

# Anaesthetic Management of Patients with Dilated Cardiomyopathy Undergoing Non-Cardiac Surgery.

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## ABSTRACT

The anaesthetic management of a patient with dilated cardiomyopathy (DCM) undergoing non-cardiac surgery has always posed a challenge for Anaesthesiologist either due to pre-existing or a risk of precipitating congestive heart failure. Hereby, we report a case of an elderly patient with Dilated cardiomyopathy and Ejection Fraction less than 35%, MET criteria more than 5 for mid- Ureteric calculus removal surgery under Epidural Anaesthesia.

**Keywords:** Anaesthesia, Dilated cardiomyopathy, Epidural Anaesthesia, Ejection fraction.

## INTRODUCTION

Dilated cardiomyopathy (DCM) is a myocardial disease of varied causes characterized by dilatation of one or both the ventricles, impaired myocardial contractility, decreased cardiac output and increased ventricular filling pressures [1] DCM is defined by the presence of: (a) Fractional myocardial shortening less than 25% and/or left ventricular ejection fraction (LVEF) less than 45%; and (b) LV end diastolic diameter greater than 117% excluding any known cause of myocardial disease [2] DCM is the most common type of non-ischemic cardiomyopathy, the third most common cause of heart failure, and the most common indication for cardiac transplantation. A considerable amount of data is available regarding cardiac risk in patients with coronary artery disease, but not with patients with cardiomyopathy, undergoing non-cardiac surgery.

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The presence of a history or signs of heart failure and un-diagnosed DCM preoperatively, may be associated with an increased risk during non-cardiac surgery. In these patients, preoperative assessment of LV function, including echocardiography, and assessment of an individual's capacity to perform a spectrum of common daily tasks may be recommended to quantify the severity of systolic function. It is important to prevent low cardiac output and arrhythmia for the peri-operative

management of patients with DCM. Sympathetic hyperactivity often causes atrial or ventricular tachyarrhythmia, which could worsen systemic hemodynamics in these patients. In particular, the prevention of life-threatening arrhythmia, such as, ventricular tachycardia or ventricular fibrillation is important. To prevent perioperative low output syndrome, inotropic support, using catecholamines or phosphodiesterase inhibitors with or without vasodilators should be performed under careful monitoring. Every effort must be made to detect postoperative heart failure by careful monitoring, including PAC, and physical examination. Evaluation of cardiac reserve is more important than the resting value of ejection fraction. In order to clearly elucidate risk factors for adverse perioperative outcomes, further analysis will be necessary as more cases are documented.

## CASE REPORT

A 35-years-old male came to the emergency room with complaints of pain left renal area, was diagnosed to have left renal calculus and was scheduled for an Ureteroscopic removal of stones (URS). He was a known case of DCM for 7 years. He gave a history of hospital admission 7 years ago with features suggestive of congestive heart failure. His symptoms were well-controlled on treatment with Tab Carvedilol 6.25 mg, Tab Digoxin 0.25 mg, Tab Cardace 2.5 mg and Inj Dytor plus 20. On examination, her heart rate was 88/min and blood pressure of 130/86 mmHg. There were no features suggestive of congestive cardiac failure. A 12 lead electrocardiography (ECG) showed Complete Right Bundle Branch Block, Inferior Myocardial Infarction

(II, III, aVF), Middle ST Depression (v2), Right Ventricular Hypertrophy. The Echocardiography showed LVEF of less than 35%. Routine laboratory investigations were normal with a haemoglobin level of 14.9 gm%.

High-risk consent was taken from the patient and regional anesthesia technique explained.

Epidural anesthesia was planned. After taking a patient in the operating room, pulse oximetry, ECG and non-invasive blood pressure monitors were applied. After securing intravenous line, left radial artery and right internal jugular vein cannulation were also carried out under local anesthesia.

Under all aseptic precautions, Epidural block was given using 18G Epidural needles at L3-L4 space using 12cc Inj Ropivacaine 0.75% using Hanging drop and loss of resistance technique attained an adequate blockade level of T10. It was associated with hypotension with blood pressure of 76/40 mmHg, which was managed with intermittent intravenous boluses of 3 microgram of Inj Phenyl epinephrine. The surgery lasted 45 min. Central Venous Pressure (CVP) ranged from 7 to 9 cm H<sub>2</sub>O. Her post-operative course in the high dependency unit for 1 day and further inward till discharge was uneventful.

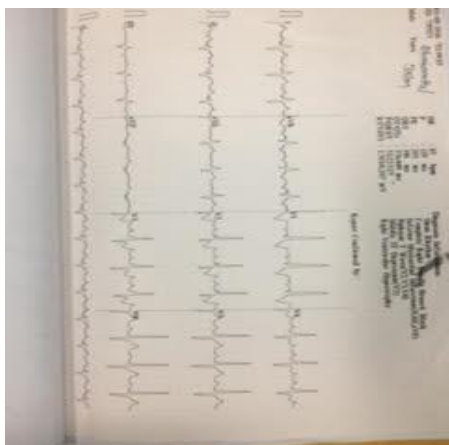


Figure 1: EKG.



Figure 2: Chest X-Ray.

## DISCUSSION

In patients with DCM, left and/or right ventricular systolic pump function is impaired, leading to progressive cardiac enlargement, a process called remodelling, and often, but not invariably, producing symptoms of congestive heart failure. Although no cause is apparent in many cases, DCM is probably the end result of myocardial damage produced by a variety of toxic, metabolic or infectious agents. Mural thrombi may be present, particularly in the LV apex.

Peri-operative issues in such patients include precipitation of congestive heart failure, arrhythmias and systemic embolism from pre-existing mural thrombi, the last two being absent in our patient.

The poor predictors in this patient were an ejection fraction of less than 20% on echocardiography, LV end diastolic dilation and hypokinetic LV. High-risk consent was taken due to above reasons. Other poor prognostic factors associated with DCM is non-sustained ventricular tachycardia.<sup>[3]</sup>

Anaesthetic management goals in such patients consist of maintaining normovolemia, prevention of an increase in after load and avoidance of drug induced myocardial depression. Invasive blood pressure monitoring was carried out in the above case for early detection and treatment of hypotension. Central venous pressure monitoring helped in optimizing fluid therapy. Transesophageal echocardiography, continuous cardiac output monitoring,<sup>[4]</sup> bispectral index<sup>[5]</sup> and pulmonary artery catheterization are some of the other modalities of monitoring, that have been found useful in patients with DCM.

Neuraxial blockade and various pharmacological agents such as dobutamine, amrinone, milrinone, and levosimendan<sup>[6]</sup> have been used in patients with DCM successfully to reduce after load.

An Epidural Block was planned in our patient because along with reducing the after load, it provides predictable and good post-operative analgesia.<sup>[7]</sup>

## CONCLUSION

Anaesthetic management of patients with DCM poses a challenge for the anaesthesiologist, but meticulous planning, appropriate monitoring, judicious use of pharmacological agents and tailor made anaesthetic technique according to patient's general condition and surgical requirement can lead to a favourable outcome.

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