

Dilated Cardiomyopathy and Anesthesia in Prone Position: A Case Report.

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ABSTRACT

Dilated cardiomyopathy is the myocardial disease characterized by progressive ventricular dilatation and results in ventricular dysfunction. It poses challenge to anesthesiologists because of its various pathophysiological changes. These patients are prone for developing progressive cardiac failure and malignant arrhythmias during perioperative period. Besides geriatric patients add further age related risk factor. This is a case report of successful anesthetic management of 83 years old lady with dilated cardiomyopathy who underwent lumbar microdiscectomy in prone position under general anesthesia with endotracheal intubation.

KEY WORDS: Dilated cardiomyopathy, anesthesia

INTRODUCTION

Cardiomyopathy is the myocardial disease of the heart of varied etiology characterized by dilatation of one or both the ventricles causing impaired myocardial contractility, decrease cardiac output and increased left ventricle filling pressures. Patients with dilated cardiomyopathy may present for elective or emergency surgeries. Because of its complicated pathophysiological changes, these cases are challenge to anesthesiologists. One of the most important effects of anesthetic agents is myocardial depression. These cases are prone for developing acute ventricular failure and malignant arrhythmias during perioperative period.

Here, we report a case of dilated cardiomyopathy with low ejection fraction and under diuretics, antihypertensive, vasodilator and antiplatelet drugs that underwent for elective lumbar microdiscectomy under general anesthesia.

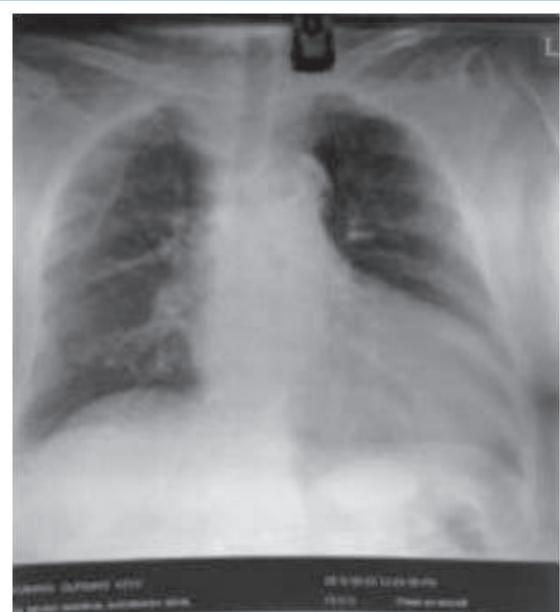


Figure 1: Chest X-ray

CASE REPORT

An 83 years old lady with severe low back pain due to prolapse intervertebral disc at L4-5 level was scheduled for lumbar microdiscectomy. She was diagnosed as ischaemic heart disease 10 years back. She was on tablet isosorbide mononitrate 10mg OD, amiloride

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5mg OD, furosemide 10mg OD, clopidogrel 10mg OD, digoxin 0.125mg and losartan 50mg OD. She had dyspnea on exertion with NYHA grade II. She had no history of orthopnea, paroxysmal nocturnal dyspnea and recent chest pain. She had occasional palpitation. She completed radiotherapy for Carcinoma Cervix two months ago. Besides these she denied having other medical problems. After cardiologist consultation clopidogrel was stopped for 6 days. On examination her general condition was fair. Physical signs include mild pedal edema but no other signs of heart failure. Her pulse was 76 beats per minute regular, blood pressure was 140/80mmHg, respiratory rate was 16 beats per minute and oxygen saturation in room air was 92%. On auscultation of chest, there was bilateral equal air entry with no added sounds. Both the heart sounds were audible with early systolic murmur in mitral area. On airway examination, she had Mallampati grade II with no abnormality in neck movements and temporomandibular joints. Her preoperative biochemical and hematological investigations were within normal limits. Her preoperative Chest X ray showed cardiomegaly with prominent bronchovascular markings (figure 1) and 12 leads ECG showed poor progression of R waves and left bundle branch block. The echocardiography showed dilated left atrium and ventricle, global hypokinesia, akinetic interventricular septum with ejection fraction of 36% and moderate mitral regurgitation. She was diagnosed as a case of dilated cardiomyopathy.

Lumbar microdiscectomy was planned in prone position. Informed written high risk consent was obtained and surgery was planned in general endotracheal anesthesia. Inside the operation theatre, the monitors used were ECG, Noninvasive blood pressure, pulse oximeter and capnometer. Premedication was done with midazolam 1mg and fentanyl 50 mcg. Invasive monitors which included arterial cannulation in left radial artery and central venous cannulation in right subclavian vein, were put under local anesthesia. Central venous pressure measured was 10cmH₂O. Preoxygenation was done and Fentanyl 50mcg was again given. Patient was induced with ketamine 40 mg and propofol 40mg in titration. Inj xylocard 60 mg was given to blunt hemodynamic reflex of intubation which was facilitated with rocuronium 40mg. Patient was intubated with the nonkinking cuffed endotracheal tube 7mm (internal diameter). Before induction Dopamine was started

at 3mcg/kg/min in order to maintain Mean arterial pressure. Her preoperative vitals were as follows: blood pressure 160/80mmHg, pulse 86/min, SpO₂ 94%. Anesthesia was maintained with oxygen, Isoflurane and intermittent positive pressure ventilation. Two episodes of hypotension (mean arterial pressure less than 20% of baseline) occurred during intraoperative period which was managed by decreasing the inhalation agent. First episode of hypotension (80/40 mmHg) was noted after changing to prone position. Second episode of hypotension (86/44 mmHg) was noted in the middle of surgery. Surgical time was about 90 min. Patient was reversed with Inj. neostigmine 2.5mg and glycopyrrolate 0.4mg and extubated in deep plain of anaesthesia. She received 500ml of Normal saline and 500ml of Ringer's lactate solution during intraoperative period. Patient was transferred to ICU with the same monitors. Post-operative analgesia was managed with Inj. tramadol 50mg TDS and Inj. Paracetamol 1 gm 8hrly. Her usual medications were started on the same day except clopidogrel. Her postoperative period was uneventful and she was discharged on 10th postoperative day.

DISCUSSION

Anesthetic management of patients with cardiomyopathy can be challenging and may be associated with high morbidity and mortality.¹ It has a prevalence of 36 per 100 000 population.² The causes are varied and may be ischemic or nonischemic. The ischemic type is related to atherosclerosis and ischemic heart disease.² The nonischemic type may be secondary to infections, chemotherapeutic agents, alcohol abuse or during the peripartum period. The clinical presentation can vary from simply asymptomatic cardiomegaly to overt heart failure. The management includes medical therapy with drug like vasodilators, antiarrhythmic, diuretics or betablockers and recently atrioventricular pacing. The optimal timing for surgery is difficult to decide but medical control of heart failure for more than 1 week is desirable.¹ There are case reports of surgeries conducted on general and regional anesthesia in these patients. Kaur H et al had reported the anesthetic management of a patient with dilated cardiomyopathy with ejection fraction of 25% undergoing surgery for Carcinoma breast under general anesthesia.² Intraoperatively this patient had a fall of blood pressure to 72/45mmHg and CVP was 5 cmH₂O. Dopamine drip was started at the rate of

5mcg/kg/min to maintain systolic bloodpressure of 90mmHg. ECG tracing showed sinus rhythm with infrequent PVC (< 6/min) without ischemic changes. At the end of surgery, patient was kept electively intubated and shifted to intensive care unit to put on ventilator. By the next evening the dopamine drip was tapered off and patient was successfully weaned off from ventilatory support. Nallam SR et al reported a perioperative anesthetic management of a case of severe dilated cardiomyopathy undergoing elective lower segment cesarean section under epidural anesthesia.³ In this case there was fall in blood pressure to 80/60mmHg after 10 min of epidural analgesia which was treated with intermittent bolus doses of ephedrine 2.5 to 5mg. In Postoperative ward, epidural analgesia was maintained with 0.5% Ropivacaine and fentanyl 50mcg.

In our case patient had history of Ischemic heart disease under medication. She was not in state of acute heart failure and had no arrhythmias despite of dilated cardiomyopathy. Surgery was planned in prone position so general endotracheal anesthesia was administered. Intraoperative events were two episodes of hypotension which was managed by decreasing the inhalation agent. Dopamine was started before induction of anesthesia. Besides, poor ejection fraction (36%), the other risk was old age (83 years). Geriatric patients are more sensitive to anesthetic agents due to age related physiological changes and common diseases of the elderly.⁴ Diminished cardiac reserve in many elderly patients may be manifested as exaggerated drops in blood pressure during induction of general anesthesia. Prolonged circulation time delays the onset of intravenous drugs. Elderly patients have less ability to respond to hypoxia, hypotension or hypovolemia with an increase in heart rate.⁶

The anesthetic goals in this type of patients are 1) Avoid Myocardial depression, 2) Maintain normovolemia, 3) Avoid overdose of drugs during induction as circulation time is slow, 4) Avoid ventricular afterload, 5) Avoid sudden hypotension when regional anesthesia is a choice. 1) Drugs like ketamine, etomidate and narcotics have minimal depressing effect on cardiac function and are used frequently.⁵ In this case also ketamine and fentanyl were used with titrating dose of propofol. Oxygen carrying capacity should be adequate. The main determinants of oxygen carrying capacity are cardiac output and hemoglobin. Therefore, hemoglobin should be optimized before elective surgery. Haemoglobin is

an independent predictor of mortality in chronic heart failure patients, with anaemic and polycythaemic patients having the worst survival.⁶ Skeletal muscle paralysis is to be provided by nondepolarizing muscle relaxant that lack significant cardiovascular effects. In this case rocuronium was used.

Inotropic agents may be required to counteract the myocardial depression of anesthetic agents.⁷ Dopamine has positive inotropic, chronotropic and vasoconstrictive effect. So it was used preoperatively before induction in this case. The other drugs like Dobutamine, phosphodiesterase inhibitor or levosimendan are also recommended. Anaesthesiologist should also be prepared to use lidocaine, amiodarone or defibrillation to treat the arrhythmias. Arrhythmias occur when potassium and magnesium levels are decreased (as these patients are usually on diuretic therapy).⁸ These electrolytes should be assessed preoperatively and corrected as necessary.⁹

Fluid management should be judicious in these types of patients. Central venous pressure monitoring give some idea about right ventricular preload but does not give complete information of left ventricular pressure. Pulmonary artery catheterization is ideal in this situation. Continuous cardiac output monitoring and transesophageal echocardiography are recommended as they help to evaluate the ventricular performance in response to inotrope and fluid therapy.⁸ However these equipments were not available in our setup. Continuous intraarterial pressure monitoring and central venous pressure monitoring were done. Central venous pressure was maintained between 8-10 cmH₂O.

Another issue in this case was prone position. Turning a patient in prone position causes reduction in cardiac index due to reduced venous return, direct effect on arterial filling and reduced left ventricular compliance secondary to increase thoracic pressure.¹⁰ Obstruction of inferior vena cava, a well recognized complication of prone position is exacerbated by any degree of abdominal compression leading to decreased cardiac output. This can create further complication in this type of patient.

Elderly patient with dilated cardiomyopathy poses great challenge to anesthetists. In this case patient was at her optimal good health for surgery. Though the surgery was performed under general anesthesia in prone position, the intraoperative and post-operative course was uneventful.

CONCLUSION

Elderly patients with dilated cardiomyopathy have high chance of perioperative morbidity and mortality. The anesthetic technique should be chosen accordingly to the clinical condition of the patient and surgical technique. The anesthesiologist should have sound knowledge of the pathophysiological changes related to the disease process. Careful and detail perioperative evaluation and optimization of the reversible conditions are must before surgery along with judicious intraoperative and postoperative monitoring. Hence we concluded that patients with dilated cardiomyopathy could safely undergo surgery in prone position under general endotracheal anesthesia.

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