

POSTOPERATIVE PAIN MANAGEMENT IN ELDERLY PATIENTS: AN INTEGRATIVE REVIEW

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Abstract: Introduction: Postoperative pain has long been recognized as a critical concern in patient recovery. Effective treatment of postoperative pain is critical not only for the immediate well-being of the patient but also to prevent chronicity of pain and its associated complications. Traditionally, opioids have been the mainstay of postoperative analgesia, despite their adverse effects and risk of addiction.¹ **Methodology:** This study adopts the integrative literature review approach, the research selected studies published between 2019 and 2024, using specific descriptors in databases such as MEDLINE, WPRIM and Google Scholar, of the articles found seven were selected and analyzed, where it was demonstrated that multimodal analgesia is effective in the treatment of postoperative pain and contributes to the reduction of the use of opioids. **Discussion:** Recent studies have demonstrated the effectiveness of multimodal analgesia in procedures. For a more detailed analysis on the topic in question, we categorized the selected articles into 1- Effectiveness of Multimodal Analgesia Techniques, 2-Challenges and Specific Considerations in Elderly Patients, 3-Recent Developments and Innovations in Analgesia Techniques. **Conclusion:** Multimodal anesthesia in the postoperative period of the elderly offers an effective and safe method for pain control, promoting faster recovery and minimizing the risks associated with excessive use of opioids. The adoption of these strategies in clinical practice can significantly improve surgical outcomes and the quality of life of elderly patients.

INTRODUCTION

Postoperative pain has long been recognized as a crucial concern in patient recovery. Effective treatment of postoperative pain is critical not only for the immediate well-being of the patient but also to prevent chronicity of pain and its associated complications. Traditionally, opioids have been the mainstay of postoperative analgesia, despite their adverse effects and risk of dependence.¹ Multimodal analgesia, which combines different classes of analgesics and techniques, has emerged as a superior approach, minimizing opioid use and its side effects.

Multimodal anesthesia is an effective approach to pain management that combines different classes of analgesics to provide more complete relief and reduce the side effects associated with the high use of a single agent. Recent studies have shown that multimodal anesthesia can improve postoperative pain control and reduce the need for opioids, which helps minimize the risk of adverse effects and dependence. A recent study highlights that the combination of medications such as opioids, nonsteroidal anti-inflammatory drugs (NSAIDs), and local anesthetics offers significant benefits in terms of pain relief and faster patient recovery.² In addition, the use of regional blocks in conjunction with systemic therapies has shown promise in the management of postoperative pain, increasing the efficacy of analgesia and improving the patient experience¹⁻².

Advances in medicine and pharmacological approaches have sought to improve the quality of life and care for patients. In the case of care for elderly patients, there are specific peculiarities that must be considered. Aging brings about physiological changes that influence the body's response to anesthesia and the management of postoperative pain. The elderly, defined by the World Health Organization as individuals

aged 65 or over, present multifactorial changes that can complicate the anesthetic process and postoperative recovery. These changes include decreased kidney and liver function, reduced muscle and bone mass, as well as changes in cardiovascular function and skin and tissue elasticity. These changes can increase vulnerability to adverse effects of anesthetics and prolong the recovery period, increasing the experience of postoperative pain.³⁻⁴

Anesthesia in the elderly must be approached with caution, taking into consideration, these physiological changes. The administration of anesthetics may require specific adjustments to avoid side effects and complications, such as hyposensitivity to analgesia, which can lead to inadequate pain management. In addition, the presence of common comorbidities in the elderly population, such as diabetes and hypertension, may influence the choice of anesthetic agents and the postoperative analgesic strategy, especially in the management of postoperative pain⁵⁻⁶.

Therefore, the study presented here aims to identify the analgesic efficacy of multimodal analgesia techniques in elderly patients in the postoperative period.

METHOD

This study adopts the integrative literature review approach, which involves synthesizing multiple published studies on a specific topic and identifying gaps that need to be addressed by future research. This review method is particularly focused on summarizing existing literature, whether empirically or theoretically based, to obtain a more comprehensive understanding of a phenomenon or health problem. Integrative reviews have the potential to advance knowledge on a given topic, guiding research and practice. When well executed, these reviews not only update the state of the science, but also contribute to

theoretical development and have practical application⁷.

To apply an operational system in relation to the review, the following steps were adopted: 1- identification of the theme and selection of the research question; 2- establishment of criteria for inclusion and exclusion of studies/sampling; 3- definition of the information to be extracted from the selected studies/categorization of studies; 4- evaluation of the included studies; 5- interpretation of the results and 6- presentation of the review/synthesis of knowledge.

The guiding question of the research is: What multimodal analgesia techniques have been applied in elderly patients in the postoperative period for pain management?

The searches were conducted in the US National Library of Medicine (MEDLINE) portal, in the Western Pacific WPrim and in the Google Scholar repository. The following descriptors in health sciences (DeCS) were used: multimodal anesthesia, pain, elderly, postoperative. From June 10 to June 25, 2024, a five-year limit was established for the year of publication, that is, from 2019 to 2024, considering the research question formulated, the possible influence of the current health scenario and the challenges faced by anesthetists, aiming to ensure an updated search. Two evaluators participated in the study selection process.

The inclusion criteria for selecting the studies were: scientific articles published in English, Portuguese or Dutch, which addressed multimodal anesthesia and postoperative pain management in the elderly or surgeries that have a higher rate of performance in the elderly.

Articles that were not available in full online were excluded. Only studies related to patient care were considered.

Materials with unsatisfactory methodological quality were discarded, taking into consideration, the rigorous analysis necessary to construct an integrative review¹⁶. The excluded materials included informal case reports, book chapters, reflection articles, dissertations, theses, news reports, non-scientific editorials, and integrative reviews.

The search was initiated on the MEDLINE portal, using the advanced form with combinations of descriptors. Then, searches were performed in the Wprim and Google Scholar databases, using cross-references with the Boolean operator “and” between the descriptors. After the cross-references, publications were found.

Data were collected using a validated instrument adapted for this study, covering the following items: identification of the article (title, journal, database, authors, country, language, year of publication, institution hosting the study and type of scientific journal), assessment of the introduction and objectives, methodological characteristics (study design, sample, data collection and analysis), description and analysis of results and conclusions⁸. To ensure methodological rigor, at least two authors analyzed the studies, reviewing the results found.

In the assessment of methodological rigor, an instrument adapted from the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) System was used, which requires clear specification of the population, intervention, comparator and outcomes – usually illustrated by the acronym PICO (Population, Intervention, Comparator, Outcome) – and relevant context to initiate the GRADE assessment⁸.

The GRADE system is a sensitive and transparent method developed by a group of researchers since 2000 to classify the quality of evidence and the strength of recommendations. The GRADE approach is endorsed by several

international organizations specializing in systematic reviews and clinical protocols, such as the Cochrane Collaboration and the World Health Organization⁸⁻¹⁰.

Evidence is graded by the initial study design: randomized controlled trials receive a score of 4, corresponding to high quality, while observational studies receive a low score (2 points). Some factors can increase or decrease this initial score, such as study limitations or biases, heterogeneity, imprecision and indirect evidence.⁸⁻¹⁰ The analysis must consider the expected impact on the result and outcome⁸⁻¹⁰.

In the end, 7 original research articles were included. The results were categorized based on the sources searched and the levels of evidence applied by GRADE.

RESULTS

The sample comprised 7 studies, the article selection process is outlined in figure 1.

PROFILE OF SCIENTIFIC PRODUCTION

The studies included in the integrative review, all 7, are in health journals¹¹⁻¹⁷, there was a predominance of journals in the area of Anesthesia, 3 studies are from journals exclusively on anesthesia¹¹⁻¹³⁻¹⁷, corresponding to 42%, 2 studies are in surgical journals¹⁴⁻¹⁶.

Most articles are published in English and international journals.¹¹⁻¹⁶, which corresponds to 6 studies and 85.72% of the total, 1 article was published in national journals¹⁷, corresponding to 14.28%, where this is in the Portuguese language¹⁷.

SUMMARY OF SELECTED ARTICLES

Table 1 presents data from the 7 publications selected for the study, according to author and year of publication, type of study and language verified in the journal, population and sample, objectives and results.

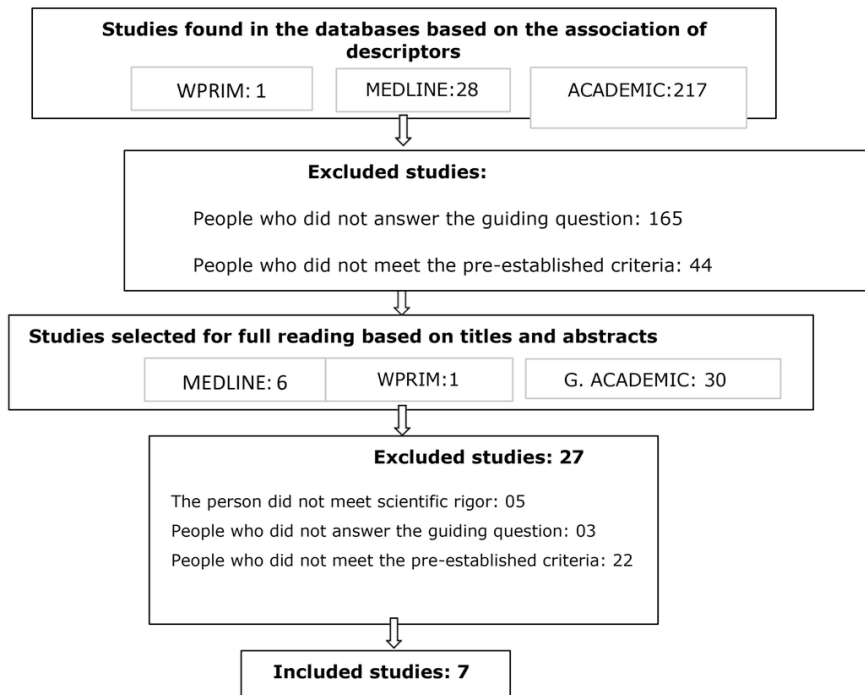


Figure 1: Flowchart of the study selection process. Rio de Janeiro, 2024.

Source: Authors, 2024

| DESCRIPTORS | MEDLINE | WPRIM | Academic Google | TOTAL |
|--|---------|-------|-----------------|-------|
| “Multimodal anesthesia” AND “Pain” AND “elderly” AND “postoperative” | 28 | 1 | 217 | 246 |
| TOTAL | 28 | 1 | 217 | 246 |

Table 1: Searches used in the databases. Rio de Janeiro, 2024

| Title | Área | Newspapers | Type of article |
|--|----------------|---|-----------------|
| Intrathecal bupivacaine/morphine for robot-assisted radical prostatectomy | Anesthesia | Anesthesia | English |
| Estimates of the frequency of geriatric delirium in noncardiac surgeries and its evaluation over the years: a systematic review and meta-analysis | Medicine | The Journal of Post-Acute and Long-Term Care Medicine | English |
| Quality of Recovery After Breast Surgery: A Multicenter Randomized Clinical Trial Comparing Pectoral Nerve Infiltration Surgery | Patient safety | Anesthesia and Analgesia | English |
| Opioid-free anesthesia in an enhanced recovery pathway after surgery for minimally invasive lumbar spine surgery: a retrospective cohort study | Neurosurgery | Neurocirurgia Foco | English |
| Efficacy of adding infiltration between the popliteal artery and the posterior capsule of the knee (IPACK) to adductor canal block and local infiltration analgesia in total knee arthroplasty: a retrospective cohort study | Orthopedics | Journal of Orthopaedic Surgery | English |
| Incidence and associated factors of postoperative pain after emergency orthopedic surgery: a multicenter prospective observational cohort study | Surgery | International Journal of Open Surgery | English |
| Use of transdermal buprenorphine in acute postoperative pain: systematic review | Anestesia | Brazilian Journal of Anesthesiology | Portuguese |

Table 2: Language, Periodicals and Area; Rio de Janeiro, 2024

Source: elaboration by the authors, 2024.

| Author, year | Type of study/ language | Population and sample | Goals | Results / cares |
|--|--|---|---|---|
| Koning MV, Teunissen AJW, Vlieger R, Gan M, Ruijgrok EJ, Graaff JC, Koopman JSHA, Stolker RJ. (2020) ¹¹ . | Clinical Trial Randomized/ English | 160 patients | The aim of this study was therefore to evaluate the quality of recovery after intrathecal administration of bupivacaine/morphine after robot-assisted radical prostatectomy surgery. In addition to length of hospital stay and surgical conditions, this study investigated the positive and negative effects of intrathecal morphine. | We concluded that despite a modest increase in the incidence of pruritus, multimodal pain management with intrathecal bupivacaine/morphine remains a viable option for robot-assisted radical prostatectomy. |
| Silva, AR, Regueira MD, Albuquerque EMD, Baldeiras I. FC. (2021) ¹² . | Systematic review and meta-analysis/ English | Forty-nine studies were included with a total of 26,865 patients. | Elderly patients undergoing surgery are at higher risk of developing perioperative delirium, especially those with associated comorbidities. It is not yet clear whether the frequency of delirium varies between surgical settings. remained stable throughout te years. | The type of anesthesia and preoperative cognitive status were significant moderators of the frequency of delirium. POD in noncardiac surgery has increased over the years, suggesting that more resources must be allocated to prevention and management of delirium. |
| Barrington MJ, Seah G., Gotmaker R., Lim D., Byrne K, JL (2020) ¹³ . | Clinical Trial Randomized/ English | 104 patients | PECS II block or local infiltration by the surgeon may improve outcomes, including quality of recovery (QoR). | In this randomized clinical trial, there were no differences in patient-reported quality of recovery in patients receiving PECS blocks compared with those receiving local infiltration. |
| Soffin E, Wetmore D. , Beckman J. , Sheha E., Vaishnav A. MJ (2019) ¹⁴ . | Analysis retrospective/ English | They included 36 patients who underwent lumbar decompression under the ERAS pathway for spinal decompression between February and August 2018. | To evaluate an OFA regimen within an ERAS pathway for lumbar decompressive surgery and compare perioperative opioid requirements in a matched cohort of patients treated with traditional anesthesia containing opioids (OCA). | There was a significant reduction in total perioperative opioid consumption in patients receiving OFA (2.43 ± 0.86 oral morphine equivalents [OMEs]; mean ± SEM), compared with patients receiving OC (38.125 ± 6.11 OMEs) There were no significant differences in worst postoperative pain scores (NRS scores 2.55 ± 0.70 vs 2.58 ± 0.73) or opioid consumption (5.28 ± 1.7 vs 4.86 ± 1.5 OMEs) in the PACU between the OFA and OCA groups, respectively. |
| Zhao D, Pengcheng L, Lima DB (2024) ¹⁵ . | Cohort retrospective/ English | Patients undergoing primary unilateral TKA were divided into two groups based on the date of admission. Sixty-three patients underwent IPACK, ACB, and LIA (IPACK group) during surgery, while 60 patients underwent ACB and LIA (control group). | To explore the efficacy of adding the IPACK technique to ACB and LIA in patients undergoing TKA | The addition of IPACK to ACB and LIA did not provide any clinical analgesic benefit. Orthopaedic surgeons and anaesthesiologists have a rationale for using ACB and LIA without IPACK for TKA. |

| | | | | |
|---|-----------------------------------|--|---|---|
| Arefayne NR, Tegegne SS, Geebregzi AH (2020) ¹⁶ . | Observational cohort/ English. | A multicenter prospective observational cohort study was conducted to determine the incidence and associated factors of postoperative pain after emergency orthopedic surgeries from March 1 to May 30, 2020. The data were analyzed using the Statistical Package for Social Sciences, version 20. To identify the association between the outcome variable and independent variables, descriptive statistics, cross-tabulation and binary logistic regression were used. | Determine the incidence and associated factors of postoperative pain in Emergency Orthopedic Surgery. | Postoperative pain management must be given high priority in emergency orthopedic surgery. An appropriate pain management strategy must be implemented to decrease the suffering of postoperative pain. Factors associated with postoperative pain were: preoperative history of pain and anxiety, patient expectation of postoperative pain, and being under general anesthesia. |
| Urbanetto JS, Rocha OS, Dutra RC, Maciel MC, Bandeira AG, Magnago TSBS (2020) ¹⁷ . | Systematic review/ Portuguese. | Data from nine studies (615 patients) were included in this review. Most studies initiated transdermal use of buprenorphine 6 to 48 hours before surgery, maintaining use for 1 to 28 days after the procedure. | To examine the role of transdermal buprenorphine in the treatment of acute postoperative pain. | Although more studies are needed, initial results show that transdermal buprenorphine appears to be a safe and effective form of opioid administration. in the treatment of acute postoperative pain. |

Table 1: Description of selected publications according to author, year of publication, type of study, language, population, sample, objectives and results. Rio, 2024

Source: elaboration of the authors, 2024.

| ARTICLE | Category 1: Effectiveness of Multimodal Analgesia Techniques. | Category 2: Specific Challenges and Considerations in Elderly Patients | Category 3: Recent Developments and Innovations in Analgesia Techniques. |
|---|---|--|--|
| 11 - The effect of intrathecal bupivacaine/morphine on quality of recovery in robot-assisted radical prostatectomy: a randomized clinical trial | ✓ | | |
| 12 - Estimates of the frequency of geriatric delirium in noncardiac surgeries and its evaluation over the years: a systematic review and meta-analysis | | | |
| Geriatrics in Noncardiac Surgeries and Their Assessment Over the Years: A Systematic Review and Meta-Analysis | ✓ | ✓ | |
| 13 - Quality of recovery after breast surgery: a multicenter, randomized clinical trial comparing pectoral nerves. Interfascial plane block (pectoral nerves II) with surgical infiltration. | ✓ | | ✓ |
| 14 - Opioid-free anesthesia within an enhanced recovery protocol after minimally invasive lumbar spine surgery: a retrospective matched cohort study. | ✓ | | ✓ |
| 15 - Efficacy of adding infiltration between the popliteal artery and the posterior capsule of the knee (IPACK) to adductor canal block and local infiltration analgesia in total knee arthroplasty: a retrospective cohort study | ✓ | | ✓ |
| 16 - Incidence and associated factors of postoperative pain after emergency Orthopedic surgery: a multicenter prospective observational cohort study | ✓ | | |
| 17 - Use of transdermal buprenorphine in acute postoperative pain: a systematic review | ✓ | ✓ | |

Table 2: Categorization of articles selected for study.

Source: authors

DISCUSSION

Multimodal analgesia is an effective approach to postoperative pain management, especially in elderly patients. This approach combines different techniques and medications to effectively control pain while minimizing side effects and the need for opioids, which can be harmful to elderly patients due to the increased risk of delirium, constipation, and respiratory depression¹¹⁻¹³.

Recent studies have demonstrated the effectiveness of multimodal analgesia in hip and knee arthroplasty procedures. The combination of techniques, such as peripheral nerve blocks and local infiltration with long-acting anesthetics, provided better pain control and reduced the need for opioids, resulting in faster recovery and lower rates of complications such as nausea and vomiting¹¹⁻¹⁵.

For a more detailed analysis on the topic in question, we categorized the selected articles:

CATEGORY 1: EFFECTIVENESS OF MULTIMODAL ANALGESIA TECHNIQUES

All the articles reviewed demonstrate that the implemented multimodal techniques have a significant impact on recovery and reduction of postoperative pain. According to the article¹⁷ although multimodal analgesia is the best approach, opioid therapy continues to be the main treatment prescribed for pain after surgical procedures.

The studies ¹¹⁻¹²⁻¹⁴ bring to light the knowledge that the adoption of associated treatments significantly reduces the use of opioids in the postoperative period. When nonsteroidal anti-inflammatory drugs (NSAIDs) are combined with opioids, they considerably reduce the number of opioids needed and offer more effective pain relief with lower doses of both drugs than if they were used individually¹⁶. The study ¹³⁻¹⁵ showed that

infiltration combined with multimodal therapy was effective in controlling pain.

These results highlight the importance of monitoring and managing appropriate therapies for each postoperative case in order to make this period less painful and with fewer complications associated with the use of a single therapy based on the prescription of opioids, considering that the rate of surgeries in the elderly is higher and tends to increase over time.

CATEGORY 2: SPECIFIC CHALLENGES AND CONSIDERATIONS IN ELDERLY PATIENTS

The studies ¹² and ¹⁷ demonstrate that the use of opioids in the postoperative period of elderly people is closely linked to adverse effects, mainly in the appearance of delirium and cognitive deficit, which have been shown to be comorbidities that affect not only the quality of life of elderly people, but also increase morbidity and mortality.

The studies in question demonstrate that this lower consumption of opioids has a significant impact on reducing the adverse effects related to the use of these drugs, which are even more prevalent in the elderly population, reducing the frequency of delirium and cognitive damage. This means that the analgesic therapy indicated for elderly people is carried out taking into consideration, all preoperative data and associated comorbidities, taking into consideration, the use of drugs associated with less adverse action in the target population.

CATEGORY 3: RECENT DEVELOPMENTS AND INNOVATIONS IN ANALGESIA TECHNIQUES

In addition to the infiltration techniques and multimodal therapies mentioned, recent advances in analgesia have shown the importance of personalized strategies for pain control. Technologies such as patient-controlled analgesia (PCA) and transcutaneous electrical nerve stimulation (TENS) have proven effective in tailoring treatment to individual patient needs.

The articles¹³⁻¹⁴⁻¹⁵ demonstrate that infiltration techniques in association with other multimodal therapies as an excellent treatment alternative for pain control, the combination of these approaches can offer more effective pain relief, reduce the need for opioids and minimize the risks associated with their prolonged use. These innovations not only improve pain control, but also promote a faster and more comfortable recovery for patients, resulting in a better quality of life.

CONCLUSION

Implementation of multimodal analgesia protocols must consider the specific characteristics of elderly patients, such as the presence of multiple comorbidities and drug sensitivity. Individualization of pain management strategies is essential to meet the needs of this population and ensure safe and effective recovery. In addition, ongoing education of health professionals on new techniques and emerging evidence in analgesia is essential for the successful application of these approaches¹⁴.

Multimodal anesthesia in the postoperative period of elderly patients offers an effective and safe method for pain control, promoting faster recovery and minimizing the risks associated with excessive use of opioids¹⁶. Adopting these strategies in clinical practice can significantly improve surgical outcomes and quality of life of elderly patients¹⁷.

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