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Anaesthetic management of patient with Ischaemic Heart Disease with 25% ejection fraction for Urethroplasty

Anaesthesiology

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ABSTRACT

Administering anaesthesia to cardiac patients for non cardiac surgery has always been challenging. The ultimate goal of anaesthesia in these patients is to avoid ischaemia by balancing myocardial oxygen demand and supply. Preoperative assessment of risk factors, cardiovascular examination, preoperative evaluation and optimization is required for ischaemic heart disease patients. We need to select appropriate anaesthetic technique and drugs to improve patient's outcome. Though the choice of anaesthesia has been general anaesthesia to achieve goal of greater myocardial oxygen supply than demand, in this case we decided to give lower segment epidural block for anaesthesia and post operative analgesia. We used Ropivacaine 0.75% for loading dose and 0.5% Ropivacaine for maintenance keeping haemodynamics stable. We report a successful anaesthetic management of a patient with ischaemic heart disease for urethroplasty under epidural anaesthesia and analgesia

Introduction : Ischaemic heart disease is number one cause of morbidity and mortality in the world.[1] Perioperative myocardial infarction is the most common cause of morbidity and mortality in patients who have had non cardiac surgery, but diagnosis can be difficult.[2] Preoperative evaluation is important to identify risk factors and planning of anaesthetic management. The goal of anaesthesia is to keep myocardial oxygen supply greater than the demand to avoid ischaemia.[2] For patients with ischaemic heart disease, general anaesthesia has always been first choice. Major concerns of general anaesthesia are tachycardia and hypertension during laryngoscopy and intubation as well as during extubation. Epidural anaesthesia can decrease cardiac mortality and morbidity in IHD patients coming for non cardiac surgery.[1] For many years Bupivacaine have been commonly used drug in central neuraxial blockade. However Bupivacaine has cardiotoxic potential. Ropivacaine is a long acting amide local anaesthetic agent and first produced as a pure S enantiomer of S-1-Propyl-2,6-Pipecoloxylidide, unlike Bupivacaine, which is racemate. It is developed for the purpose of reducing potential toxicity and improving relative sensory and motor block profiles. Due to less lipophilic nature and stereoselectivity, Ropivacaine has less cardiotoxicity and CNS toxicity than Bupivacaine.[3] Myocardial ischaemia is precipitated when there is an imbalance between coronary blood flow and myocardial oxygen consumption. Prevention of a perioperative myocardial infarction is important to improve overall postoperative outcome.[4] Here we report anaesthetic management of a patient with anterior wall IHD, posted for urethroplasty under epidural anaesthesia and analgesia.

Case Report : 45 year old male, dyspnoea on exertion(NYHA grade II), known case of IHD since 3 years, diagnosed to have stricture urethra, posted for urethroplasty. Patient was on tablet aspirin 75 mg, tablet clopidogrel 75 mg, tablet atorvastatin 20 mg and tablet digoxin 0.25 mg Once a day.

On examination : Patient was moderately built, weight 75 kg, pulse rate and blood pressure were within normal limits. Cardiovascular examination and other systemic examination were normal. Laboratory investigations and chest x-ray were normal. Electrocardiogram (ECG) showed anterolateral wall ischaemic changes. 2D-echo showed septo apical wall akinesia, poor LV systolic function with left ventricular ejection fraction 25%. Coronary angiography showed proximal left anterior descending artery had 70%stenosis. Cardiologist opinion was obtained. Patient was advised to stop tablet clopidogrel 75 mg and continue tablet aspirin 75 mg seven days prior to surgery. PT-INR to be done 7 days after stopping tablet clopidogrel 75 mg. After seven days PT-INR was done and it was normal.

Anaesthetic Management : Patient accepted under ASA grade III with high risk. After preoperative counselling and informed consent obtained, oral alprazolam 0.25 mg was given night prior to surgery. Tablet digoxin was continued. Tablet aspirin discontinued on previous day of surgery. After securing intravenous access injection ranitidine 50 mg, injection ondansetron 4 mg, injection midazolam 1 mg were administered. Standard monitors pulse oximeter, electrocardiogram, non-invasive blood pressure were attached. Patient was preloaded with 10ml/kg ringer lactate. Supplemental oxygen via face mask was given.

Under strict aseptic precaution, in sitting position, skin was infiltrated with 2% plain Lignocaine. Using 18G Tuohy's needle, epidural space confirmed at L4-L5 inter vertebral space with loss of resistance technique. After confirming negative aspiration for CSF and blood, 20G epidural catheter was threaded and fixed 3 cm inside. After this total 8 ml of 0.75% Ropivacaine was given via epidural catheter. Total blockade obtained from L2-S5 level. Duration of surgery was 3 hours. Epidural top up was given with 3ml of 0.5% Ropivacaine after 1 hour of starting bolus dose and once again after 1 hour of first top dose. Total intravenous fluid given intra-operatively was 1500ml of crystalloids, urine output of 280 ml and estimated blood loss 300ml. Intra-operative systolic blood pressure maintained between 100-120mm of Hg. Diastolic blood pressure maintained between 65-85 mm of Hg. Heart rate maintained between 70-80/min. Patient shifted to post operative room. Post-operatively SpO2, NIBP, ECG were monitored and O2 supplementation by face mask was given in recovery room.

Discussion : The etiology of perioperative myocardial infarction remains poorly understood. Long duration subendocardial myocardial ischaemia or acute coronary occlusion as a result of plaque disruption or thrombosis can be the primary mechanism of perioperative myocardial infarction in the individual patient.[2] The exact nature of perioperative myocardial injury remains elusive.

Surgery with its associated trauma, anaesthesia, intubation, extubation, pain, hypothermia, bleeding these all are triggering factors for perioperative myocardial injury. These factors can initiate inflammatory, hypercoaguable stress and hypoxic state associated with perioperative elevation of troponin levels, arterial thrombosis and mortality.[5] Induction of anaesthesia in patients with IHD should be smooth and attempts should be made to minimize imbalance between oxygen supply and demand. Choice of anaesthesia has always been general anaesthesia by achieving goal of higher oxygen supply than demand and preventing tachycardia and extremes of blood pressure.[6] But potential and well known advantage of regional anaesthesia over general anaesthesia that is good analgesia and avoidance of presssor response to laryngoscopy, intubation and extubation should be an asset in cardiac patients. The decision to use neuraxial anaesthesia for high risk cardiac patient may be influenced by dermatomal level of the surgical procedure.[4]

Epidural local anaesthesia is good for postoperative analgesia suppressing the stress response to surgery, reducing incidence of myocardial infarction and dysrhythmias.[7] Ropivacaine is long acting amide local anaesthetic. Due to its less lipophilic nature and pure S enantiomer structure has much less CNS and CVS toxicity.[8] Beattie et al in meta analysis on epidural analgesia, concluded that reduction in cardiac events with postoperative epidural analgesia is important because many high risk patients cannot tolerate beta-adrenergic blockers, which also reduces postop myocardial infarction.[9] Studies have shown that Ropivacaine and Bupivacaine are comparable in epidural anaesthesia. Ropivacaine 0.75% is safer and effective alternative to Bupivacaine in epidural anaesthesia.[10] The magnitude of haemodynamic changes resulting from epidural anaesthesia is significantly less than that seen with comparable levels of subarachnoid block.[11] Epidural anaesthesia provides stable cardiovascular status, reduction in blood loss and prolonged postoperative analgesia.[11] Basavraj M et al concluded that epidural anaesthesia can equally be an alternative for general anaesthesia in cardiac patients for non-cardiac surgery.[1]

Conclusion: In our study we found that epidural anaesthesia serves stable haemodynamic parameters. Ropivacaine is better alternative to Bupivacaine as it is less cardiotoxic and neurotoxic.Hypotension and tachycardia due to spinal anaesthesia are avoided, when we give only epidural anaesthesia for ischaemic heart disease patients.

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