Effects of Human-Milk-Based-Human-Milk Fortifier on Necrotizing Enterocolitis and Nutritional Outcomes in Preterm Infants

Shruti Patel, MD; Nikitha Mangalapally, MD; Alexandra Vik; Christine Capriolo, DO; Erin Schofield, MD; Natalie Davis MD, MMSc

The authors have no financial relationships to disclose.

University of Maryland School of Medicine

Background

Human-Milk-Based-Human-Milk Fortifier (HMBHMF):

- Implemented to provide exclusive human milk based diet and minimize risk of morbidities (necrotizing enterocolitis (NEC), late onset sepsis, bronchopulmonary dysplasia (BPD))
- More expensive than bovine-based fortifiers
- Concern for poorer somatic growth
- Limited data on morbidity and mortality in early preterm infants

University of Maryland Medical Center JiJi NICU (Level IV) introduced HMBHMF in November 2018 for neonates < 1250g who were being fed MBM or DBM

Objectives

To evaluate the effect of HMBHMF introduction on feeding characteristics, growth and incidences of morbidities during NICU admission.

Methods

Retrospective medical record review, neonates born <1250g:

- Bovine-based HMF only (8/2015-10/2018)
- After introduction of HMBHMF (11/2018-12/2020)

Table 1. Demographic/clinical characteristics of neonates born <1250g who did vs. did not receive HMBHMF

	Ever received HMBHMF (N=121)	Never received HMBHMF (N=298)	P-value
Birth GA (weeks) Mean (SD)	27.2 (2.2)	28.1 (2.7)	0.0013
Morbidities			
NEC (all stages 1-3)	18 (14.9%)	39 (13.1%)	0.628
NEC stage II or III	8 (6.6%)	20 (6.7%)	0.9704
SIP	4 (3%)	14 (5%)	0.5241
PVL	9 (7%)	28 (10%)	0.492
IVH Grade III/IV	11 (9%)	24 (8%)	0.8469
ROP requiring treatment	5 (4%)	12 (5%)	0.3344
Late onset sepsis	18 (15%)	26 (9%)	0.0602
FiO2 >21% at 36 weeks PMA	64 (54%)	156 (53%)	0.8166
Growth			
Median daily weight gain, birth to 4 weeks of life, g/kg/day [median (IQR)]	12 (8-17)	15 (11-20)	0.0008
Median daily weight gain, birth to 6 weeks of life, g/kg/day [median (IQR)]	17 (12-21)	19 (14-23)	0.0493
Feeds at discharge			
BM	55 (47%)	86 (30%)	
Formula	50 (42%)	144 (51%)	0.0041
Both	13 (11%)	55 (19%)	

Table 2. Multivariable modelling with logistic regression for predictors of Stage 2 or 3 NEC

	OR	95% CI	p-value
Ever fed HMBMHF	1.016	0.414 - 2.490	0.9730
Ever fed formula	0.868	0.353 - 2.134	0.7573
Ever fed donor breast milk	0.881	0.365 - 2.122	0.7770
Increasing birth GA	0.960	0.935 - 0.984	0.0015
PPROM	0.311	0.101 - 0.957	0.0418

Results

We identified 419 infants, of whom 121 (29%) received HMBHMF.

- No association with lower incidence of NEC, BPD, ROP requiring treatment, PVL, IVH, or death
- Slower average weight gain (g/kg/day) at 4 weeks (p=0.0008) and 6 weeks (p=0.0493) of age compared to those not receiving HMBHMF
- Using a multivariable logistic regression model for predictors of stage 2 or 3 NEC, HMBHMF did not significantly decrease the odds of NEC (p=0.9730) when adjusting for donor breast milk and infant formula exposure
- Lower birth GA and premature prolonged rupture of membranes (PPROM) were significantly associated with NEC

Conclusions

Infants fed HMBHMF:

- Slower growth rates
- No improvement in feeding characteristics
- No association with reduction of rates of NEC or other common co-morbidities of prematurity