

Children's Mercy Kansas City

SHARE @ Children's Mercy

Research at Children's Mercy Month 2019

Research at Children's Mercy Month

5-2019

Association of Enteral Tube Feedings at Discharge for Neonates with Critical Congenital Heart Disease

Lori Erickson

Katherine Bonessa

Usman Hasnie

Janelle R. Noel-Macdonnell

Natalie Jayaram

See next page for additional authors

Follow this and additional works at: https://scholarlyexchange.childrensmercy.org/research_month2019

Authors

Lori Erickson, Katherine Bonessa, Usman Hasnie, Janelle R. Noel-Macdonnell, Natalie Jayaram, Julie Weiner, and Tara Swanson

Lori Erickson MSN, CPNP-PC, Katherine Bonessa CPNP-AC, Amy Ricketts, RN, Usman Hasnie, Janelle Noel-MacDonnell PhD, Natalie Jayaram MD, Julie Weiner DO, Tara Swanson MD

Children's Mercy Kansas City, Kansas City, MO



BACKGROUND

Infants with critical congenital heart disease (cCHD) requiring surgery or cardiac catheterization within the first 30 days of life are at risk for requiring supplemental enteral nutrition or tube feedings (TF). We sought to determine clinical characteristics associated with requirement for nasogastric or gastric tube feedings at neonatal discharge following surgery for cCHD.

METHODS

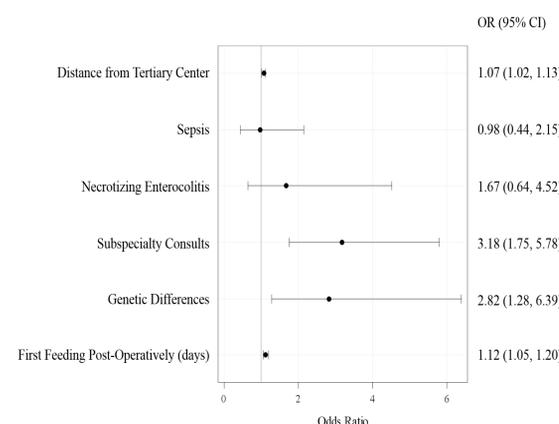
A secondary analysis was completed from an existing dataset from all newborns with cCHD requiring cardiac surgery within the first 30 days of life (n=339) from our tertiary children's hospital from January 2008 to March 2013. Descriptive statistics of groups of all PO vs. any TF comparisons using a univariate analysis of 57 variables. Multivariable logistic regression with variable receiver operating characteristics (ROC) curve comparisons were used to determine the association between patient characteristics and requirement for TF at discharge. Patients who did not survive to discharge were excluded from this secondary analysis. Descriptive statistics, univariate, and multivariate logistic regression including probability model were completed using SAS Version 9.4.

$$\hat{\pi} = \Pr(\text{Supplemental feed}) = \frac{\exp(-2.01 + 0.07X_{1j} - 0.02X_{2j} + 0.51X_{3j} + 1.16X_{4j} + 1.04X_{5j} + 0.11X_{6j})}{1 + \exp(-2.01 + 0.07X_{1j} - 0.02X_{2j} + 0.51X_{3j} + 1.16X_{4j} + 1.04X_{5j} + 0.11X_{6j})}$$

Author Contact: laerickson@cmh.edu

RESULTS

Demographic Descriptive Results	n=339
Female	36.1%
Prenatal detection	39.8%
Gestational age in weeks (Mean (SD))	38.4 (1.6)
Birth weight in kg	3.3 (1.9)
Maternal age in years (Mean (SD))	27.3 (5.7)
Private insurance	47.7%
STAT score >4	68.3%
Single ventricular anatomy	37.4%



Significant Variables for Univariate Analysis	100% PO feeds n=217	Tube feeds n=122	p value
Feeding pre-operatively	159 (73.3%)	76 (62.3%)	0.035
Sepsis	19 (8.8%)	29 (23.8%)	<0.001
Necrotizing enterocolitis	9 (4.1%)	19 (15.6%)	<0.001
Subspecialty consults >=2	43 (19.8%)	72 (59.0%)	<0.001
Significant genetic differences	15 (6.9%)	32 (26.2%)	<0.001
Birth miles from tertiary center (Mean (SD))	61.0 (82.83)	88.7 (112.3)	0.010
First day feeding post-operatively (Mean (SD))	3.63 (3.5)	7.0 (8.7)	<0.001

ESTIMATED PROBABILITY MODEL EXAMPLE

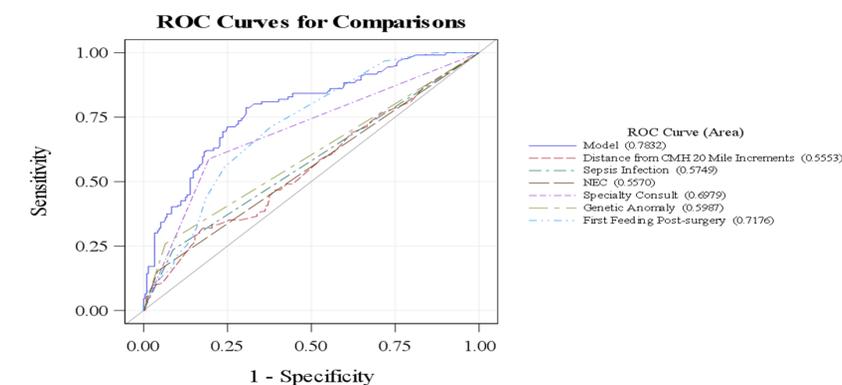
Example Probability model: Born 200 miles from surgery center, had sepsis, more than 2 specialty consults, a variant of unknown significance (VUS), and first feeding post surgery at day 5.

Estimated probability of needing a supplemental feeding tube is 71%

RESULTS

Multivariable adjustment: The odds of TF increased with distance from surgery center and birth hospital at increase of 7% risk TF for every 20 miles. The odds of TF increased with 2 or more subspecialty consults by 3 units and major genetic abnormalities by 2.8. Delays in post-operative feedings indicated a 12% increase for each day delay in post-surgical feeding.

ROC curve- Good model fit of 0.7832 for sensitivity and 1-specificity for Area under the curve (AUC)



CONCLUSIONS

Infants with cCHD that deliver farther from the children's hospital, have multiple subspecialty consults, genetic abnormalities, and delays in post-operative feeds are associated with a greater likelihood for tube feeds at hospital discharge.

Next steps: Validity additional cohort at current site 2014-2018 and Reliability: Consider testing model at another pediatric tertiary hospital