Anaesthetic management of transurethral resection of prostate in a patient with aortic and mitral valve replacement

Sir,

A 57-year-old man was scheduled to undergo Transurethral resection of prostate (TURP) for benign prostatic hypertrophy. He was catheterised for acute urinary retention three months back. He was a known case of severe mitral regurgitation, severe aortic stenosis, and severe tricuspid regurgitation for which he underwent aortic and mitral valve replacement with tricuspid annuloplasty one month earlier. He required early surgery to decrease the risk of infective endocarditis from urosepsis.

His preoperative evaluation revealed a functional capacity of New York Heart Association (NYHA) class II, atrial fibrillation with controlled ventricular rate and valve clicks at aortic and mitral areas. He was on oral digoxin 0.25 mg, verapamil 40 mg, furosemide 40 mg, and coumarin 2 mg OD. Two-dimensional echocardiogram revealed normally functioning aortic and mitral prosthetic valves, mild left ventricular dysfunction (EF-45%), and no left atrium (LA) and left ventricular (LV) thrombus. International normalised ratio was 2.6. Warfarin was substituted with subcutaneous heparin 5,000 units twice a day four days before the surgery. Heparin was last administered the night before surgery. On

the morning of surgery, prothrombin time (PT) was 15.1, international normalized ratio (INR)- 1.14, activated partial thromboplastin time (APTT)- 42.8, and platelet count- 1,85,000/mm^3, sodium- 134 meq/L and potassium- 3.6 meq/L. Infective endocarditis (IE) prophylaxis was given 1 hour before surgery, with ampicillin 2 g and gentamicin 80 mg intravenously.

Under strict aseptic precautions, 1 ml of 0.5% hyperbaric bupivacaine with 50 micrograms of fentanyl was injected into the subarachnoid space. The patient was maintained in sitting position for 10 min to establish saddle block anaesthesia. Intraoperative monitoring included electrocardiogram (ECG), pulse oximetry, invasive arterial blood pressure and central venous pressure. Thirty grams of the prostate tissue was resected. The duration of resection was 65 minutes. The total amount of glycine infused was 8 L. The central venous pressure (CVP) increased from 4 mm Hg at the start of resection to 8 mm Hg at the completion of resection. There was no abnormal bleeding from the surgical site. Postoperatively, IE prophylaxis was repeated. Heparin was restarted 8 hr after surgery. On the third postoperative day, warfarin was restarted. Postoperative ECHO revealed no vegetation or thrombus. There was no secondary haemorrhage from the surgical site.

TURP in patients with cardiac disease is a challenge to the anaesthesiologist due to acute fluid overload, myocardial depression due to irrigation fluids, drug interaction and electrolyte imbalances. The perioperative bleeding, thrombosis and infective endocarditis are known to increase the perioperative risk. However, the cardiac complications of TURP syndrome in patients with recent prosthetic valve replacement have received scant attention. The ideal anaesthetic technique for TURP should provide adequate analgesia, minimal physiological disturbances and early recognition of over-hydration, perforation and haemolysis. Patients with prosthetic heart valve may continue their anticoagulation if laser TURP is done as the bleeding is minimal. As laser TURP was not available, we planned for conventional TURP. After weighing the risks and benefits of regional anaesthesia in the anticoagulated patient, we preferred central neuraxial blockade for our patient. The cardiac function and coagulation profile on the day of surgery were within normal limits. A regional technique allows monitoring the neurologic status of the patient and identifying symptoms much before cardiac symptoms manifest. TURP requires a block up to T10 dermatome but can be done at lower levels if bladder distension is avoided. As the anticoagulation would be started soon after the surgery, graded epidural anaesthesia with a catheter technique was avoided. However, spinal anaesthesia can cause hypotension, which is undesirable in cardiac patients. To avoid this, the volume and the concentration was reduced by addition of fentanyl, and the spread was limited by making the patient sit for 10 min to achieve saddle block. Saddle block achieves adequate anaesthesia, stable haemodynamics and lower degree of motor blockade.[1] In spinal blocks with higher levels, cardiac patients may develop congestive heart failure when the block dissipates. Also, it is better to treat the spinal hypotension, if it occurs with vasopressors than with fluids.

TURP syndrome causes acute changes in the intravascular volume and plasma solute concentrations. Hypervolaemia is followed by a hypokinetic phase, characterised by low cardiac output, hypovolaemia and low arterial pressure. Patients with cardiac disease may poorly tolerate these changes. Hyponatraemia is accompanied by reduction in serum osmolality, as most irrigating fluids are hypo-osmolar. In cardiac patients who are on diuretics routinely, the risk of hyponatraemia is increased. Dilutional hypokalaemia may precipitate digitalis toxicity.[2] Hypocalcaemia, acute lowering of the body temperature and release of prostatic substances or endotoxins may all increase cardiac morbidity. The incidence of urosepsis, hence the risk of the prosthetic heart valve endocarditis, is increased by intravenous fluid absorption during TURP.[3]

Depression of the conductivity system, bradycardia and ECG changes are common during TURP. Absorption of glycine is frequently followed by non-specific ECG signs.[4] In spite of this, evidence of cardiac ischaemia, using Holter ECG, was found in 18% of TURP patients. The incidence of acute myocardial infarction during TURP is between 1% and 3%. Patients with more prostate tissue resected and greater blood loss are at increased risk for perioperative myocardial ischaemia.[5] Of the irrigating fluids, mannitol 3% expands the plasma more than glycine 1.5%, while sorbitol–mannitol takes an intermediate position. Damage to the myocardium occurs by irrigation fluids; glycine, in particular, causes hypoxic lesions and acute increase in the weight of the heart.[6] A marginal increase in Aspartate aminotransferase, Creatinine kinase MB isoenzyme, Troponin enzymes occurs in patients undergoing

TURP, and the incidence was higher with glycine.[4,7] Therefore, in high-risk cardiac patients, diagnosis of cardiac events needs to be done with caution after careful history, physical examination, ECG changes and definite elevations in cardiac enzymes.

As monitoring of pulmonary capillary wedge pressure is more invasive, CVP was measured. CVP increases transiently on absorption of irrigating fluid, but to assess the amount of fluid absorbed during TURP, it is relatively insensitive. The result is also affected by blood loss and other fluid therapy. Hypertonic saline is preferred over furosemide as first line of treatment in TURP syndrome. Furosemide aggravates hyponatraemia. Although there is a concern of hypertonic saline inducing pulmonary oedema, this has not been seen in clinical experience.

We conclude that patients with prosthetic heart valves can undergo TURP under spinal anaesthesia with acceptable risk. Patients should be monitored for acute fluid overload, left ventricular dysfunction, electrolyte imbalances and digitalis toxicity. The diagnosis of cardiac events needs to be done with caution after careful history, physical examination, ECG changes and definite elevations in cardiac enzymes.

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