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ANAESTHETIC MANAGEMENT OF A PATIENT WITH DILATED CARDIOMYOPATHY AND SEVERE LEFT VENTRICULAR DYSFUNCTION UNDERGOING NON-CARDIAC SURGERY

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ABSTRACT

Dilated cardiomyopathy (DCM) is characterized by progressive ventricular dilation and results in impaired ventricular function. The anesthetic management of patients with dilated cardiomyopathy is a daunting task for anesthesiologist, due to pre-existing or progressive congestive cardiac failure, poor left systolic function, ventricular enlargement, risk of malignant arrhythmias and sudden cardiac death. We report the successful management of a 54 year old male patient with idiopathic dilated cardiomyopathy and low ejection fraction (LVEF < 20%) who underwent surgery for lumbar canal stenosis of L2-S1 under general anesthesia.

INTRODUCTION:-

Dilated cardiomyopathy, primarily a myocardial disease is characterized by progressive left ventricular or biventricular dilation and impaired contractility. [1] The reported annual incidence is around 36 cases per 100,000 populations. However, the true incidence is probably underestimated by those figures, since many asymptomatic cases remain unrecognized. [2] Although idiopathic, familial association is observed in case of DCM. The other known causes are ischemic, valve dysfunction, post-viral infections, alcoholism, hypothyroidism or chemotherapy induced. [3] Such cases are always a challenge to the anesthesiologists, because of the associated global ventricular dysfunction and predisposition to malignant arrhythmias perioperatively, both of which are aggravated by the myocardial depressant effect of anaesthetic drugs as well as surgical stress. Operative concerns are precipitation of congestive heart failure, fatal arrhythmias and systemic embolization due to presence of mural thrombi in left ventricle. [4]

CASE REPORT:

A 54 year male weighing 68 kgs diagnosed with Lumbar canal stenosis of L2-S1 was posted for posterior decompression and laminectomy. He was a known case of dilated cardiomyopathy since 3 years. He had history of hospital admission 3 years ago with features suggestive of congestive heart failure. His symptoms were well controlled on Tab Digoxin 0.25 mg OD, Tab Torsemide 10 mg OD, Tab Clopidogrel 75 mg, Tab Ecosprin 150 mg. At the time of presentation the patient was in NYHA class II. Chest auscultation was normal. There were no rhonchi or crepitations. B/L air entry was equal. CXR showed Cardiomegaly. Routine laboratory investigations were normal with a haemoglobin level of 14.2 gm%. 2D Echo showed- hypokinesia in apex, apicolateral and inferoseptal wall. Severe LV dysfunction (LVEF- 15-20%). Mild to moderate MR, Severe pulmonary artery hypertension (PASP- 61 mm Hg), Mild pericardial effusion and dilated LV. Clopidogrel was stopped 6 days prior and rest of the medications were continued till the day of surgery.

High risk consent was obtained and general anaesthesia was planned. His pre-op vitals were- BP- 126/80 mm Hg, HR- 104/ min. Spo2- 100%, RR- 18/ min. Prior to the induction of anaesthesia left radial artery was cannulated and right internal jugular central venous catheter was placed under local anaesthesia. ECG, NIBP and pulse oximetry monitors were attached. Patient was preloaded with 250 ml Ringer lactate.

Premedication was done with Inj Midazolam 1 mg iv, Inj.Glycopyrrolate 0.2 mg iv and Inj.Fentanyl 100 mcg iv. After preoxygenation for 3 mins induction was carried out with Inj. Etomidate 18 mg iv and inj. Rocuronium 40 mg iv. Trachea was intubated with FMT sized 8.0 mm. Anaesthesia was maintained with O_2, Nitrous oxide and Isoflurane with rocuronium given at intermittent bolus doses of 0.03 mg/kg. Surgery lasted for approximately 120 mins. Inj Paracetamol 1 gm iv was given for pain management and Inj Fentanyl 50 mg iv was repeated after 1 hour of induction. Neuromuscular blockade was reversed with inj. neostigmine 2.5 mg and inj glycopyrrolate 0.4 mg iv. Patient was extubated uneventfully and shifted to intensive care unit for postoperative monitoring. His post-op vitals were- BP- 96/62 mm Hg. HR- 80-86 / min. Spo2- 100%. I/O- 1000ml/ 250 ml.

DISCUSSION:-

In patients with DCM, there is impairment of left and/or right ventricular systolic pump, which leads to progressive cardiac enlargement, a process called remodeling, and often, produces symptoms of congestive heart failure [5] Ventricular dilation may be so marked that functional mitral or tricuspid regurgitation occurs. These patients are often at a risk of dysrrhythmias or sudden cardiac death.[3] Therefore, preoperative assessment and correction of electrolytes are of particular importance in these patients as potassium and magnesium deficiencies can be commonly seen secondary to the chronic use of diuretics. [9] Intraoperative monitoring is essential to take care of the following factors- (1) avoidance of anaesthetic drug induced myocardial depression, (2) maintenance of myocardial contractility, (3) avoidance of hypotension to prevent myocardial hypoperfusion, (4) maintenance of adequate preload while preventing fluid overload. [6] 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. Information from a pulmonary artery catheter can be useful, although may not improve outcome. In the peri-operative period, the maintenance of sinus rhythm and avoidance of tachycardia are of utmost importance. Inotropic support, if required during and after surgery can be obtained by the use of vasopressors like dopamine, dobutamine, phosphodiesterase inhibitors, and levosimendin. Good postoperative analgesia avoids increases in systemic vascular resistance and heart rate. [7]. Life threatening ventricular arrhythmias may also occurs during the intraoperative period, so all emergency drugs such as lignocaine and amiodarone should be ready in the operating room. Commonly used induction agents like propofol, thiopentone sodium have a depressant effect on myocardium. Etomidate is the ideal induction agent in these patients as it causes least cardiovascular depression. [8] Opioids cause little or almost nil cardiovascular depression and decrease the dose of general anesthetic drugs for both induction as well as maintenance. All of the clinically used volatile anesthetic agents are myocardial depressants, and therefore, high concentration of these agents is best avoided. Low doses are usually well-tolerated; Extubation

should be smooth to avoid abrupt tachycardia and hypertensive response. Patient should be closely monitored in post-operative period for strict fluid management and to look for signs and symptoms of Congestive cardiac failure or ventricular arrhythmias. A well-managed postoperative analgesia is required to prevent increases in heart rate and systemic vascular resistance. [9]

CONCLUSION:

Management of patients with DCM is always a challenge for the anesthesiologists, but thorough pre-operative assessment, pre-operative optimization, vigilant perioperative monitoring and judicious use of pharmacological agents and anaesthetic techniques according to surgical requirement lead to a favorable outcome.

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