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"CASE REPORT ON ANAESTHETIC MANAGEMENT OF A CASE OF INGUINAL HERNIA REPAIR SURGERY WITH HYPERTROPHIC OBSTRUCTIVE CARDIOMYOPATHY"

Anaesthesiology

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ABSTRACT

Hypertrophic obstructive cardiomyopathy (HOCM) is rare genetic disorder characterized by left ventricular tract (LVOT) obstruction. Clinical presentation varies from absence of symptoms, angina pectoris, syncope to sudden death. HOCM may present to anaesthesiologist more often than anticipated, sometimes in undiagnosed form during routine perioperative visit. Surgery & anaesthesia may complicate perioperative outcome. Therefore, complete understanding of pathophysiology, haemodynamic changes & anesthetic implications is needed for successful perioperative outcome.

In this case report, we describe management of patient with HOCM, who underwent inguinal hernia repair surgery under general anaesthesia + inguinal nerve block.

KEYWORDS

HOCM, LVOT, inguinal hernia repair.

INTRODUCTION :

HOCM is transmitted as autosomal dominant trait & most common of the genetic cardiovascular diseases caused by multitude of mutations in genes encoding proteins of the cardiac sarcomere [1]. It pose considerable anaesthetic challenge as outflow tract obstruction can be worsened by decrease in preload , afterload or by sympathetic stimulation (a common occurrence during perioperative period) leading to increase in myocardial contractility. Sudden unexpected death, presumably caused by acute LVOT obstruction or fatal cardiac dysrhythmia, is possible in an asymptomatic patient [2]. In addition, the higher incidence of ischemic heart disease in patients with HOCM may further increase the risk of anesthesia and surgery [3].

We hereby describe how our anaesthetic technique (general anaesthesia with peripheral nerve block) for inguinal hernia repair was well chosen for perioperative management of such patient.

CASE REPORT :

30 year old male, with history of swelling in right inguinal region since last 3 years was scheduled to undergo right hernioplasty. He had past history of breathlessness with intermittent giddiness 1 year back & 2 months back was diagnosed as having HOCM, & started on tablet Bisoprolol 2.5 mg twice daily.

Physical examination revealed pulse rate 72 beats/min, blood pressure (BP) 100/60 mmHg. Cardiovascular examination revealed pansystolic murmur at cardiac apex & left parasternal region radiating to back & axilla. ECG showed T wave inversion in lead I, aVL & ST depression in lead I, aVL, V4-6. 2D-EHO reported asymmetrical septal hypertrophy with preserved left ventricular systolic fuction, septal thickness 19mm, LVOT gradient of 100 mmHg, ejection fraction 50% with normal chamber dimensions, without regional wall motion abnormalities. After thorough preanaesthestic examination & routine blood tests, patient & relatives were explained about high risk with need for postoperative ICU care. Written informed consent taken. All cardiac medication continued till day of surgery. All equipment and drugs necessary for resuscitation and general anesthesia were kept ready.

Baseline heart rate (HR) 68 beats/min, BP 102/56 mmHg, respiratory rate 14 breaths/min noted. Injection (Inj.) Cefotaxime 1 gm intravenously (IV) given for infective endocarditis prophylaxis. Right internal jugular venous cannulation done with aim of keeping central venous pressure (CVP) 10-12 cmH2O. Preloading done with 1000 millilitre of Ringer's lactate & 500 millilitre of Haesteryl. Premedicated with Inj. Midazolam 1 mg + Inj. Ondansetron 4 mg IV. Preoxygenation done with 100% oxygen (O2) for 5 minutes. Patient was induced with Inj. Fentanyl 300 μg Inj. Vecuronium 4 mg & inhalational agent Halothane. Hypotension was evident after induction with BP of 58/32 mmHg & significant ST depression on ECG monitor. To treat hypotension 200 millilitre crystlloid bolus & Inj. Phenylephrine 50 μg IV given. Still there was evidence of hypotension with BP of 60/42 mmHG & HR of 45 beats/min, which was managed by Inj. Phenylephrine 50 μg & Inj. Glycopyrrolate 0.2 mg IV. Within next 30 seconds HR settled to 68 beats/min & BP to 106/60 mmHg, followed by which well lubricated no. 4 laryngeal mask airway (LMA) was inserted. After cuff inflation, bilateral equal air entry confirmed the position. LMA was secured & fixed. Anaethesia was maintained with 66% N2O (nitrous oxide) + 33% O2 + Halothane with patient taking spontaneous respirations with intermittent positive pressure ventilation.

After this under all aseptic precautions standard inguinal nerve block was given with Inj. Bupivacaine 0.5% 10 millilitre + Inj. Lignocaine 10 millilitre + distilled water 10 millilitre to total volume of 30 millilitre. Intraoperatively HR was between 74-80 beats/min, BP 108/64 to 109/51 mmHg & MAP maintained between 74-79 mmHg. Intraoperatively patient received 500 millilitre of Ringer lactate & 500 millilitre of DNS.

Procedure completed uneventfully in 90 mins & at the end patient was well tolerating LMA & well maintaining on 02+N2O+Halothane with spontaneous respiration. After discontinuing halothane & N2O, 100% O2 continued for 5 minutes. After confirming good respiratory & muscular efforts, LMA was removed without giving reversal. Postoperatively patient was haemodynamically stable & shifted to PACU, with O2 supplementation by facemask, for further observation & management.

PACU stay of 48 hrs was uneventful. On 7th postoperative day patient was discharged from ward with advice to continue cardiac medications & follow up with cardiology OPD for further management of HOCM.

DISCUSSION:

HOCM is a complex cardiac disease with unique pathophysiologic characteristics [4]. HOCM is marked by asymmetric hypertrophy of left ventricle (left ventricular wall thickness >15mm) , dynamic LVOT obstruction due to systolic anterior motion of anterior valve leaflet of mitral valve and diastolic dysfunction caused due to impaired relaxation of noncompliant left ventricle. Patient may present from infancy to older than 90years with prevalence of 1:500(0.2%) [5]. Although adverse clinical consequences of disease, particularly sudden cardiac death , are well documented. More balanced perspective regarding prognosis has recently evolved in which normal longevity is seen with relatively mild disability. Symptomatic patient may experience progressive heart failure with exertional dyspnea , fatigue & chest pain, evolution to end stage phase & atrial fibrillation .

Few factors during anaethesia and surgery are inevitable, such as sympathetic stimulation arising out of laryngoscopy & intubation, incision, surgical stress & blood loss. Inappropriate monitoring may

worsen dynamic outflow tract obstruction. Thus, management in these patients is directed towards minimizing LVOT obstruction. These patients may deteriorate perioperatively due to arrhythmia, dynamic LVOT obstruction & diastolic dysfunction. Hence, preventive measures include – aggressive maintenance of sinus rhythm with defibrillation or pharmacological therapy, prevention or treatment of LVOT obstruction by maintaining preload & afterload with phenylephrine, administration of β-blockers or verapamil & suppression of sympathetic stimulation.

Preloading before induction helps maintain stroke volume, preload & minimize adverse events of positive pressure ventilation. Premedication with midazolam helps in alleviating anxiety, preventing unnecessary sympathetic stimulation. Halothane was preferred over other inhalation anesthetic agents because it decreases HR & myocardial contractility with minimal decrease in systemic vascular resistance. Selective α-1 agonist, like phenylephrine is preferred over ephedrine & dopamine for treating intraoperative hypotension along with crystalloid, as it increases systemic vascular resistance without any significant effect on myocardial contractility & HR.

β-blockers & calcium channel blockers have been used to treat HOCM. The beneficial role of β-blockers is due to decreased HR with consequent prolongation of diastole, increased passive ventricular filling & decrease in myocardial O2 requirement.

CONCLUSION:

Keeping the underlying pathophysiology in view, goals of anaesthetic management should aim at avoiding exacerbation of outflow tract obstruction (due to sympathetic stimulation), maintaining diastolic filling by maintenance of sinus rhythm & preventing fall in preload & afterload. Hence, in this case we chose general anaesthesia without intubation & with inguinal hernia block with invasive haemodynamic monitoring for our patient. Central neuraxial block, though not absolutely contraindicated, are still best avoided, because of risk of profound bilateral sympathectomy & hypotension.

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