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Comparison Of Opioid Based Versus Opioid Free Anesthesia in Cardiovascular Surgeries a Comparative Study.

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Introduction

Cardiovascular surgeries require effective anaesthesia to ensure optimal patient outcomes. Opioid-based anaesthesia (OBA) has been traditionally used, but opioidfreeanaesthesia (OFA) has emerged as a promising alternative (1, 2). Cardiac surgery requires careful anaesthetic management to ensure optimal patient outcomes. Opioids have been traditionally used as part of anaesthesia protocols due to their analgesic and sedative properties.Opioids are associated with several adverse effects, including respiratory depression, nausea, vomiting, and addiction (3, 4). However, concerns about opioid-related adverse effects, such as respiratory depression, nausea, and addiction, have led to the development of opioid-free anaesthesia (OFA) techniques. In contrast, OFA has been shown to reduce opioidrelated complications and improve postoperative outcomes (5, 6).

In recent years, there has been a growing interest in OFA for cardiac surgery, driven by the need to reduce opioid-related complications and improve patient outcomes.

Several studies have compared opioid-based anaesthesia (OBA) and OFA in cardiac surgery, but the results are inconsistent and limited by small sample sizes and variable study designs.

This study aims to provide a comprehensive comparison on OBA and OFA in cardiac surgery, including a comparison of their effects on patient outcomes in terms of post operative pain level,effect on respiration,andhospitalstay duration.

Abstract

This paper examines the efficacy and safety of opioid-based versus opioid-free anesthesia (OFA) in cardiovascular surgeries. Opioid-based anesthesia has long been the standard for managing intraoperative and postoperative pain. However, increasing concerns regarding opioid-related side effects, including opioid dependence, postoperative cognitive dysfunction, and gastrointestinal complications, have prompted a shift toward opioid-free anesthesia (OFA). This study compares the two anesthesia techniques in terms of pain control, hemodynamic stability, recovery time, postoperative complications, and patient outcomes.

Aim of the study

To compare opioid free anaesthesia(OFA) and opioid based anaesthesia(OBA) in cardiovascular surgeries.

Materials and methods

This will be a comparative prospective study wherein a comparison will be done between those patients who will receive opioids versus those who do not in terms of their pain score, respiratory complications and duration of hospital stay. Minimum 15 patients from each group will be enrolled in the study. Pain score, respiratory rate and saturation,will be calculated at 1 hr,2 hr and 4 hr post operatively. Pain level will be calculated based onnumeric pain rating scale (NPRS) using letters 0 to 10.

Results will be deduced using statistical methods as required.

CONCLUSION

Several studies have compared OBA and OFA in cardiac surgery. A systematic review and meta-analysis published in the Journal of Cardiothoracic and Vascular Anaesthesia found that:

1. OFA was associated with reduced opioid consumption and shorter ICU stay.
2. OBA was associated with increased risk of respiratory depression and nausea.
3. There was no significant difference in postoperative pain scores or mortality between the two groups.

Another study published in the Journal of Cardiovascular Anaesthesia found that OFA was associated with improved postoperative cognitive function and reduced risk of delirium.The results of this multiple systematic review suggest that OFA may be associated with improved patient outcomes, reduced opioid consumption, and shorter hospital length of stay compared to OBA. However, the results are inconsistent and limited by small sample sizes and variable

study designs. Further research is needed to determine the optimal anaesthesia protocol for cardiac surgery and to establish clear guidelines for the use of OFA in this setting. Opioid-free anaesthesia may be a viable alternative to opioid-based anaesthesia for cardiac surgery, offering improved patient outcomes, reduced opioid consumption, and shorter hospital length of stay. However, further research is needed to establish clear guidelines for the use of OFA in this setting. Opioid-free anaesthesia is a viable alternative to opioid-based anaesthesia in cardiac surgery. While OBA provides effective pain management and hemodynamic stability, OFA reduces opioid-related adverse effects and promotes faster recovery. Further research is needed to determine the optimal anaesthesia protocol for cardiac surger

3.1 Pain Management

Opioid-Based Anesthesia: Studies indicate that opioid-based anesthesia provides effective intraoperative analgesia and postoperative pain control. However, opioid consumption post-surgery tends to be higher, leading to side effects such as nausea, vomiting, and constipation.**Opioid-Free Anesthesia**: Opioid-free approaches often result in lower opioid consumption in the immediate postoperative period. Patients have reported better gastrointestinal recovery and reduced opioid-related side effects. However, pain control during and after surgery may be suboptimal if alternative agents are not sufficiently titrated.

3.2 Hemodynamic Stability

Opioid-Based Anesthesia: Opioids, such as fentanyl and remifentanil, are known for their ability to stabilize hemodynamics during surgery by reducing sympathetic nervous system responses.

Opioid-Free Anesthesia: Non-opioid agents like dexmedetomidine also stabilize hemodynamics but may cause bradycardia and hypotension if not monitored carefully.

3.3 Recovery Time

- **Opioid-Based Anesthesia**: Recovery is generally slower due to residual opioid effects, which can delay bowel motility, prolong sedation, and increase the risk of postoperative cognitive dysfunction.
- **Opioid-Free Anesthesia**: Patients undergoing opioid-free anesthesia often experience faster recovery, including quicker awakening from anesthesia and shorter time to bowel function recovery. There is also a reduction in the incidence of postoperative nausea and vomiting (PONV).

3.4 Postoperative Complications

- **Opioid-Based Anesthesia**: Opioid-related complications, including PONV, respiratory depression, and prolonged sedation, are common. These complications contribute to longer hospital stays and a delayed return to normal activity.
- **Opioid-Free Anesthesia**: Studies show that opioid-free anesthesia can reduce the incidence of PONV and opioid-related sedation. However, there are occasional reports of discomfort or under-analgesia, especially in high-risk patients or in complex surgeries.

3.5 Cognitive Function

- **Opioid-Based Anesthesia**: Prolonged opioid use, particularly in elderly patients, has been linked to postoperative cognitive dysfunction (POCD) and delirium.
- **Opioid-Free Anesthesia**: Several studies suggest that opioid-free approaches may reduce the incidence of POCD, leading to improved long-term recovery, particularly in elderly or vulnerable patients.

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4. Discussion:

4.1 Comparison of Pain Control

While opioid-based anesthesia remains a reliable method for managing intraoperative and postoperative pain, the opioid-free approach offers significant benefits in reducing opioid-related side effects. Multimodal analgesia, incorporating both opioid and non-opioid agents, may offer an ideal balance between effective pain control and minimizing adverse effects.

4.2 Hemodynamic Considerations

Opioid-free anesthesia, though effective in providing stable hemodynamics, requires careful monitoring and dose adjustments, particularly in patients with cardiovascular disease, due to the risk of bradycardia and hypotension. In contrast, opioids offer predictable hemodynamic control but at the cost of longer recovery times and increased risk of side effects.

4.3 Recovery and Postoperative Outcomes

The reduction in opioid consumption with opioid-free anesthesia translates to a faster recovery, reduced length of stay, and fewer complications such as PONV. However, the success of OFA depends on individual patient characteristics, and certain patients may still require opioids for adequate analgesia.

4.4 Implications for Clinical Practice

The findings support the incorporation of opioid-free anesthesia or opioid-sparing techniques in cardiovascular surgeries. However, careful patient selection is essential to ensure adequate analgesia and avoid under-analgesia. Further research is needed to refine protocols for opioid-free anesthesia in this patient population.

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5. Conclusion:

Opioid-free anesthesia represents a promising alternative to traditional opioid-based anesthesia in cardiovascular surgeries, offering significant benefits in reducing opioid-related side effects, promoting faster recovery, and improving postoperative outcomes. However, it is not without its challenges, particularly in terms of pain management and

hemodynamic control. A multimodal approach, tailored to the individual patient, may provide the optimal solution for balancing effective pain relief and minimizing complications.

Timeline

- Literature review and study design: 2 months
- Data collection: 6 months
- Data analysis: 4 months
- Writing and revisions: 4 months

Expected Outcomes

1. Reduced incidence of opioid-related complications in the OFA group (7, 8).
2. Improved postoperative pain management and reduced nausea and vomiting in the OFA group .
3. Comparable cardiovascular stability and hemodynamic parameters between OBA and OFA groups .
4. Shorter hospital stay and faster postoperative recovery in the OFA group .

Implications

1. This study will provide evidence-based recommendations for anaesthesia management in cardiovascular surgeries.
2. The findings will inform the development of clinical guidelines and protocols for opioid-free anaesthesia in cardiovascular surgeries.
3. The study will contribute to the growing body of research on opioid-free anaesthesia and its potential benefits in reducing opioid-related complications.

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