PEC Blocks

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Disclosures
• I have no conflicts of interest or financial disclosures

Objectives
• Describe the PEC I, PEC II and Serratus blocks
• Review the indications for each block
• Discuss the relative contraindications for each block
• Discuss the types of cases that these blocks can be used for
• Review current literature regarding these blocks
PEC I Block


• Provides analgesia for lumpectomy, tissue expanders for breast reconstruction, pacemakers
• Targets the lateral and medial pectoral nerves as they pierce the pec minor.
• Thoracoacromial artery also pierces the pec minor
• Placed at 3rd rib

Sometimes called the modified PEC I block
- Blocks long thoracic nerve, intercostal nerves 2-6, and thoracodorsal nerve
- Local anesthetic placed between pectoralis minor and serratus anterior muscles
- Useful for mastectomy, sentinel lymph node biopsy, AV fistula formation high up in the arm/armpit
PEC II Block

Serratus plane block

- Useful for lat dorsi flap reconstructions, rib fractures. Blocks the thoracodorsal nerve and lateral intercostals.
- Local anesthetic is placed between the lattisimus dorsi and serratus muscle at the level of 4th or 5th rib in mid axillary line
Serratus anterior muscle

Serratus Plane Block

Target injection to plane just above (or just below) serratus anterior muscle

Lateral intercostal arteries emerge to surface of serratus muscle where branches travel anterior and posterior

Anterior intercostal nerves

Serratus Plane Block
Complications

- Compared with epidural and paravertebral plane blocks are less likely to result in:
  - Pneumothorax
  - Spinal cord trauma
  - LAST
  - Neuraxial infection

- Compared with epidural and paravertebral, plane blocks are harder to place catheters for (which may be in the way of the surgical prep)

Research Studies

Efficacy of pectoral nerve block versus thoracic paravertebral block for postoperative analgesia after radical mastectomy: a randomized controlled trial

S. Kulhari¹, N. Bhartiii⁵, J. Bal⁵, S. Aroj⁵ and G. Singh³

¹Department of Anaesthesia and Intensive Care and ²Department of Surgery, Postgraduate Institute of Medical Education and Research, Chandigarh, India

Aim of the study was to compare safety and efficacy of the PECs blocks to thoracic paravertebral block for postoperative analgesia after radical mastectomy

- Patients all underwent general anesthesia
- Primary outcomes were time to first analgesia and 24 hour morphine consumption
Table 1: Patient characteristics. Data are expressed as the mean (range) or number of patients in each group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group 1 (n=20)</th>
<th>Group 2 (n=20)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yrs)</td>
<td>51 (30-80)</td>
<td>54 (37-60)</td>
<td></td>
</tr>
<tr>
<td>Height (cm)</td>
<td>163 (150-168)</td>
<td>165 (158-169)</td>
<td></td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>65 (62-85)</td>
<td>67 (55-80)</td>
<td></td>
</tr>
<tr>
<td>ASA status (0-4)</td>
<td>14 (6)</td>
<td>9 (11)</td>
<td></td>
</tr>
<tr>
<td>Duration of surgery (min)</td>
<td>58 (45-75)</td>
<td>66 (45-90)</td>
<td></td>
</tr>
</tbody>
</table>

Group 1: Thoracic Paravertebral, single shot, T3, 25 ml of 0.5% ropivicaine
Group 2: PECs blocks, 10 ml of 0.5% for PEC1 and 15 ml of 0.5% for PEC 2

Table 2 (Number of analgesic and total analgesic requirement). CI, confidence interval

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group 1 (n=20)</th>
<th>Group 2 (n=20)</th>
<th>Mean difference (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of analgesic (hrs mean)</td>
<td>17.5 (15.75)</td>
<td>24 (23.75)</td>
<td>7 (20.96-27.82)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>24 h analgesic consumption (mg mean)</td>
<td>13 (10)</td>
<td>15 (10)</td>
<td>14 (11.31-14.69)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Table 3: Pain scores (visual analog scale score). Data are expressed as the median (interquartile range)

<table>
<thead>
<tr>
<th>Time (h)</th>
<th>Group 1 (n=20)</th>
<th>Group 2 (n=20)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2 (0-3)</td>
<td>1 (0-3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>0.5</td>
<td>2 (0-3)</td>
<td>1 (0-3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>1</td>
<td>4 (0-6)</td>
<td>2 (0-6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>2</td>
<td>3 (0-5)</td>
<td>2 (0-5)</td>
<td>0.044</td>
</tr>
<tr>
<td>4</td>
<td>4 (0-6)</td>
<td>4 (0-6)</td>
<td>0.610</td>
</tr>
<tr>
<td>8</td>
<td>3 (0-5)</td>
<td>5 (0-6)</td>
<td>0.143</td>
</tr>
<tr>
<td>24</td>
<td>1 (0-3)</td>
<td>1 (0-3)</td>
<td>0.902</td>
</tr>
</tbody>
</table>

Table 4: Sensory spread. Data are expressed as the number of patients in each group

<table>
<thead>
<tr>
<th>Dermatome</th>
<th>Group 1 (n=20)</th>
<th>Group 2 (n=20)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>T2</td>
<td>4</td>
<td>17</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>T3</td>
<td>20</td>
<td>20</td>
<td>1.000</td>
</tr>
<tr>
<td>T4</td>
<td>20</td>
<td>20</td>
<td>1.000</td>
</tr>
<tr>
<td>T5</td>
<td>20</td>
<td>15</td>
<td>0.047</td>
</tr>
<tr>
<td>T6</td>
<td>5</td>
<td>1</td>
<td>0.182</td>
</tr>
</tbody>
</table>

- Authors concluded that the PEC blocks are superior analgesics for radical mastectomy because they:
  - Last longer (by about 90 min)
  - Result in less opioid usage (about 2.5 mg/24h)
  - Safer*
Summary

- Three thoracic plane blocks that can be utilized for patients undergoing breast surgery, anterior chest wall surgery, or axilla surgery. These blocks can be an alternative to epidural and PVB in patient with rib fractures.
- Plane blocks are easy to perform under ultrasound.
- Relatively comfortable for patients as they can remain supine.
- Serious risks of pneumothorax, accidental dural puncture, epidural spread, and high uptake of LA resulting in LAST are reduced.

- PECS blocks can be difficult to place if performed after wire localization or in patients with significant morbid obesity or large amounts of breast tissue.
- As with all plane blocks, ample amounts of more dilute local anesthetic are needed to get adequate spread.
- Catheter placement can occur, but is often in the surgical field.
- Addition of dexamethasone, clonidine and epinephrine can prolong block duration.

Questions?