Clinical Effectiveness in Cardiac Anesthesia

Outcomes of a Standardized Anesthetic Approach to the Primary Repair of Tetralogy of Fallot

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INTRODUCTION

The United States is in transition to a value based reimbursement system. Recently, data from the Pediatric Health Information System (PHIS) showed our institution performing in the third tertile nationally, with an average 12 day Length of stay (LOS) in children undergoing primary repair of Tetralogy of Fallot (TOF). On further examination, variability was noted in the perioperative management of TOF patients. Thus, it was postulated that unnecessary variation was likely contributing to inefficiencies in care, resulting in prolonged LOS and increased costs. Utilizing the principles of high reliability, we standardized perioperative TOF management and evaluated the impact on outcomes.

OBJECTIVE

METHODS

A multi-disciplinary team developed and implemented a detailed clinical pathway standardizing the perioperative management of primary repair TOF cases meeting inclusion criteria.

- Key drivers and interventions of prolonged LOS were identified by a multi-disciplinary core pathway team
- Extensive socialization of the pathway occurred with stakeholders across the hospital prior to implementation
- The pathway went live on 11/2014
- All eligible patients were enrolled at the time of analysis, and 15/17 (88%) completed the pathway
- There were no reintubations, CVICU back transfers or hospital readmissions within 7 or 30 days of surgery
- The LOS dropped from a mean of 12 to 7 days, and median dropped from 9 to 7 days post pathway
- The best performing hospitals averaged a mean of 9 days

TOF pre/post pathway outcomes:

<table>
<thead>
<tr>
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<th>Valve Sparing Repair</th>
<th>Transannular Patch Repair</th>
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</thead>
<tbody>
<tr>
<td>Pre-pathway</td>
<td>6.4</td>
<td>11.9</td>
</tr>
<tr>
<td>Post-pathway</td>
<td>4.3</td>
<td>9</td>
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TOF Clinical Pathway Inclusion Criteria

- > 6 weeks of age
- > 3.5 kg
- Confluent pulmonary arteries
- Without significant comorbidities
- Undergoing primary repair

Standardized Anesthetic Management

- Standard IV, arterial and central line placement
- Total dose of fentanyl dose was 30 µg/kg or less
- Isoflurane was used on CPB and post CPB as necessary
- Transfer of patient from OR to CVICU on standardized inotropes, analgesics and sedatives

RESULTS

POST-OPERATIVE OUTCOMES

- Time to extubation: 6 vs. 7 days
- CVICU LOS: 9 vs. 7 days
- Total Hospital LOS: 12 vs. 10 days

Discussion/Conclusion

- Standardization of intra-operative anesthetics with a plan for extubation within 24 hours was achieved in all instances and there were no complications associated with patients participating in the TOF clinical pathway
- Post-pathway implementation, LOS at LPCH dramatically improved, going from the third to the first tertile
- Our favorable results support the use of clinical pathways to improve outcomes and conserve resources in the management of pediatric cardiac surgical repair
- A multidisciplinary team was required for the successful build and implementation of this pilot clinical pathway
- Next steps are focused on sustaining and automating the TOF pathway, and include: Integrating standard pathway order sets into the clinical workflow, developing and integrating actionable information into the clinical workflow
- Development of additional clinical pathways at LPCH are underway, using this pilot pathway as a model for future endeavors.