

Perioperative Management of the Geriatric Patient

V Joshi*, S Shivkumaran**, V Bhargava**, B Kansara**, RS Sharma***

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Introduction

Large number of elderly individuals are undergoing surgery because of the advances in surgical and anesthetic techniques combined with sophisticated perioperative monitoring.^{1,2} Preoperative assessment is useful to identify risk factors and to recommend a management plan that minimizes the risks. Each person should be assessed individually and judgments should be based on an individual's problem and physiological status, not on age alone. Older persons often have overlapping comorbid conditions that limit their functional capacity, recovery and increase the risk of death. Advanced age, poor functional status, impaired cognition, and limited home support are risk factors for adverse outcomes.³⁻⁸ In one study, the mortality rate for patients older than 70 years undergoing elective cholecystectomy was nearly 10 times that for younger patients. In a study of abdominal operations, the mortality rate for patients aged 80-84 years was 3%; the rate was 9% for patients aged 85-89 years and 25% for those older than 90 years.⁹ However, when age and severity of illness are directly compared, severity of illness is a much better predictor of outcome compared to age.⁷ Emergency operations are an independent predictor of adverse postoperative outcomes in elderly persons.^{10,11}

Preoperative Assessment

A complete history with full medication list, physical examination, laboratory examinations, and an assessment of the surgical risks should be included for a preoperative evaluation of an elective surgery.

Informed consent

The patient, consenting family member(s) or legal guardian(s) should be told about the procedure and

regarding any potential complications or disabilities. Decision capacity is a prerequisite for providing legally and morally sufficient informed consent or refusal.¹²

Nutritional status

Nutritional status should be determined, as those who are malnourished have increased morbidity and mortality.^{13,14} The laboratory assessment of malnutrition generally includes a complete blood cell count, albumin level, and transferrin levels. Albumin levels of less than 3.2 g/dl in a frail elderly person is a risk factor for increased mortality. A body mass index of less than 20 kg/m² also suggests a high risk.

Physical examination

A complete and careful physical examination is necessary. The important points to be noted are hydration, nutritional status, the neck (lymph nodes, thyroid masses, carotid pulsations and bruits), blood pressure, the abdominal examination for lesions such as hernia, aortic aneurysm and incidental masses. Rectal examination is a prerequisite, as is pelvic examination in women. Any evidence of peripheral vascular disease should be identified.

Investigations

Current data shows that routine testing based on age alone is not indicated. Significant predictors of adverse outcome after surgery in the elderly are not the laboratory abnormalities but rather American Society of Anaesthetist status and surgical risk.¹⁵

System oriented perioperative care

Cardiovascular diseases

Cardiac complications are among the most common and the most serious postoperative problems. The strongest predictors of adverse cardiac outcomes are recent myocardial infarction (MI), uncompensated congestive heart failure (CHF), unstable ischemic heart disease, and certain cardiac rhythm disorders.¹⁶ The major clinical predictors are unstable coronary

* Professor, ** Senior Resident, ***Professor and Head, Department of Anesthesiology and Critical Care, M G Hospital, Dr S N Medical College, Jodhpur.

Address for correspondence:

Dr Vinay Joshi, Professor, Department of Anesthesiology and Critical Care, M G Hospital, Dr S N Medical College, Jodhpur-342003.

syndromes, decompensated CHF, significant arrhythmias, and severe valvular diseases. Intermediate clinical predictors are mild angina pectoris, prior MI, compensated or prior CHF, and diabetes mellitus. Minor clinical predictors are advanced age, abnormal ECG findings, rhythm other than sinus, low functional capacity, history of stroke, and uncontrolled systemic hypertension.¹⁷ The assessment of functional capacity is based on energy expenditure measured in terms of metabolic equivalents (METs).

If an emergency surgery is needed, the patient's risk stratification and management is assessed afterwards. If the surgery is urgent or elective and if the patient has had coronary revascularization within five years and has had no recurrent symptoms or signs, patient can be considered for surgery. If the patient has recurrent symptoms or signs but has had a recent coronary evaluation, such as angiogram or stress test, with a favorable result, then surgery is considered with calculated risk. If coronary evaluation results are unfavorable or if change in symptoms occurs, then American College of Cardiology / American Heart Association Task Force's Practice Guidelines on perioperative cardiovascular evaluation for noncardiac surgery is to be followed.^{16,17}

Perioperative betablocker therapy has been shown to reduce long term (six months) mortality rates, with few adverse effects.^{17,18} Thus, the perioperative use of atenolol is recommended in patients with coronary artery disease or in those individuals with risk factors for coronary artery disease unless the patient has significant contraindications, such as asthma. Due to lack of controlled evidence, no recommendations can be made either for or against the use of other medical therapies such as digitalis, nitrates, or calcium channel antagonists. Therapy with these drugs should be continued or started based on the same criteria that would apply in the non operative setting.

If the initial evaluation indicates mild or moderate hypertension and no associated metabolic or cardiovascular abnormalities, no reason exists to delay the surgery. Anti hypertensive medications should be continued during the perioperative period; a diastolic blood pressure of 110 mm Hg or higher requires control before undergoing surgery. If patient is on beta blockers or clonidine, they should be continued because of potential heart rate and blood pressure rebound. In the postoperative period, acute elevations in blood pressure,

labile blood pressure, sometimes significant hypotension can occur. Occasionally, uncontrolled pain, ischemia, fluid overload, excitement, electrolyte abnormalities, anxiety or a distended bladder can cause hypertension. As much as 30% of postoperative hypertension is idiopathic and resolves within three hours. When secondary causes are not responsible for the rise in the blood pressure, treatment with calcium channel antagonists, beta blockers and drugs that block both alpha and beta adrenergic receptors should be considered.

CHF is a significant risk factor associated with poorer outcomes.¹⁹ In patients aged sixty five years and above, heart failure patients undergoing major noncardiac surgery experience substantial morbidity and mortality despite advances in perioperative care, whereas those with coronary artery disease without heart failure have similar mortality compared with a more general population. Identifying heart failure based on findings from a careful history and physical examination is important. If possible, the cause should be identified and treated accordingly.

Pulmonary diseases

Pulmonary diseases increase the risk of postoperative complications, accounting for 40% of postoperative complications and 20% of deaths.^{20,21} Age related changes such as increased closing volumes, decreased expiratory flow rates, increased dead space and decreased diffusing capacity predispose older persons to pulmonary complications. Ventilatory responses to hypoxia, hypercarbia and mechanical stress are impaired secondary to reduced central nervous system activity.²⁰ There is also an exaggerated respiratory depression to benzodiazepines, opioids, and volatile anaesthetics.^{20,21} The additive effect of supine position, general anesthesia and abdominal incisions leads to a significant reduction in functional residual capacity and an associated increase in airway resistance. The combination of these effects predisposes patients to atelectasis, with the risks of hypoxemia and infection. Additionally, postoperative pain and use of analgesics contribute to a reduced tidal volume and impaired clearing of secretions dependent on adequate coughing and deep breathing.

The preoperative functional level has been shown to be a reliable predictor of pulmonary complications. Preoperative smoking cessation, antimicrobial therapy for bronchitis, perioperative bronchodilator therapy,

optimization of therapy for uncompensated right heart failure, inhalation of humidified gas, postural drainage, and chest physiotherapy can reduce pulmonary complications, lower mortality and shorten hospital stay. Pulmonary function testing is indicated in patients considered for lung resection. Abnormalities suggesting an increased risk of postoperative pulmonary complications include a vital capacity of less than 50% of predicted, a forced expiratory volume in one second (FEV 1) of less than 2 L or less than 50% predicted or the presence of substantial hypoxemia or hypercapnia. Hypoxic pulmonary vasoconstriction is blunted in elderly and can cause difficulty with one lung ventilation.²²

Renal diseases

Preoperative renal status is the best universal predictor of postoperative renal failure. Serum creatinine is a poor predictor of renal function in older patients with renal disease. Paying close attention to volume status, aggressively treating infections and avoiding the use of nephrotoxic drugs are critical to minimize postoperative renal deterioration in older adults.

Diabetes mellitus

Diabetes mellitus is associated with increased incidence of perioperative complications including ketoacidosis, stroke, renal failure and sepsis. Recommendations for the control of blood sugar levels are made based on the extent of surgery and time of resumption of a normal diet. The glucose level should be less than 300 mg/dl preoperatively (preferably <200 mg/dl). Prevention of hyperglycemia during the perioperative period has been shown to improve wound healing, reduce the risk of infection and reduce cerebral damage in the presence of a hypoxic event. Diabetic patients undergoing major noncardiac surgery appear to have a high mortality rate, often because of cardiovascular death.²³

Thromboembolic disease

An estimated 20-30% of patients undergoing general surgery without prophylaxis develop deep vein thrombosis and the incidence rate is as high as 40% in those undergoing hip and knee surgery, gynecologic cancer operations, open prostatectomies and major neurosurgical procedures. Fatal pulmonary embolism is a major cause of operative deaths in elderly persons. The Fifth American College of Chest Physicians Consensus Conference on Antithrombotic Therapy recommendations can be followed for risk assessment,

prophylaxis, intraoperative and postoperative anti-thrombotic therapy.²⁴

Neuropsychiatric disorders

Neuropsychiatric problems are common among older patients. Delirium, dementia and depression are common important conditions to be considered. 15% of all patients admitted for repair of hip fractures have dementia. Depression is also common among older patients and can be exacerbated by any acute illness or hospitalization.²⁵ An abrupt change in cognition and consciousness is the major manifestation of delirium. New onset visual hallucinations in elderly patients are more suggestive of delirium than of a new psychiatric disorder. Delirium develops in at least 15% of elderly surgical patients and studies show that hospitalized patients with delirium have higher rates of morbidity compared to hospitalized patients in control groups and that delirium is a predictor of poor outcome.^{26,27} The length of stay in hospital for a patient with delirium is increased by 60%, and their rate for nursing home placement is five times higher. Independent, specific factors that preoperatively predicted postoperative delirium in elderly patients are age, poor cognitive function, poor physical function, self reported alcohol abuse, aortic aneurysm surgery, noncardiac thoracic surgery and abnormal preoperative sodium, potassium, or glucose level. Independent precipitating factors for delirium are use of physical restraints, malnutrition, respiratory insufficiency, dehydration, addition of more than three medications and nosocomial infection.²⁸⁻³⁴

Intraoperative risk factors for delirium include the type of surgery, hypoperfusion and anesthetic drugs. Delirium occurs after general surgery in 10-15% of patients, after orthopedic surgery in 28-61% of patients, and after cataract surgery in 1-3% of patients. After surgery for femoral neck fractures or bilateral knee replacements, delirium occurs in up to 61% of elderly patients. Several studies have found no difference in the effects of general, epidural, or spinal anesthesia on postoperative delirium rates if medications are controlled for in the analysis.²⁷

Postoperative factors associated with delirium include hypoxia and hypocapnia. The rate of postoperative delirium decreases from 61.3% to 47.6% when geriatric assessment is performed both preoperatively and postoperatively and when appropriate interventions are implemented. Perioperative donepezil decreases postoperative confusion and delirium.

Perioperative interventions should focus on

thrombosis prophylaxis, oxygen therapy, prevention and treatment of perioperative hypotension, prompt identification and treatment of postoperative complications. Improving orientation by placing clocks, calendars, appropriate lighting, decreasing sensory overload, providing reassurance and using personal hearing aids and eyeglasses are some of the non pharmacologic interventions for delirium. Intubated patients should have access to communication via word boards, paper and pencil. Physical restraints have not been shown to be safe or effective in the management of delirium. Observation by the nursing staff or family members provides better patient care than physical restraints.

Patients with Parkinson disease require special attention during the perioperative period. These include withholding medications in patients who are advised nothing by mouth, can cause significant worsening of symptoms. Patients may experience hypoxia from stiffening of chest wall muscles, dysphagia and worsened tremor (which can cause increased pain at the operative site). If possible, a feeding tube can be used to administer the medications at appropriate times. Patients who take levodopa may develop orthostatic hypotension, nightmares, hallucinations and occasionally delirium, all of which may worsen with the addition of surgery and anesthesia. Anticholinergic drugs such as trihexyphenidyl are used alone in the early stages of treatment and later to supplement levodopa. Adverse effects may include dry mouth, urinary retention, constipation, confusion, delirium and impaired thermoregulation due to decreased sweating. Meperidine and propoxyphene should be avoided in elderly persons because of the accumulation of toxic metabolites and the potential severe reaction.

Intraoperative care

Regional versus general anaesthesia

Most evidences show little difference between regional and general anaesthesia in elderly.³⁵ However regional anaesthesia may show some benefits like affecting coagulation system by preventing postoperative inhibition of fibrinolysis, thereby decreasing deep vein thrombosis and pulmonary embolism. There may be decreased blood loss in pelvic and lower limb surgeries in regional anaesthesia. Patient in regional anaesthesia do not undergo airway instrumentation, hence have lower risk of hypoxia.³⁶

Hypothermia

Maintaining body temperature is important because hypothermia is associated with myocardial ischemia and hypoxia in early postoperative period.³⁷ Advanced age and general anesthesia are associated with hypothermia. Spinal anaesthesia with high blockade can also lead to decreased core temperature.

Postoperative pain management and care

Hypoxemia is more common during transportation of elderly patient and in early postoperative period. So supplementary oxygenation and oxygen saturation monitoring is mandatory during this period. Pain management is a crucial aspect of perioperative care.³⁸ There is age related decrease in pain perception.^{39,40} Depression, anxiety, fear, fatigue and cognitive impairment can affect the perception of pain. The treatment plan should anticipate the need for pain control which should be individualized, it should be assessed and modified frequently based on the patient's response. Both medical and nonpharmacologic approaches, such as physical agents and cognitive behavioral approaches, should be used.^{41,42} The risk of addiction to opioids is small when used for acute pain syndromes.⁴³ To avoid the risk of acetaminophen toxicity, the dose should not exceed 4 g/day in older patients with normal liver function. Older persons, who are hospitalized for acute illnesses including surgical interventions, often lose their independence and are discharged to institutions for long term care. Specific changes in the provision of acute hospital care can reduce the frequency of discharge to institutions for long term care. Individualized care, consultation with specialists in multiple disciplines such as nurses, social service counselors, pharmacists, physical and occupational therapist whenever possible promote an optimal patient outcome.⁴⁴

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