Advances in Pain Control after Nuss Repair

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Disclosure Information

Dr. Gary Raff is a consultant for Atricure and a surgical colleague
Remainder of speakers/colleagues have no other conflicts

Objectives

-To understand the traditional pain management for Nuss patients
-To become familiar with the cryoablation procedure
-To appreciate the improved outcomes with cryoablation for pain management post-Nuss
Nuss repair

Traditional Pain management

- Epidural
- Narcotic PCA
- Local infusion catheters
- Muscle relaxants
- Gabapentin
- Anti-inflammatories
- Outpatient narcotic use

BENZODIAZEPINES
NARCOTICS
NSAIDS
GABAPENTIN
LOCAL INFUSION CATHETER
INTERCOSTAL CRYOABLATION
Cryoablation

**History and Background**

- Utilize Nuss incisions
- Subcutaneous tunnel to 3rd intercostal space
- Atricure Probe cooled to -60°C for 2 minutes
- Probe warmed prior to nerve release
- Repeat in 3-7th intercostal spaces

**Cryoablation Method**

Video
Cryoablation - our experience

Multi-institutional retrospective review 6/2015-1/2016

Significant reduction in mean length of stay (LOS) and use of narcotics compared to thoracic epidural patients

No readmissions or complications

Avg LOS 3.5 days

Normal activity in 2 weeks


Results

<table>
<thead>
<tr>
<th>Patient Demographics</th>
<th>Epidural</th>
<th>Cryoablation</th>
</tr>
</thead>
<tbody>
<tr>
<td># of patients</td>
<td>n=26</td>
<td>n=26</td>
</tr>
<tr>
<td>Mean age at repair (range)</td>
<td>15.26</td>
<td>15.59</td>
</tr>
<tr>
<td>Mean Haller index (SD)</td>
<td>3.8</td>
<td>4.23</td>
</tr>
<tr>
<td>Mean ASA physical status</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Indications for pectus repair</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise intolerance (%)</td>
<td>20 (80%)</td>
<td>21 (81%)</td>
</tr>
<tr>
<td>Chest wall pain (%)</td>
<td>20 (77%)</td>
<td>14 (54%)</td>
</tr>
<tr>
<td>Body image (%)</td>
<td>17 (65%)</td>
<td>10 (38%)</td>
</tr>
</tbody>
</table>

Note: Comparison of LOS might be skewed.


Results

<table>
<thead>
<tr>
<th>Patient Outcomes</th>
<th>Epidural</th>
<th>Cryoablation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off parenteral narcotics by POD#2</td>
<td>22 (88%)</td>
<td></td>
</tr>
<tr>
<td>Off parenteral narcotics by POD#3</td>
<td>15 (100%)</td>
<td></td>
</tr>
<tr>
<td>Median time in monitored unit (range)</td>
<td>1.5 days (1-4)</td>
<td>1.5 days (1-4)</td>
</tr>
<tr>
<td>Mean hospital discharge (SD)</td>
<td>3.54 days +/-0.81 days</td>
<td>3.54 days +/-0.81 days</td>
</tr>
<tr>
<td>Chest wall complaints at 3 month follow-up</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Complications (n=4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Displaced Nuss bar requiring revision</td>
<td>3 (12%)</td>
<td></td>
</tr>
<tr>
<td>Uncontrolled pain requiring readmission</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Note: Comparison of LOS might be skewed.
Cryoablation

Cost:
- Risk for neuropathic pain. Gabapentin prophylaxis
- Increased surgical time 20 min and cost of cryoablation
- Compliance with activity restrictions/risk displacement

Benefit:
- Improved pain control, eliminated need for epidurals
- Decreased length of stay
- Decreased missed school days

References
