD[4]; Jeremy Schneeweiss[2]; Erika Gibson, MSc, RD[2]; Megan Healey, RN[2]; Adelina Morra, BSc, MN[2]; Fariha Chowdhury, BASc, MSc[4]; Jillian Owens, MSc, RD[4]; Robert H. J. Bandsma, MD, PhD[2]; Bonnie Fleming-Carroll, RN(EC), MN, FCAN[2]; Daina Kalnins, MSc, RD[2]; Koen Huysentruyt, MD, PhD[5]; Kim Brunet-Wood, MSc, RD[6]; Valerie Marchand, MD, PhD[7]; Nikhil Pai, MD, CNSC, FRCPC, FAAP[8]; Jessie Hulst, MD, PhD[9]

[1]Children's Hospital LHSC/Western University, London, Ontario; [2]The Hospital for Sick Children, Toronto, Ontario; [3]McMaster University, Toronto, Ontario; [4]McMaster University, Hamilton, Ontario; [5]UZ Brussel, Jette, Brussels Hoofdstedelijk Gewest; [6]Canadian Nutrition Society, St Albert, Alberta; [7]University of Montreal, Montreal, Quebec; [8]Children's Hospital of Philadelphia, Philadelphia, Pennsylvania; [9]Hospital for Sick Children, Toronto, Ontario

Financial Support: None Reported.

Background: Disease-associated malnutrition in hospitalized children is associated with adverse outcomes, yet standardized malnutrition screening, assessment and management are underutilized. The Canadian Malnutrition Task Force developed the Pediatric Integrated Nutrition Pathway for Acute Care (P-INPAC) to address this gap. Objective: Evaluate feasibility and barriers to implementation of the first two steps of P-INPAC including standardized nutritional risk screening and nutritional assessment.

Methods: This prospective study on pediatric/surgical units of three tertiary care pediatric hospitals in Canada included patients ≥30 days old and admitted ≥24hours(h). Phase 1 (8 weeks) assessed current nutrition practices. Phase 2 (8 weeks) involved staff training on workflow changes, standardized protocols using newly developed educational resources, and tools in electronic medical records. In Phase 3 (16 weeks), audits were conducted twice monthly to assess completion of nutritional risk screening (STRONGkids) ≤24h, and measurements of weight (W) and length/height (H) by nursing staff ≤48h after admission (step 1). Completion of Subjective Global Nutritional Assessment (SGNA) by dietitians for at-risk patients (high STRONGkids score and/or any z-score < -2SD for W/H/BMI, step 2) was also assessed. In addition, anonymous surveys were sent to healthcare providers during and after implementation to assess barriers and possible solutions.

Results: Results from 2 sites are reported including a total of 324 audited patients (54.9% male, median age 7 years, median hospital stay 4 days). Across each hospital, screening rates peaked at 64% and 60% for STRONGkids, 67% and 54% for weight and 48% and 31% for height respectively (FIGURE). Overall, STRONGkids was performed in 34.3% of patients, identifying 9% as high-risk; whereas 55.2% had W and/or H measured ≤48h, with 16.2% showing z-scores < -2SD. Both assessments were completed in 21% of patients, and 68.5% had either done. SGNA was successfully completed ≤72h in 52.6% of patients needing step 2, with 55% confirmed malnourished. Most cited barriers for completing screening and anthropometrics by nurses and dietitians were patient factors (e.g. acutely unwell, cooperation) and lack of appropriate equipment or time. Difficulty completing tasks within the prescribed timeframe (e.g. short patient admission, away for investigations) was also frequently reported by dietitians. An overview of most reported barriers and feedback on possible solutions are outlined in the included Table. Further analysis of barriers across all three sites is ongoing.

Conclusion: Initial results of P-INPAC implementation indicate reasonable adoption of STRONGkids, weight measurements, and SGNA in routine care, while measuring length/height proved more challenging. Barriers related to patient factors as well as clinical workflows currently exist and hinder target completion rates. Continuous engagement of ward leads and compliance reporting to prompt adopting practice into workflows and policy revisions, are crucial to ensure sustained adoption.

Table 1. Most-cited barriers and proposed solutions to completing screening tools and anthropometrics within the prescribed timeline by nurses and dietitians

Identified Barriers	Proposed Solutions
Patient factors (e.g. acutely unwell, cooperation)	- Expand timeframe to obtain measurements and screening - Ensure adequate equipment for ease of completion (e.g. patient lifts) - Involve other healthcare providers to assist (e.g. healthcare aids)
Lack of appropriate equipment	- Centralize equipment ordering and tracking - Encourage sharing resources across units - Advocate at an institution level for the importance of nutrition screening and appropriate equipment (e.g. patient lifts)
Lack of time/personnel or conflicting clinical demands	- Delegate to other providers (e.g. healthcare aids) - Identify other quality improvement targets to reduce clinical demands - Deliver ongoing education on importance of nutrition assessments
Inconsistent unit policies and cross coverage	- Establish institution wide policies for nutrition screening and measurement - Consider incentivizing compliance via audit/feedback reports - Allow ease in visualization and tracking completed measurements in medical charting system
Short admission turnaround or admission over the weekend	- Incorporate measurements and screening into admission workflow - Identify alternative providers to complete screening during weekends - Expand timeframe to obtain measurements and screening
Family declines	- Educate on importance of nutrition assessments - Expand timeframe to obtain measurements and screening - Incorporate measurements and screening into admission workflow

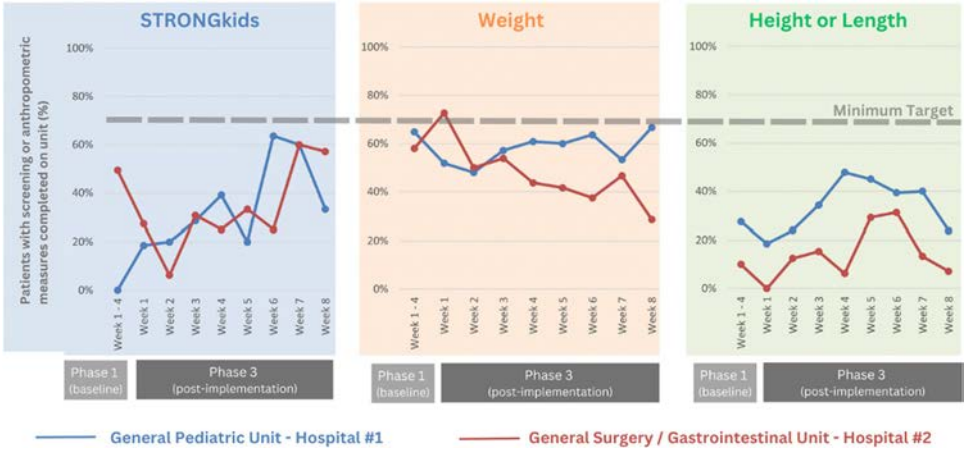

Figure 1. Run chart demonstrating uptake of STRONGkids nutrition risk screening (completed ≤ 24 hours) and anthropometric, measurements (completed ≤ 48 hours) following P-INPAC implementation at two tertiary care Hospitals

P161 - Total Body Sodium Depletion and Growth Failure in Infants and Small Children: A Single-Center Experience

Skyler Tomko, DNP, APRN, FNP-C[1]; Florencia Brioni, MS, RD, LDN, CNSC[1]; Bridget Whitehead, MD, MSCI[1]; Katherine Brennan, MSN, APRN, FNP-C, CPN[1]; Valeria Cohran, MD, MS[1]; Batul Kaj-Carbaidwala, MD[1]

[1]Ann & Robert H. Lurie Children's Hospital of Chicago, Chicago, Illinois

Financial Support: None Reported.

Background: Sodium is an essential nutrient, and several studies have demonstrated a correlation between sodium depletion and impaired growth in pediatric patients. Premature and newborn infants are at risk for sodium depletion due to relatively low sodium content in breastmilk and immaturity of the infant renal system. Children with short bowel syndrome or ileostomies are at risk for excessive sodium loss due to high sodium concentration in stoma effluent or stool. Urine sodium monitoring is not always routine practice in pediatric patients with concerns for growth failure. The objective of this study was to evaluate the utility of using random urine sodium concentration monitoring and the effect of sodium supplementation on weight gain.

Methods: A retrospective observational study was conducted on 10 patients at a free standing pediatric academic medical center from January to March 2025. Inclusion criteria for the study were patients that had a medical history of prematurity, short bowel syndrome, and/or the presence of an ileostomy and had total body sodium depletion, which was defined by a random urine sodium concentration less than 40 mEq/L. Sodium was supplemented parenterally if the patient was dependent on parenteral nutrition, or enterally with the use of either oral sodium chloride solution, oral sodium citrate and citric acid solution, or table salt. The sodium dose was titrated by 1-2mEq/kg/day until the random urine sodium concentration was greater than 40mEq/L. Growth velocity calculated in grams per day was assessed over 7-28 days post sodium repletion. Caloric intake measured in kilocalories per day (kcal/day) was reviewed at baseline and during the intervention.

Results: In this study, the majority (70%) of patients were premature and at baseline, 50% had an ostomy and 30% required parenteral nutrition in addition to enteral feedings. Prior to the intervention, only 2 of 10 patients met criteria for normal growth velocity by age and 3 patients experienced weight loss. There was a statistically significant increase in urine sodium levels following salt supplementation with mean urine sodium increasing from 21 to 83 (p=0.001). After salt supplementation, there was a significant improvement in growth with increased mean weight gain from 9 g/day to 37 g/day (p = 0.004). All 10 patients gained weight either within or above expected growth velocity for age (p = 0.008) following the intervention. In the study period, less than half (40%) of the patients had clinically meaningful (>10%) increases in their total kcal/day with the remaining 6 patients having 0 to 4% increase in calories. No patients were newly started on parenteral nutrition during the study period.

Conclusion: Insufficient sodium intake and/or excessive sodium loss is an underappreciated yet critical factor in growth in infants and small children. Increased screening for total body sodium depletion in select patients with risk factors for inadequate sodium intake or excessive sodium loss is necessary to identify and treat a reversible condition that may be contributing to growth failure.

Table 1. Patient characteristics and intervention data

Patient ID	Patient sex, Age	Prematurity	Diagnosis, Anatomy	Nutrition source	Sodium supplement	Weight gain before intervention	Weight gain after intervention	Daily calorie intake before intervention	Daily calorie intake after intervention
1	Male, 3 weeks	No	Cecum perforation, Ileostomy	EN	NaCl oral solution	Weight loss	67 g/day	352 kcal/day	396 kcal/day
2	Male, 4 weeks	Yes	NEC, Ileostomy	EN	Table salt	29 g/day	96 g/day	438 kcal/day	447 kcal/day
3	Male, 6 months	No	Volvulus, Jejunostomy	EN + PN	PN	Weight loss	35 g/day	700 kcal/day (60 in EN, 640 in PN)	770 kcal/day (100 in EN, 670 in PN)
4	Male, 5 months	Yes	Ileal atresia, in continuity	EN	Table salt	21 g/day	30 g/day	657 kcal/day	657 kcal/day
5	Male, 4 weeks	Yes	Ileal perforation, Ileostomy	EN	NaCl oral solution + Sodium Citrate/Citric Acid	8 g/day	23 g/day	233 kcal/day	256 kcal/day
6	Female, 3 months	Yes	Volvulus/ileal atresia, in continuity	EN	Sodium Citrate/Citric Acid	17 g/day	36 g/day	480 kcal/day	480 kcal/day
7	Male, 16 months	Yes	Gastroschisis, Ileostomy	EN	Table salt	Weight loss	43 g/day	533 kcal/day	533 kcal/day
8	Female, 5 months	Yes	Gastroschisis, in continuity	EN + PN	PN	3 g/day	13 g/day	596 kcal/day (196 in EN, 400 in PN)	610 kcal/day (210 in EN, 400 in PN)
9	Female, 6 months	No	NEC, in continuity	EN	NaCl oral solution	6 g/day	16 g/day	400 kcal/day	453 kcal/day
10	Male, 2 months	Yes	Gastroschisis, in continuity	EN + PN	PN	8 g/day	27 g/day	540 kcal/day (160 in EN, 380 in PN)	565 kcal/day (72 in EN, 493 in PN)

Abbreviations: ID = identifier; NEC = necrotizing enterocolitis; EN = enteral nutrition; PN = parenteral nutrition; NaCl = sodium chloride.

P162 - Nutrition Support in Children With Biliary Atresia After Liver Transplant

Nicole Knebusch, BS[1]; Manpreet Virk, MD[2]; Desai Moreshwar, MD[2]; Marwa Mansour, MD[2]; Stacey Beer, MPH, RD, LD[2]; Brittany Pearo, RD, CSP, LDN, CCTD[3]; Kelby Fuller, PA[2]; John Goss, MD[2]; Thomas Fogarty, MD[2]; Fernando Stein, MD, FCCM[2]; Jorge Coss-Bu, MD, FCCM[4]
[1]Imperial College of London, Baylor College of Medicine and Texas Children's Hospital, Houston, Texas; [2]Baylor College of Medicine and Texas Children's Hospital, Houston, Texas; [3]Department of Clinical Nutrition Services, Texas Children's Hospital, Houston, Texas; [4]Baylor College of Medicine, Houston, Texas

Financial Support: None Reported.

Background: Biliary atresia is a leading cause of pediatric liver transplantation (LT) and is often associated with significant malnutrition, which impacts outcomes and growth after transplant. Post-transplant nutrition support is tailored to each child's baseline status, comorbidities, and stability. In the Pediatric Intensive Care Unit (PICU), children are at high risk of lean body mass loss due to altered metabolism and protein catabolism. Studies suggest that providing at least 60% of daily protein and energy needs during the first week, especially via enteral nutrition, reduces mortality. The study evaluated nutrition support adequacy in the first week after LT.

Methods: Retrospective cohort study of children with biliary atresia admitted (index) to Texas Children's Hospital PICU after LT between 2011-2024. Patients admitted to the PICU before transplant were excluded. Nutritional status was evaluated by WHO (WFA, HFA, WFL z-scores) and CDC growth charts (Body Mass Index [BMI] z-scores) as appropriate. Nutrition support included enteral and parenteral nutrition adequacy, defined as [(intake/prescription) x 100]; P.O. intake was not included in the calculation. All BMR calculations used the Schofield equation to estimate daily energy requirements and a protein goal of 1.5 g/kg/day. Comparison by Mann-Whitney test as appropriate.

Results: Out of 368 pediatric LT admissions between 2011–2024, 138 patients with biliary atresia (62% female) met inclusion criteria. Median (25th–75th IQR) age was 13.9 (9.0–13.9) months, weight 10.0 (8.4–14.0) kg, and height 75 (67.0–92.3) cm. Ethnic distribution: 13.8% African American, 2.9% Asian, 19.6% Hispanic, 58.0% White. Median PELD score was 26.0 (15.0–30.3), surgical time (including anesthesia) 355 (336–393) minutes, Mechanical ventilation (MV) duration 1.0 (0.5–20) days, PICU Length of stay (LOS) 7.0 (3.0–25.5) days, and hospital LOS 24 (9.0–63) days. Nutritional status on admission showed 21.7% stunted, 10.2% underweight, and 1.45% acutely malnourished. Basal metabolic rate was 49.4 (45.5–53.5) kcal/kg/day. When comparing outcomes by nutritional status, stunted patients had significantly longer MV duration (6.2 [0.5–31.7] vs. 0.6 [0.5–11] days, p=0.0117) and PICU LOS (15.2 [3.6–51] vs. 6.0 [3.0–21.7] days, p=0.0211). No difference in total hospital LOS was observed (p=0.068). Other forms of malnutrition were not associated with outcome differences, including mortality. Table 1 shows median caloric and protein adequacy percentages across the first 7 days post-transplant. The percentage of patients who reached at least 60% goal adequacy for total calories during the first seven days of admission after LT on days 1, 3, 5, and 7 was 17.5%, 49.6%, 62%, and 61%, respectively. For protein, the percentage of patients that reached 1.5 g/kg/day of total protein intake through the first week of admission was 12.3% for day 1, 43.5% for day 3, 50% for day 5, and 53% for day 7. Figures 1 AND 2 display calorie and protein adequacy stratified by age. Younger children (< 1 year) consistently achieved higher total adequacy percentages than older children (>1 year), with significant differences observed from day 1 through day 7 (p< 0.01).

Conclusion: Children with biliary atresia frequently present with malnutrition at the time of transplant, impacting early post-operative outcomes. Stunting was associated with longer ventilation and PICU stays. Younger children achieved higher nutritional adequacy during the first week post-transplant. These findings highlight the need for age-specific, targeted nutrition strategies in the immediate post-transplant period.

Table 1. Caloric and protein adequacy during the first 7 days post-transplant

n = 138	Caloric adequacy (%)		Protein adequacy (%)	
	Total	Enteral	Total	Enteral
Day 1	0 (0-33)	0 (0-0)	0 (0-31)	0 (0-0)
Day 3	60 (0-122)	0 (0-11)	69 (0-159)	0 (0-9)
Day 5	93 (0-148)	4 (0-51)	97 (0-173)	4 (0-42)
Day 7	98 (0-149)	6 (0-66)	101 (0-175)	5 (0-51)
BMR: 49.4 (45.5 – 53.5) kcal/kg/day and recommended protein intake: 1.5 g/kg/day				

Continuous variables are represented as medians with interquartile ranges ($25^{th} - 75^{th}$). Adequacy was calculated as [(intake/prescription) × 100]. BMR: Basal metabolic rate by Schofield equation.

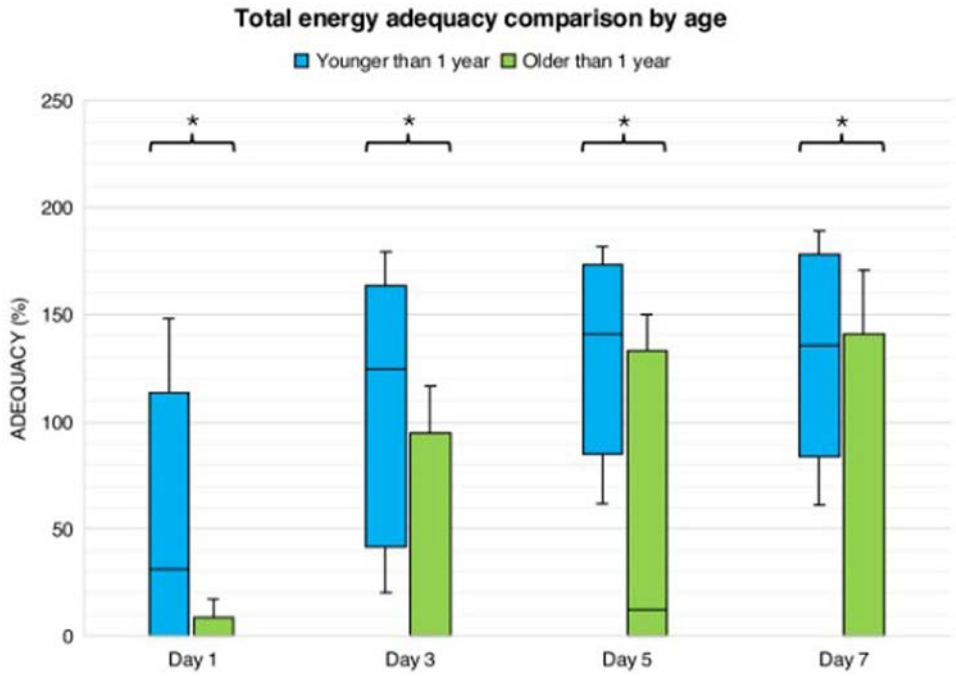

Figure 1. Total energy adequacy by age

Total caloric adequacy comparison by age. Values represent the percentage of adequacy for calories based on age. Bars represent medians and 25th-75th IQR, whiskers are 10th – 90th IQR. Comparison by Mann-Whitney test. * $p < 0.001$.

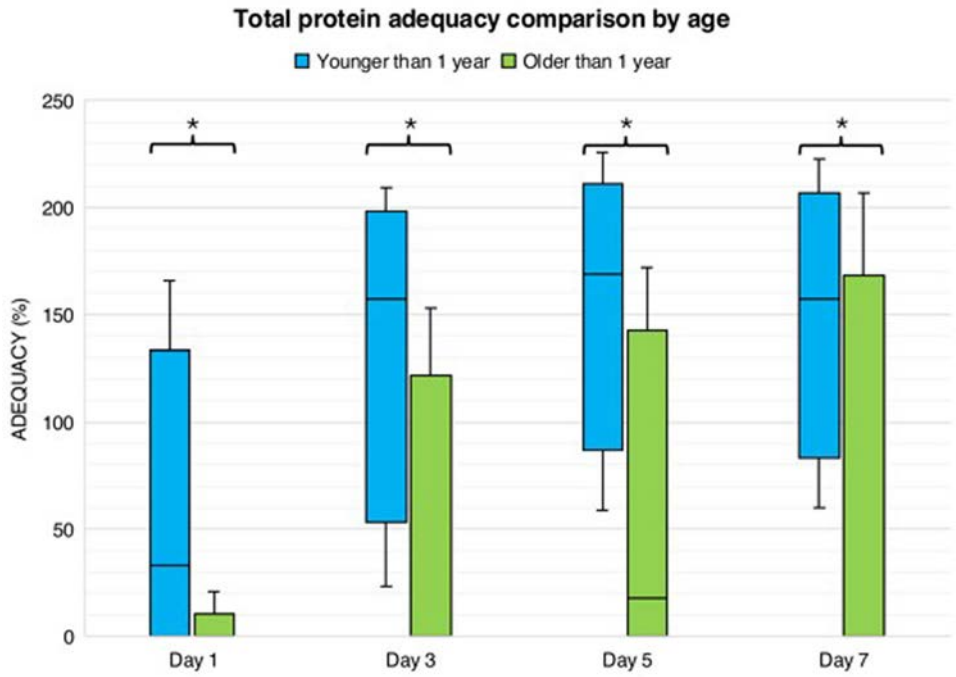

Figure 2. Total protein adequacy by age

Total protein adequacy comparison by age. Values represent the percentage of adequacy for protein based on age. Bars represent medians and 25th-75th IQR, whiskers are 10th – 90th IQR. Comparison by Mann-Whitney test. * $p < 0.001$.

Poster of Distinction Award

P163 - Recurrence of Cholestasis in Infants With IFALD After Transitioning From Fish Oil Lipid Injectable Emulsion to Soy Oil and/or Mixed Lipid Injectable Emulsion: A Retrospective Study

Courtney Svenstrup, MD[1]; Anthony Perkins, MS[2]; Kanika Puri, MD[1]; Charles Vanderpool, MD[3]

[1]Riley Children's Hospital at IU Health, Indianapolis, Indiana; [2]Indiana University, Indianapolis, Indiana; [3]Riley Children's Hospital and IU Health, Indianapolis, Indiana

Financial Support: None Reported.

Background: Intestinal failure-associated liver disease (IFALD) may occur in up to 75% of neonates receiving prolonged parenteral nutrition (PN). IFALD is multifactorial with prolonged PN use, prematurity, lack of enteral feeds, sepsis, and multiple surgical procedures as known risk factors. Fish-oil lipid injectable emulsion (FO-ILE) has been associated with cholestasis reversal in some infants with IFALD; however, there are no widely accepted recommendations for optimal duration of FO-ILE therapy following cholestasis resolution. Given that FO-ILE is limited in dosing to 1gm/kg/day, use of an alternate lipid emulsion at higher gram per kilogram dosing may provide flexibility in glucose infusion and parenteral nutrition cycling during intestinal rehabilitation. In this study, we reviewed duration of use and clinical outcomes of patients with IFALD treated with FO-ILE. Our hypothesis was that cholestasis recurrence would be rare in infants transitioned off FO-ILE to an alternative lipid emulsion.

Methods: This is a single-center retrospective chart review of infants from January 2018 – December 2024 with surgical short bowel syndrome (SBS) who developed IFALD as defined as a direct bilirubin > 2 grams per deciliter. All infants included received FO-ILE therapy for IFALD and then transitioned to soy oil-based ILE (SO-ILE) and/or soy, MCT, olive, fish oil-based ILE (SO, MCT, OO, FO-ILE). A total of 19 patients were included. Primary outcome was cholestasis re-development (defined as direct bilirubin > 2gm/dL) after transitioning from FO-ILE to SO-ILE and/or SO, MCT, OO, FO-ILE. Secondary outcomes include laboratory parameters, anthropometrics, and nutritional intake.

Results: Following FO-ILE, five patients (26%) were switched to SO-ILE, and 14 patients (74%) were switched to SO, MCT, OO, FO-ILE (Figure 1). Nine infants (47%) received both SO-ILE and SO, MCT, OO, FO-ILE over the 12 months following FO-ILE. The median duration of FO-ILE therapy was 32 days (Interquartile Range or IQR: 21-49) (Table 1). One patient (5.3%) re-developed cholestasis after transitioning off FO-ILE to SO, MCT, OO, FO-ILE (duration 73 days, average dose 2.9gm/kg/day) (Figure 2A). The median direct bilirubin level decreased significantly from 3.4gm/dL (IQR: 2.8-4.4) at FO-ILE initiation to 1.2gm/dL (IQR: 0.60 - 1.90) at discontinuation ($p < 0.001$) (Table 2). The median number of days that the direct bilirubin level was < 2gm/dL while on FO-ILE was 10.5 (IQR: 7 - 17) (Table 1). Among patients with available data, the median direct bilirubin levels at 1, 3, and 6 months post FO-ILE were 0.35gm/dL (IQR: 0.10 - 0.60), 0.15gm/dL (IQR: 0.10 - 0.30), and 0.10gm/dL (IQR: 0.10-0.10), respectively (Figure 2B). The median percent of enteral nutrition (EN) increased from 5 (IQR 0-30) at FO-ILE initiation to 26 (IQR 4 – 38) at discontinuation ($p < 0.031$) (Table 2).

Conclusion: In our patient population, cholestasis recurred in only one (5.3%) patient, suggesting that transitioning from FO-ILE to an alternative lipid emulsion is tolerated by most infants with SBS and IFALD following cholestasis reversal. This study highlights the need for prospective studies aimed at investigating cholestasis recurrence following FO-ILE discontinuation and determining optimal timing for transitioning from FO-ILE to an alternate lipid emulsion.

Table 1. Summary of FO-ILE initiation, duration, and direct bilirubin clearance

Age at FO-ILE Initiation (Days)	n	
Mean (SD)	19	100.05 (89.41)
Median (25%, 75%)	19	84 (58, 98)
Duration of FO-ILE (Days)		
Mean (SD)	19	37.05 (25.82)
Median (25%, 75%)	19	32 (21, 49)
Duration of Direct Bilirubin < 2gm/dL while on FO-ILE (Days)		
Mean (SD)	14	14.29 (14.42)
Median (25%, 75%)	14	10.5 (7, 17)

Abbreviations: FO-ILE = fish oil-based lipid injectable emulsion; SD = standard deviation; EN = enteral nutrition.

Table 2. Change in selected characteristics during FO-ILE therapy

	FO-ILE Initiaition		FO-ILE Discontinuation		P Value
Direct Bilirubin	n		n		
Mean (SD)	19	3.71 (1.32)	18	1.38 (0.96)	<0.001
Median (25%, 75%)	19	3.4 (2.8, 4.4)	18	1.20 (0.60, 1.90)	<0.001
Weight Z-Score					
Mean (SD)	19	-1.05 (1.24)	19	-0.89 (1.30)	0.320
Median (25%, 75%)	19	-1.34 (-2.10, 0.16)	19	-0.73 (-1.50, 0.29)	0.245
Height Z-score					
Mean (SD)	19	-2.07 (1.50)	18	-2.54 (2.02)	0.089
Median (25%, 75%)	19	-2.20 (-2.94, -0.80)	18	-2.41 (-3.58, -0.99)	0.088
Head Circumference Z-Score					
Mean (SD)	19	-1.17 (1.22)	17	-1.03 (1.37)	0.915
Median (25%, 75%)	19	-1.35 (-2.25, -0.57)	17	-0.70 (-1.74, -0.46)	0.721
% EN Calories					
Mean (SD)	19	16.16 (19.91)	19	27.95 (28.71)	0.039
Median (25%, 75%)	19	5 (0, 30)	19	26 (4, 38)	0.031

Abbreviations: FO-ILE = fish oil-based lipid injectable emulsion; SD = standard deviation; EN = enteral nutrition.

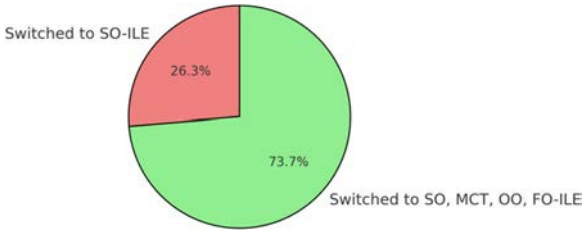

Figure 1. Lipid injectable emulsions that patients received at the time of FO-ILE discontinuation (n = 19)

Abbreviations: ILE = lipid injectable emulsion; FO-ILE = fish oil-based lipid injectable emulsion; SO-ILE = soy oil-based ILE; SO, MCT, OO, FO-ILE = soy, MCT, olive, fish oil-based ILE.

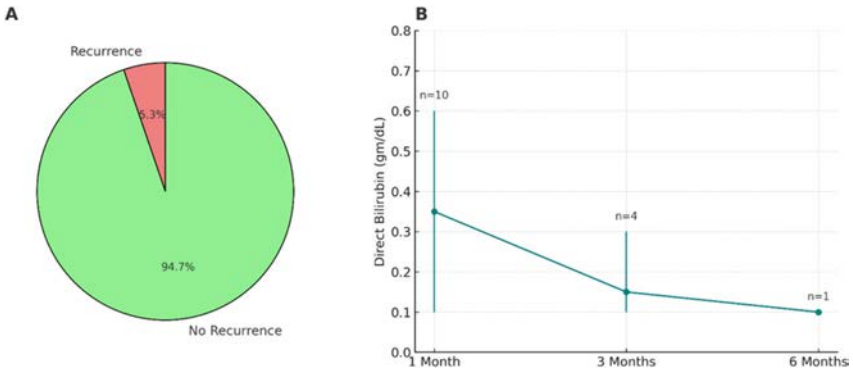

Figure 2. Cholestasis recurrence and changes in direct bilirubin following FO-ILE discontinuation

(A) Proportion of patients with cholestasis recurrence (n = 19). (B) Median direct bilirubin (gm/dL) at 1, 3, and 6 months post FO-ILE with interquartile range (IQR) error bars; sample sizes shown above each point. Abbreviations: FO-ILE = fish oil-based lipid injectable emulsion; IFALD = intestinal failure associated liver disease.

P164 - A US Survey of Clinical Enteral Nutrition Practices in Level 2, 3, and 4 NICUS

Bethany Hodges, MS, RD, MSL-BC[1]; Heather Evans, MS, RDN, LDN, CNSC, CLC, MSL-BC[2]; Alayne Gatto, MS, MBA, RDN, CSP, LDN, CLC, FAND, MSL-BC[3]; Austin Michalski, RDN, CSPCC[4]; Lisa Beatrice, RD, LDN, CLC, MSL-BC[5]; Katina Langley, MS, RDN, CLC, MSL-BC[6]; Jodee Le Vin, MS, RDN, LDN, CNSC, CLC[7]; Deborah Abel, PhD, RDN, LDN[8]

[1]Mead Johnson Nutrition, Evansville, Indiana; [2]Mead Johnson Nutrition, Waunakee, Wisconsin; [3]Mead Johnson Nutrition, Bloomingdale, Georgia; [4]University of Michigan Health, CS Mott Children's Hospital, Ann Arbor, Michigan; [5]Mead Johnson Nutrition, Weymouth, Massachusetts; [6]Mead Johnson Nutrition, Goodyear, Arizona; [7]Mead Johnson Nutrition, Chesterfield, Missouri; [8]Florida International University, Miami, Florida

Financial Support: None Reported.

Background: Enteral nutrition management practices in US neonatal intensive care units (NICUs) vary. US NICUs lack nationally recognized standards for enteral nutrition and feeding. Substantial variability exists in assigned human milk composition values, fortification and feeding regimens, and enteral product use. This study aims to describe current clinical enteral nutrition practices among healthcare professionals in Level 2, 3, and 4 NICUs.

Methods: An anonymous electronic survey of US healthcare professionals was conducted June-July 2025. Respondents included registered dietitians, neonatologists, nurse practitioners, and physician assistants currently working at least 8 hours per month in a Level 2, 3, or 4 NICU. Descriptive statistics were used to examine the distribution of responses.

Results: Of the 300 respondents, 234 met the inclusion criteria representing 40 states in the US. Nutritional Care of Preterm Infants 2nd Edition, Koletzko et al, 2021, was chosen as the most followed resource for nutritional reference guidelines. Use of a length board to measure growth was reported by 75.4% of respondents and documented using the Fenton 2013 growth chart (96.4%). Human milk fortifier preferences were driven by scientific evidence (57.8%), tolerance (45.5%), and hospital formulary (40.6%). The use of a human milk analyzer (HMA) was minimal; only 8.70% reported having access to a HMA with cost cited as the most common barrier followed by lack of clinical need or application. Almost half of respondents (48.4%) reported varied protein values based on type of human milk (HM) (preterm, mature, and donor). The most commonly reported estimated protein values were 1.4-2.1 g/dL for preterm HM, 0.9-1.5 g/dL for mature HM and 0.8-1 g/dL for donor HM. Fortifier use included 12.0% human milk-based fortifier (HMBF), 49.5% bovine milk-based fortifier (BMBF), and 38.0% both HMBF and BMBF. The most common volume to initiate fortification of HMBF and BMBF was 60-80 mL/kg/day. HMBF was most frequently initiated at 26 kcal/oz while BMBF was initiated at 24 kcal/oz. Regardless of fortifier type, respondents indicated the need to increase fortification beyond 24 kcal/oz and may include the usage of fat and protein modulars (67.4% and 59.4%) respectively. Commonly supplemented micronutrients beyond vitamin D and iron included sodium (86.8%) and zinc (49.5%). The promotion of HM continues with clinicians reporting 51-75% of infants receiving HM at hospital discharge. For these infants, clinicians included HM fortified with a powdered infant formula (85.7%) and HM fortified with a human milk fortifier (36.8%). For infant formulas chosen at discharge, 92.9% prefer a preterm discharge/transitional formula, followed by extensively hydrolyzed protein, amino acid, routine, partially hydrolyzed, pre-thickened, and preterm formulas respectfully. Feeding densities vary from 22-30 kcal/oz at hospital discharge, with the most common caloric value at 24 kcal/oz.

Conclusion: This survey describes current enteral nutrition practices in US NICUs and illustrates the need for baseline standardized feeding and nutrition guidelines that allow for both individualized care and consistent reporting of data. Future US multi-site studies should implement standardized guidelines to identify practices that improve nutrition care and outcomes in NICUs.

International Poster of Distinction Award

P165 - Development and Evaluation of Ready-To-Use Parenteral Nutrition Bags for Preterm Patient Care

Eleonora Castellana, PharmD[1]; Francesco Cresi, MD[2]; Martina Capitanio, MD[2]; Chiara Peila, MD[2]; Alessandra Coscia, MD[2]; Maria Rachele Chiappetta, PharmD[1]

[1]Hospital Pharmacy, Città della Salute e della Scienza di Torino University Hospital, University of Turin, Italy, Turin, Piemonte; [2]Neonatal Intensive Care Unit, University Department, Sant'Anna Hospital, Città della Salute e della Scienza di Torino University Hospital, University of Turin, Italy, Turin, Piemonte

Encore Poster

Previous Presentation: XLV Congresso Nazionale Sifo, Octobre 2024, Napoli, Italy.

Previous Publication: GIFAC 2024;38(2 Suppl. 1):e1-e409.

Financial Support: None Reported.

Background: Very low birth weight (VLBW) and extremely low birth weight (ELBW) preterm infants often require parenteral nutrition (PN) during the first days of life, as enteral feeding is introduced gradually. Traditionally, individualized parenteral nutrition (IPN) has been used to tailor nutrient intake to each patient. However, this approach is time- and resource-intensive and prone to procedural errors. In light of the 2018 ESPGHAN guidelines and the 2020 NICE recommendations (Neonatal Parenteral Nutrition), the Hospital Pharmacy identified the need to reorganize the pediatric PN service to align clinical practice with international standards. As a result, a set of seven standardized, ready-to-use parenteral nutrition bags (SSBs) was developed and implemented, aiming to improve patient safety, reduce errors, increase efficiency, and ensure timely and adequate nutritional support. This study assessed the clinical and economic impact of SSB use compared to IPN in neonatal intensive care units (NICUs).

Methods: The composition of the seven SSBs was defined through a retrospective analysis of IPN prescriptions and in accordance with the ESPGHAN 2018 Pediatric Parenteral Nutrition guidelines. The bags were manufactured by an industrial partner according to GMP Annex 1 standards and introduced into clinical practice through collaboration among hospital pharmacists, neonatologists, and nursing staff. Since 2021, neonatologists have implemented prescribing software that guides clinicians in selecting the most appropriate bag based on the infant's age, weight, and feeding status. Clinical parameters such as growth trends, time to PN initiation and weaning, weight loss during the first week of life, PN duration, and nutrient absorption were monitored. A micro-costing analysis (November 2022–October 2023) was also conducted to evaluate the economic impact of SSBs versus IPN produced by the hospital pharmacy.

Results: The seven SSBs were formulated (Table 1) to meet a range of clinical needs, from early peripheral administration in the first hours of life to later stages involving partial or full enteral feeding with human milk or fortified formula. Approximately 250 SSBs were used per month during the observation period, replacing 85% of IPN preparations. The average cost per IPN bag was 160.36$ (Figure 1 shows the breakdown of cost components), while SSBs averaged 63,35$, representing a 60.5% cost reduction. Infants receiving SSBs demonstrated improved growth (p= 0.028) and achieved full enteral feeding earlier. The mean time to PN weaning was 28 days for the SSB group versus 44 days for the IPN group (p= 0.001). Mean time to PN initiation was 6.33 hours for SSBs versus 8.41 hours for IPN. Only 1% of SSBs expired before use, reflecting good—but still optimizable—inventory management. Their 90-day shelf life and GMP-compliant manufacturing process improved microbiological safety and simplified logistical management.

Conclusion: The introduction of standardized, ready-to-use PN bags in NICUs resulted in significant clinical and economic benefits. SSBs ensured consistent and timely nutritional support, 24/7 availability, reduced prescription and compounding errors, and lowered preparation workload. The associated cost savings and improved early clinical outcomes support their broader adoption. The use of prescribing software enabled targeted bag selection, facilitating clinical personalization within a standardized framework.

Table 1. Detailed description of the compositions of the seven standardized parenteral nutrition bags

FORMULATION	BAG-1	BAG-2	BAG-3	BAG-4	BAG-5	BAG-6	BAG-7
AMMINOACIDS-(GRAMS)	10	20	15	13	17	15	10
GLUCOSE-(GRAMS)	30	60	50	50	50	55	50
SODIUM-(MEQ)	6	0	5	12	16	18	14
POTASSIUM-(MEQ)	5	8	9	9	12	9	0
CALCIUM-(MEQ)	0	10	9	9	10	3	2
MAGNESIUM-(MEQ)	0	1	1	2	2	3	1
PHOSPHATE-(MEQ)	0	0	5	12	16	12	5
CHLORIDE-(MEQ)	5	1	1	2	2	12	1
OLIGOELEMENTS-(ML)	0	4	4	4	4	0	0
FINAL VOLUME	404	531	451	520	461	520	462
OSMOLARITY	660	986	969	840	1039	923	839

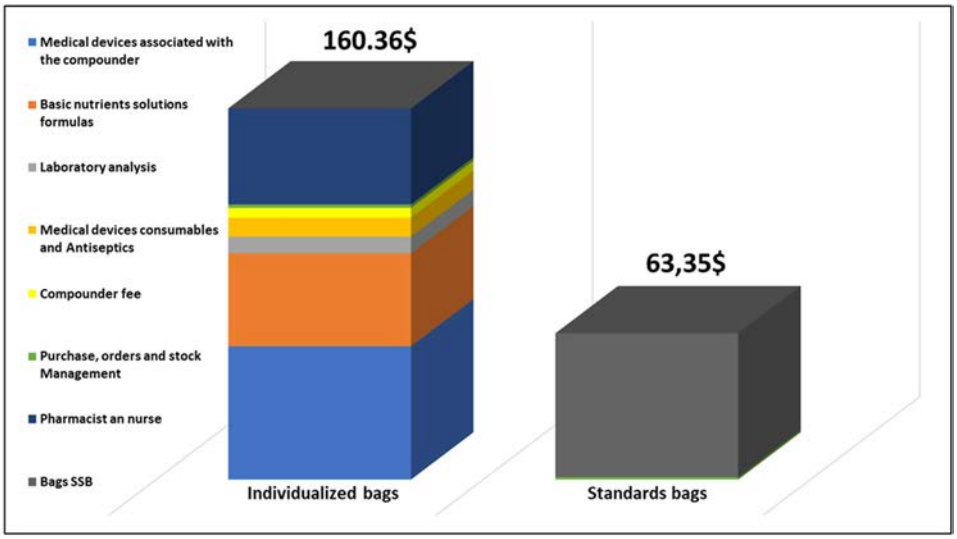

Figure 1. Description of cost differences between the seven standardized bags and individualized preparations, with detailed breakdown of cost components

International Poster of Distinction Award

P166 - Caregivers' Lived Experiences of Deferred Consent in a Pediatric Critical Care Feeding Trial: A Qualitative Reflexive Thematic Analysis

Nicole Gilbert, RD[1]; Zoe Portelance, RN, BN[1]; Laurie Lee, NP, MN, PhD (Epi)[2]; Dana Boctor, MSc, MD, FRCP(C)[3]; Lucie Laferriere, RD[4]; Tanis Fenton, PhD, RD, FDC[3]

[1]University of Calgary/Alberta Health Services, Calgary, Alberta; [2]Faculty of Nursing, University of Calgary, Calgary, Alberta; [3]University of Calgary, Calgary, Alberta; [4]Alberta Health Services, Calgary, Alberta

Financial Support: This work was supported by the ASPEN Rhoads Research Foundation.

Background: Obtaining informed consent in pediatric intensive care units (PICUs) is ethically and logistically challenging. The acute nature of critical illness and heightened caregiver stress can hinder prospective consent. Deferred consent, where study enrollment occurs before consent, facilitates timely study intervention while giving families space to consider participation. Little is known about caregiver perceptions of enrollment under deferred consent. Understanding these experiences is crucial to developing family-centered research practices. The objective of this study was to understand how caregivers experienced the deferred consent process during a volume-based enteral nutrition (VBEN) feasibility randomized control trial.

Methods: This qualitative study is informed by a phenomenological epistemology. The study context involved caregiver decision-making under high stress in a PICU. We conducted semi-structured interviews of 10 caregivers whose children were enrolled in the VBEN RCT by deferred consent at the Alberta Children's Hospital. Data were analyzed using Braun and Clarke's six-phase approach to reflexive thematic analysis. Two researchers conducted the analysis: NG, a PICU research dietitian and principal investigator of the VBEN trial, and ZP, a PICU research nurse involved in obtaining trial consent. Transcripts were independently coded in duplicate with agreement achieved through discussion. Themes were then developed collaboratively by consensus.

Results: Four interrelated themes emerged (Table 1): 1: Shaping caregiving into a role of protection in the PICU Caregivers experienced tension between their role as protector and the burden imposed by early requests for research participation. While caregivers wished to be involved in consent decisions, they reported having limited capacity to provide consent upfront. Early consent conversations were perceived as disrespectful, diverting attention from what mattered most, saving their child. 2: Research participation offers hope in the face of uncertainty Research involvement was seen as morally right and offered hope that their child's participation might help others and that it could improve their child's outcome. However, this hope depended on research being safe, delivered with respectful treatment by staff, and individualized, flexible timing of consent discussions. 3: Caregivers frame feeding as low risk Caregivers viewed feeding as a necessary outcome of their child's admission. Caregivers perceived the study intervention as low risk, and this increased their comfort with its initiation prior to formal consent. 4:

The challenge of informed consent in the PICU A caregivers' focus is on the survival of their child during traumatic PICU admissions. Although caregivers believed they were providing informed consent, many struggled to recall study specifics and perceived the interventional study as merely observational and low risk. Trauma resulted in limited capacity to engage in research decisions. This raised questions about whether asking for consent in this context inadvertently diminishes parental autonomy.

Conclusion: The parental protector role, motivation to contribute to research, and comfort in the need to feed their child were central to caregiver experiences with deferred consent. However, the complex PICU context challenges the feasibility of fully informed consent. Early consent requests were perceived as disrespectful and distressing, suggesting deferred consent may offer a pragmatic compromise. Findings emphasize the need for consent approaches that are open, respectful, and responsive to family readiness, prioritizing flexibility over rigid research timelines to ethically engage families in critical care research.

Table 1. Themes, codes and supporting quotes from the volume-based enteral nutrition trial deferred consent study

Theme	Supporting Codes	Quotes
Shaping caregiving into a role of protection in the PICU	Caregiver role of protector	P6: *In this case my child is a teenager, and it's my responsibility as a mother and my husband as a father.*
	Trust in self	P3: *I'm pretty sure I know myself I wouldn't sign anything that I think it would hurt or I'm not comfortable with.*
	Caregivers not focused on research	P7: *I think that this is so low on the totem pole.*
	Delay consent until stable	P1: *When things have kind of calmed down, and there's more time for the parent to think about everything that's gone on, and kind of wrap their head around everything.*
	Early consent is disrespectful	*P4: In those 1st couple of days. I think approaching people with a low-risk thing is irresponsible.*
Research participation offers hope in the face of uncertainty	Helping others	P2: *It helps to other families. That's why I enrolled.*
	Helping self	P3: *At least I know that I'm doing my part as a parent, as a mom. I think I'm doing okay. I am contributing.*
	Uniqueness of child's condition	P5: *And with all of his medical issues there's no other kid like him.*
	Need for research trumps timing	P3: *I'd really love to help, so whether... I was informed after she was enrolled It doesn't matter... I'm doing it.*
	New research is important	P1: *Always important to have new research.*
	Research is morally right	P3: *I know that I am doing the right thing.*
	Researchers should have good intentions	P5: *The only thing that would have changed my mind is if I knew for certain that the person doing the study didn't give a darn about my kid.*
	Respect	P5: *We've been a part of 2 studies. The 1st one, I said. Absolutely not. My kid's not a specimen, and he was spoken about as a specimen like he was a lab rat.*
Caregivers frame feeding as low risk	Feelings towards feeding	P2: *We are used to that... That he can't eat by mouth.*
	Feeding is safe and necessary	P1: *If we were safely approaching the topic, whether it be with or without the research study she would need to eat and be fed and nourished.*
	Feeding is low-risk	P6: *because it's only feeding. It's not a new medication. It's no nothing about cancer. It's no nothing dangerous.*
	Harm	P1: *if it's not harmful to the patient or the family. I don't see why not.*
	Deferred consent requires acceptance of intervention	P6: *Well, that's one factor level of the risk. But another factor, maybe, is the necessity will start to feeding... As soon as possible, because for her it's better.*
The challenge of informed consent in the PICU	Save my child	P10: *When things are going crazy, it's like. Oh, no, hey, wait a minute. Come, talk to me about this research... I don't even know if my kid's gonna live, you know.*
	PICU stress and trauma hinder informed consent	P8: *Doctor wanted to explain us everything in ICU. And we were not in that stage of hearing. I said, Just do whatever you want to do. We are 100% agreeing. We are giving every consent.*
	Lack of understanding and miscommunication hinder informed consent	P7: *Because regardless of whether we did the study or not, it was gonna be given the same amount of food... They weren't increasing its amount to, you know, to influence the study or anything again. He was just in a situation to be studied so.*
	Consent is not a choice	P3: *They made the decision before me.*
	Do parents need to consent	P5: *And honestly, do they need to know? I mean absolutely you should tell them. I don't think it's really necessary.*

P167 - Monitoring and Assessing NICU Patients in Their Own Residence (MANOR): A Remote Monitoring Feeding Program in a Level IV Neonatal Intensive Care Unit (NICU)

Rachel Mills, RD, LD, CNSC[1]; Sujir Pritha Nayak, MD[2]; Jerithea Tidwell, PhD, ARPN, PNP-BC, PCNS[3]; Erika Godinez, RN, BSN, RN-C[3]; Raphael Peeples[3]; Petrissa Ncomo[3]; Jeanne Gaines, DNP, RN, RN-C[3]; Nandini Channabasappa, MD[2]; Chelsea Johnson-Hence, MD[2]; Sushmita Yallapragada, MD[2]
[1]Children's Health, Richardson, Texas; [2]UT Southwestern, Dallas, Texas; [3]Children's Health, Dallas, Texas

Encore Poster
Previous Presentation: Pediatric Academic Society Conference (PAS), April 2024.

Financial Support: None Reported.

Background: The inability to take full oral feeds is a limiting step in discharge from the NICU and a point of parental frustration. Surgical gastrostomy tube placement (S-GT) is offered to qualifying infants to discharge home. Nasogastric tube (NGT) feeds are an alternative means to discharge. Hesitation from providers and caregivers as safety and efficacy is not yet proven long-term has made it a less favorable option.

Remote patient monitoring (RPM) has been shown to decrease hospital readmissions and improve the patient and parent experience. The impact of RPM to monitor infants using NGT on length of stay and need for S-GT requires further study.

Methods: LOCUS Health was identified as a usable platform, a dashboard was created and infants were identified (Table 1). Caregivers were given an iPad and Bluetooth baby scale to enter measurements, concerns and updates. Pre-discharge education included NGT and feeding pump education. Follow-up included calls at 48-72 hours post-discharge and biweekly check-ins. Weekly multidisciplinary calls to the caregiver included a registered dietitian, physician, nurse practitioner, and lactation specialist. The one-month RPM program transitioned NGT-dependent infants to gastroenterology for ongoing care.

Results: Since the program's launch in April 2024, 24 infants have enrolled. 22 infants reached full oral feeds at the time of graduation from the program, while 2 ultimately required S-GT placement. Admission diagnosis included conditions such as bronchopulmonary dysplasia (BPD), surgical necrotizing enterocolitis (NEC), congenital diaphragmatic hernia, omphalocele and cleft lip/palate. Average oral feeds at the time of onboarding was 61%. Mean gestational age at hospital discharge was 45 weeks. Average time on RPM was 22 days. No feeding-related readmissions occurred. Of the 17 caregivers who completed the surveys at the time of program graduation, all expressed satisfaction and noted improved care of their infant.

Conclusion: In the development phase of our program, we demonstrated safety and feasibility of home NGT feeds under the guidance of the medical team via telemedicine. With caregiver support, S-GT placement can be avoided in certain infants. Implementation of this program may reduce hospital costs and length of stay versus controls.

Table 1. Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Post menstrual age >35 weeks	Abnormal swallow study
Nippling /oral feeds 50% or greater	Craniofacial abnormality deemed unsafe to tolerate oral feeds
Room air or home oxygen	S-GT placement
Reliable caregiver	Minimal parental involvement
Medically stable for discharge (Normothermia, no apnea, no desaturations and no bradycardia)	Hospice /palliative discharge

P168 - Nutritionally Complete Tube-Feeding Formula With Real Food Ingredients – Tolerance and Growth Outcomes in Ex-Premature Medically Complex Children With Developmental Delay: A Case Series

Gerard Minor, PA-C, MMS[1]; Allison Blackmer, PharmD, BCPPS, FCCP, FASPEN[2]
[1]Kidz Medical Inc, Hollywood, Florida; [2]Nestle Health Science, Denver, Colorado

Financial Support: Financial support provided by Nestle Health Science.

Background: For ex-premature children with medical complexity and developmental delay (DD) transitioning from infant to pediatric enteral formulas, providing optimal nutrition can be challenging due to variable tolerance and efficacy of enteral formulas. Multiple enteral formula trials may be required before finding a well-tolerated option. Real food ingredient formulas offer benefits such as diversity of ingredients and fiber sources, positive microbiome effects, immune benefits, and impact on digestive health. Clinical interest is growing in these formulas, and the supporting body of evidence is expanding. However, questions exist such as which pediatric populations may benefit from real food ingredient containing formulas and growth outcomes using standardized evaluation methods, like z-scores. We present two ex-premature medically complex children, gastrointestinal (GI) symptoms, and DD transitioning from post-discharge infant formulas to a 1.0 kcal/ml pediatric tube-feeding formula made with real food ingredients (e.g., chicken, tomatoes, peaches, green beans, carrots, peas; Compleat® Pediatric Original 1.0, Nestlé Health Science, New Jersey [RFF]). Patient A (Table 1, Figure 1) was born at 23 weeks (wk) gestation with DD, bronchopulmonary dysplasia (BPD), gastroesophageal reflux (GER), constipation, and feeding disorder (FD). She was discharged at 12 wk corrected age on a 24 kcal/oz post-discharge formula and lactulose for constipation. At 13 months (mo) (9 mo corrected), transition to pediatric enteral formula was attempted for 3 mo, first to a standard pediatric formula with intact protein and no real fruit and vegetable ingredients, then to two different peptide-based formulas. All three were unsuccessful due to intolerance and lack of adequate growth. GI symptoms worsened, requiring initiation of famotidine, azithromycin, and metoclopramide. RFF was then initiated (97 kcal/kg/d via G-tube). All GI symptoms, weight, and height began to improve after 1 mo, though growth velocity was suboptimal leading to an increase in caloric provision (130 kcal/kg/d). The next month, all GI medications were discontinued. Over the next year, Patient A maintained growth and development on RFF. Patient B (Table 2, Figure 2) was born at 25 wk gestation with pulmonary hypertension, atrial septal defect (ASD), DD, BPD, GER, and FD. She was discharged at 19 wk corrected age on a 26 kcal/oz post-discharge formula and metoclopramide and esomeprazole for reflux and emesis. Due to intolerance, caloric density was reduced to 24 kcal/oz. At 13 mo (9 mo corrected), she transitioned to RFF (106 kcal/kg/d) via G-tube bolus. In the first 3.5 mo after switching, Patient B consumed purees and other foods for comfort in addition to RFF (106-117 kcal/kg/d) with increasing amounts of RFF by mouth, and with adequate GI tolerance, but no significant weight gain. At 17 mo (13 mo corrected), Patient B underwent ASD closure via median sternotomy. By 19 mo (16 mo corrected), her reflux resolved, and while still taking most feeds by mouth (101 kcal/kg/d), demonstrated positive weight gain from 0.5th to 3.6th percentile. In the next 2 mo, weight gain increased to the 10th percentile, GI medications were stepped down. Patient B was consuming RFF solely by mouth and continued appropriate growth through 2 years of age. These cases provide real-world evidence of successful use of RFF in ex-premature children with medical complexity and significant GI symptoms transitioning from infant to pediatric enteral formulas, highlighting the benefits of real food ingredients in this population. While challenges can still present, these children demonstrated positive growth outcomes and tolerated RFF well, evidenced by the ability to discontinue GI medications.

Methods: None Reported.

Results: None Reported.

Conclusion: None Reported.

Table 1. Patient A growth parameters

Chronological Age (months)†	Corrected Age (months)†	Weight		Length		Weight-for-length
		kg	z-score*	cm	z-score*	z-score*
8	4	5.83	-0.58	62	0.03	-0.97
11	7	6.95	-0.81	64	-1.04	0.20
16	12	7.45	-2.15	72	-0.41	-2.10
Switch to RFF						
17	13	7.41	-2.60	78	1.16	-4.46
18	14	7.57	-2.68	78	0.79	-4.12
19	15	8.29	-2.15	ND	ND	ND
21	17	8.64	-2.12	79	0.03	-2.43
26	22	9.5	-2.05	75	-2.52**	0.06

† Rounded to nearest whole number. *z-score calculated based on corrected age. **Standing height, other measurements supine length. Abbreviations: cm = centimeters; kg = kilograms; ND = not done; RFF pediatric tube-feeding formula made with real food ingredients.

Table 2. Patient B growth parameters

Chronological Age (months)†	Corrected Age (months)†	Weight		Length		Weight-for-length
		kg	z-score*	cm	z-score*	z-score*
8	5	4.94	-2.05	54	-3.38	1.36
9	5	5.49	-1.60	56	-2.92	1.33
10	7	6.78	-0.86	63	-1.24	0.33
11	7	6.57	-1.34	63	-1.47	-0.01
13	9	7.1	-1.70	66	-1.49	-0.35
Switch to RFF						
15	11	7.3	-2.16	69	-1.23	-1.20
16	13	7.25	-2.79	72	-0.85	-2.49
19	16	8.41	-2.16	74	-1.24	-1.15
21	18	9.24	-1.60	75	-1.47	-0.27
24	21	10.6	-0.74	78	-1.37	0.54
26	22	10.7	-0.86	80	-1.13	0.14

† Rounded to nearest whole number. *z-score calculated based on corrected age. Abbreviations: cm = centimeters; kg = kilograms; RFF pediatric tube-feeding formula made with real food ingredients.

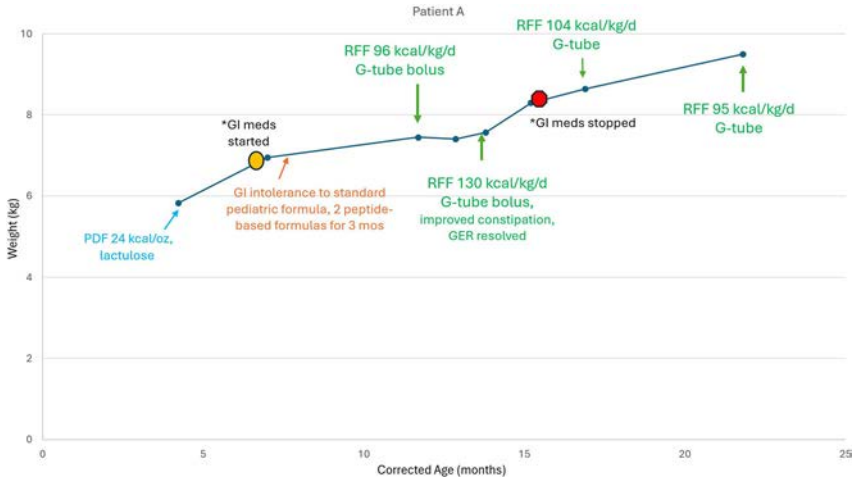

Figure 1. Patient A clinical course

Figure 1 describes Patient A's clinical course over time.

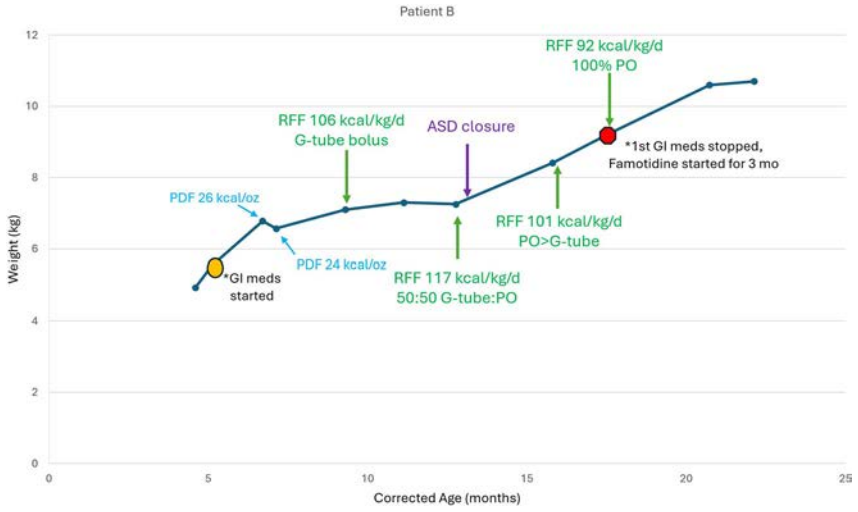

Figure 2. Patient B clinical course

Figure 2 describes Patient B's clinical course over time.

P169 - Individual and Combined Bedside Signs and Symptoms of Enteral Nutrition Tolerance Are Associated With Enteral Nutrition Delivery in the Pediatric ICU- A Retrospective Cohort Study

Enid Martinez, MD[1]; Alireza Akhondi-Asl, PhD[1]; Dennis Simon, MD[2]; Michael Morowitz, MD, FACS[2]; Nilesh Mehta, MD[3]
[1]Boston Children's Hospital/ Harvard Medical School, Boston, Massachusetts; [2]University of Pittsburgh, Pittsburgh, Pennsylvania; [3]Boston Children's Hospital, Boston, Massachusetts

Financial Support: None Reported.

Background: Enteral nutrition (EN) adequacy is associated with improved clinical outcomes in pediatric critical care. Enteral nutrition intolerance often impedes EN adequacy, and yet EN intolerance is poorly defined. We aimed to examine the relationship between clinical signs and symptoms used as markers of EN intolerance and EN delivery.

Methods: We performed a secondary analysis of a multi-center, observational cohort study including 77 pediatric intensive care units (PICU) from 17 countries with a minimum of 8 beds. Children were included in the study if they were between 1 month to 18 years of age, required mechanical ventilation within 48 hours of PICU admission and had a minimum 3-day length of stay in the PICU. We reviewed demographic data; clinical characteristics (admission diagnoses, comorbidities, and medications); nutrition variables (prescribed energy goal, daily energy delivered by EN); and clinical signs and symptoms associated with EN intolerance (high gastric residual volume (GRV), abdominal distension, emesis, diarrhea, subjective abdominal discomfort), during the first 10 days of PICU admission. We performed a multivariable frailty regression analysis examining the relationship between individual and combined signs and symptoms of EN tolerance and EN adequacy, defined as time to reach 60% of EN goal, within the first 10 days of PICU admission. We adjusted for age, sex, severity of illness, admission type, medication exposure (e.g. sedatives), GI disease that could impact EN delivery (e.g. GI bleeding, motility disorder), location of feeding tube and caloric density of EN formula and a random intercept for each hospital.

Results: 1838 patients of 1844 received EN and were included in the analysis. The cohort's mean (standard deviation, SD) age was 4.36 (5.21) years and 55.4% were male. Medical admissions accounted for 70.5% of the encounters. 60% of EN goal was achieved by 68.6% of patients within 10 days of PICU admission. After adjusting for potential confounders, high GRV, abdominal distension, and emesis, and number of symptoms, irrespective of which individual symptoms, were associated with a lower hazard ratio of achieving 60% of EN goal within 10 days of ICU admission, [high GRV HR 0.30, 95% CI 0.15, 0.59, p-value < 0.0001; abdominal distension HR 0.11, 95% CI 0.03, 0.45, p-value 0.002, and emesis HR 0.49, 95% CI 0.27, 0.90, p-value 0.022; and number of symptoms HR 0.31, 95% CI 0.21, 0.46, p-value < 0.0001].

Conclusion: Clinical signs and symptoms of EN intolerance, both as individual and combined symptoms, were predictive of achieving 60% EN goal. Individual or combined bedside clinical signs and symptoms can be considered for assessing EN tolerance and advancement in clinical practice and provide a potential unifying definition for research studies.

P170 - Prevalence and Management of Carnitine Deficiency in Pediatric Patients Receiving a Whole Food Blend Formula Via Gastrostomy Tube

Jennifer Mein, RD, CSP[1]; Staci Collins, RD, CNSC[2]; Madelena Martin, MD[3]
[1]UC Davis Health, Woodland, California; [2]UC Davis Health, Davis, California; [3]UC Davis Health, Sacramento, California

Financial Support: None Reported.

Background: Carnitine is a critical nutrient for fatty acid oxidation, and deficiency can lead to metabolic disturbances such as hypoglycemia. In healthy individuals with adequate dietary intake and intact metabolic pathways, carnitine deficiency is rare. Endogenous synthesis and dietary intake typically maintain sufficient levels, even in patients with complex medical needs. Therefore, carnitine deficiency should not develop in medically stable, well-nourished pediatric patients unless intake is chronically inadequate (1,2). An initial case of hypoglycemia in a pediatric patient dependent on whole food blend formula via gastrostomy tube led to the discovery of acquired carnitine deficiency. Subsequent analysis confirmed that the whole food blend formula used did not contain carnitine, prompting broader investigation across the patient population.

Methods: A retrospective chart review was conducted of 38 pediatric patients receiving carnitine-free whole food blend formulas via gastrostomy tube. Serum free and total carnitine levels were obtained. Patients with confirmed deficiency were assessed for symptoms and either

initiated on L-carnitine supplementation per the developed protocol or family opted to change to a carnitine containing formula. Repeat labs were obtained on average after 4.5 months, with dose adjustments based on follow-up results. A detailed guideline was developed and implemented across the care team for consistent practice.

Results: Of the 38 patients screened, 18 (47%) were found to have carnitine deficiency. 10 (55%) out of those 18 patients were exclusively formula fed. Age range of subject group 3-18 years with median age range 7 years old. The index case presented with hypoglycemia; however, most other deficient patients were asymptomatic. During the course of our study, two patients passed away due to medical complications unrelated to carnitine deficiency. Among the 18 deficient patients:

9 (50%) showed biochemical improvement following L-carnitine supplementation or transition to a carnitine-containing formula.
5 (27%) transitioned to a carnitine-containing formula.
For the 5 patients who transitioned to carnitine containing formula, the carnitine dose ranged from 0.7 -2.4 mg/kg carnitine
8 (44%) had not yet completed follow-up labs.
2 (11%) experienced gastrointestinal intolerance to L-carnitine, with increased stooling reported.

Conclusion: Carnitine deficiency was identified in nearly half of pediatric patients receiving a carnitine-free whole food blend formulas via gastrostomy tube. This deficiency may go unrecognized without routine monitoring. Screening and supplementation protocols are essential for preventing metabolic complications and ensuring safe, complete nutrition in medically complex pediatric patients relying on specialized enteral nutrition. Both initiation of L-Carnitine supplementation or transition to a carnitine containing formula appear effective in resolving the deficiency within 2 to 4 months.

P171 - Use of a Novel Lym-X-Sorb–Based Medical Food to Improve Fat Absorption in Pediatric Short Bowel Syndrome: A Case Report

Sivan Kinberg, MD, MS, MA[1]; Everardo Perez Montoya, MS, RD, CDN, CSP, CNSC[1]
[1]Columbia University Irving Medical Center, New York, New York

Financial Support: None Reported.

Background: Short bowel syndrome (SBS) can cause fat malabsorption due to reduced intestinal surface area, rapid transit, bile acid deficiency, and postcibal asynchrony. Patients often experience feeding intolerance, poor weight gain, and dependence on parenteral nutrition (PN). We present a pediatric patient with SBS who weaned off PN but developed severe failure to thrive (FTT) that improved with a novel Lym-X-Sorb–based medical food added to oral feeds. Case: A 5-year-old ex-29-week female with SBS secondary to necrotizing enterocolitis with 25 cm of jejunum anastomosed to ascending colon (no ileocecal valve) weaned off PN at 15 months but had persistent oral aversion, abdominal distention, feeding difficulties, and FTT. Despite gastrostomy tube (GT) feeds and high-calorie (>120 kcal/kg/day) homemade blended meals prepared by her chef father, she lost weight, and fell off the growth chart after PN cessation (BMI Z-score: –4.38; MUAC Z-score: –5.98). Patient slowly discontinued GT feeds and transitioned to taking all blended meals by mouth, but she had loose/pasty stools 2-6x/day, gassiness, and bloating. Nutrition-focused physical exam revealed severe fat loss in temples, orbits, and extremities. Labs showed essential fatty acid deficiency, improved with flaxseed oil. Stool studies confirmed fat malabsorption; pancreatic elastase was normal. Commercial formulas were trialed but family declined further formula use, preferring natural food options. Medications, including loperamide, metronidazole, cholestyramine and oral pancreatic enzymes provided some symptomatic relief but were ineffective to promote weight gain. Multidisciplinary discussions considered hospitalization, restarting PN, endoscopy, and starting teduglutide. We decided to start Seracal, a novel medical food powder composed of Lym-X-Sorb, a structured lipid matrix that facilitates absorption of fatty acids, calories, and fat-soluble nutrients without requiring bile acids or pancreatic enzymes. The medical food was introduced at 1 tbsp and titrated to 3 tbsp per blended meal (total 12 tbsp/day). Meals included pureed chicken/vegetable soup with added oils or mashed pasta with cheese and ground turkey. Over 3.5 months, she gained 1.5 kg (see growth chart) and gastrointestinal (GI) symptoms improved, with pastier stools 2-3x/day and less bloating. No adverse effects occurred. For the first time in three years, the patient demonstrated consistent weight gain, coinciding with the introduction of the medical food as the only change in management. Conclusion: This case highlights the potential utility of Lym-X-Sorb–based medical food in managing SBS-associated fat malabsorption and malnutrition. In our patient, it was well tolerated, improved weight gain, and reduced GI symptoms. Further studies are needed to evaluate its efficacy, safety, and tolerability in the pediatric SBS population.

Methods: None Reported.

Results: None Reported.

Conclusion: None Reported.

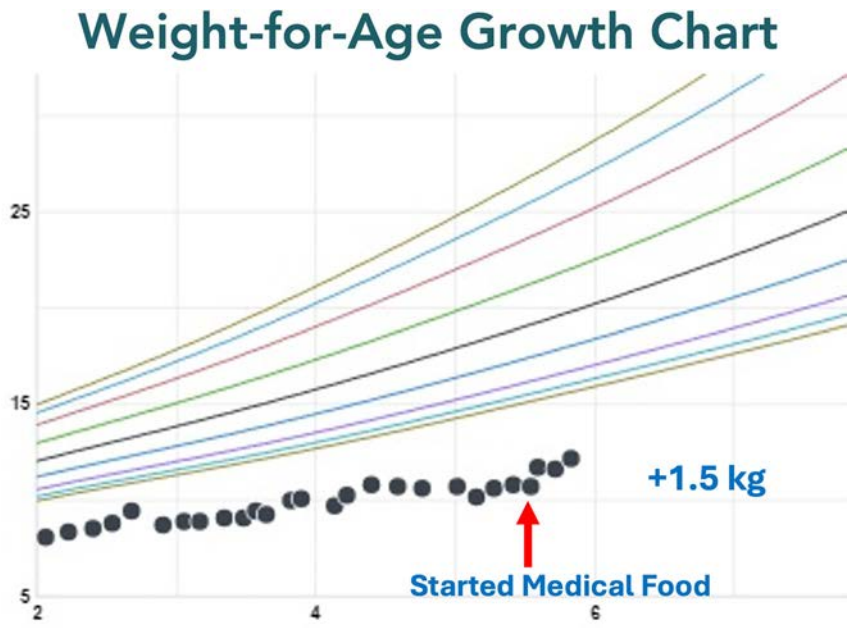

Figure 1.

P172 - Successful Transition From Total Parenteral Nutrition in an Infant With Short Bowel Syndrome Following Neonatal Midgut Volvulus: A Case Report

Laura Avila, MD[1]; Beverly Jacobson[2]; Barbara Hansen[3]
[1]Hospital Universitario La Paz, Madrid; [2]Brock's Academy, Woodinville, Washington; [3]University of South Florida, Tampa, Florida

Financial Support: None Reported.

Background: Short bowel syndrome (SBS) is a major cause of pediatric intestinal failure (IF), defined as the reduction of functional gut mass below the amount necessary for adequate absorption of nutrients and fluids to support growth in children. SBS commonly results from congenital or acquired conditions such as midgut volvulus, which may necessitate extensive small intestinal resection. Although SBS was once associated with high mortality, the introduction of total parenteral nutrition (TPN) in the 1960s significantly improved survival. The goal of clinical management is to support intestinal adaptation and achieve enteral autonomy through nutritional rehabilitation. This case from 1969 describes a neonate with SBS due to midgut volvulus, managed with TPN and successfully transitioned to full oral feeding without long-term complications.

Methods: Case Presentation: A full-term neonate, adopted at birth in 1969. The diagnosis of midgut volvulus was not identified prenatally, and symptoms were first recognized during the initial 8 hours at home. Surgical intervention was performed shortly after birth, during which approximately two-thirds of the small intestine were removed. A central venous catheter for TPN was placed via the jugular vein, terminating in the right atrium. TPN was administered for 93 days. The formulation was compounded manually into a glass container, as commercial plastic TPN bags were not in use at the time. No catheter-related bloodstream infections or liver function abnormalities occurred. There were no reported issues with nutrient absorption or diarrhea. Electrolyte levels were carefully monitored and adjusted as needed during TPN administration. Nutritional Management and Outcome: TPN was discontinued before oral feeding began. No nasogastric or jejunal feeding tubes were required. The patient progressed gradually from clear liquids to full liquids, then soft solids, and finally to a complete infant diet by approximately nine months of age. No nutritional supplements were necessary. Growth and development proceeded normally throughout childhood and adolescence, without hospital readmissions for nutritional or gastrointestinal issues. As an adult, the patient maintains a regular diet, with no restrictions or need for nutritional support.

Results: This case highlights the successful management of neonatal SBS using TPN followed by gradual reintroduction of oral feeding. The absence of complications such as liver disease or sepsis, along with the preserved capacity for nutrient absorption, likely contributed to the favorable outcome. The early adaptation and tolerance of oral feeding reflect the natural capacity of the intestine to undergo structural and functional changes that enhance absorption following resection. As demonstrated in this case, with meticulous clinical monitoring and tailored nutritional strategies, children with significant intestinal loss can achieve enteral autonomy and normal long-term outcomes.

Conclusion: Parenteral nutrition remains a cornerstone in the treatment of neonatal SBS. When combined with careful monitoring and individualized nutritional rehabilitation, even infants with substantial small bowel resection can attain complete independence from TPN and sustain normal growth and development.

P173 - Equity in Enrollment: A 20-Year Review of Diversity in Infant Formula Clinical Trials and Alignment With FDA Expectations

Weihong Zhuang, MS[1]; Nancy Moore, RD[1]; Jami Walker, MS, MHA[1]; Sisi Cao, PhD[1]; Amber Jessell[1]; Veronica Fabrizio, DO[1]; Amy Gates, PhD, RDN, LD[1]
[1]Mead Johnson Nutrition, Evansville, Indiana

Financial Support: This is industry research.

Background: The U.S. Food and Drug Administration (FDA) has emphasized the importance of diversity in clinical trials, urging sponsors to ensure that study populations reflect the demographics of those who will ultimately use the product. This guidance is particularly critical in the field of pediatric nutrition, where infant formulas serve a broad and diverse population of infants, including those born preterm or with specific dietary needs, such as cow's milk allergy. Ensuring demographic representation in clinical research not only supports regulatory compliance but also enhances the generalizability and ethical integrity of the findings.

Methods: To assess the alignment with this expectation, we conducted a retrospective review of Mead Johnson Nutrition–sponsored clinical trials over the past 22 years (2002 to 2024). This review focused on studies involving routine formulas (14 in the U.S.), hypoallergenic formulas (3 in the U.S.,1 in Italy), and formulas designed for preterm infants (3 in the U.S.,1 in Australia). Participant race data were compared with real-world estimates, which were derived from national birth statistics using a Bayesian approach.

Results: The results show that our trials consistently reflect the racial composition of the populations using these products. In particular, our studies involving preterm infants demonstrated particularly strong alignment with national data. As an example, White and Black infants comprised approximately 67% and 23% of the U.S. preterm population, respectively, and represented 68% and 22% of our clinical trial participants, reinforcing the external validity of our research. This consistency across product categories suggests that our recruitment strategies have been effective in reaching diverse populations.

Conclusion: This review confirms that our recruitment strategies align with FDA diversity guidance and support ethical research practices. We recognize the importance of further enhancing inclusivity in our clinical research and will strive to broaden representation of additional racial and ethnic groups in future studies. These insights will inform future trial planning and help ensure our nutritional products are safe and effective for all infants.

P174 - Immobilized Lipase Cartridge is Compatible With a Broad Range of Individual Infant Enteral Nutrition Practices for Fat Hydrolysis During Tube Feeding

Lynn Wilson, MA[1]; Greta Loring, PhD[1]; Kayla Paul, RD, LD, CNSC[1]; Michael Yeh, MD, MPH, MBA[1]
[1]Alcresta Therapeutics, Waltham, Massachusetts

Financial Support: Alcresta Therapeutics.

Background: Adequate nutrition during infancy is critical for growth and development, particularly for neonates and infants with complex medical conditions requiring tube feeding. Since April 2025, an immobilized lipase cartridge (ILC) has been indicated for use in pediatrics (including neonates and infants) and adult patients to hydrolyze fats during enteral feeding. However, real-world data on infant feeding practices using an ILC in conjunction with enteral feeding have been limited. This analysis evaluates real-world feeding practices and formula compatibility with ILC use in infants under one year of age.

Methods: Retrospective real-world data were analyzed from a third-party reimbursement program database. All patients were less than 1 year of age when they initiated use of the ILC, RELiZORB® (Alcresta Therapeutics), with infant formula or human milk between January 2020 and October 2024. Baseline characteristics and enteral feeding regimens were captured for all patients.

Results: Data from 96 patients across 60 clinics in the United States were analyzed for baseline characteristics and formula data. The patients ranged in age from -2.2 months (neonate, adjusted for prematurity) to 11.89 months, with a mean age of 5.64 ± 3.57 months, mean weight of 5.36 ± 1.77 kg, and mean height of 59.97 ± 8.24 cm. Of the 96 infants, 84 (87.5%) received formula-only feeds, while 12 (12.5%) received human milk or human milk mixed with formula. Nineteen percent of the cohort received some parenteral nutrition support in addition to enteral feeds at the initiation of ILC use. Caloric density of enteral nutrition ranged from 20 to 30 kcal/oz, with higher caloric concentrations often achieved by using powdered infant formula either alone or as a supplement. Of the 96 patients 57% (55 patients) continued ILC use for 12 months. There were 19 different formulas noted with approximately 50% of infants using elemental formulas, 33% using polymeric (protein-based) formulas, and 17% using semi-elemental (peptide-based) formulas. Feeding volumes ranged from < 250 mL/day to 1,500 mL/day, with most infants (51%) receiving between 501–1,250 mL/day. Delivery patterns varied: 25% of infants received continuous 24-hour feeds through ILC via pump, 68% received overnight feeds (8–12 hours), and the remainder had other cyclic schedules. Flow rates ranged widely, but 70% fell between 26–50 mL/hr.

Conclusion: This multi-site review shows wide variation in infant enteral feeding regimens that spans human milk, elemental, semi-elemental, and polymeric formulas, across diverse caloric densities and flow rates. Feeding schedules varied from continuous to cyclic overnight regimens, underscoring the device's adaptability to individualized nutritional needs. The variability in formula type, caloric density, and delivery parameters reflect highly individualized infant enteral feeding regimens all using an ILC to meet the infants' nutritional needs and to support optimal growth and development in this vulnerable patient population.

Table 1. Formula regimen

Variable	Patients (n)
Formula Type	
- Elemental (amino acid based)	48
- Semi-Elemental (peptide based)	16
- Polymeric (protein based)	32
Human Milk	
- Milk only	4
- Milk with elemental formula	2
- Milk with semi-elemental formula	2
- Milk with polymeric formula	3
Daily Volume Range (mL)	
- <250	4
- 251-500	6
- 501-750	23
- 751-1000	26
- 1001-1250	22
- 1251-1500	3
- Unknown	12
Daytime Flow Rate (mL/hr)	
- <10	4
- 11-25	3
- 26-50	21
- >100	2
Nighttime Flow Rate (mL/hr)	
- <10	4
- 11-25	10
- 26-50	64
- >100	13
Type of Feeding Daytime	
- Bolus	4
- Intermittent	0
- Cyclic	4
- Continuous	24
Type of Feeding Nighttime	
- Bolus	0
- Intermittent	1
- Cyclic	65
- Continuous	26

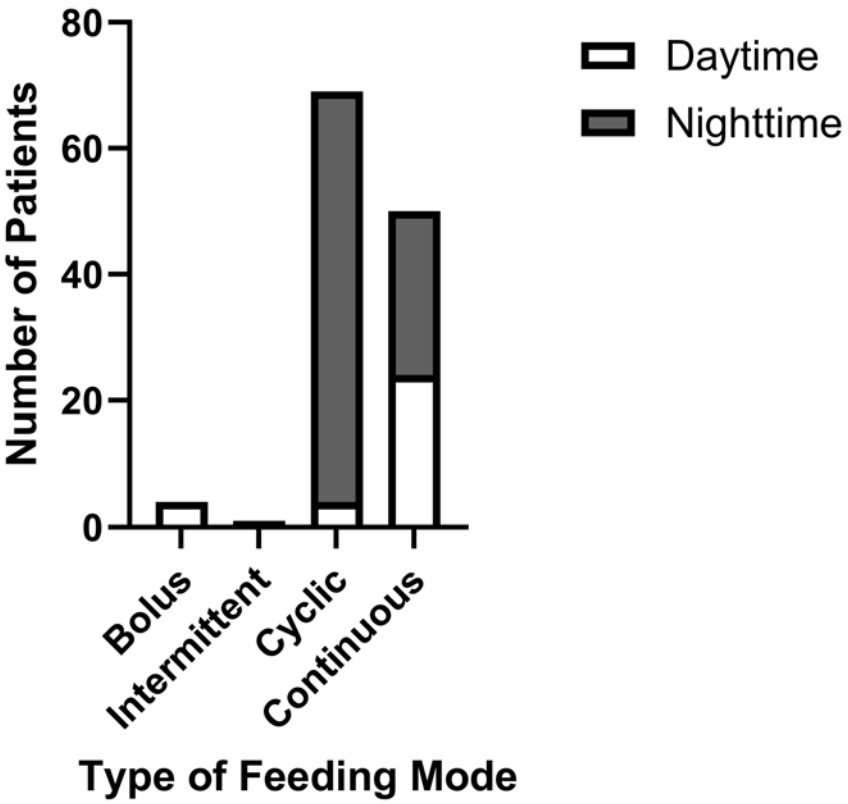

Figure 1. ILC daytime and nighttime use

P175 - Review of Pediatric (Ages 1 – 5) Enteral Feeding Practices Utilizing an Immobilized Lipase Cartridge for the Hydrolysis of Fats in Enteral Formulas

Greta Loring, PhD[1]; Lynn Wilson, MA[1]; Kayla Paul, RD, LD, CNSC[1]; Michael Yeh, MD, MPH, MBA[1]
[1]Alcresta Therapeutics, Waltham, Massachusetts

Financial Support: Alcresta Therapeutics.

Background: Pediatric patients who rely on tube feeding for nutritional support often experience fat malabsorption. Use of an immobilized lipase cartridge (ILC) to hydrolyze fats in enteral feeds has demonstrated safety and efficacy in improving fat absorption and enteral feeding tolerance in patients with exocrine pancreatic insufficiency associated with cystic fibrosis. While the ILC has shown effective fat hydrolysis with a wide range of enteral feeding formulas in in vitro conditions, the range of real-world feeding practices with it is largely unknown. This review evaluates real-world feeding practices in pediatric patients aged 1–5 years using the ILC, focusing on formula selection, volumes, flow rates, and device utilization patterns.

Methods: A retrospective analysis of real-world data extracted from a third-party reimbursement program database was conducted to review feeding practices utilizing the ILC, RELiZORB® (Alcresta Therapeutics), in pediatric patients aged 1–5 years. All patient data were collected between 2019 and 2023 and included baseline characteristics and enteral feeding regimens. ILC use was categorized by formula usage, the number of devices per day, the total daily volume, and the feeding method.

Results: The results were based on a total of 186 patients from 80 clinics in the United States with baseline characteristics that included mean age (2.88 ± 1.21 years), weight (11.90 ± 3.04 kg), and height (87.23 ± 11.48 cm). Most of the patients (69%) remained on ILC at 12 months. Of the 38 different formulas used, 56% were semi-elemental or peptide-based formulas and the remaining 44% were evenly divided between polymeric (protein-based) and elemental (amino acid-based) formulas. Nearly all formulas were pediatric or infant-specific, with caloric density ranging from < 1–2.0 kcal/mL. The volume ranged from 500 mL to >1500 mL with 49% receiving 500 mL per session and 84% using a pump for cyclic tube feeding, typically overnight.

Conclusion: This review demonstrates the broad compatibility of the ILC with diverse pediatric feeding practices in children aged 1–5 years. With nearly 70% of patients using the ILC with enteral feeds for a year, this analysis suggests successful compatibility of the ILC across multiple formula types, caloric densities, and volumes, reflecting flexibility in clinical application. Most patients used one or two devices in alignment with labeled capacity (500mL), and cyclic overnight feeding was the predominant pattern. The observed variability in formula type, feeding volume, and flow rate indicates that the ILC is broadly compatible with individually tailored enteral feeding regimens. These findings support the adaptability of the ILC in pediatric nutrition management and can provide real-world guidance for clinicians implementing fat hydrolysis technology in enteral feeding protocols.

Table 1. Formula Regimen

Variable	Patients (n)
Formula Type	
- Elemental (amino acid based)	39
- Semi-Elemental (peptide based)	104
- Polymeric (protein based)	43
Daily Volume Range (mL)	
- 500	90
- 501-1000	76
- 1001-1250	6
- 1251-1500	9
- >1500	2
Flow Rate (mL/hr)	
- <10	1
- 11-25	6
- 26-50	73
- 51-75	77
- 76-100	18
- >100	5
Caloric Density (kcal/mL)	
- <1	5
- 1	65
- 1.5	83
- 2	1
Type of Feeding	
- Continuous	28
- Cyclic	153
- Intermittent	2
- Not Specified	3
Devices per Day	
- 1	104
- 2	79
- 3	2
- 4	1

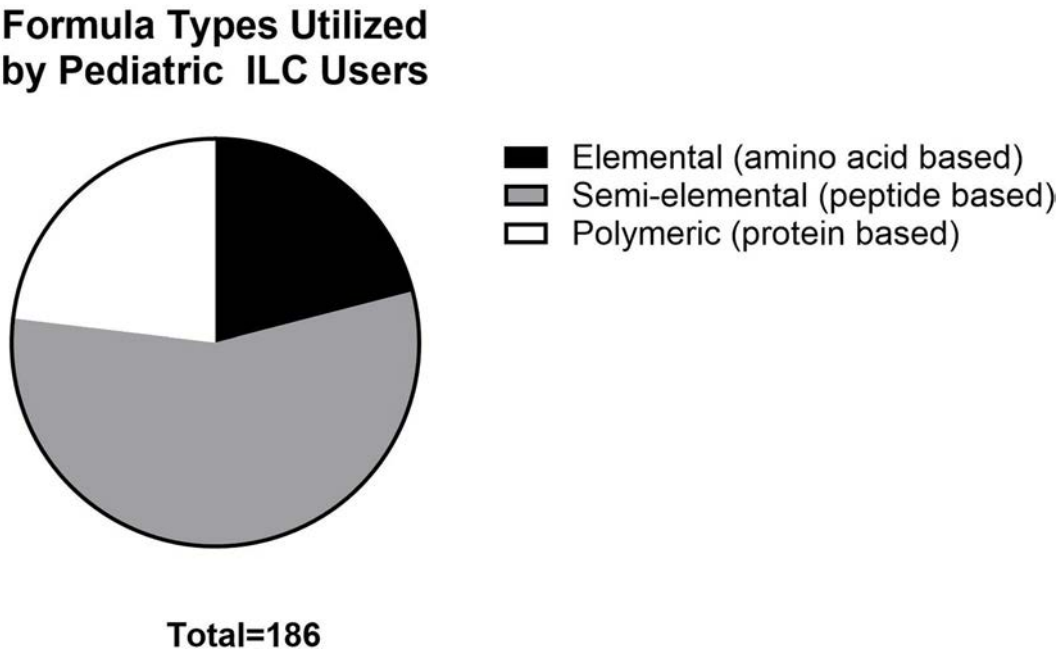

Figure 1. Formula type

P176 - Defining Clinical Risks of Venous Thromboembolism in Children With Intestinal Failure

Alayna Koch, DO[1]; Gillian Goddard, MD[1]; Jorie Gatts, MD[1]; Joseph Palumbo, MD[1]; Paul Wales, MD, Msc[1]
[1]Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio

Encore Poster

Previous Presentation: American Society of Hematology (ASH), December 2025, Orlando, FL.

Financial Support: None Reported.

P177 - Growth After Parenteral Nutrition Weaning by Race and Intestinal Transplant Status in Children With Intestinal Failure

Anita Nucci, PhD, RD, LD[1]; Alexander Kirpich, PhD[1]; Jeffrey Rudolph, MD[2]; Vikram Raghu, MD, MS[2]
[1]Georgia State University, Atlanta, Georgia; [2]UPMC, Pittsburgh, Pennsylvania

Financial Support: None Reported.

Background: Survival for children with intestinal failure (IF) has improved with parenteral nutrition (PN). Growth maintenance or catch-up growth has been observed to occur more frequently in the second year after PN weaning and in children who have received an intestinal transplant (ITx). However, many of these children still fail to achieve catch-up growth. Racial differences in clinical metrics including length of stay, rate of venous thromboembolism, central line-associated blood stream infections, and mortality have been reported where non-White children experienced worse outcomes. Growth after PN weaning by race has not been examined. We aim to describe growth patterns by race and ITx status in children with IF after PN weaning.

Methods: This retrospective observational study was conducted using an established registry at a center for pediatric intestinal rehabilitation (IR) in the U.S. Eligibility criteria included diagnosis with IF (PN use $\geq$ 60 days within a 74 consecutive day interval) at < 12 months of age and successful weaning from PN (off PN $\geq$ 90 days). Children were initially referred for IR between September 1989 and January 2023. Z-score values for weight and length/height (adjusted for gestational age up to 2 years of age) are described from the time of PN discontinuation (baseline) up to 2 years after weaning (time points: 30, 60, 90, 120, 180, 360, 540, 720 days) by race

(White [W] and non-White [NW]). The change in z scores over time are defined as decelerated (>−0.5), stable/maintained (± 0.5), or accelerated (>+0.5).

Results: 119 children (59% male) were eligible for the study. The median age (days) at diagnosis for W (n=95) and NW (n=24) children was 2 (interquartile range [IQR] 0,14.5) and 14 (IQR 2,38.5), respectively (p=0.013). The most frequent diagnoses for W children were necrotizing enterocolitis (NEC, 29.5%), gastroschisis (20%), and midgut volvulus (15.8%). Children who were NW were most frequently diagnosed with NEC (37.5%), midgut volvulus (20.8%), and small bowel atresia (16.7%). Clinical characteristics by race (W and NW, respectively) did not differ significantly for median gestational age (weeks) 35 (IQR 31,38) and 32.5 (IQR 28,36.75), percent small bowel remaining at diagnosis 27% (IQR 15,53) and 21% (IQR 10,57) and having a functional ileocecal valve 43% and 29%. Median time (years) to PN wean by W and NW race was similar at 1.5 (IQR 1,2.6) and 1.3 (IQR 1,1.8), respectively. Enteral autonomy was achieved (growth maintenance for >3 consecutive months) by 89% and 87% W and NW children, respectively. Of the 85 W and 20 NW children who achieved enteral autonomy 33 (39%) and 5 (25%) received an intestinal transplant, respectively. Mean weight and length/height z-score at the time of PN weaning in W children was -1.23 $\pm$ 1.4 and -2.04 $\pm$ 1.7, respectively. These values were not significantly different from those of NW children at -1.07 $\pm$ 1.26 and -1.86 $\pm$ 1.42, respectively. Growth pattern by race and transplant status by year of follow-up is shown in Tables 1 and 2. Weight gain and linear growth were maintained during the two-year follow-up period except for accelerated weight gain observed in both years in NW children who were transplanted and accelerated linear growth velocity in year one in NW children who were not transplanted. Acceleration in linear growth was achieved by more children in year two who were not transplanted vs. transplanted.

Conclusion: Growth was maintained for two years post-PN weaning for most children regardless of race and ITx status. Catch-up growth occurred more frequently in NW children. However, catch-up growth remains a challenge for the majority of children with IF.

Table 1. Growth pattern by race and intestinal transplant status in children with intestinal failure (year one)

	Transplanted		Not Transplanted	
	White (%) n=33	Non-White (%) n=5	White (%) n=57	Non-White (%) n=14
Weight z-score				
Decelerated	21	40	28	29
Maintained	**49**	0	**53**	**50**
Accelerated	30	**60**	19	21
Length/Height z-score				
Decelerated	21	17	19	23
Maintained	**52**	**66**	**60**	23
Accelerated	27	17	21	**54**

Table 2. Growth pattern by race and intestinal transplant status in children with intestinal failure (year two)

	Transplanted		Not Transplanted	
	White (%) n=33	Non-White (%) n=5	White (%) n=52	Non-White (%) n=11
Weight z-score				
Decelerated	15	0	12	18
Maintained	**61**	40	**71**	**64**
Accelerated	24	**60**	17	18
Length/Height z-score				
Decelerated	6	17	12	20
Maintained	**82**	**83**	**63**	**50**
Accelerated	12	0	25	30

P178 - A Quality Improvement Initiative to Understand Barriers to Obtaining Weight Measurements in a Pediatric Intensive Care Unit

Tracy Walton, RN, MSN, CPNP[1]; Samuel Hickey, BS[2]; Kelsey Hodge, RD, LDN, CNSC[2]; Meghan Keenan, RD, MS, LDN, CNSC[2]; Jessica Saleeba, MSN, RN, CCRN[2]; Darlene Whitney, BSN, RN, CCRN[2]; Nilesh Mehta, MD[3]; Enid Martinez, MD[4]

[1]Boston Children's Hospital, Acton, Massachusetts; [2]Boston Children's Hospital, Boston, Massachusetts; [3]Boston Children's Hospital, Boston, Massachusetts; [4]Boston Children's Hospital/ Harvard Medical School, Boston, Massachusetts

Financial Support: None Reported.

Background: Missing weight measurements are common in pediatric intensive care units (PICU), which can lead to errors in medication, fluid and nutrition administration, and impact patient safety and recovery. In this study, we aimed to understand our local weight measurement practices including potential barriers for missing weight measurements.

Methods: We conducted twice a week audits to identify patients with missing weight measurements. In our unit, we recommend obtaining a weight within 24 hours of a patient's admission and follow-up weights at least once a week for patients aged ≥ 12 months or every 4 days for patients aged < 12 months. Resource nurses were alerted to patients that were missing a weight measurement so they could facilitate obtaining a weight within 24 hours of being audited. A retrospective chart review was performed to collect additional data regarding potential barriers to obtaining weight measurements.

Results: In a 6-week period, there were 57 occasions of missed weight measurements in 40 patients (average 16% of admitted PICU patients) of which 77% were follow-up weight measurements. The mean ± standard deviation age for this cohort was 9.6 ± 7 years. Most admissions were non-elective (72%) and for post-operative care (61%). Primary diagnoses at admission included respiratory, neurologic and gastrointestinal disease (33%, 23% and 18%, respectively). Patients were admitted to the PICU from the emergency department (31%), the operating room (31%), another inpatient unit within the hospital (26%) or directly admitted via critical care transport (13%). A potential barrier limiting the ability to obtain a weight was identified in 24 cases (42%), and these included hemodynamic instability with vasopressor requirement 9/57 (16%), neurologic instability 7/57 (12%), high ventilator settings or oscillator (6/57, 11%), ECMO therapy (5/57, 9%), behavioral/safety concerns (5/57, 9%) and movement restrictions due to spinal instability (4/57, 7%). In addition, patients had a limited mobility recommendation in 25 of 57 (43%) occasions. However, in 22 of 24 (92%) occasions, where a barrier to weighing was recorded, an imaging study (e.g. chest radiography) was obtained on the day of the audit. In addition, 21/24 (88%) patients with a barrier to obtaining a weight were eligible for a bed or crib with weighing capacity which would have allowed for weight measurements without any or significant patient movement. After alerting the resource nurse, a weight measurement was obtained within 24h of the audit in 42% of patients with missing weights, including 33% of patients with a recorded barrier.

Conclusion: No barrier to obtaining a weight measurement was identified for most occasions where there was a missing measurement in our cohort. Most patients with a potential barrier to obtaining a weight measurement were eligible for the use of beds or cribs with zeroing capacity and had bedside or remote imaging studies suggesting opportunities for improved practices. Additional education about the importance and logistics of weighing patients, just-in-time awareness of stakeholders, and support from local champions will help improve compliance with obtaining weight measurements in the PICU.

P179 - Complications of Defunctionalized Aganglionic Bowel in Pediatric Intestinal Failure Patients With Long Segment Hirschsprung Disease: A Case Series

Elizabeth Castle, DNP, CPNP-AC[1]; Danielle Stamm, RN, MSN FNP-BC[1]; Tom Jaksic, MD, PhD[1]; Alexandra Carey, MD[2]; Christopher Duggan, MD, MPH[3]; Biren Modi, MD, MPH[1]

[1]Boston Children's Hospital, Boston, Massachusetts; [2]Boston Children's Hospital, Harvard Medical School, Boston, Massachusetts; [3]Harvard Medical School, Boston, Massachusetts

Financial Support: None Reported.

Background: Long segment Hirschsprung disease (LSHD) is a rare condition characterized by absent ganglion cells throughout the colon, sometimes extending into the small bowel. This leads to reduced or absent peristalsis, impaired gastrointestinal transit, and accumulation of unpropelled intestinal contents, leading to the need for a leveling enterostomy proximal to the aganglionic bowel. LSHD with small bowel involvement frequently leads to intestinal failure and prolonged parenteral nutrition (PN) dependence, with possible need for future

transplantation. Defunctionalized aganglionic bowel is often left in situ for preservation of abdominal domain, verification of diagnosis or future therapy. Retention of aganglionic bowel and accumulation of inspissated material can lead to diversion colitis, systemic inflammation and abdominal pain. There is a paucity of literature describing the clinical course, nutrition considerations and optimal management strategies to address defunctionalized intestine in LSHD.

Methods: A retrospective chart review was conducted of 329 patients managed by a interdisciplinary intestinal rehabilitation program. Eighteen LSHD patients were identified, 10 with retained defunctionalized aganglionic bowel. Nine developed associated complications requiring intervention, of whom six underwent distal enterectomy/colectomy due to refractory symptoms.

Results: Prior to surgery, all received metronidazole for dysbiosis, 4 attempted saline rectal/mucous fistula irrigations and 3 underwent fecal disimpaction with N-acetylcysteine with inadequate response. Patient 1: 7-year-old male with ~100 cm ganglionated small bowel to end jejunostomy. Weaned from PN at 18 months and IV fluids at 47 months, now fully enterally fed. Underwent complete enterectomy and colectomy at age 5 years due to refractory abdominal pain and small bowel obstruction due to compression by inspissated mucous in defunctionalized segment. Patient 2: 7-year-old female with 13 cm ganglionated and 25cm aganglionic jejunum to end jejunostomy. Fully PN dependent. Underwent complete distal enterectomy and colectomy at age 7 years due to refractory abdominal pain. Patient 3: 7-year-old male with aganglionosis to the stomach with 80 cm aganglionic bowel to end jejunostomy. Fully PN dependent. Underwent complete distal enterectomy and colectomy at age 7 years due to refractory abdominal pain and purulent mucous fistula drainage. Patient 4: 4-year-old female with 20 cm small bowel to end jejunostomy. Primarily PN dependent, minimal enteral/oral feeds tolerated. Underwent mucous fistula takedown and resection of aganglionic small bowel and cecum and distal stool evacuation at age 2 years. Patient 5: 2-year-old female with 58 cm small bowel to end jejunostomy. Dependent on PN for ~50% of total energy intake. Required complete distal enterectomy and colectomy due to intra-abdominal abscess involving defunctionalized small bowel. Patient 6: 17-year-old male with 270 cm to end jejunostomy. Fully PN dependent. Underwent resection of aganglionic small bowel and total colectomy due to stricture, purulent drainage and recurrent infection in defunctionalized bowel segment at age 15 years. Five patients were PN dependent prior to enterectomy/colectomy and all remained partially PN dependent postoperatively.

Conclusion: Intestinal rehabilitation in patients with LSHD with small bowel aganglionosis may necessitate removal of aganglionic bowel to improve refractory symptoms of diversion colitis, inspissated mucus, and abdominal pain. Longterm follow-up of this patient cohort is ongoing.

P180 - Tolerance and Weight Gain With 100% Whey Protein Peptide Based Enteral Formulas in Pediatric Population: A Retrospective Review

Osman Mohamed Elfadil, MBBS[1]; Vidit Jogani, MBBS[1]; Danelle Johnson, MS, RD-AP, LDN, CNSC[2]; Jithinraj Edakkanambeth Varayil, MD[1]; Ryan Hurt, MD, PhD[1]; Dana Steien, MD, PNS[1]; Manpreet Mundi, MD, FASPEN[1]
[1]Mayo Clinic, Rochester, Minnesota; [2]Mayo Clinic, Rochester, Minnesota

Financial Support: Nestlé Health Science.

Background: Many children with medical conditions require enteral nutrition (EN) to optimize growth and development. Peptide-based formulas containing 100% whey protein are associated with better tolerance, but there is limited data on its effects on growth in children. This study evaluated the utilization, tolerance, and outcomes of pediatric patients receiving a 100% whey protein peptide-based formula.

Methods: A retrospective chart review was conducted in pediatric patients who received a 100% whey protein peptide-based formula for ≥30 days with the initiation date between January 2018 and December 2024. Patients' nutrition histories and outcomes were tracked through May 2025. Demographics, underlying diagnoses, indications for initiation or transition to the study formula, nutritional adequacy, anthropometrics, and outcomes were analyzed.

Results: The analysis included 37 patients. Mean age at initiation was 7.8 ± 5.6 years; 75.7% female. Underlying disease processes primarily included congenital/developmental delay (32.5%), malignancy-related conditions (27.0%), and dysmotility (13.5%) (Table 1). Sixteen patients (43.2%) initiated EN with the study formula, while 21 (56.8%) transitioned, primarily due to enteral feeding intolerance (EFI) (81%). Pediatric-specific formulations (1.0 kcal/mL and 1.5 kcal/mL) were most frequently used, accounting for 67.6% of the prescriptions. The median duration of formula use was 200 days (80–514). At the conclusion of the study, 94.6% were no longer on 100% whey peptide-based formula. Among these, 42.9% achieved oral autonomy, 54.3% transitioned to a standard formula with improvement in their tolerance and underlying disease, and

2.8% died due to their underlying disease (Table 1). Nutritional adequacy was high with the delivered volumes and protein met 95% ± 11.3 and 91.6% ± 20.6 of targets, respectively (Table 2). Baseline anthropometrics included a median weight 19.3 kg (13.4–34.9) and height 116.9 cm (92.5–137.8), with a median weight-for-age z-score of -1.18 and a median height-for-age Z-score of -1.17 (Table 2). During the study, patients gained a median of 0.41% (0.1,0.8) of baseline weight per week and a median gain of 5.9% (1.2,11.3) of baseline weight per 100 EN days (Fig. 1). This translated into increases in median weight-for-age z-scores, 0.01 (-0.01,0.05) per week and 0.17 (-0.15,0.77) per 100 EN days (Fig. 2).

Conclusion: In this pediatric cohort, EN intake with 100% whey protein peptide-based formulas was well tolerated, provided complete nutrition, and supported favorable clinical outcomes, including appropriate weight gain and achieving oral autonomy in nearly half of the patients.

Table 1. Baseline demographics and clinical characteristics

Variables n (%); mean ± SD; median (IQR: 25th,75th)	**n=37**
Age (at admission), year	7.8 ± 5.6
Gender	
• Male	9 (24.3)
• Female	28 (75.7)
Underlying disease process	
• Congenital/Developmental delay	12 (32.5)
• Dysmotility	5 (13.5)
• Functional disorder	2 (5.4)
• Hepato-biliary/ Pancreatic Disease	1 (2.7)
• Malignancy related (including, chemo/radiation related)	10 (27)
• Mechanical Obstruction (non-malignant)	1 (2.7)
• Mucosal Disease	2 (5.4)
• Short Bowel Syndrome	1 (2.7)
• Trauma/ Injury	3 (8.1)
Study formula use	
• Initial formula	16 (43.2)
• Transition formula	21 (56.8)
Reason for transition (n=21)	
• Failure to achieve nutrition goals	3 (14.3)
• Enteral feeding intolerance	17 (81)
• Unspecified	1 (4.7)
Type of formula (100% whey protein semi-elemental)	
• 1.0 kcal/mL (pediatric specific)	13 (35.1)
• 1.5 kcal/mL (pediatric specific)	12 (32.5)
• 1.0 kcal/mL with Fiber (pediatric specific)	1 (2.7)
• 1.0 kcal/mL (adult formulation)	3 (8.1)
• 1.5 kcal/mL (adult formulation)	6 (16.2)
• 1.0 kcal/mL with Fiber ingredient (adult formulation)	2 (5.4)
Utilization of study formula	
• Duration of study formula EN, days	200 (80,514)
• No longer on EN/HEN by end of the study	35 (94.6)
• Still on EN/HEN by end of the study	2 (5.4)
Outcomes for those no longer on study formula (n=35)	
• Achieved oral autonomy	15 (42.9)
• Transition to another formula	19 (54.3)
• Death (due to underlying disease)	1 (2.8)

Table 2. EN regimen and anthropometrics

Variables mean ± SD; median (IQR: 25th,75th)	n=37
Nutrition needs (Study formula)	
• Target volume, mL/d	1089.2 ± 365
• Target calorie, kcal/d	1372.2 ± 494.1
• Target calorie, kcal/kg/d	64.1 (44.6,86.2)
• Target protein, g/d	46.5 ± 24.1
• Target protein g/kg/d	2.31 ± 1.48
Nutrition provided (Study formula)	
• % delivered of target volume/calorie	95 ± 11.3
• % delivered of target protein	91.6 ± 20.6
• Delivered volume, mL/d	1026.1 ± 352.6
• Delivered calorie, kcal/d	1291.5 ± 512
• Delivered calorie, kcal/kg/d	59.5 (43.8,78.1)
• Delivered protein, g/d	44.4 ± 24.3
• Delivered protein g/kg/d	2.21 ± 1.41
Anthropometrics	
• Weight at initiation of study formula, kg	19.3 (13.4,34.9)
• Height at initiation of study formula, cm	116.9 (92.5,137.8)
• Z-score for weight-for-age at initiation of study formula	-1.18 (-2.25,0.12)
• Z-score for height-for-age at initiation of study formula	-1.17 (-3.02, 0.3)

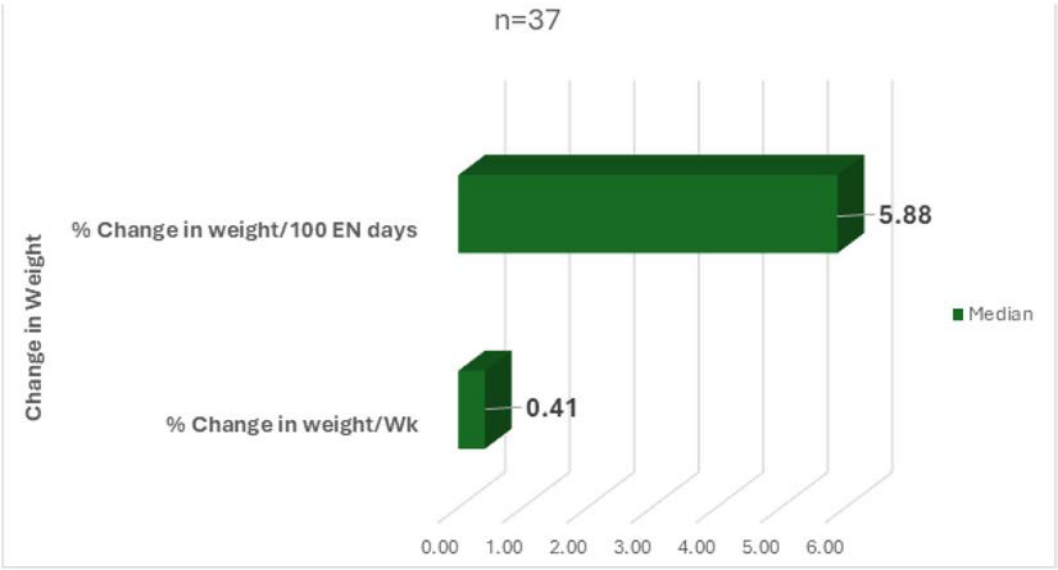

Figure 1. Change in weight with use of 100% whey peptide-based formula

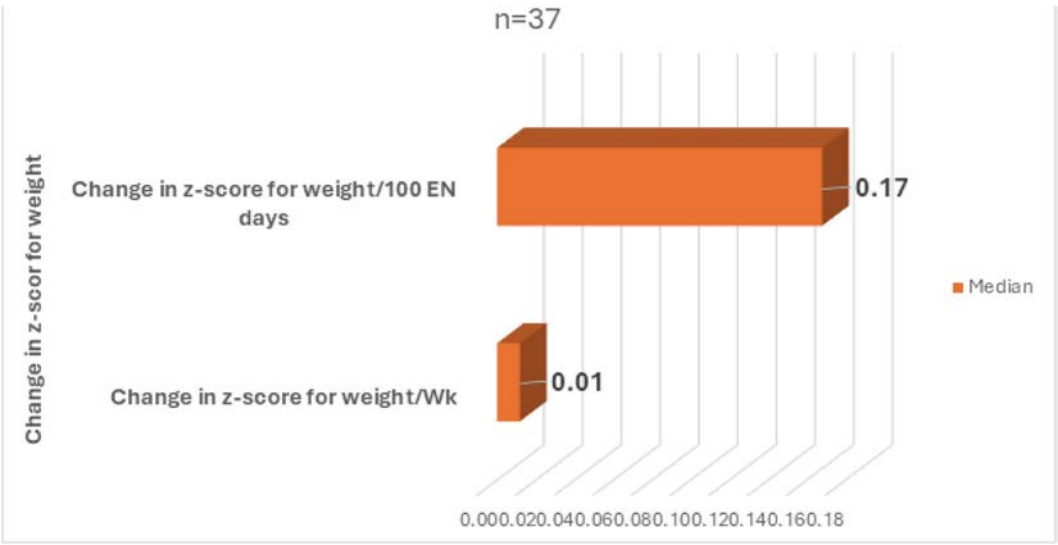

Figure 2. Change in z-score for weight with use of 100% whey protein peptide-based formula

P181 - Recent US Trend of Increasing Listings for Liver-Inclusive Pediatric Intestinal Transplantation and Decreasing Isolated Intestine Listings: The Results of a Failed Intestinal Rehabilitation Strategy

Cal Matsumoto, MD[1]; Carolina Rumbo, MD[1]; Nada Yazigi, MD[1]; Khalid Khan, MD[1]; Udeme Ekong, MD[1]; Tammy Hanel, RD[1]; Stuart Kaufman, MD[1]; Gabriel Gondolesi, MD[1]

[1]Georgetown University Hospital Transplant Institute, Washington DC

Financial Support: None Reported.

Background: Intestinal transplantation (ITx) is a rare procedure reserved for those intestinal failure (IF) patients who suffer from life-threatening complication of long term parenteral nutrition (PN) such as: intestinal failure associated liver disease (IFALD), critical loss of central venous access, or repeated catheter related bloodstream infections. Transplantation of an isolated intestine (iITx) should be performed prior to the development of irreversible IFALD (Stage 3-4 Fibrosis) in order to liberate the patient from PN and thus allow the liver to recover. The number of pediatric intestinal failure patients in the US waiting for a combined liver and intestine (LITx) transplant has been steadily increasing since 2019. Drivers of this trend are perhaps the unknown outcomes of pediatric ITx within the intestinal rehabilitation medical community with regards to iITX and LITx. We sought to evaluate our large-volume, single center ITx experience during this time period (2019-2025) of increasing US pediatric listings for combined liver-intestine transplants and simultaneous decreasing listings for iITx.

Methods: Analysis of local database from 2019 of all primary pediatric ITx performed at the largest volume ITx center in North America.

Results: During the period 1 Jan 2019 to 1 Aug 2025, 38 primary pediatric ITx were performed: 19 iITx and 19 LITx. 17/19 (89.5%) of LITx recipients had Stage 3-4 Fibrosis from IFALD on liver explant histologic examination. 1 patient required a liver LITx due to technical reasons (size) and 1 patient required a LITx due to anatomical reasons (portomesenteric thrombosis). All LITx recipients had significantly higher operative and perioperative resource utilization (Table 1). 1-year patient survival for iTX was 100% vs. 89.7% for LITx (p=0.124).

Conclusion: Excellent results can be obtained with iITx if the patient is referred to a transplant center prior to the development of irreversible liver disease. Futile intestinal rehabilitation needs to be recognized in a timely manner to avoid the need for a more complex combined liver-intestine transplant.

Table 1.

	Isolated Intestine (n=19)	Liver+ Intestine (n=19)	p value
Age (yrs)	5.0 ± 4.43	3.61± 4.19	ns
Male Sex	11	10	ns
Weight (kg)	18.72 ± 9.51	14.82 ± 9.27	ns
BMI (kg/m^2)	17.56 ± 2.16	18.14 ± 2.80	ns
LOS (days)	65.0 ± 47.37	83.67 ± 73.90	ns
PRBC/kg (cc)	20.37 ± 15.89	118.06 ± 229.60	0.035
FFP/kg (cc)	1.78 ± 5.18	70.14 ± 133.63	0.016
Case Time (Hr:Min)	5:40 ± 1:26	7:19 ± 2:32	0.0056
Vent (days)	1.84 ± 1.54	8.89 ± 14.24	0.047
Wait Time (days)	192.89 ± 169.28	254.16 ± 373.08	ns
Off PN (days)	33.32 ± 24.43	36.00 ± 16.20	ns

P182 - Premixed Starter Parenteral Nutrition Use in The Neonatal Intensive Care Unit in a Tertiary Hospital

Mohammad Alsharhan, PharmD, BCNSP, BCSCP[1]; Lamia Alzamel, PharmD[2]
[1]King Faisal Specialist Hospital and Research Center, Riyadh, Ar Riyad; [2]KFSHRC, Riyadh, Ar Riyad

Financial Support: None Reported.

Background: Preterm and critically ill neonates commonly require early parenteral nutrition (PN) to meet metabolic demands and support growth during the period when enteral feeding is limited. While individually compounded PN can be tailored, it is labor-intensive and prone to delays and compounding variability. Premixed starter PN formulations offer standardization and faster availability, potentially improving timeliness of nutrition delivery and reducing errors. In our tertiary NICU, a premixed starter PN protocol was implemented with the aim of accelerating PN initiation and streamlining early nutrition care. We conducted a pre–post evaluation to compare timeliness, intensity of PN exposure, and clinical outcomes before and after implementation.

Methods: Design and setting. Retrospective cohort study in a tertiary NICU. Cohorts. Pre-intervention (individualized starter PN): January 2020–December 2021; Post-intervention (premixed starter PN): April 2022–April 2024. Cases during the transition period (January–March 2022) were excluded. Inclusion/exclusion. Included neonates admitted to the NICU who received starter PN within 24 hours of NICU admission. We excluded neonates not started on starter PN, admissions outside the NICU, out born transfers, and encounters during the transition window. Outcomes and definitions. Primary outcome was time from birth/NICU admission to starter PN initiation (hours). Other outcomes were PN duration (days), NICU length of stay (LOS; days), birth weight (kg), discharge weight (kg), and incidence of central-line infection. Results were summarized as continuous outcomes as mean (SD) and compared pre vs. post descriptively. Categorical outcomes are reported as counts and percentages.

Results: Forty-one neonates met inclusion criteria (Pre n=15 and Post n=26). Timeliness and exposure to PN. Time to PN initiation decreased from 13.60 ± 6.23 hours (Pre) to 4.28 ± 3.44 hours (Post) — an absolute reduction of 9.32 hours (−68.5%). PN duration showed a modest decrease from 10.40 ± 8.29 days (Pre) to 9.65 ± 8.70 days (Post) (absolute −0.75 days; −7.2%). NICU LOS decreased from 41.93 ± 43.49 days (Pre) to 34.69 ± 32.04 days (Post) (absolute −7.24 days; −17.3%). Growth parameters. Birth weight was similar between groups (Pre 1.66 ± 0.55 kg vs. Post 1.65 ± 0.79 kg). Discharge weight averaged 2.32 ± 0.58 kg (Pre) vs. 2.10 ± 0.69 kg (Post). Safety outcomes. Central line infection was 0/15 (0.0%) Pre vs. 1/26 (3.8%) Post.

Conclusion: Adoption of a premixed starter PN protocol in our NICU was associated with earlier initiation of PN (mean reduction ~9 hours) and a shorter NICU stay (−7 days), without prolonging PN exposure. Earlier initiation may mitigate early caloric/protein deficits and help stabilize glucose/electrolyte profiles when monitored with robust protocols. The observed shorter LOS is favorable from both patient-centered and operational perspectives (resource utilization and bed turnover).

Table 1. Demographic and baseline characteristics

Characteristic	Pre-intervention	Post-intervention
Number of Patients	15	26
Gestational age (mean ± SD)	31.7 ± 2.9	30.9 ± 3.0
Birth weight (mean ± SD)	1.66 ± 0.55	1.65 ± 0.79
Male (%)	6 (40.0%)	12 (46.2%)
Female (%)	9 (60.0%)	14 (53.8%)
Prematurity (%)	11 (73.3%)	19 (73.1%)
Respiratory distress (%)	3 (20.0%)	5 (19.2%)
Sepsis (%)	0 (0.0%)	0 (0.0%)
Other admission reason (%)	1 (6.7%)	2 (7.7%)

P183 - Lab Abnormalities in Very Low Birth Weight Preterm Infants Following Revision of Parenteral Nutrition Feeding Protocol Including Reduced Amino Acid Dosing

Jennifer Schornack, RDN, LD[1]; Kate Beard, RDN, CSPCC[2]; Jessica Carder, RDN, IBCLC[3]; Katie Huff, MD, MS[4]
[1]Riley Children's Health, Indianapolis, Indiana; [2]Riley Children's Health, Carmel, Indiana; [3]Riley Children's Health, Lafayette, Indiana; [4]Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio

Financial Support: None Reported.

Background: Neonatal refeeding syndrome (RFS) is a poorly defined disease process diagnosed by electrolyte abnormalities in the setting of nutritional alterations. Lab abnormalities used to diagnosis RFS include hypophosphatemia, hypokalemia, hypomagnesemia, and hypercalcemia. Difficulties in describing and understanding this disease exist given the variable threshold and combination of lab abnormalities used for diagnosis. Regardless of threshold for diagnosis, studies have shown that neonates with altered growth are at increased risk for RFS, with increased risk for the disease with increased amino acid dosing. Given the difficulties with diagnosis, experts currently recommend standardizing local parenteral nutrition strategies in those patients at risk for RFS with close laboratory monitoring. In addition, in the most recent ASPEN recommendations, the maximal parenteral amino acid dosing was decreased from 4 g/kg/d to 3.5 g/kg/d. Based on these recommendations we altered our local feeding protocol, recommending lower maximum amino acid dosing, incorporating language to more closely monitor electrolytes with slow advancement in amino acid dosing if parenteral phosphorus could not be advanced. The objective of this project was to evaluate the impact of maximum parenteral amino acid (AA) limits on the frequency of electrolyte abnormalities in the first 10 days of life in infants born < 32 weeks or < 1500 grams.

Methods: A retrospective chart review was conducted on eligible infants and divided into Pre-Protocol (Epoch 1) and Post-Protocol (Epoch 2). Infants were considered eligible if they were born < 32 weeks gestational age or < 1500 grams and were admitted to our level III delivery hospital neonatal intensive care unit (NICU) for at least the first 10 days of life. IRB approval was obtained. Patient demographics, anthropometrics, parenteral nutrition (PN) prescription and delivery information were obtained. Peak and nadir electrolyte levels were obtained for the various electrolytes and compared between groups. Mann-Whitney U test, t-test, and Fisher's exact test were calculated using SPSS 29 dependent on data distribution. A p-value < 0.05 was used to define statistical significance.

Results: Epoch 1 (n = 43) and epoch 2 (n = 45) had similar birth weight, gestational age, and frequency of small-for-gestational-age diagnosis (Table 1). Average AA delivery for epoch 2 was significantly less(2.5 ± 0.4 g/kg/d vs. 2.3 ± 0.5 g/kg/d; p = 0.006), with comparable delivery of all other macro and micronutrients (Figure 1). When comparing lab abnormalities, there was no difference in phosphorus levels between groups. There was, however, less hypernatremia and lower calcium, magnesium, and sodium averages in Epoch 2 (Table 2 and Figure 2). Other outcomes including necrotizing enterocolitis, intraventricular hemorrhage, metabolic bone disease of prematurity, and mortality did not differ between groups (Table 1).

Conclusion: In our single center cohort, we were able to incorporate new thresholds for maximal AA dosing and close monitoring of electrolytes into our PN protocol. While no differences were noted in phosphorus levels, differences were noted in other electrolytes. We cannot draw conclusions about RFS in this small cohort, however, given our changes were well tolerated further analysis is needed to determine the influence on long term patient outcomes including growth.

Table 1. Demographic data and outcomes comparing groups

Parameter	Epoch 1 (n=43)	Epoch 2 (n=45)	p-value
Birth weight (kg)	1.17 ±0.41	1.21 ±0.39	0.606
Gestational age (weeks)	28.6 ±3.1	29.1 ±2.9	0.414
SGA n(%)	7 (16)	8 (18)	0.539
IUGR n(%)	6 (14)	7 (16)	0.536
Greatest percentage below birth weight in first 10 days	8.1 ±6.0	6.2 ±6.7	0.151
IVH n(%)	8 (19)	6 (13)	0.350
NEC n(%)	4 (9)	6 (13)	0.399
Mortality n(%)	4 (9)	4 (9)	0.617
MBDP n(%)	8 (19)	9 (20)	0.500

Table 2. Nutritional support and laboratory outcomes comparing groups

Parameter	Epoch 1 (n=43)	Epoch 2 (n=45)	p-value
DOL EN start	2.2 ±2.7	1.5 ±0.8	0.141
DOL last PN	10.5 ±5.0	11.3 ±8.2	0.329
Rate of hypophosphatemia n(%)	10 (23)	8 (18)	0.355
Rate of severe hypophosphatemia n(%)	3 (7)	1 (2)	0.291
Rate of hypercalcemia n(%)	6 (14)	2 (4)	0.119
Rate of hypernatremia n(%)	6 (14)	1 (2)	**0.048**
Rate of hypokalemia n(%)	10 (23)	9 (20)	0.455
Rate of hypomagnesemia n(%)	1 (2)	3 (7)	0.326
Rate of hyperglycemia n(%)	23 (53)	22 (49)	0.500

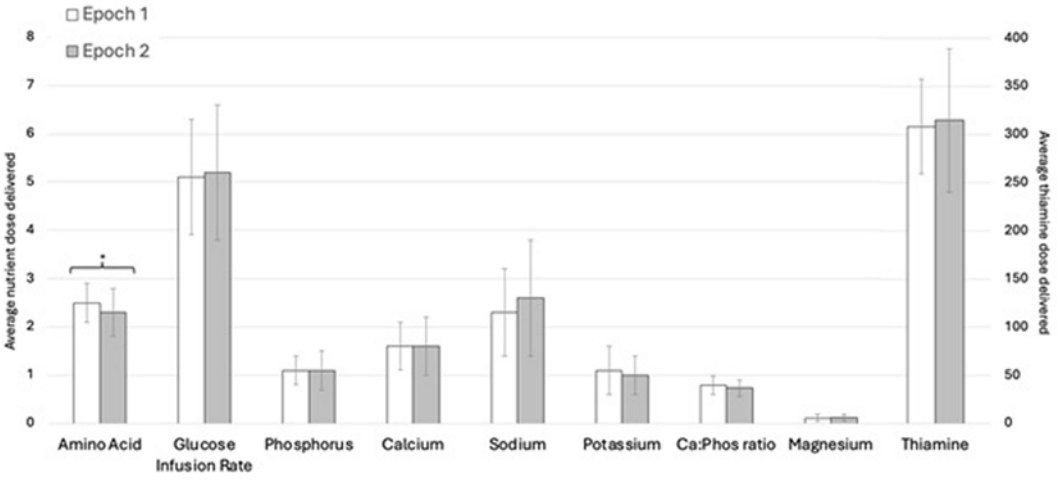

Figure 1. Average nutrient dose delivered compared between groups

Those nutrients that were significantly different with $p < 0.05$ are noted by an asterisk (Amino acids: Epoch 1: 2.5 ± 0.4 g/kg/d vs. Epoch 2: 2.3 ± 0.5 g/kg/d; $p = 0.006$). The units for each nutrient include: glucose infusion rate mg/kg/min, phosphorus mmol/kg/d, calcium mEq/kg/d, sodium mEq/kg/d, potassium mEq/kg/d, calcium (Ca): phosphorus (Phos) ratio mmol:mmol, magnesium mEq/kg/d, and thiamine mcg/kg/d.

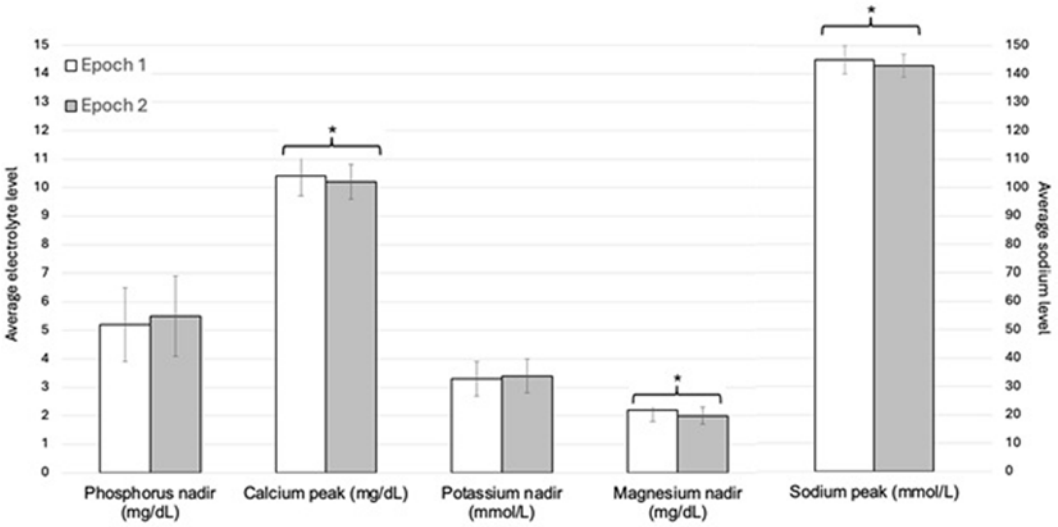

Figure 2. Average electrolyte peak or nadir compared between groups

Error bars represent the standard deviation. Those with p-vale < 0.05 noted by asterisk (calcium peak p = 0.043; Magnesium nadir p = 0.011; sodium peak p = 0.027).

P184 – Trace Mineral Imbalance: A Case of Manganese Deficiency on Continuous Renal Replacement Therapy

Sarah Simental, MS, RD, CNSC, CSPCC[1]
[1]Childrens Hospital Los Angeles, Los Angeles, California

Financial Support: None Reported.

Background: Manganese (Mn) is an essential trace element involved in enzymatic and metabolic functions. Manganese contamination is present in a wide range of parenteral nutrition (PN) components, including calcium gluconate, magnesium sulfate, and phosphate salts, even when Mn is not intentionally added to the mixture. The unintentional delivery can be clinically significant, often providing the recommended daily intake in neonatal and pediatric PN formulations. For these reasons, Mn may be removed in neonatal and pediatric PN. Patients on continuous renal replacement therapy (CRRT) are known to have increased micronutrient losses. This case study reviews two pediatric patients in acute renal failure requiring initiation of CRRT. presents a pediatric patient on PN and CRRT who developed biochemical evidence of manganese deficiency within days of initiation.

Methods: This case series describes two pediatric patients in the pediatric intensive care unit (PICU) who were initiated on PN and CRRT. Customized PN formulations were initially compounded without Mn supplementations, based on the assumption that trace contamination from standard PN components would provide sufficient levels. While not typically obtained, during routine micronutrient monitoring, serum trace elements were obtained on day 3 of therapy.

Results: Patient 1 had a manganese level of < 0.5 mcg/L and Patient 2 had a level of < 0.4 mcg/L, both below the suggested laboratory reference range of 4-15 mcg/L. Despite biochemical deficiency, neither patient exhibited obvious clinical symptoms commonly associated with manganese deficiency, such as impaired wound healing, altered glucose metabolism or neurological changes, however both patients were experiencing hyperglycemia. Following identification of the deficiency, both patients were started on 100 mcg of manganese daily added to their PN. Repeat serum levels were measured after 14 days of supplementation. Levels in both patients were minimally changed. Patient 1 improved to 0.7 mcg/L and Patient 2 improved to 0.6 mcg/L. Both patient 1 and 2, obtained chromium levels concurrently. Both chromium levels resulted within normal parameters.

Conclusion: These case studies highlight the risk of manganese deficiency in pediatric critically ill patients receiving PN and CRRT without the intentional addition of Mn into PN solutions. While widely considered a natural contaminant in PN solutions, patients on CRRT are at increased risk for trace element depletion. This underscores the importance of implementing a routine trace element monitoring while patients are on CRRT, as reliance on contamination alone may be insufficient to meet micronutrients needs. After initiating targeted supplementation both patients remained deficient after two weeks. These findings suggest further research into the need to add Mn into PN solutions for pediatric patients on CRRT. Furthermore, this case series raises awareness about the limitations of assuming adequate micronutrient provision from contaminates as well as non-contaminates. It also reinforces the role of the nutrition support dietitian in aiding to proactively identify and address micronutrient deficiencies through laboratory monitoring and PN optimization. Lastly, these cases highlight the need for broader pediatric micronutrient delivery recommendations while on CRRT, along with recommended laboratory monitoring.

P185 - Infant Hospitalization and Breastfeeding Outcomes: A Retrospective Cohort Study on The Impacts of Illness and Inpatient Lactation Support on Long Term Feeding Trajectories

Calisha Allen, MD[1]
[1]Duke University Hospital, Durham, North Carolina

Financial Support: Academic Pediatric Association RAPID Award.

Background: The American Academy of Pediatrics (AAP) recommends exclusive breastfeeding for the first six months of life due to its known benefits to child health and thus calls for pediatric healthcare providers to be knowledgeable about breastfeeding and its management, including understanding problems that may arise. Despite this, there is limited existing literature on the impacts of healthcare systems and medical interventions on breastfeeding outcomes beyond the neonatal period. This project addresses this knowledge gap by exploring aspects of illness and hospitalization that may influence long term breastfeeding outcomes. Primary aims include characterization of the hospital course, identification of common feeding related interventions, and observation of long-term breastfeeding outcomes with the hypothesis that NPO status and lack of lactation supportive measures may be associated with decreased breastfeeding at 6 months.

Methods: This project is part of a larger retrospective cohort study of infants admitted to the hospital with RSV and other infectious illnesses conducted via chart review. Eligible subjects include otherwise healthy breastfeeding infants between the ages of 0-6 months hospitalized with RSV, viral gastroenteritis, skin, soft tissue, and urinary tract infections at Duke Children's Hospital from 7/1/2012 through 7/30/2022 who were born at > 35 weeks gestational age and had at least one follow-up encounter in containing nutrition information.

Results: Analysis included a diverse population of 96 infants ranging from 6 days to 5 months old with a median hospital stay of 3 (IQR 2-5) days. Of these, 34 (35.4%) were made NPO and 80 (83.3%) received lactation support in the form of breast pumps to 38 (39.6%), parent lactation trays to 74 (77.1%), formal lactation consults for 32 (33.3%), and 41 infants (42.7%) had at least two of these. Median NPO time was 1 day (IQR 1-4) and 15 (15.6%) patients received tube feeds. Of the 86 patients with 6 month follow up data available, 56 (65.1%) continued to receive some amount of breastmilk, with 42 (48.8%) experiencing no decrease since admission. Chi-square tests revealed no relation between breastmilk decrease at follow up and any variable of interest $X^2(1, N = 86)$, including lactation support 0.57 ($p = 0.45$), multiple lactation support measures 0.0017 ($p = 0.97$), NPO status 0.56 ($p = 0.45$). There was also no relation between breastfeeding continuation at follow up and the aforementioned variables, $X^2(1, N = 86) = 0.019$ ($p = 0.89$), 0.68 ($p = 0.41$), and 1.4 ($p = 0.23$), respectively. Notably, subgroup size limited further analysis of the 30 infants made NPO. However, all four who went without lactation support got decreased breastmilk at 6 months compared to 13/26 (50%) who received support and only one of them was still receiving breastmilk at 6 months (25%) compared to 16/26 (61.5%).

Conclusion: Though this study did not reveal associations between variables of interest and breastfeeding outcomes, it provides insight into the medical course of these admissions and nutrition interruption, which highlights possible obstacles for breastfeeding during infant hospitalization and identifies a potential vulnerable subpopulation in the NPO infants without lactation support that should be further studied in a larger cohort. Given the accuracy limitations of chart review and possible interaction between confidence in breastfeeding and offering of lactation support measures, there is a need for future prospective study, accounting for family experience and goals, to better test the hypothesized impacts on breastfeeding outcomes.

P186 - Hemoglobin A1C in Pediatric Home Parenteral Nutrition

Saumya Pathak, MD[1]; Pamela Baldivia, NP[2]
[1]UCLA Pediatric Gastroenterology, Los Angeles, California; [2]UCLA Health, Van Nuys, California

Financial Support: None Reported.

Background: Long-term parenteral nutrition is defined as medical nutritional therapy that is provided intravenously for greater than 6 months. Home parenteral nutrition (HPN) is lifesaving nutritional therapy for patients suffering from chronic intestinal failure and in the pediatric population allows them to grow, develop, and thrive. Hemoglobin A1c (HbA1C), also known as glycated hemoglobin A1C, is used to measure average blood sugar levels over a ninety-day period, expressed as a percentage, good for monitoring long term glucose control, in addition to being used to diagnose diabetes mellitus. Patients receiving cycling home HPN are monitored on a quarterly interval. In an effort to determine long-term glucose control in these patients, we evaluated HbA1C values in a group of pediatric patients who require home TPN.

Methods: This single-center retrospective cohort study was conducted at UCLA using data from 2020 to 2023. It involved 24 pediatric patients who received HPN with inclusion criteria including age less than 18 years and patient requiring TPN for at least 4 days per week (Table 1) in order to grow and thrive. The study assessed amount of dextrose provided in their TPN and HbA1C lab values (Table 2). All but one patient also had some enteral nutrition source of nutrition as well. We also collected further patient data including BMI, family history of diabetes, race, and glucose affecting medication needs (such as steroids), as these can have a strong association with glucose metabolism and HbA1C values. All laboratory results were collected and analyzed at UCLA laboratory facilities only. Data was described as mean and standard deviation for normal distributed continuous variables, medians, and frequency for categorical variables.

Results: A total of 24 pediatric patients receiving HPN were analyzed during the study period. The mean age of these pediatric patients was 9.6 years old. 11 patients (45.8%) were male and 13 patients (54.2%) were female. Primary intestinal failure diagnoses requiring HPN included short bowel syndrome, malabsorption, severe dysmotility, and pseudo-obstruction. Despite receiving high amounts of dextrose in their HPN to sustain enough calories in the pediatric period of growth and development, overall the values of HbA1c were within normal limits for majority of patients in the study, twenty-one patients (87.5%) and their average HbA1C was 5.2. Only three patients (12.5%) had an elevated HbA1C values in the prediabetic range (5.7-6.4%) and their average HbA1c was 5.7. Zero patients had a HbA1C high enough to be in the diabetic range (>6.4%). No patients developed type II diabetes or required insulin in this study period.

Conclusion: Our institution has a robust HPN pediatric program. This study represents one of very few assessments of HbA1C levels in pediatric patients who require home parenteral nutrition due to intestinal failure. Laboratory monitoring of pediatric patients on HPN is usually done on a monthly basis and we propose that HbA1C is also followed as a measure of glucose tolerance along with other regularly monitored laboratory values. The overall trends in HbA1C values while patients are receiving cyclic infusions of HPN can help monitor the patient's adaptation to alterations in glucose loads. Theoretically, adjustments in amount of dextrose in HPN can made based on the individual patients' Hb A1C trends seen. However, our results show that in pediatric patients requiring high amounts of dextrose in HPN overall have HbA1C values within normal range. Additional research is required to further risk stratify HbA1C values in pediatric patients who receive HPN or long-term PN in order to assess risk of developing of diabetes over long periods of time.

Table 1. Summary descriptive statistics of 24 pediatric patients requiring HPN

	ALL N = 24
Age (years)	
Range	2 – 17 years
Mean	9.6 years
Gender, N (%)	
Female	13 (54.2 %)
Male	11 (45.8 %)
Race, N (%)	
African American	5 (20.8%)
Asian	2 (8.3 %)
White	12 (50 %)
Other	3 (12.5 %)
Chose not to share	1 (4.2 %)
Weight Percentile	
Range	<1 – 87 %ile
BMI Percentile	
Range	6 – 96 %ile
Enteral Feeds, N (%)	23 (95.8%)
HbA1c (%)	
Range	4.5-5.7
Median	5.2
TPN Days per Week	
Mean	7 days
TPN Dextrose (g) per Day	
Mean	246.6 g
Reason for HPN, N (%)	
Short Bowel Syndrome	19 (79.1 %)
Malabsorption	1 (4.2 %)
Severe Dysmotility	2 (8.3 %)
Pseudo-Obstruction	2 (8.3 %)

Table 2. Summary of HbA1c data, TPN GIR, and diabetes classification

	ALL N = 24		
HbA1C value	**Number of patients**	**TPN Glucose Infusion Rate Ranges (g/kg/min)**	**HbA1C Interpretation Normal/ Prediabetic/ Diabetic Range**
< 4.5%	0	n/a	Normal Range (HbA1C 4.5 – 5.6%) 21 (87.5%)
4.5% - 5.0%	9 (37.5%)	5.8-21.6	
5.1% - 5.6%	12 (50%)	3.9-23.4	
5.7-6.4%	3 (12.5%)	9.6-28.9	Prediabetic Range (HbA1C 5.7-6.4%) 3 (12.5%)
> 6.4%	0	n/a	Diabetic Range (HbA1C >6.4%) 0 (0%)