

Opioid Sparing Multimodal Analgesia in Adult Cardiothoracic ICU Patients: Impact on Postoperative Outcomes and Recovery

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BACKGROUND

Opioid analgesics have traditionally served as a mainstay of postoperative cardiothoracic pain management, due to their effective **nociceptive peripheral and central analgesic** effects. However, extended postoperative opioid use can contribute to adverse effects including **delayed recovery, respiratory depression, post-surgical compromise and mortality.** (Rafiq et al., 2014)

Increasing evidence of improved analgesia and fewer opioid-related adverse effects, has driven an interest in **multimodal non opioid pharmacological therapy and regional anesthesia interventions.**

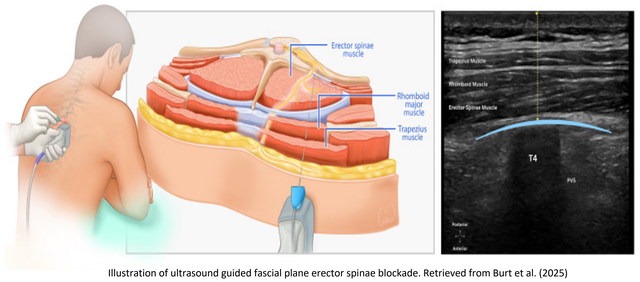
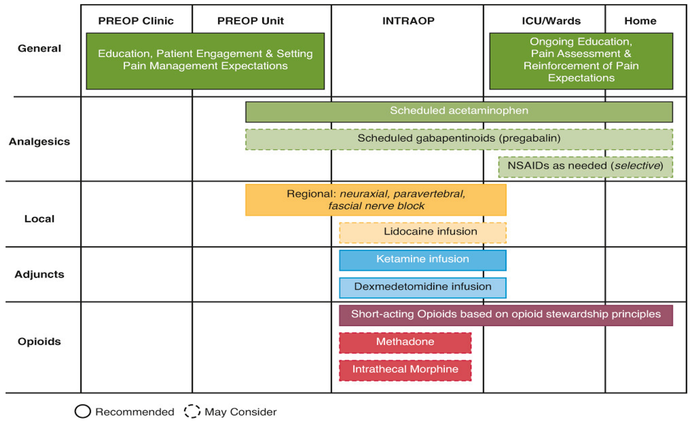


Illustration of ultrasound guided fascial plane erector spinae blockade. Retrieved from Burt et al. (2025)

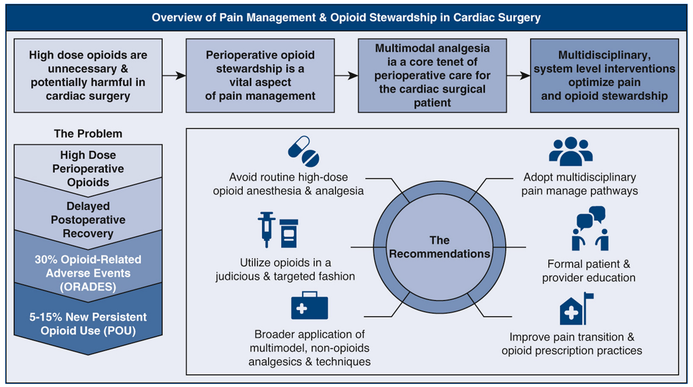
METHODS

A narrative literature review was conducted to **compare opioid sparing multimodal analgesia** strategies to traditional **morphine-based** regimens within post-operative **ICU cardiothoracic surgical patients.** Peer-reviewed randomized controlled trials, observational studies, systematic reviews, meta-analyses, and expert consensus recommendations published from **2014–2025** were identified and compiled using the following **criteria**:

- ICU Postoperative adult cardiothoracic patients
- Use of **non-opioid pharmacologic agents, regional anesthesia blockade** (epidural, paravertebral, intercostal, myofascial plane)
- **Opioid consumption(MME),** length of use, administration route
- Outcomes measured by **pain score, ICU length of stay (LOS), opioid related adverse events, mechanical ventilation, mortality**



Recommendations for pain management and opioid stewardship within adult cardiac surgery from the 8th Perioperative Quality Initiative. Retrieved from Grant et al. (2023)



Overview of the recommendations for pain management and opioid stewardship within adult cardiac surgery from the 8th Perioperative Quality Initiative. Retrieved from Grant et al. (2023)

RESULTS

- **Significantly lower postoperative pain scores** were reported with multimodal analgesia (**NRS-11: 1.9 vs 2.7**) by postoperative day 3. (Rafiq et al.)
- Opioid-sparing protocols were associated **with shorter ICU LOS reduced duration of mechanical ventilation, and lower postoperative pain scores at 12 hours.**
- An ERAS multimodal analgesia protocol increased the ICU opioid-free rate to **94.0% compared with 19.9%** under standard care, while also reducing total ICU opioid use. **(Darras et al.)**
- **Decreased median ICU opioid consumption from 31 MME to 11 MME.** Significantly reduced mechanical ventilation duration, ileus, delirium, bronchopneumonia.(Darras et al.)
- **Dexmedetomidine significantly reduced postoperative opioid requirements**,within 10 of 12 randomized trials during the first 24 hours. (Habibi et al.)
- Gabapentinoids showed mixed results: **pregabalin reduced postoperative morphine** use, while **gabapentin did not consistently reduce opioid requirements** after cardiac surgery. (Bhatt et al.)

DISCUSSION

Untreated acute pain may contribute to chronic pain, **prolonged opioid use, longer hospitalization, and increased mortality.** Opioid-sparing multimodal analgesia **reduced opioid requirements** while maintaining or improving pain control, with shorter ventilation time, ICU stay, and fewer postoperative complications. Ultrasound-guided regional techniques allow **targeted analgesia** with fewer complications and improved pain relief. Variation in medications, regional techniques, and timing makes it **difficult to define one optimal regimen**.

CONCLUSION

Multimodal analgesic management using regional anesthesia and non-opioid pharmacological therapy offers an effective strategy to improve postoperative pain.

Future studies should focus on identifying the **optimal combination and timing of regional anesthetic techniques** and establishing **consensus-based, standardized protocols** for clinical practice.

REFERENCES

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