

ANALGESIC EFFICACY OF SINGLE-SHOT SERRATUS ANTERIOR PLANE BLOCK VS. THORACIC PARAVERTEBRAL BLOCK IN BREAST AND THORACIC SURGERY- A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMISED CONTROLLED TRIALS

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STASTIICAL ANALYSIS

BACKGROUND

- Thoracic paravertebral (TPV) block -first choice for both major oncological breast and thoracic surgery.
- Technically challenging block, higher potential for complications - researchers looking for a safer alternative.
- Serratus anterior plane (SAP) block- simple, safe, and effective alternative, that blocks intercostal nerves, long thoracic nerve, and thoracodorsal nerve.
- Various retrospective and prospective trials conducted to compare these blocks for breast and thoracic surgery, however, there is a lack of aggregate meta-analysis.

OBJECTIVE

- To accumulate evidence from published randomised controlled trials (RCTs) on the relative analgesic efficacy of SAP and TPV block for breast and thoracic surgery.

METHODS

- Trials with analgesia outcomes SAP block compared with TPV block in patients undergoing breast and thoracic surgery.
- Adults ≥ 18 years
- Patients receiving single-shot SAP block, either superficial or deep approach
- Patients receiving TPV block. The trial excluded if a combination of block or catheter technique was utilized
- **Primary Outcome:** Time to the first rescue analgesia in the postoperative period.
- Secondary outcomes: opioid consumption in the 24 h, area under the curve (AUC) for static pain scores in 24 hours, pain scores (static and dynamic) at early (4–6 hours) and late (24 h) intervals, opioid-related side effects, patient satisfaction, adverse events.

Search strategy

- Two independent reviewers – comprehensive literature search in PubMed, EMBASE, and SCOPUS, till January 2022.
- Search terminology included terms covering the topics ‘serratus anterior plane block AND paravertebral block AND breast OR thoracic surgery’.

- Mean difference (MD) and 95% confidence interval (CI) for continuous outcomes and MH odds ratio (OR) with 95% CI for dichotomous outcomes.
- The trial inconsistency was measured using I² statistics, p-values were two-sided, and a p-value of less than 0.05 was considered statistically significant.
- Subgroup analyses were conducted based on the type of surgery (breast or thoracic surgery)
- Power analysis – to determine the number of trials needed to have a reasonable chance of rejecting the null hypothesis given a statistical test.
- Pooled values were used to estimate the AUC (expressed in cm·h) of the pain score at rest in the first 24-h, and a mean difference in the area under the curve was calculated for each comparison.
- Risk of bias (ROB) was assessed based on the Cochrane Collaboration ROB2. Overall ROB expressed as low risk, some concerns, or high risk.
- Methodologic quality of evidence - Grading of Recommendation, Assessment, Development, and Evaluation (GRADE) guidelines.

RESULTS

- 141 patients enrolled across 18 RCTs. 587 underwent SAP block, and 554 underwent TPV block. 13 trials with low RoB, and 5 were having high RoB.
- Time to first rescue analgesia (Fig. 1 a)
- No significant difference in the time to rescue analgesia with an MD of 0.69 hours (95% CI -1.83 to 0.45; p=0.24; I² =98%) (Moderate certainty). Thoracic surgery subgroup: TPV block associated with a statistically significant prolongation of time to first rescue analgesia MD of 0.60 hours (95% CI -0.99 to -0.21; p=0.003; I² =0%)
- Cumulative 24-hour oral morphine equivalent consumption (Fig. 1 b)
- No significant difference between two groups MD of 7.18 mg (95% CI -0.23 to 14.60; p=0.06; I² =98%) (low certainty). Thoracic surgery subgroup showed a statistically significant difference in the TPV block group with MD of 9.73 mg (95% CI 0.26 to 19.20; p=0.004; I² =97%)
- AUC for pain scores at rest in 24 hours (Fig. 2)
- MD in AUC for resting pain scores; TPV better by 1.39 cm.hr (p=0.14) for breast and by 3.61 cm.hr (p=0.03) for thoracic procedures.
- No difference in PONV, only consistently reported opioid-related adverse effects.
- Five cases of hematoma, 6 patients reported pain at the puncture site in the TPV arm

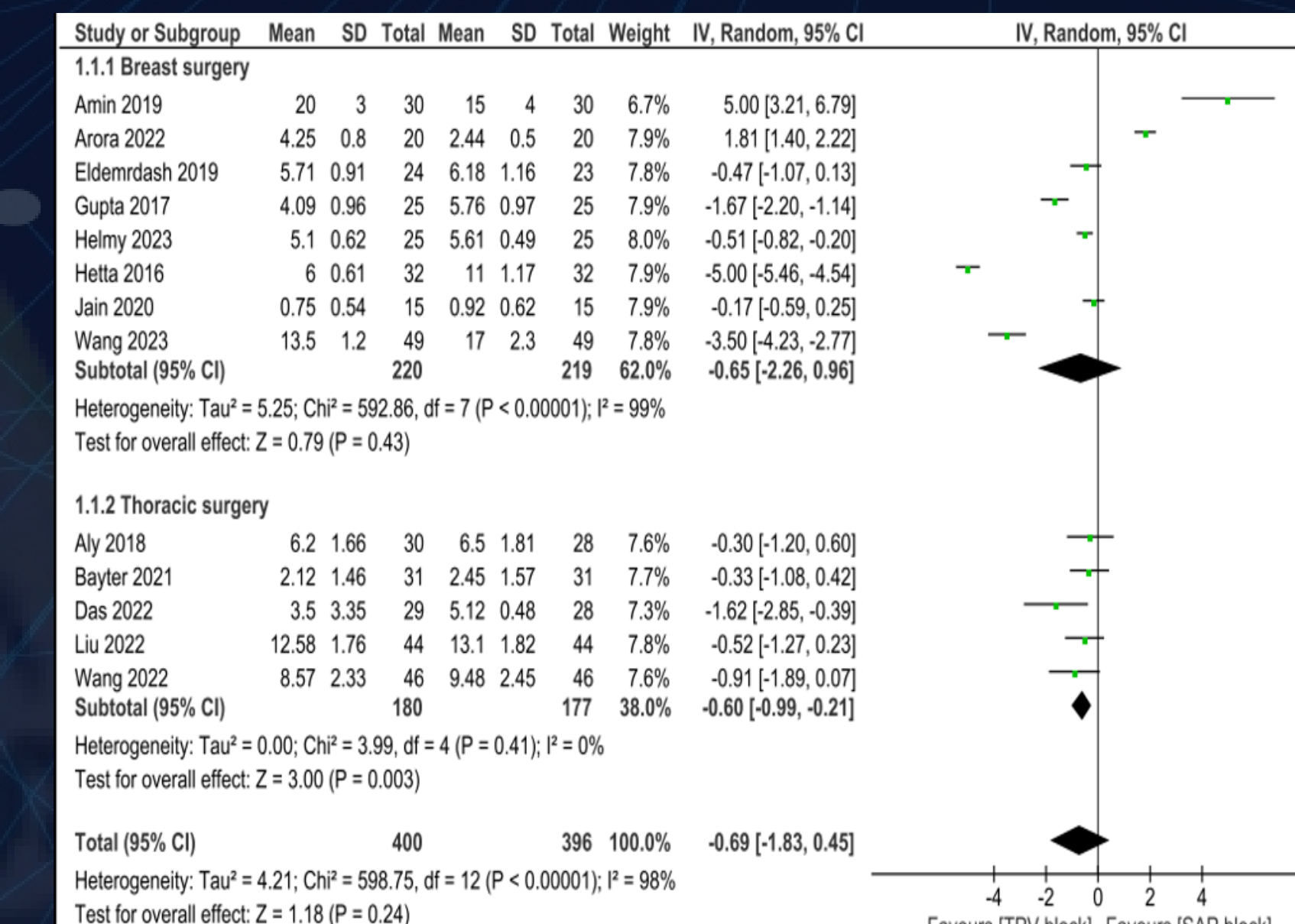


Figure 1 (a)

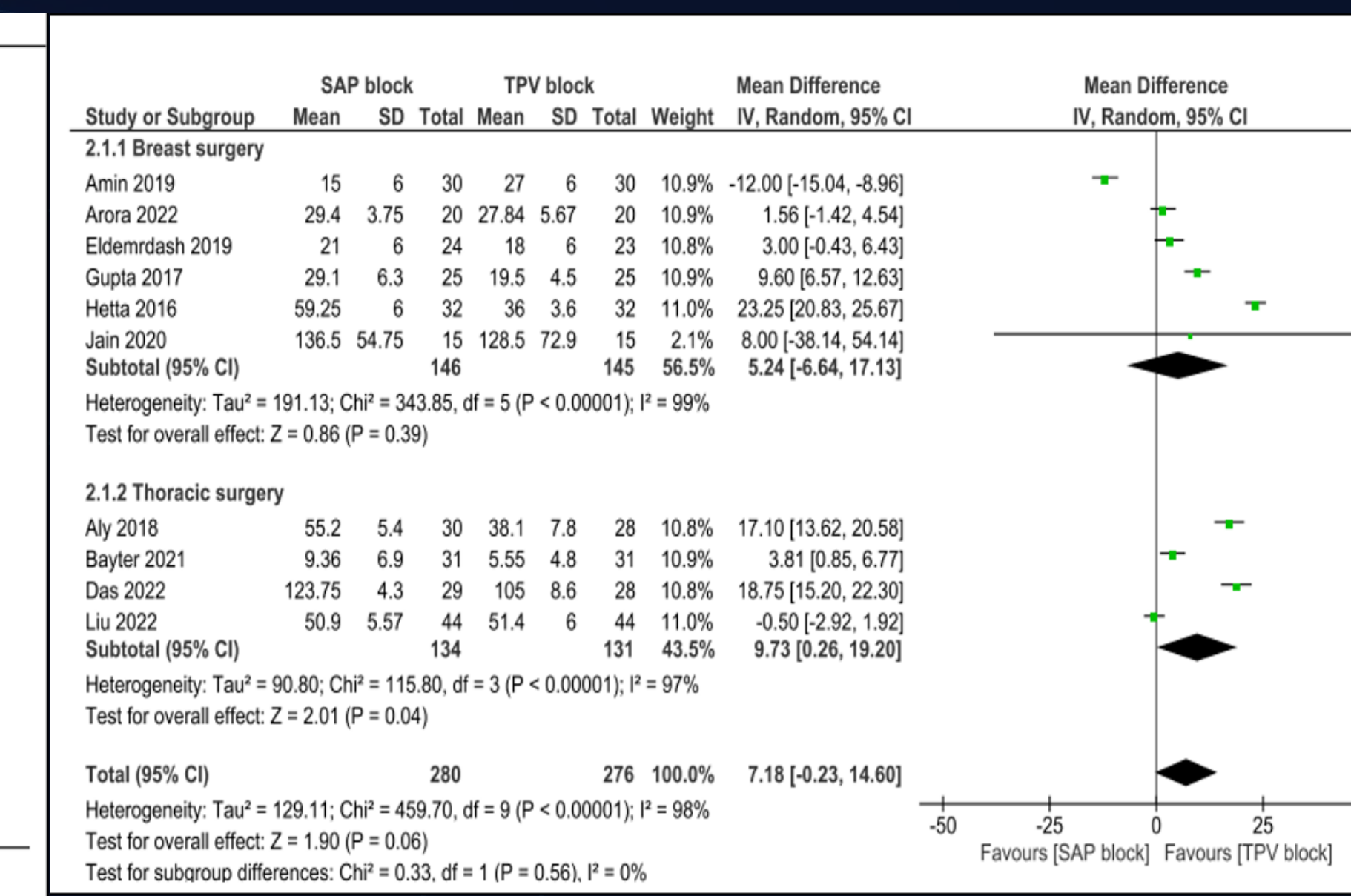


Figure 1 (b)

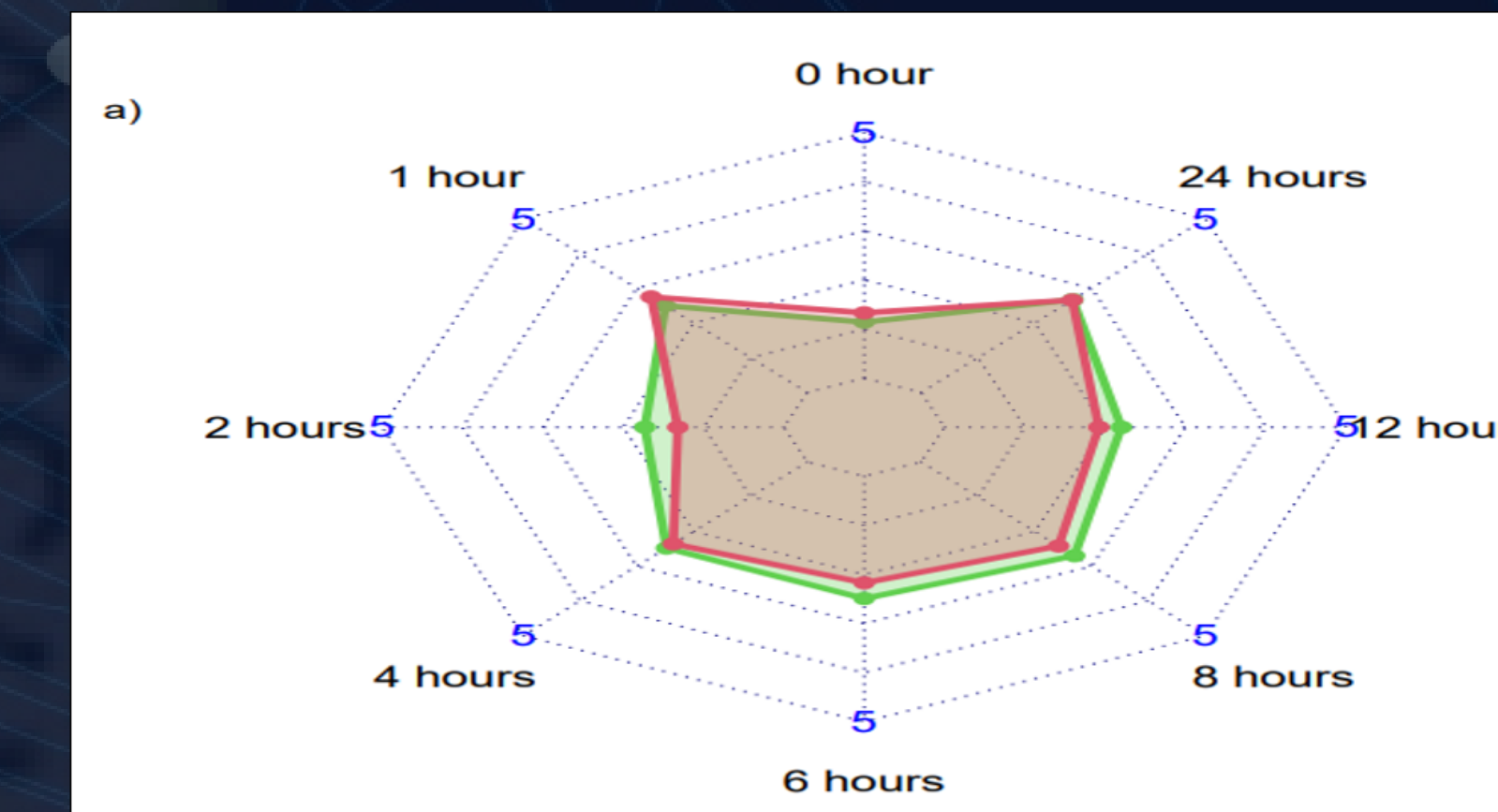


Figure 2 (a) Breast Surgery

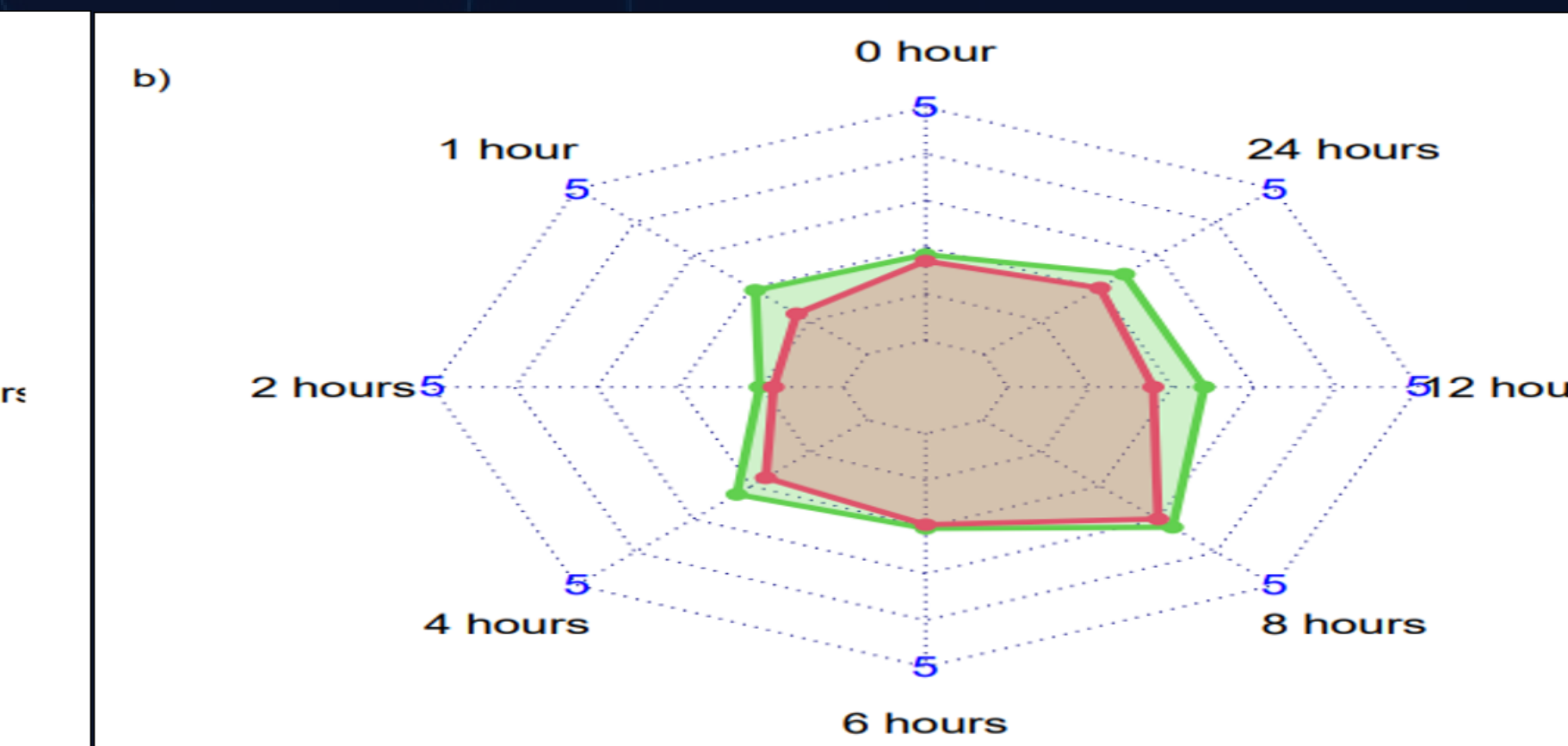


Figure 2 (b) Thoracic Surgery

CONCLUSION

- The current evidence suggests that both blocks have comparable analgesic efficacy in the breast surgery population, whereas paravertebral block is associated with marginally better analgesia outcomes after thoracic surgery. Clinicians should weigh these benefits of the TPV block with complication rate and their expertise in deciding the analgesic technique.

REFERENCES

For full article and references

