



Dilated cardiomyopathy with difficult airway: A dual challenge to an Anaesthesiologist.

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ABSTRACT:

A case report of a 45 years old male with dilated cardiomyopathy (DCM) and severe left ventricular dysfunction (LV ejection fraction 25%) having one finger mouth opening, posted for left submandibular abscess drainage and multiple tooth extraction. Considering difficult airway with inadequate mouth opening we opted for an awake nasal fiberoptic intubation followed by general anaesthesia. In such cases it is vital to have a careful preoperative planning with multidisciplinary discussion, titrated and meticulous use of selected drugs and a proper customized anaesthesia plan so as to achieve an uneventful perioperative course. We report the comprehensive anaesthetic management of this patient.

KEY WORDS: Dilated cardiomyopathy, severe LV dysfunction, awake fiberoptic, difficult airway, nasal intubation

Received 10 Feb, 2021; Revised: 23 Feb, 2021; Accepted 25 Feb © The author(s) 2021.

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I. INTRODUCTION

Dilated cardiomyopathy (DCM) is a primary myocardial disease with undetermined pathophysiology. ¹ It is marked by left ventricular or biventricular dilatation and diminished myocardial contractility. ² In DCM the most common cause of death is malignant arrhythmias. ¹ Due to global ventricular dysfunction these patients are highly susceptible to malignant arrhythmias, hence making the anaesthetic management very challenging more so because of myocardial depressant effect of anaesthetic drugs in addition to surgical stress. Hence proper understanding of its pathophysiology, clinical features, diagnostic evaluation and various treatment options is crucial. There are very few cases reported on patients with reduced ejection fraction (EF) and difficult airway. Hence we present this case, a successful anaesthetic management of a patient with DCM with restricted mouth opening posted for incision drainage of left submandibular abscess with multiple tooth extraction.

II. CASE REPORT

A 45 yrs. old male (164cm, 52.45kg) known case of Dilated cardiomyopathy (DCM) with severe left ventricular dysfunction since 2012 presented with left submandibular abscess was posted for incision drainage of abscess with multiple tooth extraction.

A complete pre-anaesthesia assessment was done. On airway examination patient had mouth opening of one finger with mallampatti grade 4, patient classified as American Society of Anaesthesiologists (ASA) grade III. Patient was medically managed with oral sacubitril, valsartan, Ramipril, carvedilol, trimetazidine, amiodarone, aspirin and clopidogrel. The 12 lead electrocardiogram (ECG) revealed right bundle branch block and left anterior hemiblock. Echocardiography demonstrated dilated cardiomyopathy, dilated left ventricle (LV), left ventricular ejection fraction (LVEF)-25% with generalised hypokinesia of LV and mild mitral

regurgitation along with thin rim of pericardial effusion. Chest radiograph (postero-anterior view) revealed cardiomegaly with normal lung fields. Considering dilated cardiomyopathy with low EF and perioperative risk of arrhythmias and left ventricular failure, postoperative need for ICU was explained. Considering difficult airway, detailed discussion of anaesthesia plan was done with patient and later discussed with surgeons to formulate plan for safely securing airway.

An awake fiberoptic bronchoscopy was planned for tracheal intubation followed by ketamine and propofol combination in titrated doses for induction of general anaesthesia considering a low EF. Patient was counselled again in preoperative room and nasal pledgets soaked with 2% ligno-adrenaline inserted in both nostrils. After attaching standard ASA monitoring in operative room, wide bore intravenous access was taken and left radial artery cannulation was done under local anaesthesia for intraoperative blood pressure monitoring, also all the necessary cardiac drugs were kept ready inside the operation theatre.

Patient's airway was prepared with oxymetazoline nasal drops, 2% lignocaine jelly nasally and trans-tracheal block was administered with 3ml 2% lignocaine. Patient was mildly sedated with Inj. midazolam 0.5mg and Inj Fentanyl 25mcg, later a No. 7 north Pole tube was then threaded over fiberoptic bronchoscope via right nostril through the vocal cords till carina was visualised, once ETCO₂ tracings were confirmed general anaesthesia was administered with titrated doses of ketofol (ketamine 50 mg and propofol 30 mg) and inj. atracurium 30mg given. Patient was mechanically ventilated on Pressure Control Volume Guaranteed (PCV-VG) mode with tidal volume of 7 ml/kg and respiratory rate of 14 cycles/min without application of positive end-expiratory pressure. Maintenance of anaesthesia was done using sevoflurane in 50% oxygen/nitrous at the minimum alveolar concentration (MAC) of 0.6 – 0.8 along with intermittent boluses of 25mcg fentanyl (Total 50mcg given), also intravenous fluids were given judiciously. Intraoperative period was uneventful and patient had stable hemodynamics throughout surgery and did not required any vasopressors. At the end of surgery patient was extubated when fully awake, with good tone and regular breaths and shifted to the post-anaesthesia care unit (PACU) where he was closely observed for two hours and remained vitally stable, rest of the postoperative course was uneventful and patient was discharged on postoperative day 4.

III. DISCUSSION

Dilated Cardiomyopathy (DCM) is marked by a gradual cardiac dilation and impaired systolic function of one or both ventricles. Most of the cases are idiopathic in nature with common causes being ischemic heart disease, valvular dysfunction and post viral infection. Anaesthetic management of patients having cardiomyopathy with impaired systolic function is demanding and may be associated with high mortality.³

Two major challenges in management of patients with cardiomyopathies are improvement in systolic function and prevention of sudden death by ventricular arrhythmias. In order to improve systolic function patient needs to be treated with diuretics, beta-blockers, angiotensin converting enzyme inhibitors or angiotensin receptor blockers. Our patient was well optimised medically before taking for surgery. The other important thing is careful preoperative preparation of these patients as they have minimal cardiac reserve, so adequate hydration is important. Also these patients are prone to develop ventricular arrhythmias in perioperative period hence continuation of antiarrhythmic medications is necessary. It is also necessary to have sufficient Oxygen carrying capacity, the main determinants of oxygen carrying capacity being cardiac output and haemoglobin. Hence it is recommended to maintain Hb between 13- 14gm/100ml.⁴ our patient's preoperative haemoglobin was 13.1 gm% and he was well optimised from cardiac point of view for surgery. Intra-operatively inotropes are frequently required to improve cardiac output. Dopamine is an ideal inotrope in many ways as it has positive inotropic, chrono tropic and vasoconstrictive to neutralise the adverse cardiovascular effects of anaesthetic drugs. Anaesthesiologist should keep lidocaine, amiodarone and defibrillator handy to manage any arrhythmias.⁵

Induction of anaesthesia is the most important stage in patients with low ejection fraction especially with difficult airway. In such cases anaesthesia management goals are to maintain cardiac contractility, avoid drugs having cardiac depressant action, and avoid increased afterload and volume overload.⁵

Etomidate is drug of choice in patients with decreased cardiac output due to its minimal cardiac depressant action but studies also suggest that it may compromise cardiac output in patients with impaired LV function⁶. The other useful drugs is Ketamine but due to its sympathetic activity it increases peripheral vascular resistance (PVR). However it can be used safely if combined with propofol, midazolam and fentanyl in titrated doses in patients with impaired cardiac function.⁷ Propofol is beneficial in neutralising the sympathetic effects of ketamine hence propofol and ketamine used for induction of general anaesthesia after awake FOB to avoid hemodynamic variations and maintain stable vitals during induction. Volatile anaesthetic agents have a cardio-depressant effect but if used at lower MAC (0.5-0.8)⁸ along with titrated doses of opioids like fentanyl will not affect cardiac contractility. In our case we used sevoflurane with oxygen nitrous mixture with MAC in the range of 0.6 to 0.8 for maintenance of anaesthesia along intermittent fentanyl boluses (total 50mcg) throughout

intraoperative period. Our patient's hemodynamics were stable throughout intraoperative period and surgery was done uneventfully.

IV. CONCLUSION

Patients with dilated cardiomyopathy with difficult airway can be extremely difficult to manage, but with thorough preoperative assessment to formulate plan for safely securing airway and medical optimisation before surgery along with swift diagnosis and management of perioperative complications will definitely improve overall patient outcome post-surgery.

CONFLICT OF INTEREST

Nil declared by the authors

FUNDING

No funding was received for this paper

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