

ANESTHETIC MANAGEMENT OF DILATED CARDIOMYOPATHY

- A Case report -

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Abstract

We report the anesthetic management of a patient with dilated cardiomyopathy, scheduled for surgery for fracture of femur.

The risks involved and the potential benefit of the use of regional versus general anesthesia, are discussed.

Key words: Cardiomyopathy, epidural.

Introduction

Dilated cardiomyopathy is a primary myocardial disease of varied causes¹. It is characterized by left ventricular or biventricular dilatation and impaired ventricular contractility².

In an analysis of the echocardiographic results of 1100 patients who underwent echocardiogram, 10.1% of them had dilated cardiomyopathy³.

Anesthetic management of these patients is quite challenging. The anesthesiologist should have the knowledge of its pathophysiology, clinical features, diagnostic evaluations and the treatment modalities. This is to be followed by careful planning for the provision of safe anesthesia.

Case Report

A 68-year-old man sustained fracture of the neck of femur and was

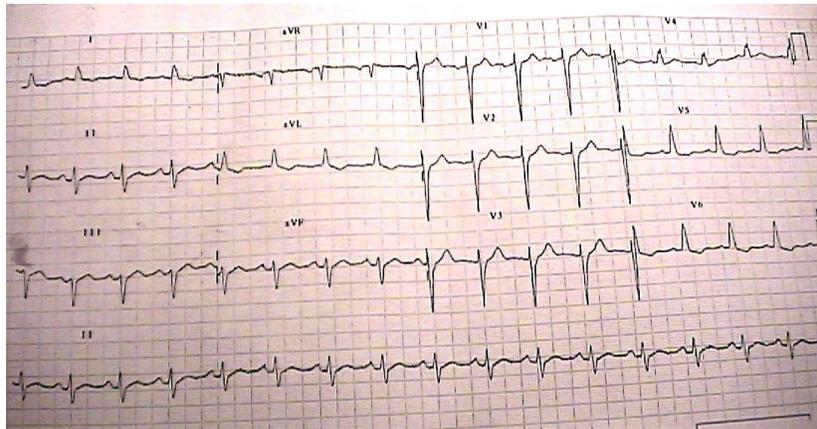
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scheduled for surgery. His previous medical records revealed that he had dilated cardiomyopathy. He was previously admitted to the Coronary Care Unit for episodes of congestive cardiac failure. He had no past history of alcohol abuse or the use of β -adrenergic agonists.

The heart rate was 74 min and regular. The systolic and diastolic blood pressures were 96 mmHg and 60 mmHg respectively. The respiratory rate was 16/min. There were no ronchi or rales on auscultation. Heart sounds were normal.

Preoperative 12 lead EKG (Figure 1) showed LBBB, rsR pattern in v4 and poor progression of R wave in leads V1-V5. X-ray chest (Figure 2) revealed cardiomegaly. The lung fields were clear.

Fig. 1
Preoperative 12 lead EKG



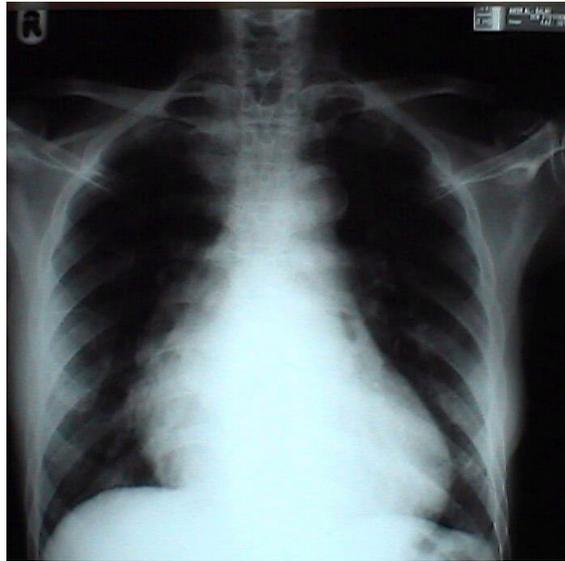
Echocardiography reports demonstrated, global hypokinesia of left ventricle, poor systolic function, ejection fraction of 25%; mitral regurgitation, tricuspid regurgitation and left ventricular end diastolic dilatation.

His symptoms were well controlled with Tab Lisinopril (zestril) 2-5 mg od, Lasix 40 mg od, digoxin 0.125 mg od, and spironolactone 25 mg od for the last 4 years, No abnormalities were noted in the laboratory investigations. Preoperative hemoglobin level was 11.1 gm%.

A high-risk consent was obtained. Regional (epidural) anesthesia technique and the reason for its selection was explained to the patient and his co-operation requested.

Fig. 2

Chest X-ray-cardiomegaly



No premedication was advised. Intravenous access was established with a 18 G cannula and lactated ringer solution administered at the rate of 1.5ml /kg/hr.

Non-invasive blood pressure (NIBP) (every 5 min), arterial oxygen saturation (SpO₂) and lead II of the electrocardiogram were monitored throughout the surgery. CVP line was inserted peripherally through the basilic vein.

After taking all aseptic and antiseptic precautions, an 18 G epidural catheter was introduced at L3-4 space. 2% xylocaine plain (without adrenaline) was injected slowly to attain a sensory and motor block up to T10 level. BP of 70 mmHg systolic was observed after 10 min. This was treated with intermittent bolus of ephedrine in doses of 2.5 to 5 mg. The

aim was to maintain the systolic BP of 90 mmHg. or more. Ventricular premature beats seen on the EKG were not persistent enough to warrant treatment.

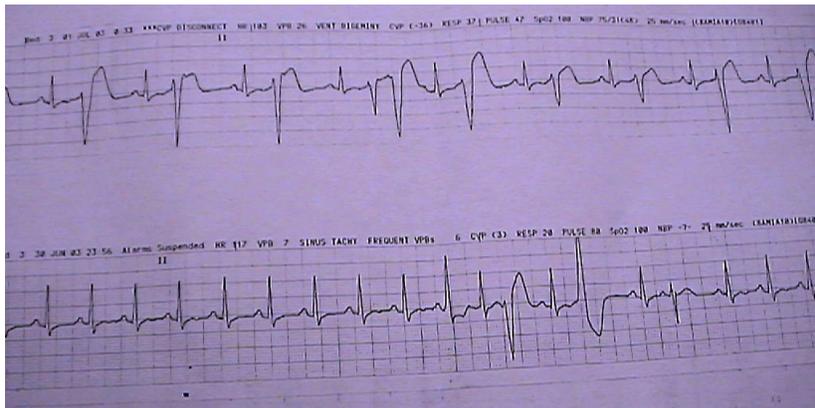
Central venous pressure ranged between 8-9 cmH₂O.

Intraoperative blood loss was about 300-350 ml as judged by the collection in suction bottle and the soaked gauze pieces. Surgery lasted for 90 min.

Postoperatively, there was a drop in the blood pressure to 76/40 mmHg, CVP was 3 cm H₂O. Patient had no complaints of chest pain, sweating or difficulty in breathing. Fluid administration continued at the rate of 75ml/hr. Dobutamine infusion was started at the rate of 7.5 ug/kg/min, to maintain the systolic blood pressure to 90 mmHg. After 1 hour, ventricular bigemini rhythm was seen on the monitor (Fig. 3), which was successfully treated by administering amiodarone. Repeat Hb value was 7.3 gm%.

1 unit of fresh blood was transfused.

Fig. 3
postoperative ventricular bigemini



The subsequent postoperative course was uneventful. The patient is doing fine and visits the OPD for regular follow up.

Discussion

Idiopathic dilated cardiomyopathy is a unique subset of primary myocardial disease of unknown cause characterized by left ventricular or biventricular dilatation and impaired myocardial contractility. Most patients are first seen between the ages of 20 and 50 Years, but it may affect children and the elderly. The most common initial manifestation as seen in this patient is heart failure, which occurs in 75 to 85 percent of patients. Symptoms of left sided heart failure predominate¹.

The true natural history of the disease onset is difficult to determine, since asymptomatic cardiomegaly may be present for months or years.

Early studies reported poor survival rates, but recent observations suggest better survival, reflecting the earlier detection and better treatment¹.

The predictors of poor prognosis¹ in our patient were, an ejection fraction of less than 0.25 (as seen on Echo, during the acute presentation of heart failure), left ventricular end diastolic dilatation, a hypokinetic left ventricle, the presence of mitral and tricuspid regurgitation. For these reasons a high risk consent was obtained.

It is recommended that fluid therapy and pharmacological management be guided by the use of pulmonary artery catheterization and the determination of cardiac filling pressures⁴; But this is not available in our hospital.

The goals for anesthetic management consist of 1) avoidance of drug induced myocardial depression, 2) maintenance of normovolemia, 3) prevention of increased ventricular after load.

Epidural anesthesia, was safely and effectively used with carefully titrated dose of local anesthetics, and hemodynamic monitoring. The changes in preload and afterload produced by epidural anesthesia mimic the pharmacological goals⁴.

Epidural was selected in preference to subarachnoid block. The advantages of epidural over spinal block consist of; lower risk of post dural puncture headache, less hypotension and the ability to prolong the

block via the indwelling catheter⁶.

Ephedrine is the drug most commonly used to treat hypotension. Bolus of 5-10 mg increase the blood pressure by restoring output and peripheral vascular resistance. Several authors have recommended treating blood pressure if it decreases more than 25-30% below baseline. What is an acceptable decrease in the blood pressure and heart rate for an individual patient is based upon the patients underlying medical condition⁶.

In this patient we administered bolus of 2.5 mg when the systolic pressure decreased by 10 mmHg. Patients with cardiomyopathy have decreased cardiac output and may have a low mixed venous oxygen saturation, and desaturation can readily occur with any further decrease in cardiac output⁵.

Although this patient was successfully managed solely with regional technique, the anesthesiologist had to be prepared to administer sedatives or general anesthesia if or when the effect of regional technique was unsatisfactory.

The responses of sedative drugs or induction agents may be slow due to the slow circulation time. Lack of response to an initial dose of induction agent, usually interpreted as a need for additional drug in a healthy patient, may in fact indicate a prolonged circulation time⁵ Opioids with benzodiazepines or nitrous oxide cause severe cardiovascular depression⁴.

Intravenous infusions should be guided by determining the cardiac filling pressures⁴.

Postoperatively this patient had hypotension possibly due to concealed intramedullary oozing. This was treated with intravenous infusion of crystalloids and inotropic support with dobutamine. Amiodarone was used to treat ventricular bigemini. Blood was transfused to raise the Hb level. Ventricular bigemini could possibly be secondary to hypotension and hypoxemia was due to a fall in the hemoglobin level or precipitated by dobutamine.

In summary, the factors which ultimately favored the good outcome of this high-risk patient, were a thorough preoperative assessment, optimized cardiac status, formulating the anesthetic plans, postoperative monitoring, prompt diagnosis and management of the complications.

References

1. WILLIAM G, VALENTIN FUSTER: Review Article- Idiopathic dilated Cardiomyopathy. *New England Journal of Medicine*; 331:1564-75, 1994.
2. Report of the WHO/ISFC task force on the definition and classification of cardiomyopathies. *British Heart Journal*;44:672-3, 1980.
3. Prabhavatei: Echocardiograms In Nizwa Hospital. *Oman Medical Journal*, Aug. 17, no. 1, 9-11, 2000.
4. ROBERT STOELTING K, STEPHEN F: Dierdorf. *Anesthesia And Co-Existing Disease*, 4th Edition Lippincott-Raven; Ch. 7:117-120.
5. HANSON C: Asymptomatic Cardiomyopathy Presenting As Cardiac Arrest In The Day Surgical Unit. *Anesthesiology*; 71:982-984, 1989.
6. CHRISTOPHER M: Bernards, Epidural And Spinal Anesthesia, Ch. 26, *Clinical Anesthesia*, Lippincot Raven 3rd Edition; Ch. 26:665, 1996.

