

Anaesthetic Considerations in the Elderly Undergoing Surgery: A Report of Three Cases.

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Abstract: The number of elderly population is increasing due to better medical care and facilities. Elderly patients require special consideration for anaesthesia. Because of decline in the organ system function, this group of patients is less able to respond to perioperative stress and more likely to suffer from an adverse postoperative outcome. The most important factors for management of elderly patients include a thorough preoperative assessment, optimizing the patient, proper anaesthetic plans, intraoperative and postoperative monitoring and prompt diagnosis & management of complications.

INTRODUCTION

The number of elderly population is increasing due to better medical care and facilities. Age increases the probability of a person to undergo surgery. Perioperative morbidity becomes more frequent in the elderly with steep increases after the age of 75. The elderly patient poses a specific challenge to the anaesthesiologist whose role might extend from perioperative physician to palliative care provider. The incidence of perioperative complications is much higher in these patients due to reduced functional reserve and a high incidence of comorbidity, but these complications can be minimized by careful preoperative assessment, a meticulous anaesthetic technique and good postoperative care¹.

CASE REPORT 1

A 108 year old male was scheduled for surgery for fracture of trochanter. He had dementia and history of fall 5 days back. Blood pressure (BP) was 140/90 mm Hg and pulse was 92/minute with missed beats. On systemic examination, air entry was decreased bilaterally & cardiovascular system was unremarkable. His blood biochemistry was normal. Chest X ray showed emphysematous changes. Electrocardiography (ECG) showed left bundle branch block. Echocardiography revealed ejection fraction 40% with mild mitral regurgitation. Spinal anaesthesia was planned for the procedure. In the operating room standard monitors (five lead ECG, BP & pulse oximeter) were attached. In addition, a central venous catheter was inserted in right internal jugular vein to guide fluid management. Spinal anaesthesia was given with 1.5 ml of 0.5% hyperbaric bupivacaine & 25 µg fentanyl. Adequate sensory block was achieved upto T₈. Intraoperative BP dropped to 90 mm Hg & frequent ventricular ectopics occurred in ECG. Mephentermine was given in a dose of 3 mg intravenously and repeated thereafter for 3 times but BP did not respond to mephentermine. Infusion of dopamine was started and BP rose to 120/70 mm Hg. Infusion of xylocard was started to treat frequent ventricular ectopics. Surgery lasted for 1 hour. After the surgery, the patient was shifted to ICU for close monitoring & shifted back to ward on 4th postoperative day. He was discharged home on 10th postoperative day in stable condition.

CASE REPORT 2

A 95 year old male presented in emergency operation theatre with perforation peritonitis. He had history of pain abdomen since 2 days. Past history revealed history of hypertension of 10 years duration. He was on tablet amlodipine 5 mg twice a day. His airway examination was unremarkable. BP was 150/80 mm Hg and pulse was 100/minute. On systemic examination cardiovascular system and respiratory system were normal. His blood biochemistry was normal. Chest X ray was normal and ECG revealed left ventricular hypertrophy. We planned epidural analgesia for postoperative pain relief but the patient could not be convinced for epidural catheter insertion. General anaesthesia was planned for the procedure. The anaesthetic procedure was explained to the patient and high risk written & informed consent was obtained. In the operating room standard monitors were attached. Rapid sequence induction was done using fentanyl, propofol and succinylcholine. Anaesthesia was maintained with isoflurane, atracurium and 67% nitrous oxide in oxygen. Central venous catheter was inserted in right internal jugular vein to guide fluid management. Intraoperatively ST depression occurred in ECG. NTG was started @ 1 µg/kg/min. Cardiac

markers were negative. At the end of surgery, residual neuromuscular blockade was reversed with neostigmine and glycopyrrolate. Postoperative analgesia was provided by diclofenac 75 mg 8 hourly intramuscularly for next 48 hours. Postoperatively patient was shifted to ICU for close monitoring, shifted back to ward on 4th postoperative day & discharged on 10th postoperative day.

CASE REPORT 3

A 102 year old male, known hypertensive was scheduled for surgery for fracture of trochanter with history of fall 3 days back. BP was 150/94 mm Hg and pulse was 96/minute with missed beats. Heart sounds were normal and air entry was decreased bilaterally. His blood biochemistry was normal. Chest X Ray showed emphysematous changes. ECG revealed left ventricular hypertrophy. Echocardiography revealed ejection fraction 42 % with mild diastolic dysfunction. He was on tablet amlodipine 5 mg once a day. Continuous spinal anaesthesia was planned for the procedure. In the operating room standard monitors were attached in addition to catheterization of internal jugular vein for monitoring of central venous pressure. Continuous spinal anaesthesia was given with Touhy epidural needle of 18 G. After obtaining free flow of cerebrospinal fluid, 20 G epidural catheter was threaded into the subarachnoid space upto a distance of 3 cm & fixed. 1.2 ml of 0.5% hyperbaric bupivacaine with 25 µg fentanyl was injected intrathecally. Adequate sensory block was achieved upto T₁₀. Intraoperatively there was one episode of hypotension which was corrected by injection mephentermine. Postoperative course was uneventful.

DISCUSSION

Two principles should be kept in mind when performing preoperative evaluation of a geriatric patient. First, the disease processes that are commonly associated with ageing and second, one should assess the degree of functional reserve of the patient. In geriatric patients, the functional capacity of organs declines and coexisting diseases further contribute to this decline. Further, the elderly are more sensitive to anaesthetic agents and generally require smaller doses for the same clinical effect and drug action is usually prolonged. Therefore, all aspects of anaesthesia i.e. perioperative management, type of anaesthetic technique, choice of anaesthetic agents etc. require careful consideration in geriatric patients¹. Risk assessment depends primarily on four factors: (1.) Age, (2.) The patient's physiologic status and coexisting disease {American Society of Anaesthesiologists (ASA Class)}, (3.) Whether the surgery is elective or urgent and (4.) Type of procedure. Anaesthetic complications are related to age. Age is an important predictor of any serious adverse perioperative event².

We used spinal anaesthesia in 1st case & continuous spinal anaesthesia in 3rd case because some aspects of regional anaesthesia may provide benefit for these elderly patients. Regional anaesthesia decreases the incidence of deep vein thrombosis after total hip arthroplasty³. The hemodynamic effects of regional anaesthesia may be associated with reduced blood loss in pelvic and lower extremity operations⁴. Regional anaesthesia does not require instrumentation of the airway and patients maintain their airway and pulmonary functions. Patients undergoing regional anaesthesia may have a lower risk of hypoxemia.

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Maintenance of consciousness during surgery permits prompt recognition of acute changes in cerebral function or the onset of angina pectoris¹. In addition, spinal anaesthesia facilitates early ambulation and minimizes the requirement of postoperative analgesia. These advantages support the use of regional anaesthesia for elderly patients undergoing surgery. Time of onset is decreased and spread is more extensive with hyperbaric bupivacaine for spinal anaesthesia⁵. We used bupivacaine in less dosage as decreased dose is required for spinal anaesthesia in elderly patients. Fentanyl was used as narcotics have minimal depressing effect on cardiac function. Prolongation of spinal anaesthesia in elderly patients may reflect decreased vascular absorption of local anaesthetics owing to decreased blood flow in atherosclerotic blood vessels surrounding the subarachnoid space.

The continuous spinal anaesthesia (CSA) technique offers several advantages over single shot spinal anaesthesia like fewer hemodynamic alterations and side effects by enabling the reduction and fractionation of the induction dose through a catheter. Initially micro catheters were recommended (28 G) for CSA but two main problems have been reported with the use of micro catheters i.e. inadequate anaesthesia and neurotoxic effects-cauda equina syndrome⁶. For these reasons use of epidural catheter as spinal catheter is gaining acceptance now a days^{7,8}. Parthasarathy et al⁹ in a study of 60 patients while using CSA with epidural catheters concluded that it is a simple and safe alternative for prolonged procedures with negligible failure rate especially in high risk patients and in patients with possible difficulties in administration of general anaesthesia. The slow onset block of the sympathetic system with CSA technique allows the cardiovascular system to adapt more easily than when the block is more abrupt as in single dose spinal anaesthesia. Another method of anaesthesia in these patients is with the help of nerve blocks.

In 2nd case report, where patient presented with perforation peritonitis, general anaesthesia was used because of requirement of high level of anaesthesia. Selection of drugs for general anaesthesia must consider changes in organ system function that accompany aging as well as altered responses to drugs because of age related changes in pharmacokinetics and pharmacodynamics. Minimum alveolar concentration (MAC) decreases approximately 6% per decade for inhaled anaesthetics & a similar pattern is observed for MAC awake¹⁰. The elderly are more sensitive to anaesthetic agents & generally require smaller doses for the same clinical effect and drug action is usually prolonged. The duration of action of neuromuscular blockers may be prolonged if their metabolism depends on renal or hepatic

excretion. Decreased cardiac output and delayed clearance of drugs may contribute to a slow onset of drug effects followed by prolonged drug effects. The combination of decreased anaesthetic requirements and decreased cardiac output can increase the risk of anaesthetic overdose especially with volatile anaesthetics¹.

Induction of anaesthesia decreases sympathetic nervous system activity, this response may manifest as hypotension during induction of anaesthesia in elderly patients. Progressive decreases in the reactivity of protective upper airway reflexes may increase the importance of protecting the lungs from aspiration by placing a cuffed tube in the patient's trachea. In general anaesthesia it is of major importance to titrate drug doses and it would be prudent to use short acting drugs as we used in present case. Advanced age & general anaesthesia are associated with hypothermia. Maintenance of normothermia is important as hypothermia is related to myocardial ischemia & hypoxemia in the early postoperative period.

Pulmonary problems are of major importance in the post operative period. Attention to the development of arterial hypoxemia or myocardial ischemia is important in post operative period. Early ambulation is recommended to decrease the likelihood of pneumonia or deep vein thrombosis¹.

To conclude, minimizing perioperative risk in geriatric patients requires thorough preoperative assessment of organ function & reserve, meticulous management of coexisting diseases and vigilant monitoring during intraoperative & postoperative period.

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LITERATURE REVIEW

20-YEAR ANALYSIS OF KIDNEY TRANSPLANTATION: A SINGLE CENTER IN JAPAN.

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Patient and graft survival after successful kidney transplantation (KT) have improved despite an increase in the number of challenging cases. Various factors have evolved during the long history of kidney transplantation. Between 1988 and 2012, a total of 292 living donor and 56 deceased donor KT were performed at Niigata University Hospital. Long-term patient and graft survival and changes in background during a 20-year period in a single center were retrospectively analyzed. Excellent patient survival rates of 95.1% at 20 years for living donor KT and 96.2% at 15 years for deceased donor KT were observed. Graft survival rates at 1, 5, 10, 15, and 20 years were 96.8%, 95.4%, 83.1%, 61.8%, and 56.2% in living donor KT, respectively. In contrast, graft survival rates at 1, 5, 10, and 15 years in deceased donor KT were 89.0%, 80.3%, 77.3%, and 33.8%, respectively. These survival rates have dramatically improved since 2002 (91.7% for living and 80.9% for deceased donor KT at 10 years post-transplantation). The number of elderly recipients (older than 60 years) and the percentage of grafts donated from spouses have increased. The rejection rate decreased and the cytomegalovirus antigenemia-positive rate increased during the 20-year period assessed. The percentage of pre-emptive KT progressively increased, with graft survival in this group tending to be better than non-preemptive KT. The causes of graft loss were chronic allograft dysfunction (54.7%), acute rejection (11.1%), and malignancies (9.4%). After living donor KT, the principal predictors of graft loss were if the recipient was younger than 30 years, if the donor was older than 50 years, and if the rejection episodes occurred after living donor KT. In contrast, the only risk factor in the case of deceased donor KT occurred after transplantation from donors who were older than 50 years. A summary of the long-term outcome of KT over 20 years in a single center has been reported. Along with the changes in patient backgrounds, immunosuppressive drugs, and our knowledge of transplantation, patient and graft survival outcomes have also changed. Investigation into such outcomes during a different transplantation era is required to fully appreciate advances in KT.