REVIEW ARTICLE

CONTENTS

Regional versus general anesthesia for hip fracture surgery in older adults: A focused research review

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ABSTRACT

Hip fractures in the elderly population are associated with considerable complications such as morbidity, mortality, and enduring functional deterioration. Thus, they render perioperative management an essential element of strategies aimed at fostering healthy aging. Regional anesthesia (RA) and general anesthesia (GA) constitute the two predominant methods for the surgical intervention of hip fractures; however, the most effective technique remains a subject of ongoing scholarly debate.

This research review seeks to systematically assess and compare regional anesthesia to general anesthesia in elderly patients undergoing surgical treatment for hip fractures, focusing on perioperative safety, mortality rates, functional recovery, cardiopulmonary issues, and cognitive outcomes to understand their implications for encouraging healthy aging.

A concentrated narrative review of pertinent literature published from the year 2020 onwards was executed, utilizing databases such as PubMed and Google Scholar. Studies were included for consideration if they provided a comparative analysis of regional anesthesia and general anesthesia in adults aged 65 years and above undergoing surgical procedures for hip fractures. Recent extensive randomized trials indicate that spinal anesthesia does not show an advantage over general anesthesia concerning survival rates, functional recovery, or significant postoperative results, including the return to ambulation at a 60-day follow-up. Meta-analyses indicate that both anesthetic methods demonstrate similar safety profiles; however, regional anesthesia might lead to reduced intraoperative blood loss, shorter operative times, and slight decreases in hospital stay for certain patient groups.

KEY WORDS: pain, delirium, recovery pathways, perioperative care

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INTRODUCTION

The incidence of hip fractures among the elderly is on the rise worldwide. It is estimated that by 2050, there will be an incidence of 4.5 to 6.25 million fractures [1, 2]. Physiologically, it is a great challenge to deal with such patients since they usually have decreased cardiovascular and pulmonary reserves [3]. In the past, the medical community has always opted to use Regional Anesthesia (RA), speculating that it lowers the incidence of Postoperative Delirium (POD) and pulmonary complications. It is believed to provide better analgesia and decrease the systemic inflammatory response [4].

However, with the results of the last few studies, the trend seems to be changing. Some studies have suggested that RA decreases 30-day mortality. But with the publication of the last few studies, it seems that it does not [5, 6]. It has been found that time to surgery and multidisciplinary treatment are more considerable outcomes than the type of anesthesia [7,8]. This review aims to summarize the literature to determine if one is better than the other in the present clinical scenario.

AIM

The aim of this systematic research review is to evaluate and compare the use of regional anesthesia with that of general anesthesia for the surgical management of hip fractures in the elderly population. The key areas of interest are the safety, mortality rates, functional recovery, cardiopulmonary outcomes, and cognition to highlight their role in promoting healthy aging.

MATERIALS AND METHODS

A focused narrative review was conducted using recent literature (2020 onward). Searches were performed in PubMed, Google Scholar, and major clinical databases using combinations of the following terms:

"hip fracture anesthesia elderly"
"regional vs general anesthesia delirium"
"spinal anesthesia hip fracture randomized trial"
"postoperative delirium elderly anesthesia"
Inclusion criteria:
Studies published 2020–2025
Patients ≥65 years
Comparative studies or reviews of RA vs GA
Outcomes including delirium, mortality, or recovery
Priority was given to randomized trials, systematic reviews, and meta-analyses.

REVIEW

POSTOPERATIVE DELIRIUM: CENTRAL OUTCOME

Postoperative delirium remains a significant determinant of recovery in elderly patients who undergo hip fracture surgeries. A recent large randomized study published in the Journal of the American Medical Association exhibited that regional anesthesia has little effect in reducing the occurrence and severity of delirium compared with general anesthesia, which challenges the conventional belief [9].

Recent systematic reviews and meta-analyses have failed to show any significant variation in the occurrence of delirium between regional anesthesia and general anesthesia, despite the theoretical neuroprotective effects of regional anesthesia [10, 11].

It is evident from the continued occurrence of delirium in various anesthetic modalities that the cause of delirium is likely related to cognitive status, inflammatory response, sedation, and the general condition of the patient, and not the anesthetic technique used. Some studies have reported decreased rates of delirium following spinal anesthesia, but this has not been consistent and may be biased due to other factors [12].

Therefore, the current trend of research suggests moving beyond the debate of regional and general anesthetics and their role in the development of delirium and rather look for individual approaches to neuroprotection.

NEUROPHYSIOLOGICAL MECHANISMS AND BRAIN VULNERABILITY

Both anesthetic methods have the potential to affect cerebral physiology. General anesthetic methods have the risk of exposing the patient to deeper levels of sedation and systemically administered anesthetics. Regional anesthesia requires the administration of sedation that is known to vary widely among institutions.

It is thought that neuroinflammation and neurotransmitter imbalance are key factors in the pathogenesis of delirium. Meta-analysis studies have emphasized the importance of perioperative factors such as hypotension, sleep deprivation, and the use of multiple medications on cognitive outcomes irrespective of the anesthetic technique used.

Current studies on the effects of various methods of sedation used in neuraxial anesthetic procedures have emphasized the importance of the degree and type of sedation on the risk of delirium [13].

MORTALITY AND FUNCTIONAL RECOVERY

In addition to delirium, survival and functional outcomes have been commonly assessed as an endpoint in the comparison of regional anesthesia (RA) with general anesthesia (GA). Large trials have demonstrated that spinal anesthesia does not have any advantage over general anesthesia in terms of survival or the ability to ambulate at 60 days postoperatively.

The results of the meta-analyses also support the conclusion that there is little difference in mortality among the anesthetic techniques, which may reflect the impact of improved perioperative care in reducing outcome differences among the anesthetic approaches.

CARDIOPULMONARY AND HEMODYNAMIC EFFECTS

Regional anesthesia is often associated with reduced blood loss, reduced duration of operation, and reduced pulmonary problems in some studies.

Spinal anesthesia may reduce the severity and need for vasopressors to treat hypotension compared with the use of general anesthesia, although the evidence is inconsistent [14].

Despite these physiological differences, advances in modern anesthetic monitoring appear to minimize the historical disadvantages of general anesthesia.

PAIN CONTROL AND RECOVERY PATHWAYS

Pain management has a significant effect on delirium risk. Some umbrella review articles show that regional analgesia (RA) may lead to reduced pain and opioid requirements after surgery, which could be beneficial for early mobilization [15].

However, randomized studies show that pain management may be related to adjunctive analgesia techniques rather than types of anesthesia.

These studies highlight the increasing importance of multimodal analgesia and enhanced recovery programs to promote positive outcomes for older people.

DISCUSSION

Recent findings have also challenged the long-held belief that regional anesthesia (RA) has a positive impact on the occurrence of delirium in the elderly population who undergo hip fracture surgery. Recent high-quality randomized trials have confirmed that the rate of delirium is similar with both regional anesthesia (RA) and general anesthesia (GA). This suggests that the modality of anesthesia does not play an important role in the occurrence of delirium.

The perioperative care process seems to play a more important role in the occurrence of delirium. This is a change in the way anesthesiology works; the focus is no longer on the modality of anesthesia but rather on the care process.

Regional anesthesia may still have an advantage over other forms of anesthesia in certain patient groups; for example, it results in less blood loss or a shorter length of stay in the hospital.

In the context of initiatives for healthy aging, the preservation of cognitive function with the maintenance of functional independence may be achieved with the help of an integrated perioperative care process rather than the modality of anesthesia.

CONCLUSIONS

The existing literature does not suggest that regional anesthesia offers any advantage over general anesthesia in preventing delirium in the older patient with hip fractures. Physiological differences exist, but it seems that the patient's characteristics are more important in determining the cognitive outcome. A personalized approach could be more beneficial to health aging than the method of anesthesia.

LIMITATIONS OF CURRENT EVIDENCE

- Significant heterogeneity in study design and delirium assessment tools
- Variable sedation practices during regional anesthesia
- Selection bias in observational cohorts
- Lack of standardized frailty measures across trials

These factors contribute to conflicting conclusions and limit definitive recommendations.

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CONFLICT OF INTEREST
The Authors declare no conflict of interest

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