

Effect of energy- and /or protein-dense enteral feeding on postoperative outcomes of infant surgical patients with congenital cardiac disease

A systematic review and meta-analysis

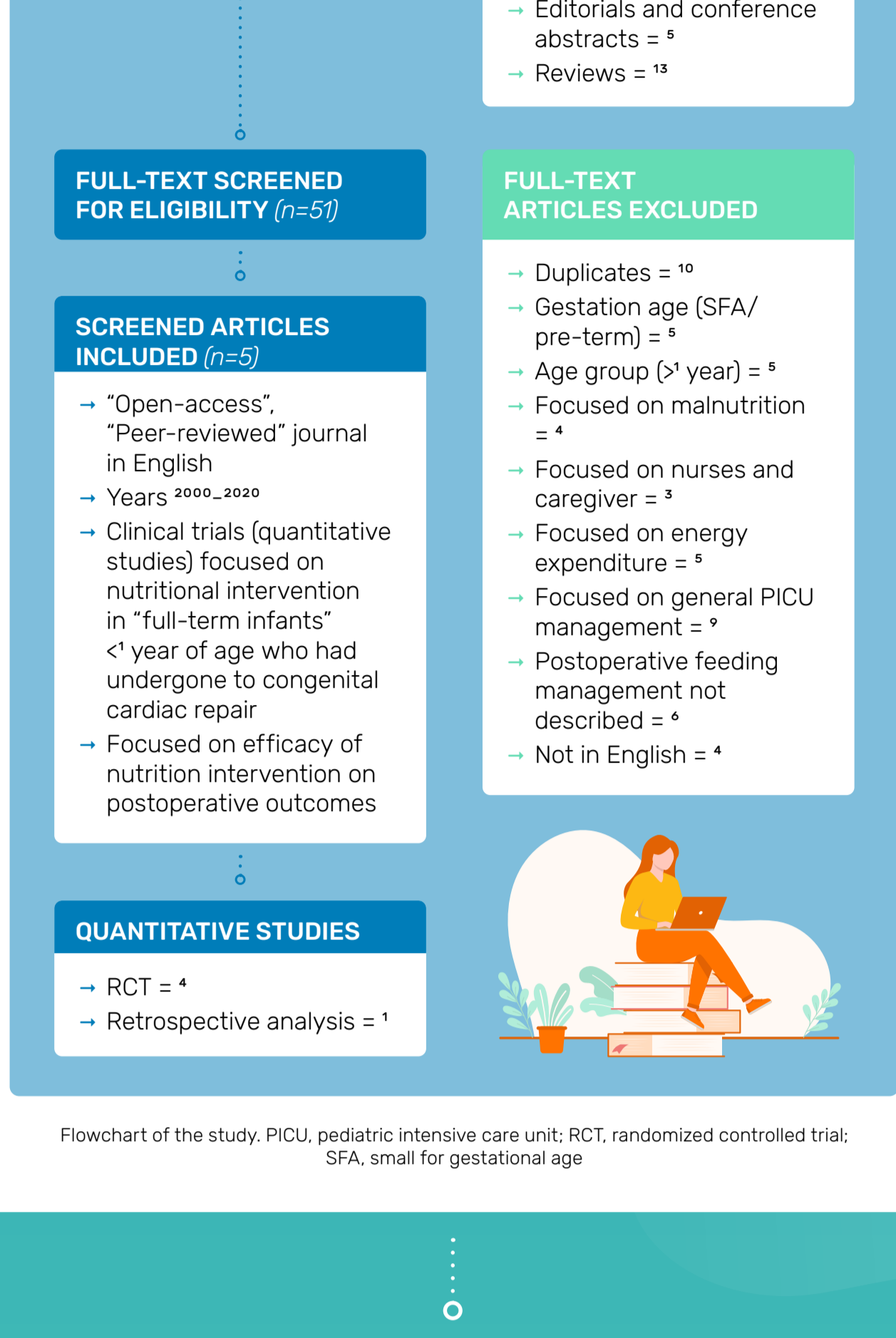


1. THE ISSUE

Why do the meta-analysis?

The meta-analysis was conducted to determine the effect of energy and/or protein-dense enteral feeding (ENDF) on outcomes in term infants <1 year old following congenital cardiac repair, compared to enterally fed expressed breast milk or standard feeding.

The search, identification, and selection of studies



Flowchart of the study. PICU, pediatric intensive care unit; RCT, randomized controlled trial; SFA, small for gestational age

2. INCLUDED STUDIES

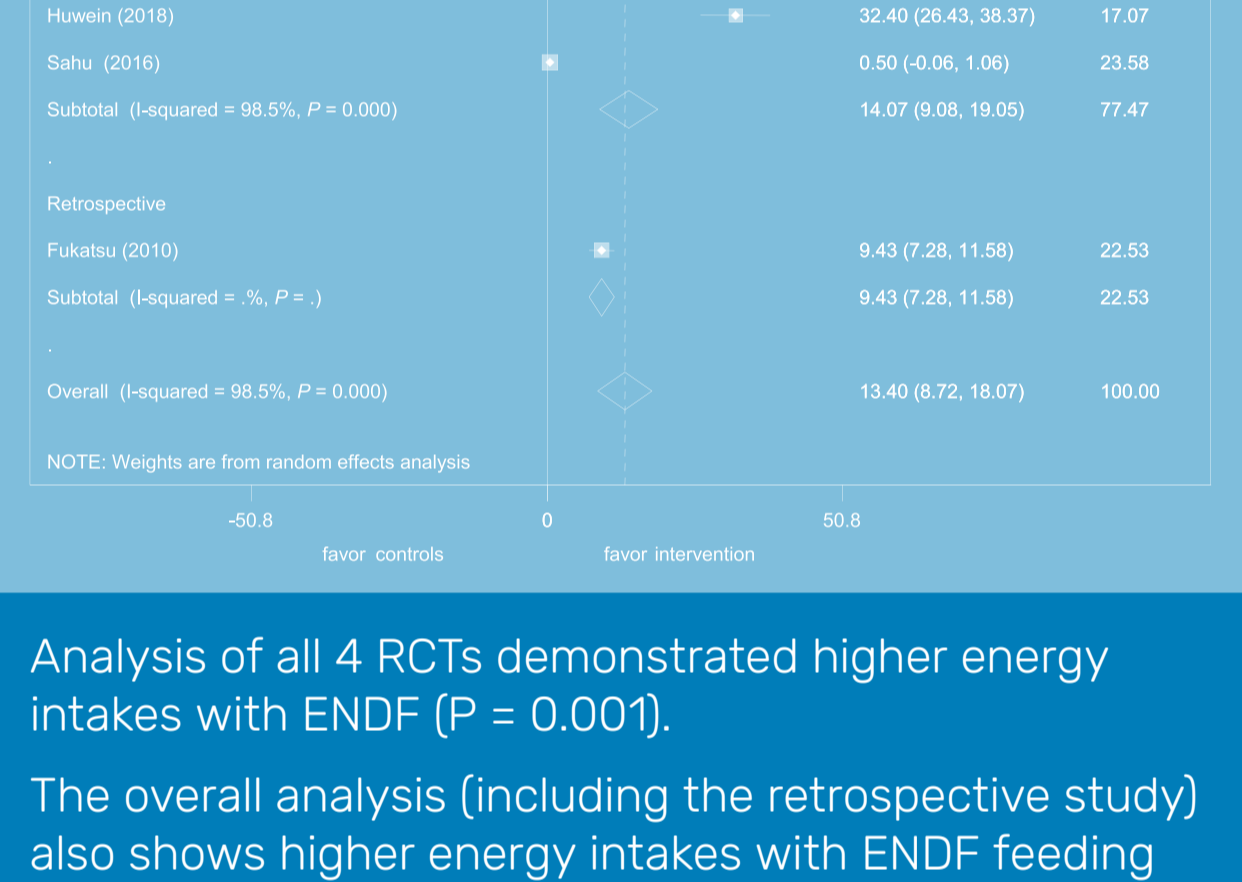
Study no.	1	2	3	4	5
Author, year	Zhang et al, 2020	Cui et al, 2018	Huwda Zhang, 2018	Sahu et al, 2016	Fuksesu et al, 2010
Type of study	RCT	RCT	RCT	RCT	Retrospective analysis
Cont SP	11	24	29	25	21
Int MP	14	26	30	25	21
HP	13				
Age	<1 year	<6 months	<6 months	<6 months	<6 months
Intervention period	5 days	5 days	7 days	10 days	SDF (4 weeks), HDF (4 weeks)
Enteral feed initiation	6 h	12-24 h	2-3 days	6 h	
Cont	Formula Nutrition 1	Formula Nutrition 1	Formula	EBM	Formula
Int	Formula bovine pure whey protein	Formula infarini	Formula	Fortified EBM	Formula
Cont SP	67:13	67:14	67:2	65:11	67:15
Int MP	77:25	100:26	100:26	51:13	80.9:1.8
HP	100:4				

— Sample size - - - Type of feed - - - Energy kcal/100ml; protein density,g/100ml

Abbreviations Cont, control EBM, expressed breast milk; high-density feed; HMF, human milk fortifier; HP, high protein; Int, intervention; MP, moderate protein; RCT, automated controlled trial; SDF, standard-density food; SP, standard protein.

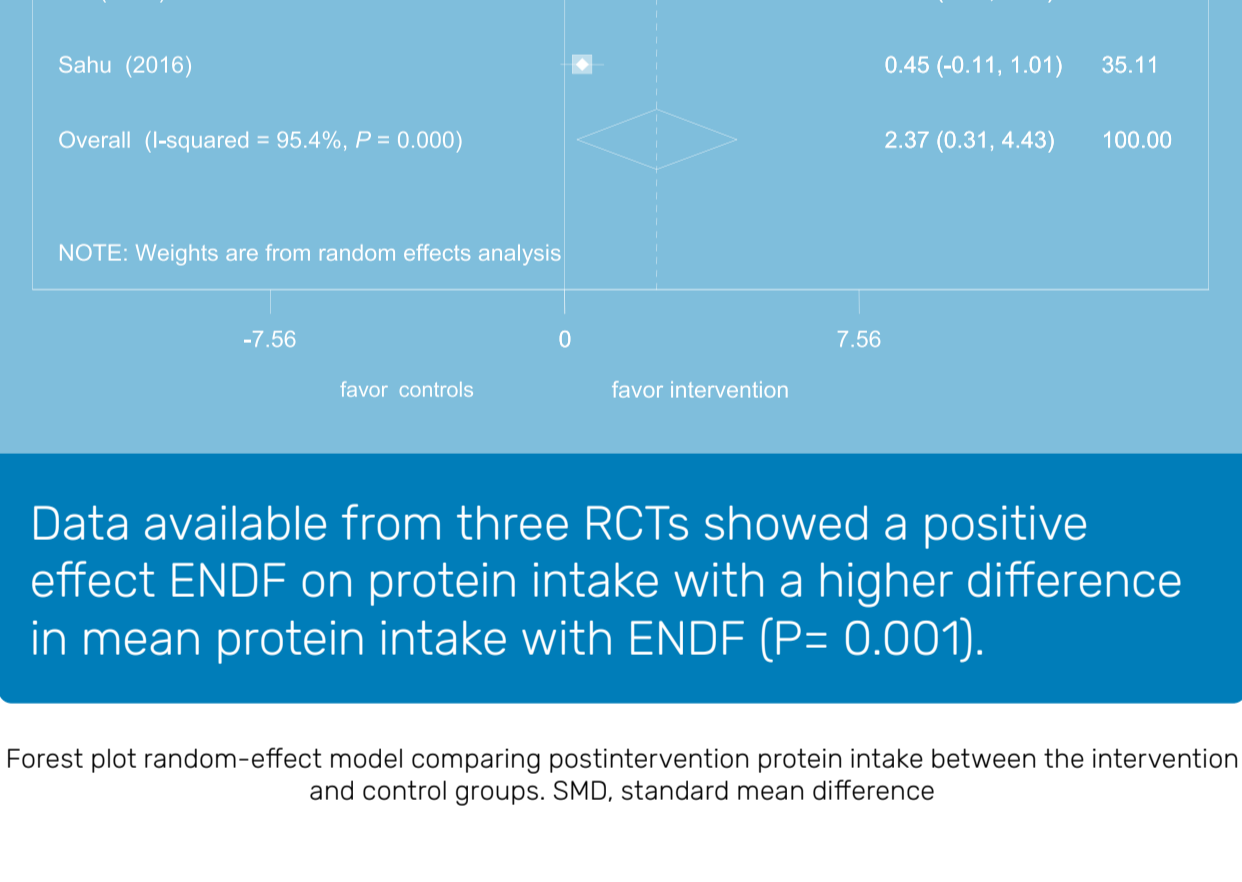
3. WHAT WAS FOUND?

ENDF supports higher nutritional intakes



Analysis of all 4 RCTs demonstrated higher energy intakes with ENDF (P = 0.001). The overall analysis (including the retrospective study) also shows higher energy intakes with ENDF feeding (P = 0.001).

Forest plot random-effect model comparing postintervention energy intake between the intervention and control groups. RCT, randomized controlled trial; SMD, standard mean difference

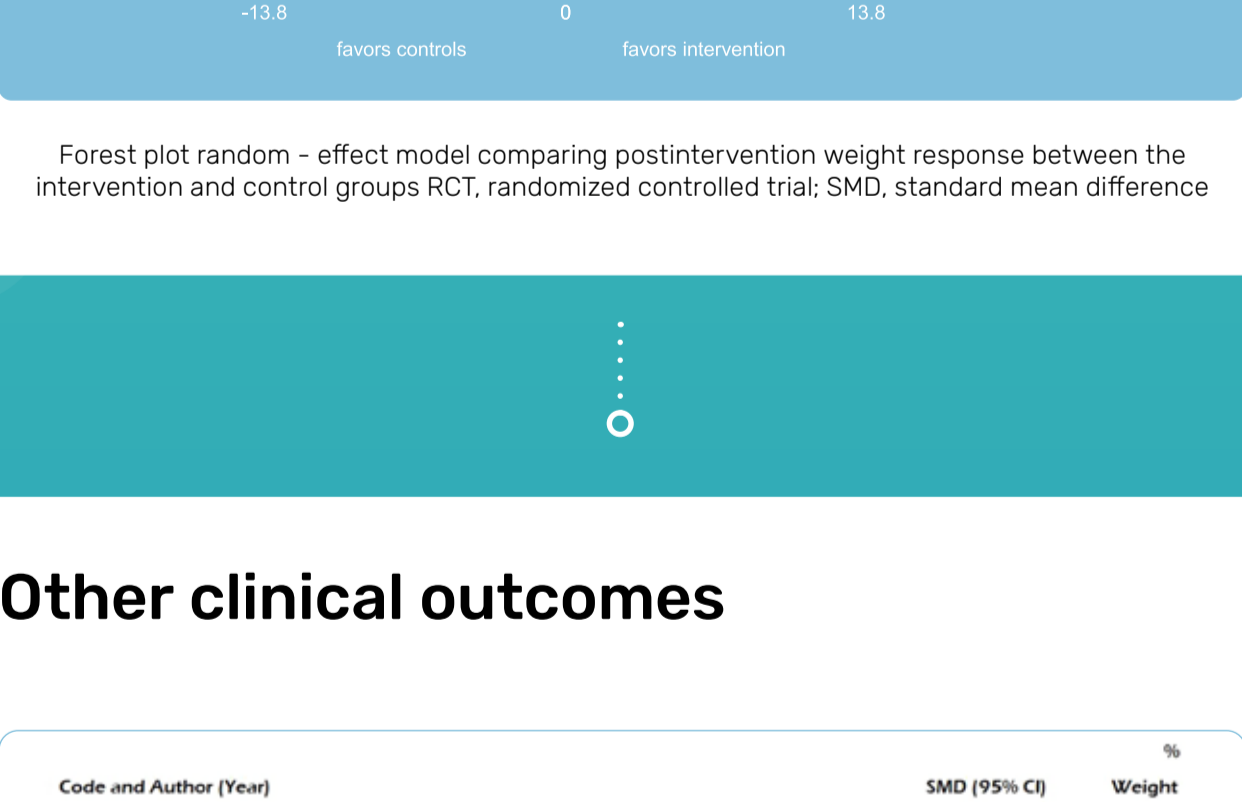


Data available from three RCTs showed a positive effect ENDF on protein intake with a higher difference in mean protein intake with ENDF (P= 0.001).

Forest plot random-effect model comparing postintervention protein intake between the intervention and control groups. SMD, standard mean difference

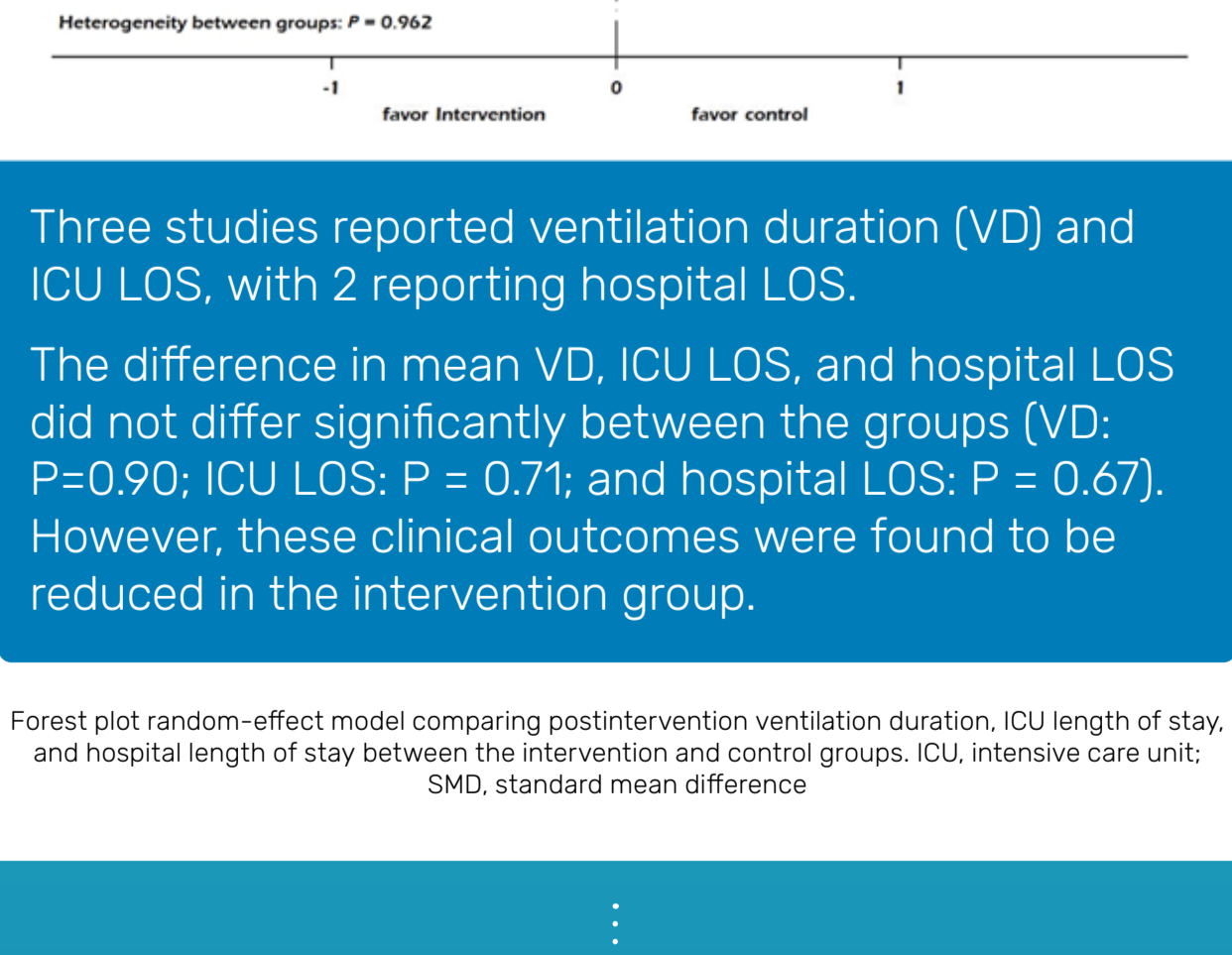
Promoting higher weight gain

All available studies and the overall analysis showed higher weight gain with ENDF (p = 0.001).



Forest plot random - effect model, comparing postintervention weight response between the intervention and control groups RCT, randomized controlled trial; SMD, standard mean difference

Other clinical outcomes



Three studies reported ventilation duration (VD) and ICU LOS, with 2 reporting hospital LOS. The difference in mean VD, ICU LOS, and hospital LOS did not differ significantly between the groups (VD: P=0.90; ICU LOS: P = 0.71; and hospital LOS: P = 0.67). However, these clinical outcomes were found to be reduced in the intervention group.

Forest plot random-effect model comparing postintervention ventilation duration, ICU length of stay, and hospital length of stay between the intervention and control groups. ICU, intensive care unit; SMD, standard mean difference

4. DISCUSSION & CONCLUSIONS

This meta-analysis shows that ENDF enteral feeding is tolerable and feasible in the immediate postoperative period, increasing energy and protein intakes and body weight compared to enterally fed EBM or standard feed.

Despite diversity in the duration of nutrition intervention, each study showed a postoperative reduction in VD, ICU LOS, and hospital LOS in infants with ENDF feeding compared to standard feeds, however the difference did not meet statistical significance.

Conclusion

This meta-analysis concludes that energy- and/or protein-dense feed with proper nutrition composition is safe and helpful for achieving energy and protein goals and the maintenance of weight postoperatively in infants who have undergone cardiac surgery.