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# Safety, Timing, and Outcomes of Early Postoperative Cardiac Catheterization Following Congenital Heart Surgery

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## Children's Mercy Kansas City

### Background

- Early postoperative (<6 weeks) cardiac catheterizations (EPOCC) have been considered high risk and often delayed, especially in patients on extracorporeal support (ECMO).
- Few studies exist demonstrating the safety of cardiac catheterization within six weeks and even within 30 days of surgery, including for patients on ECMO
- There is still significant institutional variability in timing and willingness to perform early post operative catheterization and there is limited data on the impact of EPOCC on outcomes.

### Aim

- Describe our experience with EPOCC and its impact on management, length of stay, duration of mechanical ventilation and extracorporeal support.

### Methods

#### Study Design:

- Single center, retrospective cohort study of patients who had congenital heart surgery between 01/01/2010 and 12/31/2019 had a cardiac catheterization within 30 days of surgery.

#### Analyses:

- Predictor variables: patient demographic and clinical variables, timing of cardiac catheterization, indication for cardiac catheterization, complications of catheterization
- Outcome variables: duration of mechanical ventilation and ECMO support, duration of CICU and hospital length of stay
- Compared predictor and outcome variables between patients who underwent early (cath  $\leq$ 72 hrs post op) and late EPOCC (cath >72 hrs post op)
- Statistical analyses using IBM SPSS, version 28

### Results

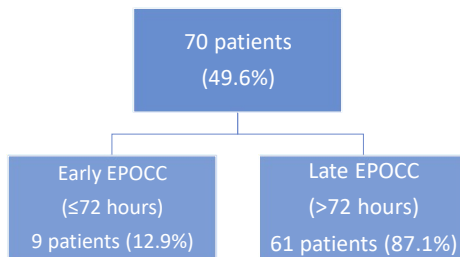
Figure 1. Patient Selection



- Median time from surgery to EPOCC was 10 days
  - Range 1-30 days
- Early EPOCC: 26 patients (18.4%)
- Late EPOCC: 115 patients (81.6%)

Table 1. Patient Characteristics	Early EPOCC ( $\leq$ 72 hours)	Late EPOCC (>72 hours)	P Value
Median Age, months	3.0	1.5	0.02*
Median Weight, kg	5.4	3.9	0.006*
Mechanical Ventilation prior to EPOCC	85%	63%	0.04*
Arrhythmia prior to EPOCC	30%	23%	0.40
Median Vasoactive Inotropic Score (VIS)	6.0	7.5	0.20
ECMO Prior to EPOCC	50%	19%	0.002*

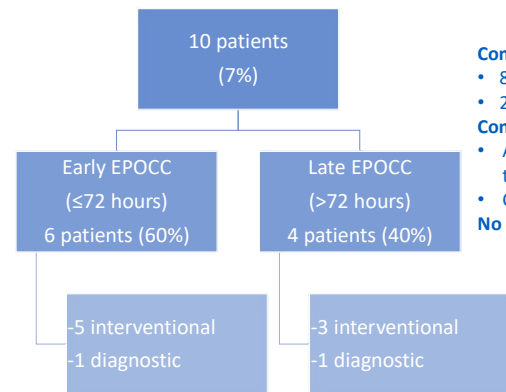
Figure 2. EPOCC Interventions



#### Most common location of intervention:

- Aortic Arch (n=9)
- Atrial Septum (n=9)
- Collateral Occlusion (n=9)
- Combination Procedures (n=13)

Figure 3. Complications



#### Complications:

- 8 interventional cath
- 2 diagnostic only cath
- Arrhythmia/ST changes requiring treatment (n=5)
- Cardiac arrest (n=3)
- No deaths or strokes

Table 2. Outcomes	Early EPOCC ( $\leq$ 72 hours)	Late EPOCC (>72 hours)	P Value
Median CICU LOS (days)	17.9	28.0	0.09
Median Hospital LOS (days)	29.6	49.9	0.16
Median Mechanical Ventilation (days)	11.4	13.4	0.11
Median Duration of ECMO (days)	7.0	15.0	0.06

### Conclusions

- There is an overall low occurrence of complications with EPOCC and no serious complications such as death or stroke
- No statistically significant differences in outcomes for CICU LOS, hospital LOS, mechanical ventilation duration, or ECMO duration. However, the trend toward shorter duration in outcomes in the early EPOCC group may suggest a benefit in early EPOCC over late EPOCC.
- Further study is warranted, however earlier EPOCC in appropriately selected patients may result in a decrease in extracorporeal support, ICU, and hospital length of stay.