Feeding Outcomes in Very Preterm Infants Following Implementation of Probiotics in a Tertiary NICU

University of Dayton

Elinor Tighe

Background

Prematurity:
- 388,889 premature births per year
- Comprises 9.85% of live births
- Leading cause of death of children under 5 globally

Neonatal Nutritional Therapy:
- Technology has improved over the last 20 years, but research is needed on how to best feed premature infants

Enteral Nutrition in Preterm Infants:
- Goal is to avoid postnatal growth failure and support positive neurodevelopmental outcomes
- Find a balance to optimize enteral nutrition without increasing the risk of NEC

Study Purpose

- Compare outcomes pre- and post-probiotic protocol with hopes to reduce necrotizing enterocolitis (NEC), improve feeding outcomes, and ensure safety and feasibility of the protocol

Study Design Methods

- Retrospective, single-center cohort study

Inclusion Criteria:
- Infants weighing <1500g
- Infants born at <32 weeks gestational age

Control Group:
- Infants born between March 2020 - June 2020

Experimental Group:
- Infants born July 2020 – October 2020 that received probiotics

Probiotics:
- *Lactobacillus reuteri*
- Infant tolerating minimum enteral feed volume of 40 mL/kg/day
- Discontinued when infant reached 35 weeks postmenstrual age and >1500g

Results

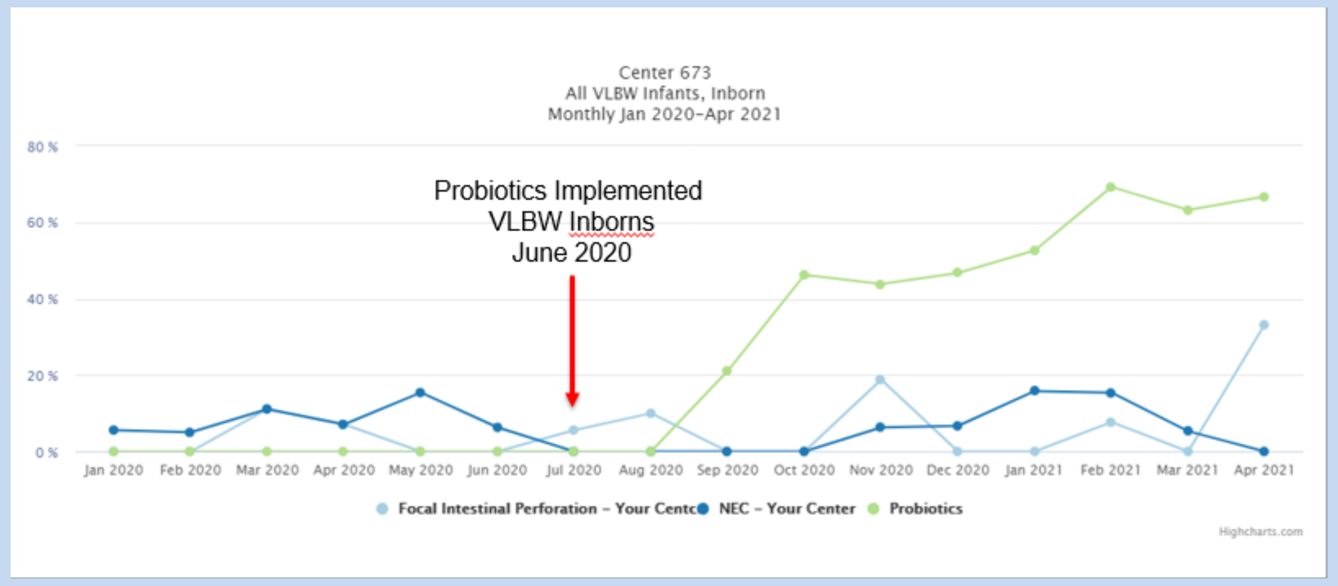
	Control Cohort (n=68)	Probiotic Cohort (n=31)	p-value
Gestational age (wk)[1]	28.6 ± 2.8	29.2 ± 2.4	0.29
Birth weight (g)[1]	1134 ± 312	1128 ± 371	0.93
Male sex, n (%)	33 (48.5)	10 (32.3)	0.19
Race/ethnicity, n (%)			0.59
White	16 (23.5)	9 (29)	
Black	26 (38.2)	8 (25.8)	
Hispanic	24 (35.3)	12 (38.7)	
Asian	2 (2.9)	2 (6.5)	
Mode of Delivery, n (%)			1.00
Vaginal	14 (20.6)	6 (19.4)	
C-Section	54 (79.4)	25 (80.6)	
PPROM, n (%)	16 (23.5)	7 (22.6)	1.00
Maternal Chorioamnionitis, n (%)	3 (4.4)	1 (3.2)	1.00
Infant Received Antibiotics at Birth, n (%)	39 (57.4)	24 (77.4)	0.07
Time to Reach Full Enteral Feeds (days)[1]	9 [7,16]	9.5 [8,14]	0.67
Duration of Parenteral Nutrition (days)[1]	10 [8,21]	11.5 [8,21]	0.93
Growth outcomes- Birth to 35 Weeks PMA			
Weight Gain Velocity (g/day)[2]	18.6 ± 4.4	18 ± 7.1	0.62
Change in Weight/age z-score[2]	-1.1 ± 0.8	-0.9 ± 0.5	0.07
Change in Length/age z-score[2]	-1.3 ± 1	-0.8 ± 1	0.02
Change in FOC/age z-score[2]	-1.5 ± 1	-1.3 ± 0.9	0.54
SGA at discharge, n (%)	32 (47.1)	11 (35.5)	0.38
Early onset Sepsis, n(%)	0 (0)	1 (3.2)	0.31
Late-Onset Sepsis, n (%)	15 (22.1)	4 (12.9)	0.41
NEC stage IIB, n (%)	4 (5.9)	1 (3.2)	0.53
Surgical NEC, n (%)	4 (5.9)	1 (3.2)	1.00
Spontaneous Intestinal Perforation, n (%)	4 (5.9)	0 (0)	0.32
Death, n (%)	2 (2.9)	1 (3.2)	1.00
Length of Stay (days)[1]	74 [47,100]	79 [50,103]	0.98

Discussion

Infants in the probiotic cohort experienced:
- Higher rates of antibiotics at birth
- Lower incidence of late-onset sepsis*
- Lower incidence of NEC*
- No spontaneous intestinal perforation*
- Increased length gain
- Less growth faltering

Future Directions:
- It is feasible and safe to implement probiotics
- A multidisciplinary approach is required to sustain probiotic use

*not statistically significant due to small sample size



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Co-Authors:
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- Monika Patil, MD
- Mohan Pammi, MD
- Murali Premkumar, MD
- Kris Reber, MD

Academic Advisor:
- Thomas Williams, PhD

Texas Children's Hospital

Baylor College of Medicine