Case Report

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Central Neuraxial Block for Renal Transplant in a Patient with Ventricular Septal Defect

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Abstract

We report a case of an adult male patient with end stage renal disease having a congenital ventricular septal defect (VSD) who underwent renal transplant. The procedure was carried out under central neuraxial block- combined sub arachnoid and epidural block. Perioperative period was uneventful with good postoperative graft functioning.

Keywords: Central neuraxial blockade; Renal transplant; Venticular septal defect.

Introduction

Congenital heart diseases (CHD) are among the most common inborn defects, of which VSD is the commonest[1]. There is increasing incidence of adult patients with congenital heart diseases presenting for non cardiac surgeries. With the incidence of renal disease on the rise, renal transplant surgery is now becoming common. We report the successful management of a patient with a ventricular septal defect for elective renal transplantation surgery under central neuraxial block-combined sub arachnoid and epidural block.

Case Report

A 30 year old male presented for renal transplant surgery, with end stage renal disease resulting from membranoproliferative glomerulonephritis. Patient gave history of a cardiac problem being detected in childhood, but no further details were available. There was no history suggestive of failure to thrive, recurrent respiratory infections, effort intolerance, cyanotic spells or developmental delay

The patient consulted a doctor one year back for nausea and vomiting and was diagnosed to have end stage renal disease, for which dialysis was initiated. He underwent right nephrectomy four months before the transplant for a pseudoaneurysm bleed, which was done under general anaesthesia plus epidural block, perioperative period of which was uneventful.

On examination, he was moderately built and nourished. Height was 168cm, weight 57kg, Body Mass Index 20.2. He had a central catheter in the internal jugular vein for dialysis. He was pale, pulse rate 78 per minute, regular and blood pressure 130/80 mm Hg. Cardiovascular examination revealed a hyperdynamic chest, apex beat in the left 6thintercostal space, just outside mid clavicular line. There was a thrill along the left sternal border, with a grade 4

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pansystolic murmur along the left sternal border.

On investigation, hemoglobin was 7.2g/dL, blood urea 51mg/dL and serum creatinine 6.6 mg/dL. Chest Xray showed cardiomegaly. ECG showed right bundle branch block and left ventricular hypertrophy.

Echocardiography revealed a 7 mm perimembraneousventricular septal defect with left to right shunt, partially closed by septal tricuspid leaflet, with a pressure gradient of 120 mmHg, and mild pulmonary artery hypertension.

Patient was dialysed on the day before the surgery. Infective endocarditis prophylaxis was given.

On morning of surgery, repeat investigation showed no significant variations from baseline values.Oral ranitidine 150 mg and metoclopromide 10 mg were given.

In the operation theatre, non invasive blood pressure, ECG and pulse oxymeter were attached. Oxygen was given at 5L/min via face mask. IV access via two 18G cannulae, one each in the right and left forearms, and a normal saline infusion was started. Patient was pre medicated with intravenousfentanyl 60 mcg, ondanseteron 4 mg and midazolam 1.5 mg.

Epidural catheter was placed in the L1-L2 space by loss of resistance technique. Test dose was given with 3 ml lignocaine with 1:2 Lakh adrenaline after negative aspiration for blood and CSF and position of catheter confirmed. Subarachnoid block was given using a 27 G Quinke needle in the L3-L4 space with 2.5ml hyperbaric bupivacaine 0.5%. a sensory block up to T4 level was attained. A 45 cm peripherally inserted cental venous catheter was introduced through the left basilic vein under local anaesthetic. Baseline CVP was 11 cm H2O.

Forced air body warmer was used and pressure points padded, and procedure was started. After one hour, epidural anaesthesia was supplemented with 2%lignocaine with 1:200,000 adrenaline, given as 2 ml boluses every 10 minutes, to maintain a sensory block level of T4.Vitals remained stable and surgical conditions were good. Before vascular anastamosis, IV normal saline was administered in for maintenance requirement. Rate of fluid administration was increased after anastamosis was established, with monitoring of CVP, which was maintained between 12 and 15 cm H_2O. A total of 2500ml normal saline was administered. After anastamosis of ureter, a urine output of 600 ml/hr was observed. Vitals remained stable intra operatively.

After the procedure, patient was shifted to post anaesthesia care room and analgesia was provided with 0.125% bupivacaine at 5 ml/hr via elastomeric epidural pump. Post operative period was uneventful and patient was shifted to renal transplant ICU and recovered well.

Discussion

Renal transplantation was first attempted in 1906[2], but the first successful procedure took place in 1954. [3] Over time, the evolution of medical science involving immunosuppressant, surgical and anaesthetic techniques have made this complex procedure into an almost routine one in today's tertiary centers.

End stage renal disease in defined as a glomerular filtration rate of less than 15ml/1.73 sq m.[4] Among the commonest etiologies are Type 2 diabetes mellitus(44%),IgA nephropathy& chronic glomerulonephriitis among others.[5] Renal failure produces detrimental effects on various organ systems, like hypertension, ischemic heart disease,

autonomic neuropathy, anemia, coagulopathy, pleural effusion,increased susceptibility to infections, acid base disturbances and electrolyte abnormalities to name a few.[6] In addition these patients are often on multiple drugs which may need to be stopped or modified prior to the procedure. Pre operative haemodialysis is usually carried out within 24 hrs prior to the procedure to minimize the acid base disturbances and electrolyte abnormalities and optimize the fluid load.

Anaesthetic goals in a renal transplant surgery include proper pre operative assessment and optimization of fluid and electrolyte status, avoiding nephrotoxic drugs, preventing hypoxia and hypotension, maintaining good renal perfusion in the transplanted kidney, providing optimal surgical conditions and adequate analgesia. Stress response to laryngoscopy and intubation should be minimised. The clearance of anaesthetic drugs such as opioids and non depolarizing muscle relaxants are reduced and may warrant a reduction in dosage and/or careful administration. Central venous pressure is commonly used as a guide to fluid administration. Although earlier high central venous pressures were recommended, recent evidence points that a CVP of 7 to 9 mm Hg may be enough for optimal graft performance.[7] Blood pressure should be closely monitored and hypotension avoided.

VSD is the commonest congenital cardiac anomaly (20%).[8] Most of these defects close by about 2 years of age and up to 90% close by the age of 10. Perimembraneous defects are the commonest, constituting 80% of all VSDs[9]. Smaller defects may produce few symptoms and may go un-noticed. Larger ones may present as recurrent respiratory tract infections, failure to thrive, or cardiac failure. Smaller VSD's may require only follow up and antibiotics, but larger ones have to undergo surgical closure. If the defect is small, there is only a minimal increase in pulmonary blood flow. Large defects on the other hand are associated with equalization of ventricular pressures and initially a marked increase in pulmonary blood flow consequent on the low resistance of the pulmonary circulation. With time, pulmonary vascular resistance (PVR) starts to rise, accompanied by a reduction in shunt flow and, if left untreated, Eisenmenger's physiology will develop. Moderate shunts may increase if SVR increases due to pain and catecholamine release. There is also a risk of endocarditis even in smaller lesions.

As an anaesthesiologist, one must ensure that the systemic vascular resistance(SVR) does not fall drastically, and avoid factors which increase pulmonary vascular resistance.(for eg:high airway pressure, acidosis, hypoxemia, hypercarbia) while optimizing oxygen delivery.

When anesthetizing patients with congenital heart disease, under either a regional technique or general anesthesia, the following factors must be kept in mind; prevention of accidental intravenous infusion of air bubbles by using loss of resistance to saline rather than air to identify the epidural space, a slow onset of epidural analgesia is useful, as rapid fall in SVR could result in reversal of shunt with hypoxaemiaor paradoxical emboli. Low blood pressure would also decrease renal perfusion. There was also the likelihood of uremic coagulopathy increasing the chances of bleeding.

By using central neuraxial block, exposure of the patient to multiple anaesthetic drugs could be avoided while the patient's renal clearance was in a compromised state. The stress response of laryngoscopy and intubation could be avoided. In addition, the use of regional

technique is more cost effective. The placement of an epidural catheter enables the slow onset of anaesthesia, avoiding hypotension. Keeping the epidural catheter in situ also enables us to provide effective postoperative analgesia and facilitate early ambulation. Keeping these factors in mind, with all the coagulation parameters normal, we decided to go with central neuraxial block-combined spinal epidural anaesthesia. As the block was established carefully, no significant fall in blood pressure was observed. Patient was comfortable throughout the surgery. Surgical conditions were good and adequate renal output was present. The epidural catheter was used to administer postoperative analgesia in a continuous manner by the use of an epidural pump. The graft function was excellent and the patient recovered well. The epidural catheter was removed on the third postoperative day. He was shifted out of the post transplant ICU on the fifth postoperative day and the rest of his hospital stay was uneventful.

Conclusion

With careful pre operative assessment, a well planned anaesthetic technique and good monitoring, central neuraxial block-combined spinal epidural anaesthesia was used as a safe anaesthetic technique for renal transplant surgery in an adult patient with ventricular septal defect.

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