

Dilated Cardiomyopathy and End Stage Renal Disease with Renal Osteodystrophy for Bilateral transcervical fracture femur fixation

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Citation

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Abstract

Dilated cardiomyopathy and End stage renal disease with renal osteodystrophy are associated with high perioperative morbidity and mortality. Administration of safe anaesthesia to these high risk patients requires knowledge of pathophysiology, associated systemic problems, potential complications and therapeutic modalities. We present the case of a patient posted for bilateral transcervical hip fracture conducted under combined spinal epidural anaesthesia and discuss the several advantageous of this technique.

CASE REPORT

A 30 year old female weighing 39 kg presented with history of pain in both hip joints since 2 years. X-ray hip joint revealed bilateral transcervical fracture femur. She was posted for bilateral pin fixation.

There was no history of fall or trauma. She gave history of severe restriction of activity due to pain in hip joints since 2 years and malaise, loss of appetite and weight, and easy fatigability since 1 year. She had 3 full term normal deliveries and the last one was 5 years back. Her pulse was 78/min and blood pressure was 180/100. A pansystolic murmur was heard in mitral area.

Her Hb was 8.2gm%, Blood Urea Nitrogen 70 mg%, Serum Creatinine 3.4 mg%, Serum Potassium 5.9 mEq/L, Serum Calcium 7mg% and Serum Phosphate 6.0 mg%. A cardiology & Nephrology consultation was asked.

Her ECG showed left axis deviation, left anterior hemiblock (LAHB), q waves in in standard lead I, avL and a prolonged QT interval. 2D Echo showed dilated left ventricle with internal diameter of 60 mm and generalized hypokinesia of both ventricles, mild MR, AR & TR. Her LVEF was 20%. She had mild pulmonary hypertension of 38 mm of Hg and an apical clot in left ventricle. The diagnosis of dilated cardiomyopathy (DCM) was made.

The patient's abdominal USG showed bilateral small and scarred kidneys. Her radiographic bone examination showed

osteopenia. Her parathyroid hormone levels were 835 pg / ml against a normal of 12-72 pg / ml. Her repeat S.Creatinine was 5.4mg%, S.Potassium 6.6 mEq/L, Urine creatinine 9.4mg%, and Urine Calcium / creatinine ratio 0.32. Her predicted creatinine clearance was < 15 ml/min. The diagnosis of End Stage Renal Disease (ESRD) with Renal Osteodystrophy was made.

The patient was started on T.Digoxin 0.25mg OD, T.Lasix 40mg TDS, T. Amlodepin 10mg BD, T.Prazopress 2.5mgBD, T.Shelcal, T. Rocaltral, Statins & Recombinant human erythropoietin. Her fluid intake was restricted to 1.5 L/day, protein intake to 0.8gm/kg/day and potassium to 60 mEq /day. As the patient was never oliguric and had urine output of around 1.5 L/day, haemodialysis was deferred and patient was started on potassium exchange resins thrice a day with dextrose. In view of upcoming surgery the use of anticoagulants was deferred.

After a week of treatment, her preoperative S.Potassium was 3.2 mEq/L, S.Creatinine 3 mg% and her Hb 9 gm%. Her bleeding time was normal and INR was 1.2. Her preoperative ABG was within normal limits. Her BP was 134/84.

In view of associated co-morbid conditions, a CSE technique was planned for her. Monitoring included pulse oxymetry, ECG monitoring, invasive BP, CVP, urine output and Arterial Blood Gases. Pulmonary Artery Catheter was not used in view of MR and LAHB.

An 18 G Epidural catheter was passed in L3-L4 space through 18 G Touhy's needle and spinal anaesthesia was given with 7.5mg of 0.5% bupivacaine (1.5 cc) with 25µg of Fentanyl (0.5 cc) in L4-L5 space with 27 G Quinke's needle by midline approach in sitting position. The sensory level achieved was T10. After 2 segment regression of block, 3 cc of 0.5% Bupivacaine was given epidurally followed by an epidural infusion of 0.5 % bupivacaine at the rate of 4 cc / hr to maintain the sensory level. The surgery lasted for 2 and half hours and the total blood loss was 350 ml. The patient's BP was maintained between 110/70 to 130/90 mm of Hg, CVP between 5-6 cm of water with 0.9 % normal saline, dextrose saline and a unit of blood and urine output at 1 ml/hr. Her intraoperative ABG and electrolytes were within normal limits.

Postoperative analgesia was given with epidural Tramadol. The patient had uneventful postoperative course. This patient took discharge against medical advice after 10 days refusing to undergo haemodialysis and never followed up.

DISCUSSION

Dilated Cardiomyopathy (DCM) is a heterogenous disease characterized by ventricular and sometimes atrial dilatation with impaired systolic function. It is the most common type of cardiomyopathy, third most common cause of heart failure and the most common indication for heart transplantation.¹ The reported incidence is 5-8/100,000 and is rising because of advanced noninvasive diagnostic tools and increased physician awareness.^{2,3,4}

Clinical presentation varies from asymptomatic with only cardiomegaly to signs and symptoms of refractory biventricular failure. Prognosis of DCM is poor with only 25% to 40% patients surviving 5 years after definitive diagnosis.^{2,3,4} The predictors of poor prognosis present in our patient were ejection fraction <25% and pulmonary hypertension.¹

End stage renal disease (ESRD) is the most severe progression of chronic renal failure that affects all body systems. The incidence of ESRD in India is higher than that in western world and is reported to be around 151 per one million. Chronic glomerulonephritis is the most common cause accounting for more than one third of patients followed by diabetic nephropathy. In India patients are generally younger (mean age 42 yrs) and less than 10% receive renal replacement therapy.⁵

Chronic kidney disease begins without any specific symptoms and symptoms may appear only as the condition progresses to ESRD. Most common symptoms are hypertension, lethargy, malaise, bone pain or fractures due to renal osteodystrophy and generalized oedema. Cardiac arrhythmias, pulmonary oedema, encephalopathy occur as the disease worsens.

The goals for anaesthetic management in this patient were- 1) Maintenance of myocardial contractility by avoiding drug induced myocardial depression, 2) Maintenance of adequate preload while preventing fluid overload 3) Prevention of increase in afterload, 4) Maintenance of adequate renal perfusion pressure 5) Avoidance of drugs requiring renal metabolism for termination of action and 6) Avoidance of nephrotoxic drugs.¹

Cardiovascular depression, arrhythmias, post operative cardiac failure and acute on chronic renal failure are well known complications of general anaesthesia in this group of patients. Since the patient had normal coagulation profile a regional block was planned for her. Many studies have proven the safety of regional anaesthesia in high risk patients undergoing major surgery.⁶ The changes produced in preload and afterload produced by regional block mimic the pharmacological goals of DCM. Regional anaesthesia attenuates neurohumoral stress response to surgery, decreases incidence of deep vein thrombosis (DVT), pulmonary embolism, respiratory depression, avoids polypharmacy, decreases transfusion requirements and is associated with reduced early mortality.^{7,8,9} Recovery and rehabilitation is faster due to better postoperative analgesia.¹⁰

A combined spinal – epidural technique was chosen for this patient. Spinal anaesthesia to begin with gives a dense block and good relaxation while epidural block prolongs anaesthesia and provides post operative analgesia. Epidural analgesia also avoids need for systemic opioid and non steroidal anti-inflammatory drugs (NSAIDs) thus the associated respiratory depression and nephrotoxic effects of these drugs respectively. The low dose of Bupivacaine with Fentanyl given intrathecally limited the block level, prevented excessive sympathetic blockade and the consequent hypotension and myocardial depression. Low dose Bupivacaine plus Fentanyl has been shown to provide stable haemodynamics with reduced use of vasoconstrictive drugs or fluids.^{7,11} Both, continuous infusion and intermittent top-up doses of local anesthetic are used for epidural anaesthesia, however keeping in view the variable

pharmacokinetics; an infusion was preferred over bolus doses to limit the total dose of the local anaesthetic drug. Postoperative analgesia was given using epidural Tramadol. Patient had uneventful perioperative course.

In conclusion, we report the safe administration of combined spinal epidural to a patient with DCM and ESRD for surgery for hip fracture.

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