CASE REPORT

Intraoperative Arrhythmia during Oral Malignancy Surgery in Geriatric Patient with Ischemic Heart Disease – A Case Report

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ABSTRACT

Advances in medical field have resulted in increased life expectancy. Hence, world is aging due to increased geriatric population resulting in 4-fold rise in surgical diseases in the elderly. Hence, operation theater will be occupied by 25% geriatric population, necessitating need of experienced and skillful geriatric anesthesiologists. Ischemic heart disease remains major cause for perioperative complications among all cardiac events contributing to more than half of post-operative deaths. Knowledge of altered cardiovascular physiology in geriatrics, identification of risk factors, optimization, and skillful selection of anesthesia techniques, and drugs are important during the management of ischemic heart disease (IHD) cases during major non-cardiac surgeries. We report successful management of a geriatric patient with IHD and management of intraoperative episode of premature ventricular contractions during oral malignancy surgery under general anesthesia.

Key words: Geriatric anesthesia, ischemic heart disease, non-cardiac surgery, perioperative arrhythmias

INTRODUCTION

Ischemic heart disease is a leading cause of perioperative complications. Perioperative morbidity and mortality are potentially higher in geriatric patients with known ischemic heart disease (IHD) undergoing major non-cardiac surgeries. Demographically geriatric population in world will be increasing from 0.05 billion (1990) to 2.1 billion (2050). Projected rise in India is from 8% (2015) to 19% (2050).[1] There will be 25% elder population in operation theater.

Major surgery stresses the cardiovascular system; this stress demands increased functioning of myocardium which cannot be achieved by diseased myocardium, resulting in substantial unwanted outcome in perioperative period. The complications which can cause death include myocardial ischemia, arrhythmia, cardiac failure/arrest, and multiple organ dysfunction syndrome secondary to low cardiac output state.[2] The American Heart Association and College of Cardiology have issued guidelines for perioperative cardiovascular evaluation for non-cardiac surgery.

CASE REPORT

A 70-year (young old) male with IHD had swelling under the tongue, gradually increasing in size over 6 months. The diagnosis was squamous cell carcinoma with cervical lymph node metastasis. The patient was posted for wide local excision with hemi-mandibulectomy with modified radical neck dissection with pectoralis major myocutaneous flap cover. Past history includes chronic alcoholism and smoking for more than 40 years, episode of anterior wall myocardial ischaemia 8 years back for which the patient underwent percutaneous coronary intervention (PCI) – drug-eluting stent placement of Left Anterior Descending artery and tablet metoprolol 25 mg OD.

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Examination

The patient is moderately built, well nourished, weighs 65 kg, with a regular pulse rate of 52/min, blood pressure of 120/70 mm Hg and S3 gallop on auscultation. Mouth opening according to modified mallampatti grading is grade III, and neck and tempero-mandibular joint movement is normal.

Blood investigations were all within normal limits. Chest X-ray showed cardiomegaly, electrocardiogram (ECG) showed anterolateral wall ischaemia, echocardiography reports severe hypokinesia of anterior wall, grade I diastolic dysfunction, sinus bradycardia, with an ejection fraction (EF) of 30%.

Anesthesia management

Pre-operative counseling and informed consent were obtained with ASA Grade III. On the day of surgery, metoprolol continued. Blood and intensive care unit (ICU) bed reserved. Intravenous (IV) line secured with two 18G intracaths. Inj. midazolam 1 mg, Inj. fentanyl 140 mcg was given. Ringer lactate used as maintenance fluid.

General anesthesia was induced with Inj. Etomidate 14 mg. Inj. Rocuronium 40 mg used for intubation. To prevent laryngoscope pressor response, Inj. Lignocaine 2% 100 mg was given 90 s before intubation. Intubation done with 8.5 mm cuffed endotracheal tube. Anesthesia was maintained with isoflurane, O_2, N_2O, and vecuronium. Intraoperative episode of premature ventricular complex (PVC) 4–5/min occurred. The patient was hemodynamically stable; hence, vigilant monitoring continued and plane of anesthesia deepened but occurrence of PVC intensified to 10–15/min. To prevent generation of ventricular tachycardia/fibrillation – Inj. Lignocaine 1 mg/kg i. v bolus was given and PVCs terminated. Surgery duration was 8 h. Inj. Fentanyl used as intraoperative analgesia. Total blood loss 1000 ml and replaced. Normothermia was maintained. Metabolic acidosis corrected. The pateint was Shifted to ICU for elective ventilation. ECG, Spo_2, non-invasive blood pressure (NIBP), blood gas, and urine output monitored. Acetaminophen and fentanyl are given for post-operative analgesia. Extubation was done on next day and shifted toward after 72 h.

DISCUSSION

Perioperative cardiac complications are common cause of death and major morbidity in geriatric patients undergoing non-cardiac surgery with cardiac comorbidity. Anesthesia goals for IHD patient are stable hemodynamic, balancing oxygen supply and demand of the myocardium, maintaining normothermia and effective post-operative analgesia, and ICU care.[3]

Structural and functional changes in coronary vasculature affect myocardial perfusion with aging. Structural changes in CVS include decreased myocyte number, left ventricular wall thickening, aortic valve sclerosis, mitral annular calcification, decreased conduction fiber density, and sinus node cell number.[4] This leads to functional (physiological) changes–decreased myocardial contractility, increased myocardial stiffness, increased ventricular filling pressures, and decreased β-adrenergic sensitivity.[5]

Cardiac adjustments due to stiffened arteries lead to increased systolic and pulse pressure, increased aortic root diameter, and aortic wall thickness. This causes increased LV afterload and increased LV tension, LV hypertrophy, and impaired diastolic function so that cardiac rhythm other than sinus is poorly tolerated. Myocytes hypertrophy occurs to compensate cardiac muscle cell death, which is another cause for ventricular hypertrophy. Stiff veins are less able to "buffer" changes in blood volume and are less effective reservoir of blood making elders more sensitive to hypovolemia. Volume shifts cause exaggerated changes in cardiac filling pressure.

There is decreased β-responsiveness, increased sympathetic nervous system activity, and reduced SA nodal cells with fibrotic infiltration of conduction system. Hence, pre-load reserve remains most important to meet increased peripheral flow demand.

Our patient had a history of IHD and echo showed global wall hypokinesia, EF 30%, and Grade I diastolic dysfunction. The patient had undergone emergency PTI. IHD/scarring if interferes with normal electrical impulses can cause PVCs. In healthy people, occasional PVCs are harmless, resolve without treatment. However, in geriatric patient with IHD, PVCs can be life threatening if not vigilantly treated. Risk factors for PVCs in our case are 70-year-old age, chronic smoking, chronic alcoholic, anxiety, IHD, malignancy, and stress of 8 h major surgery/anesthesia and intraoperative 1000 ml blood loss. Treatment included eliminating these risk triggers, hemodynamic stability, and treating major blood loss. In chronic cases of PVCs, beta-blockers which are often used to treat hypertension and radiofrequency catheter ablation may be needed.[6]

Successful management of this patient needs a holistic multidisciplinary approach. In elective surgery, pre-operative evaluation and medical optimization are important.[3] Pre-operative evaluation includes history, clinical assessment, functional capacity, risk stratification, and appropriate investigations. In this patient having a history of myocardial infarction with PCI, cardiac risk factor stratification is done according to the revised cardiac risk index and falls under intermediate-risk patient with 7% chance for major cardiac complication and intermediate cardiac risk surgery with 1–5% cardiac mortality.[7]

Our approach for this patient included well-oriented pre-operative counseling, pre-medication with anxiolytic, and continuing beta-blocker therapy on day of surgery.[2] Etomidate being most cardio stable was chosen as induction agent of choice. The powerful stressor response of intubation (hypertension and tachycardia) was avoided using opioid and lignocaine before intubation. Isoflurane was used as maintenance agent due to the advantage of ischemic pre-conditioning.[8] Opioid and nonsteroidal anti-inflammatory drugs were used to reduce the stressor response of surgical pain preventing ischemia risk. Monitoring of heart rate, ECG, NIBP, Spo_2 were done to detect any intra-operative arrhythmia, ischemic changes and hypoxemia. In this patient, elective ventilation was decided for correction of acid–base abnormality, replacing major blood loss, and prolonged surgical duration. Episode of arrhythmia was tackled immediately and effectively preventing worsening to tachyarrhythmias.

CONCLUSION

Geriatric patient with IHD undergoing major non-cardiac surgery is associated with greater morbidity and mortality. Goal is to achieve hemodynamically stable anesthesia which includes stratifying patient risks using cardiac risk assessment and selective use of investigations, optimization, appropriate knowledge about pathophysiology of disease and anesthesia drugs, and skillful techniques in geriatrics. There is a need of knowledgeable and trained geriatric anesthesiologists for imminent silver tsunami.

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