Anesthetic management of spinal decompression in double vessel coronary artery disease

Sir,

Patients with coronary artery disease pose challenge to anesthesiologist to maintain stable cardiovascular status as well as decreasing the morbidity and mortality. Usually in elective surgeries, management of cardiac risk factors precedes definitive surgical procedure. We present the anesthetic management of a patient with double vessel coronary artery stenosis necessitating angioplasty which was deferred for surgical management of progressive neurological deficit due to spinal cord compression.

A 71-year-old female presented with complaints of progressive paraparesis with bladder and bowel involvement for past 6 months. She was a known case of hypertension controlled on medication. Neurological examinations revealed sensory deficit in both lower limb with motor power of grade 3/5. Magnetic resonance imaging (MRI) scan showed severe cord compression at D_{10-11} with ossified ligamentum flavum. Preoperative echocardiography revealed hypokinesia of mid and apical anterior wall, dilated left atrium with left ventricle diastolic relaxation impairment and normal left ventricle systolic function (LVEF 55%). The patient was advised coronary angiography by the cardiologist which revealed a dominant right coronary artery with stenosis of left anterior descending artery (85%) and obtuse marginal artery (99%). Cardiologist advised angioplasty of left circumflex artery before spinal surgery. Preoperative counseling was done explaining the advantages and disadvantages of surgery. The relatives decided to defer any cardiological intervention, as it delayed spinal surgery as well as decreased the chances of neurological reversibility with passage of time. Tablet metoprolol 25 mg OD was added to her medication. The cardiac condition was stable with these medications. The patient was premedicated with oral lorazepam 2 mg and ranitidine 150 mg, night before and 2 hours prior to surgery. In the operating room, standard monitoring including electrocardiography (ECG), pulse oximetry, and noninvasive blood pressure were attached. Peripheral venous, left radial arterial and right internal jugular vein cannulation were performed under local anesthesia. Her preinduction heart rate was 64 beats/minute, arterial blood pressure (ABP) was 130/80 mmHg and central venous pressure (CVP) was 4 mmHg. Preoperative external cardiac pacemaker pads were attached to deal with any emergency situation and right femoral arterial cannulation was done for emergency placement of intra aortic balloon pump. Anesthesia was induced with titrated dose of injection (inj) midazolam, fentanyl, and thiopentone. Tracheal intubation was facilitated with vecuronium 0.1 mg/kg body weight. Maintenance of anesthesia was done with O_2:N_2O (50:50), sevoflurane and intermittent boluses of vecuronium and fentanyl. Ventilation was adjusted to maintain an $EtCO_2$ value between 30 and 35 mmHg. Temperature was maintained at around 36°C. Spinal decompression lasted 4 hours. In the perioperative period heart rate was maintained in the range of 54-76/minute, ABP between 110 and 140 mm of Hg, and CVP in the range of 4-8 mmHg. The cardiologist was on standby for emergency pacing, if required. Intravenous fluid management was guided by CVP and total 1500 mL of normal saline was given. The patient was extubated after completion of surgery. Her hemodynamic parameters were stable postoperatively. Postoperative pain relief was continued with fentanyl infusion 30 μg/hour and paracetamol 1 g i.v. 8 hourly.

High risk coronary artery lesions include left main coronary artery occlusion, high left anterior descending artery lesions, and lesions in multiple vessels. Perioperative myocardial infarction (MI) is a major cause of morbidity and mortality in such patients. Perioperative β-blocker therapy in patients with coronary artery disease has been shown to reduce cardiovascular complications and mortality. Based on the available evidence, most experts advocate a target heart rate 60/minute perioperatively.[1,2] Mortality from perioperative MI is high (40-70%). The incidence and severity of perioperative myocardial ischemia is greatest during the first 24-72 hours after surgery. This is probably related to postoperative stress of anesthesia, surgical complications, and early postoperative ambulation. Moreover, the prone position requisite for most spine surgeries has a significant effect on cardiovascular physiology including reduction in cardiac index (CI). Abdominal compression exacerbates the obstruction of IVC leading to decreased cardiac output and increased bleeding, venous stasis, and consequent thrombotic complications.[3] These risks can, however, be minimized by careful positioning of the patient.

Anesthetic goals include stable hemodynamics with control of heart rate, maintenance of sinus rhythm, adequate intravascular volume, and minimal myocardial depression.[4] Drugs leading to myocardial depression, tachycardia, decrease in systemic vascular resistance (SVR) should be avoided. We utilized fentanyl, vecuronium bromide, and sevoflurane for induction as well as maintenance of anesthesia as they have least effect on cardiovascular status. Studies have shown a decrease in CI and increase in SVR on turning the patient prone. The changes were greater during Total intravenous anesthesia (TIVA) (decrease in CI of 25.9%) than during inhalation anesthesia (12.9%).[5] Maintenance of perioperative body temperature also decreases the cardiac morbidity. Postoperative hypertension, arrhythmias, and heart failure commonly occur in the first 2 days after surgery, but the risk of myocardial infarction persists for at least 5 or 6 days after surgery. An awareness of these likely complications made us vigilant and be prepared to manage any such event.

In this case, the patient had extensive two-vessel coronary artery disease with spinal cord compression. It was felt that delaying spinal decompression surgery for coronary revascularization was difficult to justify, in view of the progressive paraparesis with bladder and bowel involvement. Moreover, myocardial revascularization following Percutaneous transluminal coronary angioplasty (PTCA) and stenting presents different sets of problems. Any surgery performed within 6 weeks of PTCA presents an excessive risk of stent thrombosis and infarction if the antiplatelet medication is stopped or of major bleeding if the treatment is maintained throughout the operation.

In conclusion, we wish to highlight the importance of preoperative counseling and discussion with patients and attendants as well as be prepared with a sound anesthesia and surgical plan to decrease the complications. Preoperative communication between all the concerned parties increases the likelihood of successful outcome.

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