Sternal pain after rigid fixation: a pilot study of randomization rigid vs conventional wire closure.

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Objective

To investigate if rigid closure reduces sternal pain.

Methods

Prospective randomized CABG +/- valve
Study period: 07/2011 – 1/2012
Rigid fixation: n=11
Wire closure: n=15

Preop and Intra-op Exclusions

Preop exclusions (78)
- Age >80 (14)
- Emergency (6)
- Redo sternum (11)
- Hx of Osteoporosis (5)
- Radiation hx (1)
- Malignancy (5)
- Immunosuppression (2)
- Known coagulopathy (2)
- Infections, IE (5)
- Metal allergy (1)
- BMI above 40 (4)

Intraop exclusions (10)
- Unexpected aortic surgery (1)
- Osteoporosis (4)
- Bleeding (5)

Randomization

Total number of CABG +/- valve: N=113
Preop exclusions: 78
Intraop exclusions: 10
Total number of Randomization: N=26

Rigid Fixation (11) Wire Closure (15)

Postop Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Rigid</th>
<th>Wire</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intubation hours</td>
<td>7.3 ± 3.1</td>
<td>9.2 ± 7.2</td>
<td>0.37</td>
</tr>
<tr>
<td>Intubation &gt;24h</td>
<td>0</td>
<td>1 (6.7%)</td>
<td>0.38</td>
</tr>
<tr>
<td>ICU stays</td>
<td>55 ± 34</td>
<td>41 ± 24</td>
<td>0.26</td>
</tr>
<tr>
<td>ICU stay &gt; 48h</td>
<td>5 (46%)</td>
<td>5 (33%)</td>
<td>0.53</td>
</tr>
<tr>
<td>Postop stay days</td>
<td>5.9 ± 2.0</td>
<td>6.3 ± 4.4</td>
<td>0.76</td>
</tr>
<tr>
<td>Postop stay &gt;7d</td>
<td>1 (9%)</td>
<td>3 (20%)</td>
<td>0.45</td>
</tr>
<tr>
<td>Postop CVA</td>
<td>1 (9%)</td>
<td>0</td>
<td>0.23</td>
</tr>
<tr>
<td>Atrial Fibrillation</td>
<td>4 (36%)</td>
<td>6 (40%)</td>
<td>0.85</td>
</tr>
<tr>
<td>Superf sternal infection</td>
<td>0</td>
<td>1 (7%)</td>
<td>0.38</td>
</tr>
<tr>
<td>Deep sternal infection</td>
<td>1 (9%)</td>
<td>0</td>
<td>0.23</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>0</td>
<td>0</td>
<td>0.99</td>
</tr>
</tbody>
</table>

Narcotic Requirement Dosage Calculation

24 hours narcotic requirement was calculated using the following formula and expressed in IV morphine equivalent

<table>
<thead>
<tr>
<th>Drug</th>
<th>Rigid</th>
<th>Wire</th>
<th>P</th>
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</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>IV 1mg</td>
<td>PO 3mg</td>
<td></td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>0.15mg</td>
<td>0.75mg</td>
<td></td>
</tr>
<tr>
<td>Percocet</td>
<td>N/A</td>
<td>3mg</td>
<td></td>
</tr>
<tr>
<td>Fentanyl</td>
<td>0.01mg (10mcg)</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

Trend of less pain in R group

Day 1 Day 2 Day 3 Day 4 Day 5
Rigid Wire

Conclusion

Randomized data showed a trend of fewer narcotic requirement in rigid fixation than in conventional wire closure.

Implications

Rigid fixation may potentially improve immediate sternal pain after open heart surgery.

Less narcotic requirement potentially facilitate early return to the normal activity. Larger population is required to justify study.

Contact Information

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