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Dilated Cardiomyopathy with Low Ejection Fraction and Anaesthesia: A Case Report

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***Abstract**: Idiopathic dilated cardiomyopathy is a primary myocardial disease of unknown etiology characterized by left ventricular or biventricular dilation and impaired contractility. Patients with dilated cardiomyopathy pose many anaesthetic challenges in patients undergoing non cardiac surgery. We report successful management of a patient with dilated cardiomyopathy with low ejection fraction who underwent total hip replacement under combined spinal epidural anaesthesia.*

***Keywords**: cardiomyopathy, combined spinal epidural (CSE), systemic vascular resistance (SVR), left bundle branch blocks (LBBB)*
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I. Introduction

Dilated cardiomyopathy is a primary myocardial disease characterized by LV or biventricular dilatation, systolic dysfunction and normal ventricular wall thickness. A large number of cases are idiopathic but within these there is a familial association. There is an increased incidence in males and in patients of Afro-Caribbean origin. The known causes are ischemic, valve dysfunction and post-viral infection. DCMP can also be found in association with sickle cell disease, muscular dystrophy, excess alcohol, hypothyroidism, and some chemotherapy drugs. Operative concerns are precipitation of congestive heart failure, arrythmias and systemic embolization due to presence of mural thrombi in left ventricle.

II. Case Report

A 55 year old female, known case of Diabetes Mellitus, hypertension and dilated cardiomyopathy was posted for total hip replacement for fracture neck femur of left side. Her heart rate was 90/min and blood pressure was 150/86 mmHg. On auscultation, bilateral air entry was equal with no added sounds. Preoperative ECG showed LAD and LBBB and recent 2-D Echo showed DCMP, depressed LV systolic function (EF 30%), mild MR and dilated left ventricle. X-ray chest showed cardiomegaly. Her hemoglobin was 11 gm/dl and all biochemical parameters were within normal limits. Medication history includes tab metformin 500 mg OD, tab glimepride for diabetes mellitus and tab carvedilol 3.125mg TDS ,tab Torsemide 5 mg OD, tab ivabradine 5 mg OD, tab atorvastatin 20 mg OD for hypertension and DCMP. Cardiologist consultation was done for patient's management, who advised to continue the above mentioned cardiac drugs. Patient was asked to omit the morning dose of oral hypoglycemic agents and to get morning electrolytes, urine for sugar ketones and fasting blood sugar done. Patient and her relatives were explained about anesthetic risk and high risk consent was taken. Combined spinal epidural anaesthesia was planned for this patient. All emergency drugs and defibrillator were kept ready. All standard monitors (ECG, NIBP and SpO_2) were attached. After securing intravenous line, with all aseptic precaution arterial line and triple lumen internal jugular venous catheterization was achieved under local anesthesia. Under all aseptic precautions, a combined spinal epidural block was given. Epidural space was identified at L2 L3 level and after giving sub arachnoid block with 27 gauge spinal needle with 10 mg of 0.5%

bupivacaine heavy along with 25 μg fentanyl, 20 G epidural catheter was inserted and fixed at 10 cm. Patient developed frequent ventricular ectopics on ECG after 45 minutes of induction, which was treated with 2.5 ml of 2 % Xylocard. Normal sinus rhythm was achieved after xylocard injection. Intraoperatively ECG showed intermittent insignificant (<5/minutes) ventricular ectopics. Patient's Blood pressure remained stable throughout the procedure. Surgery lasted for 2 hours. Central venous pressure was kept at 8-10 cmH_2O. Blood loss was approximately 250 ml and patient received 1200 ml of crystalloids over a period of 2 hrs with urine output of 400 ml. Patient was shifted to intensive care unit for postoperative monitoring. Post-operatively, blood pressure was maintained, there were no complaint of chest pain, sweating or dyspnoea. After observing 24 hrs in the intensive care unit, patient was shifted to ward.

III. Discussion

Dilated cardiomyopathy is a primary myocardial disease characterized by LV or biventricular dilatation, systolic dysfunction and normal ventricular wall thickness.[1] The etiology is unknown, but it may be genetic, or associated with infection such as coxsackie virus B infection. In approximately 30% of cases, autosomal dominant familial transmission may be present. The initial manifestation is usually heart failure. Ventricular dilation may be so marked that functional mitral or tricuspid regurgitation occurs.[1] These patients are often at a risk of dysrhythmias or sudden cardiac death.[2] Systemic embolization as a result of mural thrombi in dilated and hypokinetic chambers is also common. Recent management includes medical therapy with drugs for example vasodilator, diuretics or beta blockers and atrio-ventricular pacemakers for patients with in coordinate movements of heart chambers.[3]Anaesthetic goals include to 1) avoid tachycardia 2) maintain normovolemia 3) to prevent increase in afterload 4) Avoid myocardial depression 5) avoid sudden hypotension when regional anaesthesia is a choice. In our case, invasive arterial monitoring was done for early detection and management of hypotension. Poor predictors in our case were low ejection fraction, mild MR and dilated left ventricle. Other poor prognostic factor associated with DCMP is non-sustained ventricular tachycardia.[4]The ECG often shows ST segment and T wave abnormalities and left bundle branch block. Preoperative echocardiography is indicated to assess cardiac chambers and valvular dysfunction, and to exclude presence of mural thrombus. Electrolytes abnormalities should be corrected preoperatively particularly potassium and magnesium, as it can also precipitate arrhythmias.[5] Fluid management is critical. In our case CVP guided fluid was given. Nerve blocks are a rational approach for appropriate surgery as they have minimal hemodynamic changes. In our case, we planned combined spinal epidural anaesthesia. Epidural anaesthesia produces changes in the preload and after load similar to pharmacological goals in the treatment of this disease. In addition to this, it provides predictable and good postoperative analgesia thus preventing increase in SVR and heart rate.[6] All antiarrhythmic drugs like xylocard, amiodarone and defibrillator were kept ready. Ionotropic support if required intraoperatively and in postoperative period, can be provided with agents like dobutamine, dopamine, phosphodiesterase inhibitors and levosimendin.

In case of general anaesthesia, etomidate is preferred as IV induction agent as it causes least cardiovascular depression. Ketamine should be avoided as it causes increase in SVR. However, Yamaguchi S et al used ketamine and propofol as TIVA combined with continuous epidural analgesia.[2] Low dose of volatile anaesthetics should be used in order to avoid myocardial depression.

We conclude that regional anaesthesia can be safely used in such cases but it requires preoperative optimization of cardiac status and vigilant monitoring of hemodynamic parameters.

IV. Conclusion

Patients with dilated cardiomyopathy undergoing non cardiac surgery pose great challenge to anaesthesiologists. These patients can be effectively managed with meticulous planning, a good preoperative assessment, and optimization of cardiac status and titrated and judicious use of anaesthetic agents.

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