

## Selected Best Practices and Suggestions for Improvement

### PDI 06: RACHS-1 Pediatric Heart Surgery Mortality

#### Why focus on pediatric heart surgery mortality?

- Heart defects are among the most common birth defects in the United States. About 35,000 infants (1 of every 125) are born with a heart defect each year.<sup>1</sup>
- Other children will develop heart disease later that may require surgery, including conditions such as arrhythmias, cardiomyopathies, Kawasaki disease, and rheumatic fever.
- National annual charges for inpatient congenital cardiac surgery currently exceed \$2.2 billion.<sup>1</sup>
- One study found that in-hospital mortality after pediatric heart surgery was associated with \$337,226 in excess total charges on average per death.<sup>2</sup>
- Some hospitals<sup>3</sup> already publicly report pediatric heart surgery mortality rates.

<b>Recommended Practice</b>	<b>Details of Recommended Practice</b>
Conduct Multidisciplinary Rounds	Conduct multidisciplinary rounds on patients involving members of the entire health care team on a daily basis. <sup>4</sup>
Conduct a Preoperative Planning Conference	Conduct a multidisciplinary preoperative planning conference to plan all pediatric cardiac surgery cases. <sup>4</sup>
Ensure That Transesophageal Echocardiography (TEE) and Epicardial Echocardiography Are Available Intraoperatively	Intraoperative TEE and epicardial echocardiography should be available if needed during the surgical case. <sup>4</sup>
Use Appropriate Antibiotic Selection and Timing	Administer timely and appropriate antibiotics preoperatively and postoperatively.
Use Appropriate “Timeout” Preprocedure and Postprocedure	Perform and document that all pediatric heart surgery cases have an appropriate preprocedural and postprocedural timeout. <sup>4</sup>

#### Best Processes/Systems of Care

##### ***Introduction: Essential First Steps***

- Engage key procedural personnel, including nurses, physicians and other providers, technicians, and representatives from the quality improvement department, to develop evidence-based protocols for care of the neonatal patient population.
- The above team:
  - Identifies the purpose, goals, and scope and defines the target population for this guideline.
  - Analyzes problems with guidelines compliance, identifies opportunities for improvement, and communicates best practices to frontline teams.

- Establishes measures to indicate if changes are leading to improvement, identifies process and outcome metrics, and tracks performance using these metrics based on a standard performance improvement methodology (e.g., FOCUS-PDSA).
- Determines appropriate facility resources for effective and permanent adoption of practices.

***Recommended Practice: Conduct multidisciplinary rounds involving multiple members of the health care team***

- Conduct multidisciplinary rounds on all pediatric cardiac surgery patients on a daily basis.<sup>4</sup>
- Members of the team that should participate at a minimum include<sup>4</sup>:
  - Cardiac surgery.
  - Cardiology.
  - Critical care.
  - Caregivers/family.
  - Nurses.
  - Pharmacist.
  - Respiratory therapists.

***Recommended Practice: Conduct a multidisciplinary preoperative planning conference***

- Conduct a preoperative multidisciplinary planning conference before the pediatric cardiac surgery case.<sup>4</sup>
- Members of the team that should participate at a minimum include<sup>4</sup>:
  - Cardiac surgery.
  - Cardiology.
  - Critical care.
  - Anesthesia.

***Recommended Practice: Ensure that transesophageal echocardiography (TEE) and epicardial echocardiography are available intraoperatively***

- Intraoperative TEE and epicardial echocardiography should be available if needed during the surgical case.<sup>4</sup>
- In cases where TEE would be contraindicated or not provide enough information, epicardial echocardiography and appropriate staff support should be available if needed during a case.<sup>4</sup>

***Recommended Practice: Use appropriate antibiotic selection and timing***

- Administer prophylactic antibiotics within 1 hour prior to surgical incision.<sup>4,5</sup>
- Administer appropriate antibiotic selection based on evidence-based guidelines.<sup>4,5</sup>

***Recommended Practice: Use appropriate “timeout” both preprocedure and postprocedure***

- All “timeouts” should include the following:<sup>4</sup>
  - A “timeout,” including at a minimum the following elements: patient ID, site, procedure, and patient allergies.

- A preprocedural briefing by the attending surgeon in which the following is shared with the entire surgical team: operative plan, diagnosis, planned procedure, anesthesia and bypass strategies, antibiotic prophylaxis, availability of blood products, any anticipated/planned implants, and any anticipated challenges.
- A postprocedural debriefing by the attending surgeon in which opportunities for improvement are discussed, along with successful elements of the surgery.
  - Specifics should include the name of the procedure performed, instrument, correct sponge and needle counts, appropriate specimen labeling (if applicable), equipment problems, blood product use, and any breaks in technique.
  - This should take place prior to the patient leaving the OR (a more in-depth discussion can take place after the case).

### ***Educational Recommendation***

- Plan and provide education on protocols to physicians and other providers, nursing, and all other staff involved in procedural cases. Education should occur upon hire, annually, and when this protocol is added to job responsibilities.

### ***Effectiveness of Action Items***

- Track compliance with elements of established protocol by using checklists, appropriate documentation, etc.
- Evaluate effectiveness of new processes, determine gaps, modify processes as needed, and reimplement practices.
- Mandate that all personnel follow the safety protocols developed by the team and develop a plan of action for staff in noncompliance.
- Provide feedback to all stakeholders (physicians and other providers, nursing, and ancillary staff; senior medical staff; and executive leadership) on the level of compliance with process.
- Conduct surveillance and determine prevalence to evaluate outcomes of new process.
- Monitor and evaluate performance regularly to sustain improvements achieved.

### **Additional Resources**

#### ***Systems/Processes***

- Guidelines for pediatric cardiovascular centers. *Pediatrics* 2002;109(3):544-9.

#### ***Tools***

- The Society of Thoracic Surgeons Patient Safety Checklist  
<http://www.sts.org/quality-research-patient-safety/patient-safety-0>
- American Heart Association Congenital Heart Defects Tools and Resources  
[http://www.heart.org/HEARTORG/Conditions/CongenitalHeartDefects/Congenital-Heart-Defects\\_UCM\\_001090\\_SubHomePage.jsp](http://www.heart.org/HEARTORG/Conditions/CongenitalHeartDefects/Congenital-Heart-Defects_UCM_001090_SubHomePage.jsp)
- IHI How-to Guide: Prevent Surgical Site Infection — Pediatric Supplement  
<http://www.ihl.org/resources/Pages/Tools/HowtoGuidePreventSurgicalSiteInfectionPediatricSupplement.aspx>

**Staff Required**

- Physicians and other providers (pediatric cardiologists, pediatric cardiovascular surgeons, pediatric cardiovascular anesthesiologists, pediatric intensive care physicians, and other providers in these areas)

**Equipment**

- TEE
- Epicardial echocardiography

**Communication**

- Education on policy/protocol of monitoring and treatment of bloodstream infections

**Authority/Accountability**

- Senior leaders such as chief/chairs of surgery and medicine, nursing leadership, and unit managers

**References**

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[http://www.qualityforum.org/Publications/2011/12/National\\_Voluntary\\_Consensus\\_Standards\\_for\\_Pediatric\\_Cardiac\\_Surgery\\_A\\_Consensus\\_Report.aspx](http://www.qualityforum.org/Publications/2011/12/National_Voluntary_Consensus_Standards_for_Pediatric_Cardiac_Surgery_A_Consensus_Report.aspx). Accessed May 16, 2016.
2. Kronman MP, Hall M, Slonim AD, et al. Charges and lengths of stay attributable to adverse patient-care events using pediatric-specific quality indicators: a multicenter study of freestanding children's hospitals. *Pediatrics* 2008;121(6):e1653-e1659.
3. The Children's Hospital of Philadelphia. Heart Surgery Survival Rates by Type of Procedure. <http://www.chop.edu/service/cardiac-center/cardiac-outcomes/volumes-mortality-rates-procedure.html>. Accessed May 16, 2016.
4. Jacobs J, Jacobs M, Mayer Jr J, et al. Quality measures for congenital and pediatric cardiac surgery. *World J Pediatr Congenit Heart Surg* 2012;3(1):32-47.
5. The Joint Commission. Specifications Manual for National Hospital Inpatient Quality Measures, Version 4.3. 2014.  
[http://www.jointcommission.org/specifications\\_manual\\_for\\_national\\_hospital\\_inpatient\\_quality\\_measures.aspx](http://www.jointcommission.org/specifications_manual_for_national_hospital_inpatient_quality_measures.aspx). Accessed May 16, 2016.