ECRONICON OPEN ACCESS

EC MICROBIOLOGY
Review Article

Pre-Operative Management of the Geriatric Patient

Sultan Ghazi[1]*, Sultan Ali Abdullah Almuntashiri[2], Abdulaziz Mashan Ali Almutairi[3], Dalia Fahad Sarhan[4], Abdulrahman Mashan Almutairi[5], Ahmed Ibrahim Alharbi[6], Abdulaziz Faisal Wanes Alrubayyi[7], Abdulelah Abdullah Albaqami[8], Amal Saleh Mohammed Alrashed[9], Sultan Abdullah Albqami[10], Fatimah Hisham Alkhunaizi[11] and Mariam Hussain Alabndi[12]

[1]*Family Medicine Consultant, King Abdulaziz Medical City, National Guard, Director of Iskan PHC, Jeddah, Saudi Arabia*

[2]*Imam Abdulrahman bin Faisal University, Saudi Arabia*

[3]*Hera'a General Hospital, Makkah, Saudi Arabia*

[4]*King Abdulaziz University Hospital, Saudi Arabia*

[5]*Khulais General Hospital, Saudi Arabia*

[6]*Medical Rehabilitation Hospital in Al Madina, Saudi Arabia*

[7]*King Abdulaziz Specialist Hospital, Aljouf, Saudi Arabia*

[8]*University of Bisha, Saudi Arabia*

[9]*Al Ahssa - Mubarraz Al Yaheya Primary Health Care Center, Saudi Arabia*

[10]*King Abdullah hospital, Bisha, Saudi Arabia*

[11]*Family Resident at Qatif Central Hospital (PHC), Saudi Arabia*

[12]*Mansoura University, Prince Sultan Bin Abdullaziz Hospital, Mulaija, Saudi Arabia*

***Corresponding Author:** Sultan Ghazi, Family Medicine Consultant, King Abdulaziz Medical City, National Guard, Director of Iskan PHC, Jeddah, Saudi Arabia.

Received: December 14, 2020; **Published:** January 18, 2021

Abstract

Background: Elderly people require a greater level of perioperative care than their younger counterparts. It is projected that elderly patients need surgical procedure 4 times more than the general population. They are at serious risk of postoperative complications that consequences in a long-term drop in health and a long-term functional decline and standard of living due to lower health ability.

Aim: In this review, we will look into pre-operative risk assessment and pre-operative care of elderly population.

Conclusion: Aging is associated with decreased physiological balance of all organ systems, which dramatically raises the risk of perioperative complications. Optimized perioperative care includes a multidisciplinary strategy. Postoperative assessment and prevention treatments for common elderly conditions should be conducted on a regular basis.

Keywords: *Pre-Operative Elderly Care; Pre-Operative Geriatric Management; Physiological Changes with Aging; Elderly Risk Assessment Before Operation*

Introduction

The ageing mechanism leads to physiological impairment and compromise, along with a decrease in the human body's reserve capacity [1]. People above 65 years of age are the fastest-growing group of the population due to improved average lifespan and reduced birth rates. For the past few decades, there has been a remarkable rise in the percentage of elderly people globally [2].

Elderly people require a greater level of perioperative care than their younger counterparts. It is projected that elderly patients need surgical procedure 4 times more than the general population. They are at serious risk of postoperative complications that consequences in a long-term drop in health and a long-term functional decline and standard of living due to lower health ability [3,4].

Changes in health related to ageing and rising prevalence of comorbid disorders put older people at greater risk of serious complications. Physiological processes in age, comorbid disorders and physical and cognitive disability all predispose elderly patients to preoperative cardiac and non-cardiac complications and extended hospital stays [5].

Postoperative risks such as postoperative delirium, respiratory problems, coronary events and an even increased risk of postoperative morbidity consequentially prolong hospitalization and mortality, but also a long-term general deterioration of fitness, memory, functioning state and standard of living following operation [3].

It is essential to monitor patient-related health risks before surgery and to take effective prophylactic action to prevent POCs and generally enhance health conditions in geriatrics. Also, stable patients appear to experience a significantly greater rate of mortality and morbidity [4]. Evidence is clear that preoperative rehabilitative interventions may reduce the postoperative hazard of elderly patients struggling with POCs and thereby boost their long-term health ability [6].

Pre-operative assessment must be efficient and up to date with research about risk and preventive factors to improve postoperative safety and health of geriatrics. Caring processes comprise defying malnutrition, poor physical fitness, increasing breathing function and reducing poly-pharmacy [7].

The efficacy and advantage of the expanded pre-operative assessment and eventual delivery of the related preventative procedures need to be shown so that it is possible to enhance the preoperative and intraoperative monitoring of geriatric patients with workable effort, resulting in a total decrease in long-term physical and cognitive problems and reduced hospitalization [8].

In this review, we will look into pre-operative risk assessment and pre-operative care of elderly population.

Participants and Methods

Study design: Review article.

Study duration: Data were collected between 1 June and 30 October 2020.

Data collection: Medline and PubMed public database searches have been carried out for papers written all over the world on pre-operative geriatric care. The keyword search headings included “pre-operative elderly care, pre-operative geriatric management, physiological changes with aging, elderly risk assessment before operation” and a combination of these were used. For additional supporting data, the sources list of each research was searched.

Criteria of inclusion: The papers have been chosen on the basis of the project importance, including one of the following topics: pre-operative elderly care, pre-operative geriatric management, physiological changes with aging, elderly risk assessment before operation.

Criteria for exclusion: All other publications that did not have their main purpose in any of these areas or multiple studies and reviews were excluded.

Statistical analysis: No predictive analytics technology has been used. In order to evaluate the initial results and the methods of conducting the surgical procedure, the group members reviewed the data. The validity and minimization of error were double revised for each member’s results.

Physiological changes with aging

Altering-related improvements are natural, gradual and lead to increased vulnerability to disease. Body systems usually age at differing rates based on various factors, including diet, climate and genetics [9]. Age-related changes contribute to adjustments in the structure of the heart. While it enables regular day-to-day operation, the effect of the improvements contributes to a diminished functional reserve and in the lack of coexisting medical difficulties [10].

Risk for hypertension, coronary artery disease, heart failure, and arrhythmias increase with cardiovascular aging processes which increase the demand for intraoperative hemodynamic monitoring and perioperative care [11]. Aging often leads in degradation of pulmonary parenchyma and alterations in supportive collagen fibers, associated with decreased elastic recoil and diminished gas exchange region correlated with reductions in virtually all lung function measures, like forced expiratory volume in 1s and inspiring and expiratory functional balance [12].

Also, aging result in decreasing volume and weight of the kidneys resulting in decreased creatinine clearance [13]. Diaphragm shows few changes as well as other muscles such as the soleus show marked infiltration by collagen and fat [14]. Autonomic and peripheral nervous systems are also affected by age. There is neuronal loss in both sympathetic and parasympathetic ganglia with decreased adrenergic receptor receptiveness [15].

Preoperative risk assessment

The perioperative evaluation of older people faces problems not faced in younger patients. Health care professionals are responsible for providing care in such a manner as to maintain the physical, psychosocial and emotional dignity of the patient, both during the time of hospitalization and after recovery [16].

Status of the elderly patient must be carefully and thoroughly examined in order to identify emerging or undiagnosed conditions. The conditions previously identified must be thoroughly evaluated to ensure that existing treatments are appropriate and effective [17]. Age and multi-morbidity per se are unlikely to be useful in this sense, since many patients who are older or have managed comorbidities (such as hypertension) or both are not generally at an elevated risk of adverse postoperative outcomes. Diabetes, hypertension, addiction and inflammatory intestinal disorders, may lead to severe complications and must be diagnosed and managed before surgery. Smoking cessation and alcohol at least 1 month prior to the operation has been shown to reduce complication rates [18,19].

Lab testing should be done to determine liver and kidney function, as compromised metabolic function can involve anesthetic option and dosage with particular regard to cancer patients [20]. Full dietary assessment must be undertaken to provide data on body mass index, food intake, weight gain or loss, functional capacity, muscle mass and subcutaneous fatty tissue status, as well as concentrated or generalized fluid deposition. Anemia can lead to increased risks and mortality in order to evaluate and treat preoperative anemia as soon as possible [21].

Cognitive function must be assessed to detect cognitive deficit which is prevalent in elderly patients and rarely diagnosed. Cognitive deficit is related to a steady and permanent postoperative long-term cognitive decline. Geriatrics post-operative care assessment must include screening for potential causes of impaired sensorium so that appropriate preventative measures and management can be initiated and interventions can be implemented early in the postoperative period to minimize complications associated with these conditions [22]. Polypharmacy or multi-drug intake should be assessed and should be avoided as possible by eliminating unnecessary medications, both by giving preference to combination drugs and by adjusting dosages. Non-essential drugs, including non-prescription preparations, should be stopped during the perioperative phase [23].

Falling history is also significant, as falls are the primary cause of accidental injury in older adults [24]. In a variety of studies, fragility has been related to adverse health outcomes, including physical declines, crashes, elevated hospitalizations, and mortality. Increasing exercises, physical therapy programs, protein intake and vitamin D supplementation are all attempts for interventions to decrease frailty but the value of these interventions for improving clinical outcomes in patients with frailty is controversial [25].

Preoperative care

Different types of antibiotics are approved for use in preoperative antibiotic prophylaxis. Antibiotics with low contact capacity and well-tolerated are favoured due to repeated polypharmacy [26]. The antibiotics used are bactericidal instead of bacteriostatic. Many

preoperative prophylactic antibiotics are given intravenously. Initial timing, re-dosing and length of antibiotic prophylaxis are necessary factors of the prevention of both surgical site infections and antimicrobial stewardship [27]. Prophylactic antibiotics should be stopped within 24 hours unless there is a confirmed infection. Controversies persist regarding the length of medication to 48 hours postoperatively after cardiothoracic surgery [28].

Anesthesia and sedation are associated with unconsciousness and suppression of protective airway reflexes which may lead to vomiting when gastric pressure exceeds lower esophageal pressure which cause aspiration of gastric content into lungs [29]. Fasting is critical in some surgeries and preferred in others. It has been reported that longer fasting periods cause of various deleterious effects such as distress, fatigue, restlessness, dehydration, electrolyte imbalances and hypoglycemia of geriatric patient [30].

Anesthetic and perioperative pain management requires consideration of several interventional details. Patient status expected surgical operations, pre-existing patient co-morbidities, and postoperative analgesic criteria should often be weighed when agreeing on an effective perioperative pain relief plan for the elderly [31]. The pharmacological choices and formulations of widely used analgesics, such as opioids, NSAIDs, paracetamol, tramadol and other non-opioid analgesics are addressed. Such analgesics have been seen to offer successful relief of pain, and their combination indicate a decrease in opioid use [32].

Effects of aging on anesthetic drugs

Aging may alter drug metabolism due to physiologic changes of hepatic and renal function. Elderlies are usually more sensitive to anesthetic agents and require smaller doses for required clinical effect, and drug action is usually prolonged [33]. Lower doses of opioids are required for pain management. Minimum alveolar anesthetic concentration decreases by 6% for every decade which alters activity of neuronal ion channels associated with acetylcholine, nicotinic and GABA receptors. Duration of drug action may be prolonged if metabolism depends on renal or hepatic excretion. Duration of analgesia may be prolonged with age. When general anesthesia carries great risk for the patient, administrating regional anesthesia if possible could provide an excellent solution [33].

Post-operative care

Elderly patients are at significantly increased risk of postoperative problems, such delirium, declines, inadequate diet, urinary tract infections (UTIs), other infections, pressure ulcers, and functional deterioration. Elderly people have higher prevalence of heart and pulmonary complications, venous thromboembolic disease (VTED) and acute kidney damage [34].

Delirium is by far the most frequent postoperative complication in elderly patients with highest rate of high-risk surgery; the incidence can reach 80 per cent of patients needing artificial ventilation in an intensive care setting [35]. Postoperative delirium occurrence can be associated with permanent cognitive deficits, physical declines, increased hospital stays and cost and higher deaths. Age is an independent risk factor for postoperative delirium along with pre-existing neuropsychological disorder, polypharmacy, renal failure, and excess alcohol intake. Delirium is by far the most frequent postoperative complication in elderly patients with highest rate of high-risk surgery; the incidence can reach 80 per cent of patients needing artificial ventilation in an intensive care setting [35]. Postoperative delirium occurrence can be associated with permanent cognitive deficits, physical declines, increased hospital stays and cost and higher deaths [36]. Pharmacologic treatment for the control of delirium must be addressed only following failed efforts with non-pharmacological treatments. Best clinical recommendations prescribe low-dose antipsychotics for the maximum practicable time and should only be used in agitated or anxious people who do damage to themselves or others. Preventative approaches should focus on avoiding sensory deprivation, preserving normal social interactions and routine diurnal variations in activities, and maintaining physiological homeostasis [38].

The history of heart disease is one of the predictors of perioperative cardiovascular risk, although it is an indirect risk factor unless it is an urgent, active case, in which case it confers a substantial risk of death, especially in older patients. Patients of decompensated heart fail-

ure must be managed in compliance with current protocols, and elective surgery must be postponed if necessary and monitored closely to avoid volume overload, but in most cases there is no need to delay elective non-cardiac or cardiac surgery [39].

Aging is often associated with altered thermoregulation ability. These alterations can be caused by anesthetic-induced suppression of thermoregulatory reaction times, resulting in moderate hypothermia typically observed in elderly persons after major surgery. Active thermal control, involving forced-air heating devices, air temperatures maintenance above 21°C and/or intravenous heating fluids, is typically indicated in elderly with severe postoperative hypothermia [40].

Postoperative pain result clinical and psychological changes if left unmanaged that increase morbidity and mortality, obstructs the rehabilitation process, and decrease patient satisfaction with surgical experience [41]. Analgesic regimens must be adapted to meet the needs of older patients taking into account their medical condition, forms of surgery and prior familiarity of analgesic medications in the management of postoperative pain. Drug formulation and dose must be changed to ensure that pain control is as effective as possible in elderly outpatients [42].

Improved rehabilitation following surgery helps to decrease intraoperative blood loss, minimize postoperative complications, and reduce recovery periods. Enhanced rehabilitation mechanisms differ across organizations, but incorporate core elements such as hemodynamic optimization, early ambulation, structured pain and emesis regulation regimens [43]. Fasting from solid food for just 6h and perioperative liquid carbohydrate loading up to 2h until operation proved to be healthy and shortened recovery times. Appropriate use of IV fluids to avoid adverse reactions associated with reduced physiological reserve is necessary in the care of elderly surgical patients [44]. Patients who are not supposed to have a full oral diet within 3 days should get enteral feeding. Postoperative intravenous feeding is useful for malnourished patients that cannot or cannot handle enteral nutrition, as well as for patients with postoperative conditions that affect digestive health who are unable to undergo and consume sufficient quantities of oral/enteral food for at least 7 days [45].

Conclusion

Aging is associated with decreased physiological balance of all organ systems, which dramatically raises the risk of perioperative complications. Optimized perioperative care includes a multidisciplinary strategy. Postoperative assessment and prevention treatments for common elderly conditions should be conducted on a regular basis.

Bibliography

1. Halaszynski T. "Influences of the aging process on acute perioperative pain management in elderly and cognitively impaired patients". *Ochsner Journal* 13.2 (2013): 228-247.

2. Etzioni DA., *et al.* "The aging population and its impact on the surgery workforce". *Annals of Surgery* 238 (2003): 170-177.

3. Olotu C., *et al.* "Improvement of perioperative care of the elderly patient (PeriAge): protocol of a controlled interventional feasibility study". *BMJ Open* 9.11 (2019): e031837.

4. Scandrett KG., *et al.* "Operative risk stratification in the older adult". *Surgical Clinics of North America* 95 (2015): 149-172.

5. Mohanty S., *et al.* "Optimal perioperative management of the geriatric patient: a best practices guideline from the American College of Surgeons NSQIP and the American Geriatrics Society". *Journal of the American College of Surgeons* 222.5 (2016): 930-947.

6. Bauer JM., *et al.* "Diagnostik Der Mangelernährung des älteren Menschen". *Deutsche Medizinische Wochenschrift* 131 (2006): 223-227.

7. Weimann A., *et al.* "ESPEN guidelines on enteral nutrition: surgery including organ transplantation". *Clinical Nutrition* 25 (2006): 224-244.

8. Jack S., *et al.* "Perioperative exercise training in elderly subjects". *Best Practice and Research: Clinical Anaesthesiology* 25 (2011): 461-472.

9. Wolfe JD., *et al.* "Perioperative care of the geriatric patient for noncardiac surgery". *Clinical Cardiology* 43 (2020): 127-136.

10. Mohanty S., *et al.* "Optimal perioperative management of the geriatric patient: a best practices guideline from the American College of surgeons NSQIP and the American geriatrics Society". *Journal of the American College of Surgeons* 222 (2016): 930-947.

11. Gerstenblith G., *et al.* "Age changes in myocardial function and exercise response". *Progress in Cardiovascular Diseases* 19 (1976): 1-21.

12. Zaugg M amd Lucchinetti E. "Respiratory function in the elderly". *Anesthesiology Clinics of North America* 18.1 (2000): 47-58.

13. Anderson S and Brenner BM. "The aging kidney: structure, function, mechanisms, and therapeutic implications". *Journal of the American Geriatrics Society* 35.6 (1987): 590-593.

14. Rebeiz JJ., *et al.* "Variations in muscle status with age and systemic diseases". *Acta Neuropathologica* 22 (1972): 127-144.

15. Creasey H and Rapoport SI. "The aging human brain". *Annals of Neurology* 17.1 (1985): 2-10.

16. Mörgeli R., *et al.* "Perioperative Management of Elderly Patients with Gastrointestinal Malignancies: The Contribution of Anesthesia". *Visceral Medicine* 33.4 (2017): 267-274.

17. Crocker T., *et al.* "Physical rehabilitation for older people in long-term care". *Cochrane Database of Systematic Reviews* 2 (2013): CD004294.

18. Wong J., *et al.* "Short-term preoperative smoking cessation and postoperative complications: a systematic review and meta-analysis". *The Canadian Journal of Anesthesia* 59 (2012): 268-279.

19. Tønnesen H., *et al.* "Smoking and alcohol intervention before surgery: evidence for best practice". *British Journal of Anaesthesia* 102 (2009): 297-306.

20. Ward N. "Nutrition support to patients undergoing gastrointestinal surgery". *Nutrition Journal* 2 (2003): 18.

21. Musallam KM., *et al.* "Preoperative anaemia and postoperative outcomes in non-cardiac surgery: a retrospective cohort study". *Lancet* 378 (2011): 1396-1407.

22. Plassman BL., *et al.* "Prevalence of cognitive impairment without dementia in the United States". *Annals of Internal Medicin* 148 (2008): 427-434.

23. Ancelin ML., *et al.* "Non-degenerative mild cognitive impairment in elderly people and use of anticholinergic drugs: longitudinal cohort study". *British Medical Journal* 332 (2006): 455-459.

24. Tinetti ME., *et al.* "A multifactorial intervention to reduce the risk of falling among elderly people living in the community". *The New England Journal of Medicine* 331.13 (1994): 821-827.

25. Van Der Elst M., *et al.* "Interventions for frail community-dwelling older adults have no significant effect on adverse outcomes: a systematic review and meta-analysis". *BMC Geriatrics* 18.1 (2018): 249.

26. Scottish Intercollegiate Guidelines Network (SIGN) A national clinical guideline (2008).

27. Chen X., *et al.* "Optimal Cefazolin Prophylactic Dosing for Bariatric Surgery: No Need for Higher Doses or Intraoperative Redosing". *Obesity Surgery* 27.3 (2017): 626-629.

28. Unger NR and Stein BJ. "Effectiveness of pre-operative cefazolin in obese patients". *Surgical Infections* 15.4 (2014): 412-416.

29. "American Society of Anesthesiologists Clinical Practice guidelines for preoperative fasting and the use of pharmacologic agents to reduce the risk of pulmonary aspiration application to healthy patients undergoing elective procedures: an updated report by the American Society of Anesthesiologists Committee on Standards and Practice Parameters". *Anesthesiology* 114.3 (2011): 495-451.

30. Shiraishi T., *et al.* "Gastric fluid volume change after oral rehydration solution intake in morbidly obese and normal controls a magnetic resonance imaging-based analysis". *Anesthesia and Analgesia* 124 (2017): 1174-1178.

31. Leung JM and Dzankic S. "Relative importance of preoperative health status versus intraoperative factors in predicting postoperative adverse outcomes in geriatric surgical patients". *Journal of the American Geriatrics Society* 49 (2001): 1080.

32. Pyati S and Gan TJ. "Perioperative pain management". *CNS Drugs* 21.3 (2007): 185-211.

33. Kanonidou Z and Karystianou G. "Anesthesia for the elderly". *Hippokratia* 11.4 (2007): 175-177.

34. Mohanty S., *et al.* "Optimal perioperative management of the geriatric patient: a best practices guideline from the American College of Surgeons NSQIP and the American Geriatrics Society". *Journal of the American College of Surgeons* 222.5 (2016): 930-947.

35. Fleisher LA., *et al.* "2014 ACC/AHA guideline on perioperative cardiovascular evaluation and management of patients undergoing noncardiac surgery". *Journal of the American College of Cardiology* 64.22 (2014): e77-e137.

36. Ely EW., *et al.* "Delirium in mechanically ventilated Patients Validity and reliability of the confusion assessment method for the intensive care unit (CAM-ICU)". *The Journal of the American Medical Association* 286.21 (2001): 2703-2710.

37. Rudolph JL., *et al.* "Derivation and validation of a preoperative prediction rule for delirium after cardiac surgery". *Circulation* 119 (2009): 229-236.

38. Inouye SK., *et al.* "Delirium in elderly people". *Lancet* 383.9920 (2014): 911-922.

39. Mebazaa A., *et al.* "Clinical review: Practical recommendations on the management of perioperative heart failure in cardiac surgery". *Critical Care* 14 (2010): 201.

40. Baquero GA and Rich MW. "Perioperative care in older adults". *Journal of Geriatric Cardiology* 12.5 (2015): 465-469.

41. Falzone E., *et al.* "Postoperative analgesia in elderly patients". *Drugs and Aging* 30.2 (2013): 81-90.

42. Barnett SR. "Polypharmacy and perioperative medications in the elderly". *Anesthesiology Clinics* 27.3 (2009): 377-389.

43. Kim G., *et al.* "Effect of pre-warmed intravenous fluids on perioperative hypothermia and shivering after ambulatory surgery under monitored anesthesia care". *The Journal of Anesthesia* 28.6 (2014): 880-885.

44. Kreymann KG., *et al.* "ESPEN Guidelines on Enteral Nutrition: intensive care". *Clinical Nutrition* 25 (2006): 210-223.

45. Braga M., *et al.* "ESPEN Guidelines on Parenteral Nutrition: surgery". *Clinical Nutrition* 28 (2009): 378-386.

Volume 17 Issue 2 Febuary 2021