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Annals of Geriatric Education and Medical Sciences

Journal homepage: https://www.joooo.org/

Review Article

Management of geriatric patients undergoing surgery

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Abstract

The process of aging results in physiological decline, disabilities, and a decreased reserve capacity of the body, with the elderly being the demographic that is growing the fastest. They need more comprehensive perioperative care and have a heightened risk of postoperative complications, which may result in long-term health deterioration, reduced functional ability, and diminished quality of life. Changes in health due to aging, along with comorbidities and declines in physical and cognitive functions, make elderly patients more vulnerable to both cardiac and non-cardiac issues before and after surgery, as well as contributing to lengthier hospital stays. Risks associated with surgery, such as delirium, respiratory issues, cardiac incidents, and increased morbidity, can result in longer hospitalizations, greater mortality rates, and a decline in physical fitness, memory, functionality, and overall quality of life.

Keywords: Geriatric patients, Physiological changes, Surgery

Received: 15-04-2025; **Accepted:** 20-06-2025; **Available Online**: 21-08-2025

1. Introduction

The aging process leads to physiological decline and subsequent disability, along with a reduction in the body's reserve capacity. Individuals aged 65 and older represent the fastest-growing demographic due to increased life expectancy and declining birth rates. In recent decades, the proportion of elderly individuals worldwide has markedly increased. Older persons need a higher level of perioperative care compared to younger persons.[1] Older individuals usually needs surgical procedures four times more than that of the younger population. They face significant risks of postoperative complications that may lead to long-term deterioration in health, functional capacity, and quality of life due to certain changes of their health status.[2-3] Age-related health changes, along with the rising prevalence of comorbidities, increases the risk of catastrophic outcomes in elderly individuals. The physiological changes linked to aging, along with comorbidities and challenges of physical and cognitive decline, increase the susceptibility of elderly patients to both cardiac and non-cardiac problems before and after surgery, as well as prolonged hospital stays.[4-5] Post-surgical risks, including postoperative delirium, respiratory complications, cardiac events, and heightened postoperative morbidity, can lead to extended hospital stays and increased mortality, as well as a decline in physical fitness, memory, functionality, and overall quality of life following surgery.[6] Assessing health risks in patients before surgery is crucial, as is the adoption of efficient preventive strategies to mitigate postoperative complications (POCs) and enhance the overall health of elderly individuals. Furthermore, elderly persons seem to possess a markedly increased risk of mortality and morbidity.[4,6]

Evidence indicates that preoperative rehabilitative therapy may decrease postoperative risks for elderly patients having POCs, hence improving their long-term health outcomes.[6] Preoperative evaluations must be thorough and aligned with current understanding of hazards and preventive strategies to enhance the postoperative safety and health of older patients. Care protocols must include the treatment of malnutrition, the increase of physical fitness, the improvement of respiratory function, and the supervision of polypharmacy.[7] The effectiveness and benefits of a

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https://doi.org/10.18231/j.agems.v.12.i.1.3

comprehensive preoperative assessment, along with the potential adoption of related preventive measures, must be determined to improve the preoperative and intraoperative care of geriatric patients, leading to reduced long-term physical and cognitive complications and shorter hospital stays.[8] In this review article we tried to explore preoperative risk evaluation for anesthesia and its management for the elderly population.

2. Materials and Methods

Global research on pre-operative care for the elderly was extensively searched in the Medline and PubMed databases. The search criteria involved topics such as pre-operative elderly care, geriatric management, physiological changes with aging, and risk assessment for the elderly before surgery, among others. The references of each selected research were further explored to get more relevant information. Considering the significance of review articles, the selected study concentrated on topics such as preoperative geriatric management, patient care before surgery, physiological changes related to aging, and risk assessment for the elderly prior to surgery. Publications not primarily focused on these subjects or that included unrelated research and reviews were excluded from consideration. No predictive analytics technology was utilized in this method. Collaboratively, group members analyzed the data to evaluate the preliminary outcomes and surgical techniques. Each member's results were validated to ensure accuracy and minimize discrepancies.

3. Discussion

Aging in any individuals develop gradually and impacts organically, resulting in heightened vulnerability to diseases. Changes in biological systems while aging develop at different speeds, influenced by elements such as diet, environment, and heredity. Age-related changes lead to changes in anatomy. The heart and the vascular system are one of the organ that changes most with aging.[9] The probability of developing hypertension, coronary artery disease, heart failure, and arrhythmias escalates with the aging cardiovascular system, hence necessitating intraoperative blood flow monitoring and perioperative management.[10] The aging process often leads to the degradation of lung tissue and alterations in supporting collagen fibers, resulting in diminished elastic recoil and compromised gas exchange, as well as declines in nearly all lung function parameters, including forced expiratory volume in one second and inspiratory and expiratory functional capacities.[11] Furthermore, aging results in a diminution in both the size and mass of the kidneys, thus leading to decreased creatinine clearance.[12] The diaphragm stays mostly unaltered, but other muscles, such as the soleus, exhibit considerable fat and collagen infiltration.[13] The aging process impacts both the autonomic and peripheral nervous systems, resulting in neuronal degeneration in sympathetic and parasympathetic ganglia, along with diminished sensitivity to adrenergic receptors.[14] The perioperative evaluation of elderly patients presents these changes that are absent in younger populations. Healthcare practitioners must guarantee that treatment is administered in a manner that upholds the patient's physical, psychological, and emotional dignity throughout hospitalization and the recovery process. A thorough assessment of older adults is crucial for detecting new or previously undiagnosed health concerns. Previously recognized conditions must be thoroughly assessed to determine the suitability and efficacy of current therapies.[15] Age and the existence of comorbidities are unlikely to be dependable markers for risk assessment, since most elderly patients or those with diseases such as hypertension often do not exhibit an elevated risk of adverse surgical outcomes. Conditions such as diabetes, hypertension, drug dependence, and inflammatory bowel diseases might result in serious consequences and need assessment and therapy prior to surgical interventions.[16]

Discontinuing smoking and minimizing alcohol use at least one month before to surgery has been shown to diminish the risk of complications. Laboratory testing is crucial for evaluating liver and kidney function, since compromised metabolic capacity might influence anesthetic selection and dose, especially in cancer patients. A comprehensive nutritional assessment is required to collect data on body mass index, dietary intake, weight fluctuations, functional capabilities, muscle mass, and the status of subcutaneous fat, including both localized and generalized fluid retention.[17] Anemia may increase hazards and mortality rates; thus, prompt identification and therapy of preoperative anemia are essential.[18] Cognitive function should be assessed to identify impairments, which are prevalent in the elderly but sometimes overlooked. Cognitive impairment is linked to a slow and sustained deterioration in long-term postoperative cognitive functions. The evaluation of geriatric postoperative care must include screening for variables influencing mental state, allowing the prompt implementation of preventative measures and therapeutic treatments to alleviate concerns associated with these disorders.[19] The challenge of polypharmacy, characterized by the concurrent use of many drugs, necessitates assessment and reduction via the cessation of superfluous prescriptions, the priority of combination therapies, and the modification of doses where possible. Non-essential medicines, including over-the-counter drugs, should be discontinued during the perioperative phase. A record of prior falls is essential, since falls are the primary cause of unintentional injury in the senior population.[20] Numerous studies have linked fragility to negative health outcomes, such as physical deterioration, falls, heightened hospitalization rates, and increased mortality. Strategies to mitigate frailty often include increasing exercise, initiating physical therapy, enhancing protein consumption, and

providing vitamin D supplements; nevertheless, the effectiveness of these interventions in improving clinical outcomes for frail persons remains a topic of debate.[20-21]

Various classes of antibiotics are approved for preoperative antibiotic prophylaxis. Antibiotics with low adverse effects and good tolerance are preferred due to the common occurrence of recurring polypharmacy.[22] The selected antibiotics are often bactericidal rather than bacteriostatic. A substantial amount of preoperative prophylactic antibiotics is administered intravenously. The initial scheduling, re-dosing, and duration of antibiotic prophylaxis are crucial for minimizing surgical site infections and enhancing successful antimicrobial management.[23] Prophylactic antibiotics should generally be discontinued after 24 hours unless an infection is confirmed. The duration of pharmacological administration postoperatively after cardiothoracic surgery remains a contentious issue, particularly about an extension to 48 hours[22-23] Anesthesia and sedation may cause loss of consciousness and diminished airway reflexes, which may result in vomiting if gastric pressure surpasses lower esophageal pressure, leading to aspiration of gastric contents into the lungs.[24] Fasting is essential for several surgical procedures and is preferred in others. Reports indicate that extended fasting may lead to several negative consequences, such as pain, fatigue, irritability, dehydration, electrolyte imbalances, and hypoglycemia in elderly adults.2525. Planning for anesthesia and perioperative pain management necessitates the consideration of several interventional aspects. When devising a suitable pain management strategy for senior patients, it is crucial to thoroughly assess aspects such as expected surgical procedures, current comorbidities, and postoperative pain relief needs. The pharmacological alternatives and formulations of commonly used analgesics, including opioids, NSAIDs, paracetamol, tramadol, and other non-opioid pain medicines, are analyzed. These analgesics have been effective in mitigating pain, and their combination has shown a decrease in the need for opioid use.[25-26]

The aging process may influence medicine metabolism due to changes in liver and renal function. Older individuals usually exhibit increased sensitivity to anesthetic agents, necessitating reduced doses for the desired therapeutic effect, while the duration of pharmacological effects is generally prolonged.[27] Reduced opioid doses are necessary for effective pain management. The minimum alveolar anesthetic concentration decreases by 6% with each decade of life, affecting the operation of neuronal ion channels linked to acetylcholine, as well as nicotinic and GABA receptors. The duration of a medication's action, influenced by renal or hepatic clearance, may be extended with increasing age. Moreover, the duration of analgesia may be extended in older individuals. When general anesthesia poses significant risks to the patient, regional anesthesia may be a preferable alternative when feasible.[28]

Older persons have a significantly heightened risk of surgical complications, such as delirium, cognitive decline, malnutrition, urinary tract infections (UTIs), other infections, pressure ulcers, and diminished functional skills. There is an increased prevalence of cardiovascular and pulmonary disorders, venous thromboembolism (VTED), and acute renal injury.[29] Delirium is the primary postoperative complication in elderly patients, especially those undergoing high-risk procedures; its occurrence may rise to 80 percent in patients requiring mechanical ventilation in an intensive care environment.[30] Postoperative delirium may lead to lasting cognitive impairments, physical decline, extended hospital stays, greater costs, and a heightened risk of mortality. Age serves as an independent risk factor for postoperative delirium, among underlying cognitive impairments, polypharmacy, renal complications, and excessive alcohol use.[30-31] Delirium is the predominant postoperative complication in older patients undergoing high-risk surgeries, with incidence rates exceeding 80 percent for those necessitating mechanical ventilation in critical care settings.[31] The emergence of surgical delirium can result in lasting cognitive deficits, physical decline, extended hospital stays, increased expenses, and elevated mortality rates.[32] Pharmacological treatment for delirium should be contemplated solely when non-pharmacological strategies have proven ineffective. Contemporary professional recommendations recommend using low-dose antipsychotics for the shortest effective duration, only for agitated or anxious individuals at danger of self-harm or damage to others. Preventive interventions should prioritize the prevention of sensory deprivation, the maintenance of consistent social connections, the establishment of routine daily activities, and the preservation of physiological stability.[31-32] A history of heart disease is a predictor of cardiovascular risk during the perioperative period; however, it remains an indirect risk factor until linked with an urgent, active condition, at which point it markedly increases mortality risk, particularly in older patients. Patients experiencing decompensated heart failure must be managed according to established protocols, with elective surgery postponed if necessary and monitored to prevent volume overload; however, in most instances, elective non-cardiac or cardiac procedures need not be delayed.[33-35] The aging process frequently leads to changes in thermoregulatory functions. These changes may arise from the anesthetic-induced reduction of thermoregulatory response times, resulting in moderate hypothermia often seen in elderly patients after major surgical procedures.[33-35] Active thermal management, encompassing forced-air heating apparatus, maintaining air temperatures above 21°C, and/or administering heated intravenous fluids, is frequently crucial for elderly patients experiencing acute postoperative

hypothermia. Uncontrolled postoperative pain can result in clinical and psychological ramifications that increase morbidity and mortality, hinder the rehabilitation process, and reduce patient satisfaction with their surgical experience.[33-35] Analgesic regimens must be tailored to address the needs of senior patients, including their medical conditions, surgical interventions, and prior experiences with analgesic medications for postoperative pain management. Alterations in drug composition and dosage are essential for attaining effective pain management in elderly outpatients[35] Enhanced recovery after surgery results in less intraoperative blood loss, decreased risk of postoperative complications, and shortened recovery times. While improved rehabilitation methods vary across institutions, they include critical components such as hemodynamic optimization, prompt beginning of ambulation, and systematic management of pain and nausea. Allowing patients to refrain from solid food for only 6 hours and administering liquid carbohydrates up to 2 hours before to surgery has shown benefits and improves recovery[34] Careful administration of intravenous fluids is essential to prevent negative reactions linked to diminished physiological reserves, particularly in elderly surgical patients. Enteral feeding is recommended for individuals who cannot resume a full oral diet within three days. Postoperative intravenous feeding is advantageous for malnourished patients unable to tolerate enteral nutrition, as well as for those facing postoperative issues that impair digestive health and cannot consume enough oral or enteral sustenance for at least one week.[35]

4. Conclusion

The aging process leads to a decline in physiological stability across all organ systems, significantly increasing the risk of perioperative complications. Effective perioperative management requires a diverse collaborative strategy. Following surgery, routine evaluations and preventative measures for prevalent conditions in the elderly should be implemented.

5. Conflict of Interest

None

6. Source of Funding

None

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Cite this article: Begum A. Management of geriatric patients undergoing surgery. *Ann Geriatrics Educ Med Sci.* 2025;12(1):08-12