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

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BACKGROUND

- Providing optimal nutrition to ex-premature children with medical complexity and developmental delay (DD) can be challenging due to variable enteral formula tolerance and efficacy
- Multiple formula trials may be required before finding a well-tolerated option, which may impact growth and development
- Real food ingredient formulas offer benefits such as diversity of ingredients and fiber sources; positive microbiome effects and impact on digestive health; immune support[1-6]
- Limited data exist related to a) specific pediatric populations that may benefit from real food ingredient enteral formulas, and b) growth outcomes using standardized evaluation methods (i.e., z-scores)[2]

OBJECTIVE

- To present two ex-premature children with medical complexity, 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 (Figure 1, Table 1)

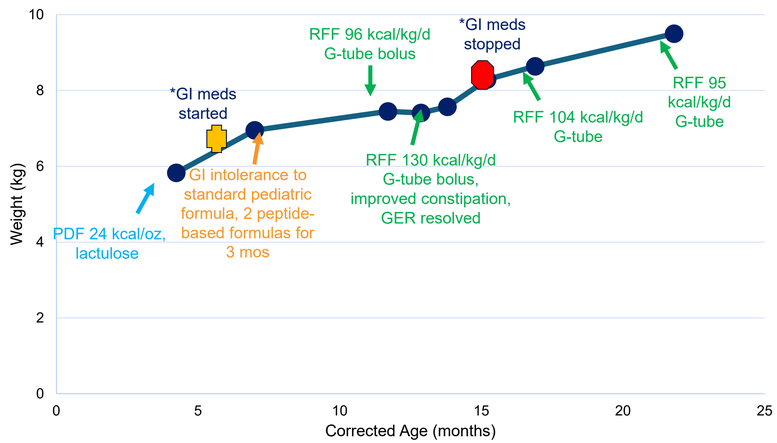
- Medical History:
  - Born at 23 weeks gestation with DD, bronchopulmonary dysplasia (BPD), gastroesophageal reflux (GER), constipation and feeding disorder (FD)
- Clinical Course:
  - Hospital discharge at 29 weeks (12 weeks corrected age) on 24 kcal/oz post-discharge formula plus lactulose for constipation
  - At 13 months (9 months corrected age), transition to pediatric enteral formula attempted for 3 months: multiple formulas tried – standard pediatric formula, then to two different peptide-based formulas – all resulting in intolerance, worsening GI symptoms requiring medications (famotidine, azithromycin and metoclopramide), and lack of adequate growth
  - RFF initiated (97 kcal/kg/day via G-tube), leading in improvement of GI symptoms, and initial improvement of growth (e.g., weight, height)
  - RFF increased to 130 kcal/kg/day resulting in continued improvement and maintenance of growth parameters (e.g., weight, height, growth velocity) as well as discontinuation of GI medications

PATIENT B (Figure 2, Table 2)

- Medical History:
  - Born at 25 weeks gestation with pulmonary hypertension, atrial septal defect (ASD), DD, BPD, GER and FD
- Clinical Course:
  - Hospital discharge at 34 weeks (19 weeks corrected age) on 26 kcal/oz post-discharge formula plus metoclopramide and esomeprazole for emesis and reflux– intolerance led to decrease in caloric density (24 kcal/oz)
  - At 13 months (9 months corrected age), transition to RFF (106 kcal/kg/day via G-tube)
  - In first 3.5 months after switching, consumed purees and other foods for comfort plus RFF (106-117 kcal/kg/day) with good GI tolerance
  - At 17 months (13 months corrected age), patient underwent ASD closure via median sternotomy
  - By 19 months (16 months corrected age), reflux resolved, GI medications stepped down over next two months and sustained weight gain observed through 2 years of age

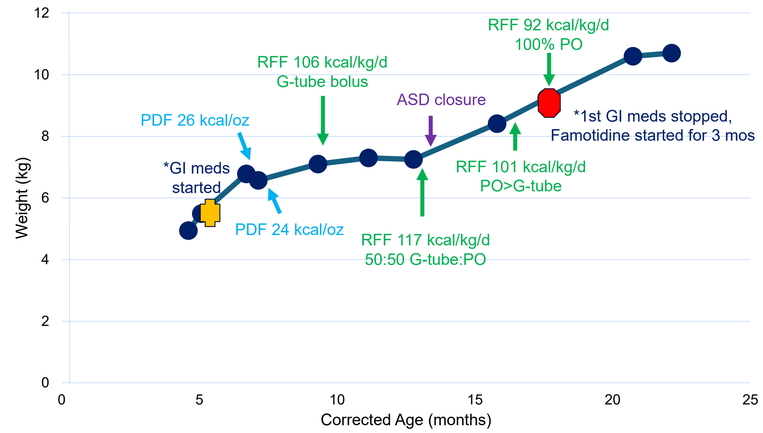
A 1.0 kcal/mL pediatric enteral formula made with real food ingredients was well tolerated and resulted in positive growth outcomes in two ex-premature, medically complex children

Figure 1. Patient A Clinical Course



‡ Abbreviations: PDF, post-discharge formula; GER, gastroesophageal reflux; GI, gastrointestinal; mos, months; RFF, pediatric tube feeding formula made with real food ingredients

Figure 2. Patient B Clinical Course



‡ Abbreviations: PDF, post-discharge formula; GI, gastrointestinal; mos, months; PO, per os; RFF, pediatric tube feeding formula made with real food ingredients; ASD, atrial septal defect

Table 1. Patient A Growth Parameters

Chronological Age	Corrected Age	Weight		Length		Weight-for-length
(months)‡	(months) ‡	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 the 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	Corrected Age	Weight		Length		Weight-for-length
(months)‡	(months) ‡	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

CONCLUSIONS

- 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
- While challenges can still present, these children demonstrated positive growth outcomes and RFF tolerance, evidenced by the ability to discontinue GI medications
- Results highlight the benefits of real food ingredient formulas in this population

REFERENCES

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