Are paravertebral block and thoracic epidural analgesia comparable for post-thoracotomy pain relief? A systematic review

Background and Goals

- **PROSPECT**: web-based clinical decision support programme (www.postoppain.org), aims to formulate robust evidence-based recommendations for procedure-specific postoperative pain management
- Initiated by an expert Working Group of surgeons and anesthesiologists
- The aim of this systematic review, which was part of a larger review investigating postoperative pain management following thoracotomy (total included studies = 169, total excluded studies = 183), was to compare the efficacy and safety of paravertebral block (PV) and thoracic epidural (TE) analgesia for the management of post-thoracotomy pain

Materials and Methods

**Selection criteria:**
- Randomised controlled trials of PV (local anaesthetic (LA)) or TE (LA ± opioid) vs. control, or PV vs. TE, at comparable times of administration in a single group and hospital thoracotomy
- Postoperative pain scores (converted to VAS 0–100 mm) at rest, on coughing and/or on movement

**Inclusion criteria:**
- Randomised controlled trials of PV (local anaesthetic (LA)) or TE (LA ± opioid) vs. control, or PV vs. TE, at comparable times of administration in a single group and hospital thoracotomy
- Postoperative pain scores (converted to VAS 0–100 mm) at rest, on coughing and/or on movement

**Exclusion criteria:**
- Qualitative and quantitative (meta-analysis, where possible) analyses of postoperative analgesic and recovery outcomes
- Significant outcomes: p<0.05

**Results and Discussion**

**PV (LA) vs. control**

- There was a significant benefit of PV (LA) treatment over control for reducing VAS pain scores at rest, see Figure 2: the effect was evident from the early postoperative period (0–6 h) through to the third postoperative day.
- PV (LA) treatment was also significantly superior to control for reducing VAS pain scores on coughing and on movement at all times recorded, see Figure 2

**TE (LA ± opioid) vs. control**

- There was a significant benefit of TE (LA ± opioid) treatment over control for reducing PV pain scores at rest and on coughing, see Figure 2
- This effect was evident at most time points recorded, with the exception of Day 2 and 8–12 h for pain at rest and on coughing, respectively; at some time points, half of the studies showed a significant benefit of TE (LA ± opioid) treatment over control
- TE (LA ± opioid) treatment was also significantly superior to control for reducing PV pain scores on movement at all time points recorded
- One study that did not specify the time of assessment found no significant difference between groups for pain on movement

**TE (LA ± opioid) vs. PV (LA ± opioid)**

- TE (LA ± opioid) was superior to control for reducing pain scores at rest:
  - at 12 h (one study plus two arms of one study, WMD -16.14 mm, p<0.0001)
  - on day 1 (three studies plus two arms of one study, WMD -12.66 mm, p<0.0001)
  - on day 2 (two studies plus two arms of one study, WMD -7.44 mm, p<0.0001)
  - on day 3 (three studies, WMD -8.20 mm, p<0.0001)
- TE (LA ± opioid) and PV (LA ± opioid) were largely comparable for reducing VAS pain scores both at rest and on coughing
- There were no studies assessing PV pain scores on movement for this particular comparison
- TE (LA ± opioid) is commonly used in clinical practice and it would be valuable to compare this technique with PV (LA ± opioid)
- Only three studies included opioid in the LA solution in one or both groups; these studies showed mixed results
- In the early postoperative period, PV (LA) and TE (LA) showed comparable effects on pain scores, see Figure 4a; studies including opioid in the LA solution showed a tendency towards higher pain scores in the PV group
- Mean or median pain scores were comparable overall between TE (LA ± opioid) and PV (LA ± opioid) on day 1/1 to 24 h, see Figure 4b

**Conclusions**

- This systematic review found that:
  - PV (LA ± opioid) and TE (LA ± opioid) were both effective for reducing pain after thoracotomy compared with control
  - When comparing PV (LA) with TE (LA), there was no overall benefit of either technique for reducing pain scores
  - PV (LA ± opioid) was associated with fewer side-effects and improved pulmonary function compared with TE (LA ± opioid)
  - There were very few studies comparing PV (LA) with TE (LA ± opioid), which currently prevents evaluation of the ‘gold standard’ for post-thoracotomy pain

**References**