Effect of Paravertebral Block on the Post-operative Outcomes of Patients Undergoing Video-Assisted Thoracic Surgery

MYRA TORRES MSN RN-BC PCCN, LINDA MINNICH RN BSN CPAN
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Learner Objectives:

At the end of the oral presentation, the learner will be able to:

- Explain the uses and complications of paravertebral block
- Identify the patient outcomes related to paravertebral block use

Conflict of interest – None
Video-Assisted Thoracic Surgery

- Minimally invasive procedure for diagnosis & treatment of diseases in chest
- Is Rib-sparing, uses thoracoscope, recovery in a week
- Pain from VATS surgery may be due to:
  - surgical port sites,
  - chest tube sites (pleural and diaphragmatic irritation),
  - surgical positioning due to ligament strain,
  - phrenic nerve irritation
Purpose:
Among Video-Assisted Thoracic Surgery patients

Is there a relationship between paravertebral block and:

► Post-op pain level by patients?
► Number of Days until urinary catheter removal?
► Hospital length of stay?
Study Design

- Retrospective
- Convenience Sampling
- Quality Improvement Project
- Wilcoxon signed-rank test
Methods

- 40 VATS patients from 2013-2015
- All patients received opioids
- Half of the study subjects received paravertebral blocks
- Wilcoxon signed-rank test
Systemic Opioids

- Usual pain regimen before, during and after surgery
- Risks: respiratory depression, nausea, vomiting, itching, and hypotension
- Examples: morphine, dilaudid, fentanyl
- Delivered IV push or PCA (patient-controlled analgesia) after surgery
Paravertebral Block

Local anesthetic injected adjacent to the thoracic vertebra close to where the spinal nerves emerge from the intervertebra foramina. This results in sympathetic nerve blockade in multiple contiguous thoracic dermatomes above and below the site of injection.
Paravertebral Block:

Complications 10%
- Pleural puncture
- Pneumothorax
- Ipsilateral Homer’s syndrome

Absolute Contraindications: Infections, tumors

Relative Contraindications: Severe coagulopathy, severe respiratory distress, spinal deformities, thoracic aneurysm, diaphragm paresis
Review of Literature

- Piraccini and colleagues (2011)- PVB is superior to IV analgesia in providing pain control and preserving postoperative pulmonary function. This results in reduced operative pain and opioid requirement.

- Scarfe and colleagues, in a systematic review and meta-analysis (2016)- out of 23 randomized control trials and 1,120 participants studied- continuous PVB was associated with a significant improvement in incidence of nausea and vomiting, hypotension and urinary retention compared with patients who received epidural blocks. There was no difference in pain relief in both groups.
# Result: Demographics

<table>
<thead>
<tr>
<th>Demographics</th>
<th>PVB N=20</th>
<th>Control</th>
<th>p</th>
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<tbody>
<tr>
<td>ASA</td>
<td>2.8 (0.4)</td>
<td>2.9 (0.3)</td>
<td>0.4</td>
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<tr>
<td>M/F</td>
<td>12/8</td>
<td>9/11</td>
<td>0.36</td>
</tr>
<tr>
<td>Age</td>
<td>63.1 (8.6)</td>
<td>64.8 (13.6)</td>
<td>0.6</td>
</tr>
<tr>
<td>BMI</td>
<td>29.4 (4.5)</td>
<td>25.2 (4.5)</td>
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<tr>
<td>Chronic Pain</td>
<td>1 (5%)</td>
<td>2 (10%)</td>
<td>0.6</td>
</tr>
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</table>
Result: Pain Scores

NUMERIC PAIN RATING

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<thead>
<tr>
<th>Time</th>
<th>PVB</th>
<th>Control</th>
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<tbody>
<tr>
<td>PACU arrival</td>
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<tr>
<td>PACU DC</td>
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<td>POD 4 PM</td>
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</tbody>
</table>
Result: Urinary Catheter

Urinary Catheter Removal Day
*p<0.05
Result: Hospital Length of Stay

Length of Stay

* \( p < 0.05 \)
Discussion

- Video-Assisted Thoracic Surgery patients who received paravertebral block:
  - reported decrease in pain scores,
  - had earlier urinary catheter removal and
  - had shorter length of stay compared to patients who did not receive paravertebral blockade.

- The average body mass index (BMI) was statistically significant and may be a possible factor to a surgeon’s decision on whether or not to use paravertebral block.
Implications for Nursing:

- Pain and Patient Satisfaction
- Urinary Catheter and CAUTI
- Length of Stay and Cost of Hospitalization
Limitations

- Sample size
- Use of PVB is still uncommon compared with opioid narcotics.
- In our area, there is a small pool of surgeons who are willing to use it.
Recommendations

Further studies:

- Factors that may influence surgeon’s choice of PVB
- Effect of PVB on chronicity of pain