



Does Delivery Site Matter? Comparing Infants with Major Congenital Heart Defects Delivered at a Free-Standing Children's Hospital to Infants Transferred for Postnatal Care

Usman Hasnie, Ammar Hasnie, Lori Erickson, Julie Weiner, Tara Swanson

¹University of Missouri-Kansas City School of Medicine, Kansas City, MO, ²Children's Mercy Hospital, Kansas City, MO



BACKGROUND

- Critical congenital heart disease (cCHD) are a group of heart defects that are life threatening if left untreated and account for more deaths than any other type of heart malformation (1,2).
- Specific heart defects defined as cCHD include: Coarctation of the aorta, d-transposition of the great arteries, hypoplastic left heart syndrome, total anomalous pulmonary venous return, tricuspid atresia and Tetralogy of Fallot.
- Approximately 1 in 4 babies born with a heart defect has a cCHD (3).
- The risk of both morbidity and mortality increases with cCHD when there is a delay in diagnosis and referral to a tertiary center with expertise in treating these disorders (4).

INTRODUCTION

- Beginning in 2011, obstetric deliveries of high risk fetal diagnoses began at Children's Mercy Hospital, including critical congenital heart disease.
- This study's aim was to evaluate the time to intervention for critical congenital heart disease (CHD) patients delivered at Children's Mercy Hospital (CMH), a free standing pediatric hospital compared to community referral hospitals.

METHODS

- A retrospective chart review (historical cohort study) of neonates admitted from Jan 2008 to Dec 2013 with critical congenital heart disease requiring either cardiac surgery or cardiac catheterization within 30 days of life was performed.
- The primary outcome of interest was length of time to first cardiac intervention (either cardiac surgery or cardiac catheterization) comparing Children's Mercy and community referral neonates.
- Secondary outcomes of interest included: pre-intervention laboratory values, intubation, length of stay, and mortality.
- Data was manually abstracted by four trained study personnel. The data was verified, and discrepancies were resolved with majority consensus among abstractors.
- Continuous variables were compared using Student's t-test and categorical variables were compared using chi-square or Fisher's exact test

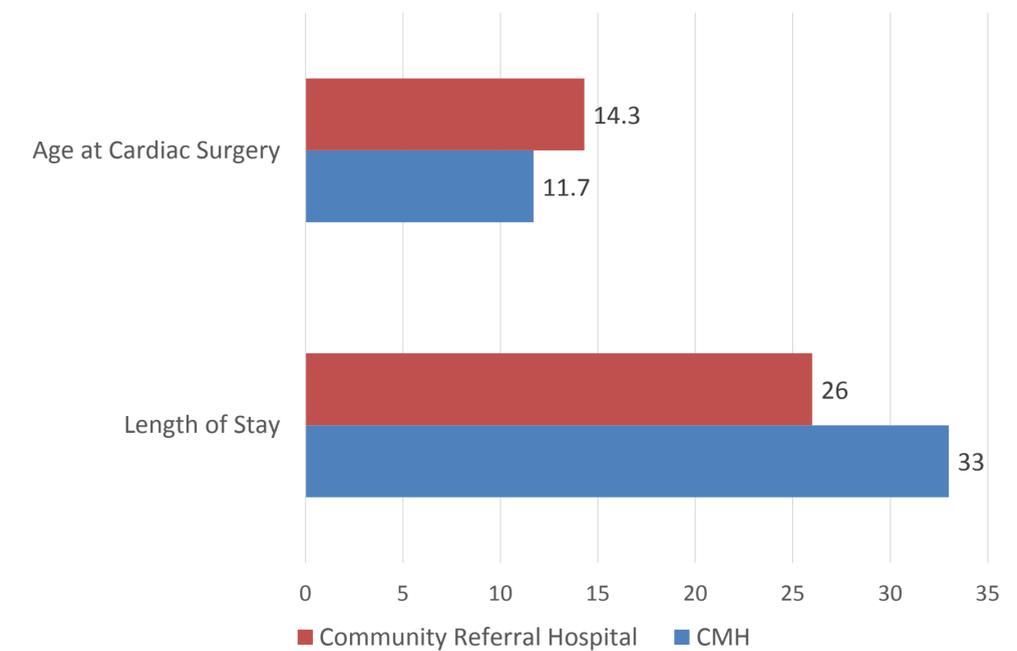
RESULTS

- 302 neonates were analyzed in a preliminary cross section of 480 patients delivered at CMH (n=41) versus community referral hospitals (n=261).
- Time to surgical intervention at CMH occurred earlier than community referral hospitals (11.7 days vs 14.3 days, p=0.039).
- Length of stay was significantly higher (33 days vs 26 days, p=0.006) for CMH compared to community referral hospitals.
- After multivariable adjustment for length of stay, CMH patients were 1.35 times more likely to have surgery within 14 days as compared to community referral hospitals (95% CI 1.03-1.77, p=0.031).
- CMH neonates had more initial acidosis pre-procedure than community referral hospital neonates (p=0.001).
- No statistically significant differences in intubation (4 days vs 3 days, p=0.332) or mortality (4.88% vs 8.8%, p=0.549) were detected, though CMH neonates had a lower 30 day mortality.

TABLE 1. MAIN RESULTS

Delivery site Location	Children's Mercy Hospital (n=41) (CMH)	Community Referral Hospital (n=261)	p-value
Prenatal Detection of cCHD	41 (100%)	73 (30.0%)	<0.001
Neonatal length of stay, days (median)	33 (23, 57)	26 (16, 41)	0.006
Age at Cardiac Surgery, days (median)	11.7 (8.1, 16.1)	14.3 (9.7, 20.2)	0.039
Lowest pH pre-procedure (median)	7.23 (7.2, 7.3)	7.3 (7.24, 7.34)	0.001
Initial Base Excess pre-procedure (median)	-4.7 (-7.5, -2.9)	-1.8 (-4, -0.4)	<0.001
Highest PCO2 Pre-Intervention (median)	53.5 (45.0, 67.9)	49.2 (45.6, 59.0)	0.091
Intubated pre-Intervention	11 (26.8%)	89 (34.1%)	0.358
Death prior to Discharge	2/41 (4.88%)	23/261 (8.8%)	0.549

CMH vs COMMUNITY REFERRAL NEONATES



CONCLUSION

- CMH neonates proved to have cardiac intervention nearly 2.5 days prior to their community referral hospital neonate counterparts
- CMH neonates also appeared to have lower mortality among neonates prior to discharge. This may be due to the higher prenatal cCHD detection rate.
- Further analysis in regards to specific subtype of cCHD will help to define and potentially explain these observed associations.

REFERENCES

1. Heron MP, Smith BL. "Deaths: leading causes for 2003." Natl Vital Stat Rep. 2007;55:1-92. Available at <http://www.ncbi.nlm.nih.gov/pubmed/17408087>. Accessed 03-10-2017.
2. Rosano A, Botto LD, Botting B, Mastroiacovo P. "Infant mortality and congenital anomalies from 1950 to 1994: an international perspective." J Epidemiol Community Health. 2000;54:660-666. Available at <http://jech.bmj.com/content/54/9/660.full.pdf>. Accessed 03-10-2017
3. Oster M, Lee K, Honein M, Colarusso T, Shin M, Correa A. Temporal trends in survival for infants with critical congenital heart defects. Pediatrics. 2013;131(5):e1502-8.
4. Screening for Critical Congenital Heart Disease in Newborns John Gordon Harold Circulation. 2014;130:e79-e81, originally published August 25, 2014 <https://doi.org/10.1161/CIRCULATIONAHA.113.008522>