Introduction

Neuraxial and peripheral nerve catheters in pediatric patients are an effective and safe method to supplement general anesthesia and provide perioperative analgesia. Data from the Pediatric Regional Anesthesia Network (PRAN) shows that the most common complication in regards to pediatric regional anesthesia is catheter dislodgement.

We conducted our own institutional review of the catheter data from 2014 to 2016 to further classify our institution’s dislodgement incidence. With this context, the goal of this quality improvement project is to help reduce the rate of catheter dislodgements or unintentional removals.

The secondary objective is to track unintentional epidural catheter removals and determine the most effective way for securing regional anesthesia catheters.

Methods

After retrospectively reviewing the data from our institution from 2014-2016, the incidence of epidural catheter dislodgement (thoracic and lumbar) was determined. As a quality improvement measure, the goal was to decrease the incidence of catheter dislodgements by 50%.

After each group, this was repeated for 10 times or until the pulling force needed to dislodge catheter by pulling was determined.

Results were recorded and data analysis was done by an unpaired test.

Table 1. In Vivo Manikin Catheter Study

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of Trials</th>
<th>Mean Force (N)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10</td>
<td>14.0 (2.9)</td>
<td>0.005</td>
</tr>
<tr>
<td>B</td>
<td>10</td>
<td>18.7 (1.6)</td>
<td>0.002</td>
</tr>
<tr>
<td>C</td>
<td>10</td>
<td>8.6 (3.2)</td>
<td>0.038</td>
</tr>
<tr>
<td>D</td>
<td>8</td>
<td>9.6 (2.5)</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Key:
A - catheters secured by SureSite® Window clear dressing
B - catheters secured by traditional sterile Strip visible dressing
C - catheters secured by SureSite® and SureSite® Window clear dressing
D - catheters secured by SureSite® and SureSite® Post-op visible dressing

Background

Number of Catheters 2014-2016

<table>
<thead>
<tr>
<th>Chart Area</th>
<th>Lumbar</th>
<th>Thoracic</th>
<th>Peripheral</th>
<th>Gaudial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of Catheters Dislodged 2014-2016</td>
<td>11%</td>
<td>9%</td>
<td>4%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Percent Catheters Dislodged 2014-16

<table>
<thead>
<tr>
<th>Chart Area</th>
<th>Lumbar</th>
<th>Thoracic</th>
<th>Peripheral</th>
<th>Gaudial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Catheters</td>
<td>39</td>
<td>10</td>
<td>4</td>
<td>22</td>
</tr>
</tbody>
</table>

Discussion

This quality improvement study is aimed at decreasing the incidence of catheter dislodgements or unintended removal. One of the causes of unintentional removal is a leaking catheter. Our in-vitro study compared the standard SureSite® Window clear dressing with Op-Stitch Post-op visible dressing. Although the SureSite® dressing required more force for catheter dislodgement, this effect was neutralized after Steri-strips application was also added. This suggests that the adhesive strength for both dressing with Steri-strips similar, thus allowing the implementation of Op-Stitch Post-op visible dressing in a future clinical trial, while monitoring the number of catheter days between unintended removal is increased.

A control chart was created to track ‘catheter days between unintentional removal’ from our historical data. With prospective tracking, different interventions will be able to be implemented and progress tracked to attempt to achieve our overall goal.