

## THE ROLE OF ANAESTHETIC TECHNIQUES IN REDUCING PERIOPERATIVE OPIOID CONSUMPTION: AN OBSERVATIONAL STUDY IN MAJOR SURGERIES

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### Abstract

**Background:** The over-reliance on opioids for perioperative pain management in major surgeries has raised concerns due to the risk of addiction and adverse side effects. This study aims to evaluate the efficacy of different anaesthetic techniques in reducing perioperative opioid consumption and improving patient outcomes. **Material & Methods:** An observational study was conducted with 100 patients undergoing major surgeries, categorized into four groups based on the anaesthetic technique used: Group A (General Anaesthesia with Opioids), Group B (General Anaesthesia with Non-opioid Adjuncts), Group C (Regional Anaesthesia), and Group D (Local Anaesthesia with Sedation). The study focused on parameters such as opioid consumption (measured in morphine milligram equivalents, MME), pain scores post-operation, length of hospital stay, incidence of opioid-related side effects, and patient satisfaction. **Results:** The findings showed that Groups C and D, employing regional and local anaesthesia, respectively, demonstrated significantly lower opioid consumption (10 MME and 5 MME) compared to Group A (30 MME). Postoperative pain scores were lowest in Group C (average score 3). Additionally, Groups C and D had shorter average hospital stays (3 and 3.5 days) and lower incidences of opioid-related side effects (12% and 15%) compared to Group A (40%). Patient satisfaction was highest in Group C (average score 4.5). **Conclusion:** The study suggests that the use of regional and local anaesthesia techniques in major surgeries significantly reduces perioperative opioid consumption, minimizes opioid-related side effects, and enhances patient outcomes, including pain management and overall satisfaction. These findings advocate for a paradigm shift towards opioid-sparing anaesthetic protocols in major surgical procedures, potentially altering standard perioperative care practices.

## INTRODUCTION

The management of perioperative pain in major surgeries has long been a crucial aspect of patient care, dictating the patient's comfort, recovery trajectory, and overall satisfaction with the surgical experience.<sup>[1]</sup> Traditionally, opioids have been the cornerstone of pain management strategies in the perioperative setting. However, the escalating concerns regarding opioid-related adverse effects, the risk of addiction, and the burgeoning opioid

crisis have necessitated a reevaluation of pain management protocols in surgical practices.<sup>[2,3]</sup>

The over-reliance on opioids poses significant risks. Opioid-related side effects such as respiratory depression, nausea, vomiting, and constipation can complicate postoperative recovery and extend hospital stays.<sup>[4]</sup> More alarming, however, is the potential for opioid addiction, a public health crisis that has garnered global attention.<sup>[5]</sup> The postoperative period is a critical window where patients are exposed to opioids, potentially leading to long-term use or dependence.<sup>[6]</sup> This scenario

underscores the urgent need to explore alternative pain management strategies that can reduce or eliminate the dependence on opioids.

Against this backdrop, anaesthetic techniques that minimize or avoid the use of opioids have gained prominence.<sup>[7]</sup> Regional anaesthesia and local anaesthesia with sedation, for instance, have shown promise in managing perioperative pain effectively while reducing or eliminating the need for opioids.<sup>[8,9]</sup> These techniques can offer targeted pain relief, often with fewer side effects and reduced recovery times. The exploration of such techniques is not only crucial for patient safety and comfort but also aligns with the broader public health goal of curbing opioid misuse.<sup>[10]</sup>

This observational study, titled "The Role of Anaesthetic Techniques in Reducing Perioperative Opioid Consumption: An Observational Study in Major Surgeries," aims to bridge this knowledge gap by investigating the efficacy of various anaesthetic techniques in reducing the reliance on opioids for pain management in the perioperative setting. By comparing traditional general anaesthesia with opioids against general anaesthesia with non-opioid adjuncts, regional anaesthesia, and local anaesthesia with sedation, this study provides insights into alternative pain management strategies that could revolutionize postoperative care.

## MATERIALS AND METHODS

**Study Design and Period:** This observational study was conducted over a six-month period, from Jan 2023 to June 2023. The design allowed for a comprehensive assessment of various anaesthetic techniques used in major surgeries and their impact on perioperative opioid consumption and patient outcomes.

**Study Setting:** The research was carried out at the Government Medical College and General Hospital in Srikakulam, a tertiary care center known for its diverse patient demographics and a wide range of surgical procedures. This setting provided a robust platform for evaluating the study objectives in a real-world clinical environment.

**Sample Selection:** A total of 100 patients who underwent major surgical procedures during the study period were included. The inclusion criteria were:

Age between 20 to 70 years.

Scheduled for major surgical procedures (abdominal, orthopedic, or thoracic surgeries).

No known allergies to anaesthetic agents.

No history of chronic opioid use or substance abuse.

Patients were excluded if they had a history of chronic pain conditions, required emergency surgery, or had contraindications to any form of anaesthesia used in the study.

**Group Allocation:** Patients were non-randomly allocated into four groups based on the anaesthetic technique employed for their surgery:

Group A: General Anaesthesia with Opioids (n=25)

Group B: General Anaesthesia with Non-opioid Adjuncts (n=25)

Group C: Regional Anaesthesia (n=25)

Group D: Local Anaesthesia with Sedation (n=25)

**Data Collection:** Data were collected on pre-designed forms, including patient demographics, type of surgery, anaesthetic technique, and the specific parameters for the study:

**Opioid Consumption:** Measured in morphine milligram equivalents (MME) during the perioperative period.

**Pain Scores:** Assessed at 24 hours post-operation using a 0-10 pain scale.

**Length of Hospital Stay:** Recorded in days from the date of surgery to discharge.

**Incidence of Opioid-Related Side Effects:** Including nausea, vomiting, and respiratory depression.

**Patient Satisfaction:** Assessed using a standardized questionnaire on a 1-5 scale, 5 being highly satisfied, during the discharge process.

**Statistical Analysis:** The collected data were analyzed using statistical software. Descriptive statistics (mean, standard deviation) were used for continuous variables, and frequencies and percentages for categorical variables. Comparative analysis between the groups was conducted using appropriate statistical tests (ANOVA, Chi-square test) for continuous and categorical data, respectively. A p-value of less than 0.05 was considered statistically significant.

**Ethical Considerations:** The study was approved by the Institutional Ethics Committee, Government Medical College and General Hospital, Srikakulam, Andhra Pradesh, India. Informed consent was obtained from all individual participants included in the study. The confidentiality of patient data was maintained throughout the research process.

## RESULTS

### 1. Opioid Consumption

A significant decrease in perioperative opioid consumption was observed across the groups, with the lowest consumption (5 MME) in Group D (Local Anaesthesia with Sedation) and the highest in Group A (General Anaesthesia with Opioids).

This suggests that anaesthetic techniques incorporating non-opioid strategies, particularly local anaesthesia with sedation, are effective in reducing opioid requirements in major surgeries.

### 2. Pain Management

Postoperative pain scores varied, with Group C (Regional Anaesthesia) reporting the lowest average pain score (3), indicating superior pain management. Group A patients experienced higher pain scores (average score 6), suggesting that opioid-based general anaesthesia may not be as effective in managing post-operative pain as other techniques.

### 3. Length of Hospital Stay

The length of hospital stay was inversely related to the use of non-opioid anaesthetic techniques. Groups C and D, using regional and local anaesthesia techniques, respectively, showed shorter average hospital stays (3 and 3.5 days) compared to Group A (5 days).

This could be attributed to better pain management and fewer opioid-related complications.

### 4. Opioid-Related Side Effects

The incidence of opioid-related side effects was significantly higher in Group A (40%), which correlates with higher opioid consumption.

The lower incidence of these side effects in Groups C (12%) and D (15%) underscores the benefit of minimizing opioid use through alternative anaesthetic techniques.

### 5. Patient Satisfaction

Patient satisfaction was highest in Group C (average score 4.5), which may be attributed to effective pain control and fewer side effects.

Lower satisfaction in Group A (average score 3) could reflect the adverse effects and less effective pain control associated with higher opioid use.

**Table 1: Sample Characteristics**

Characteristic	Details
Total Patients	100
Age Range	20-70 years
Mean Age	45 years
Types of Surgery	40% abdominal, 30% orthopedic, 30% thoracic

**Table 2: Anaesthetic Techniques and Group Division**

Group	Anaesthetic Technique	Number of Patients
Group A	General Anaesthesia with Opioids	25
Group B	General Anaesthesia with Non-opioid Adjuncts	25
Group C	Regional Anaesthesia	25
Group D	Local Anaesthesia with Sedation	25

**Table 3: Measured Parameters and Results**

Parameter	Group A	Group B	Group C	Group D
Opioid Consumption (MME)	30 MME	20 MME	10 MME	5 MME
Pain Score at 24h Post-Op	Score 6	Score 5	Score 3	Score 4
Length of Hospital Stay (Days)	5 days	4 days	3 days	3.5 days
Incidence of Opioid-Related Side Effects	40%	28%	12%	15%
Patient Satisfaction	Score 3	Score 3.5	Score 4.5	Score 4

## DISCUSSION

The findings of this observational study conducted at the Government General Hospital in Srikakulam offer valuable insights into the role of various anaesthetic techniques in reducing perioperative opioid consumption and improving patient outcomes in major surgeries.

### Interpretation of Key Findings

#### Reduction in Opioid Consumption

The study's most significant finding was the marked reduction in opioid consumption in groups receiving regional (Group C) and local anaesthesia with sedation (Group D). This aligns with the growing body of research advocating for opioid-sparing approaches in perioperative care. The efficacy of these techniques in reducing opioid use without compromising pain control is a critical step towards addressing the current concerns over opioid overuse in clinical settings.<sup>[11]</sup>

#### Pain Management Efficiency

Notably, the lowest pain scores were reported in Group C (Regional Anaesthesia), underscoring the effectiveness of regional anaesthesia in managing postoperative pain. This could be attributed to the targeted nature of regional anaesthesia, offering pain relief directly at the surgical site. In contrast, Group

A (General Anaesthesia with Opioids) reported higher pain scores, suggesting a potential reevaluation of pain management strategies in surgeries traditionally reliant on opioids.<sup>[12]</sup>

#### Hospital Stay and Recovery

The shorter hospital stays observed in Groups C and D are noteworthy. This finding is significant as it not only implies effective pain management but also indicates quicker recovery and lower risks of hospital-acquired complications. This can have substantial implications for healthcare resource utilization and patient convenience.<sup>[13]</sup>

#### Side Effects and Patient Satisfaction

The lower incidence of opioid-related side effects in the regional and local anaesthesia groups is a crucial observation, especially in the context of patient safety and comfort. Moreover, these groups also reported higher patient satisfaction scores, which can be attributed to better pain control, fewer side effects, and shorter hospital stays.<sup>[14]</sup>

#### Implications for Clinical Practice

The study's findings suggest a need for a paradigm shift in perioperative pain management. By demonstrating the effectiveness of opioid-sparing techniques, the results support a more widespread adoption of these methods. This shift not only addresses the immediate postoperative pain management but also has broader implications in

combating the opioid crisis by reducing the exposure of patients to opioids and potentially lowering the risk of long-term dependency.

### Limitations and Future Research

While the study provides compelling evidence, it is not without limitations. The non-randomized nature of group allocation and the single-center design may limit the generalizability of the findings. Future research should focus on randomized controlled trials across multiple centers to validate these results. Additionally, long-term follow-up studies are needed to assess the impact of these anaesthetic techniques on chronic pain and long-term opioid use.

## CONCLUSION

This study makes a substantial contribution to our understanding of pain management in major surgeries, emphasizing that regional and local anaesthesia techniques can profoundly reduce the reliance on opioids and simultaneously enhance patient outcomes. The impact of these findings is extensive, indicating that adopting a more measured approach to opioid use in the perioperative setting is both practical and advantageous. As the medical community continues its quest to refine patient care and tackle public health issues, the insights of this study serve as an important reference for shaping future clinical practices.

## REFERENCES

1. Soffin EM, Lee BH, Kumar KK, Wu CL. The prescription opioid crisis: role of the anaesthesiologist in reducing opioid use and misuse. *Br J Anaesth*. 2019 Jun;122(6):e198-e208. doi: 10.1016/j.bja.2018.11.019. Epub 2018 Dec 28. PMID: 30915988; PMCID: PMC8176648.
2. Baker D.W. History of the Joint Commission's Pain Standards: lessons for today's prescription opioid epidemic. *JAMA*. 2017;317:1117-1118
3. Grant M.C., Sommer P.M., He C. Preserved analgesia with reduction in opioids through the use of an acute pain protocol in enhanced recovery after surgery for open hepatectomy. *Reg Anesth Pain Med*. 2017;42:451-457.
4. Kumar K., Kirksey M.A., Duong S., Wu C.L. A review of opioid-sparing modalities in perioperative pain management: methods to decrease opioid use postoperatively. *Anesth Analg*. 2017;125:1749-1760.
5. Levy N., Sturgess J., Mills P. "Pain as the fifth vital sign" and dependence on the "numerical pain scale" is being abandoned in the US: why? *Br J Anaesth*. 2018;120:435-438.
6. Humphreys K. How Medicaid can strengthen the national response to the opioid epidemic. *Am J Public Health*. 2018;108:589-590.
7. Mack K., Zhang K., Paulozzi L., Jones C. Prescription practices involving opioid analgesics among Americans with Medicaid, 2010. *J Health Care Poor Underserved*. 2015;26:182-198.
8. Sites B.D., Beach M.L., Davis M.A. Increases in the use of prescription opioid analgesics and the lack of improvement in disability metrics among users. *Reg Anesth Pain Med*. 2014;39:6-12.
9. Tan W.H., Yu J., Feaman S. Opioid medication use in the surgical patient: an assessment of prescribing patterns and utilization. *J Am Coll Surg*. 2018;227:203-211.
10. Kennedy-Hendricks A., Richey M., McGinty E.E., Stuart E.A., Barry C.L., Webster D.W. Opioid overdose deaths and Florida's crackdown on pill mills. *Am J Public Health*. 2016;106:291-297.
11. Feinberg A.E., Chesney T.R., Srikandarajah S. Opioid use after discharge in postoperative patients: a systematic review. *Ann Surg*. 2018;267:1056-1062.
12. Bicket M.C., White E., Pronovost P.J., Wu C.L., Yaster M., Alexander G.C. Opioid oversupply after joint and spine surgery: a prospective cohort study. *Anesth Analg*. 2018 doi: 10.1213/ANE.0000000000003364.
13. Nguyen L.C., Sing D.C., Bozic K.J. Preoperative reduction of opioid use before total joint arthroplasty. *J Arthroplasty*. 2016;31(9 Suppl):282-287.
14. Long D.R., Lihn A.L., Friedrich S. Association between intraoperative opioid administration and 30-day readmission: a pre-specified analysis of registry data from a healthcare network in New England. *Br J Anaesth*. 2018;120:1090-1102.
15. McAnally H. Rationale for and approach to preoperative opioid weaning: a preoperative optimization protocol. *Perioper Med (Lond)* 2017;6:19.