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Anesthetic Management of a Patient of Valvular Heart Disease Posted for Inguinal Hernioplasty: A Case Report

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Abstract:- Patients with valvular heart diseases are a challenge to anesthesiologists. A complete understanding of pathophysiology of valvular lesions is necessary for planning anesthesia and perioperative management for such patients. Here, we report successful anaesthetic management of a 36year old patient with previously diagnosed Rheumatic valvular heart disease (severe mitral stenosis with aortic stenosis) undergoing right sided inguinal mesh hernioplasty.

In such patients, Ilioinguinal and Iliohypogastric nerve block offer an excellent alternative to neuraxial blockade and general anaesthesia.

I. INTRODUCTION

Valvular heart disease presents as mixed spectrum lesion all over the world. Rheumatic heart disease is the most common etiology of valve lesions, involving mainly mitral and aortic valves. (1)

Prevalence of Rheumatic heart disease in India is about 7.7/1000 population per year. In cases where mixed valvular lesions are present, we need to understand their pathophysiology and effects of various anaesthetic techniques on haemodynamic parameters because of these lesions. Plan of anaesthesia should be made accordingly. (1)

We are reporting here, a patient of rheumatic heart disease with mitral stenosis and aortic stenosis posted for inguinal hernioplasty.

II. CASE REPORT

A 36 year old male patient having right sided direct inguinal hernia was posted for inguinal hernioplasty.

Patient was a diagnosed with case of valvular heart disease 10 years back. Patient underwent balloon mitral valvotomy 9 years back, after which he was asymptomatic. Presently he was complaining of breathlessness on exertion. Patient was taking Tab. Digoxin 0.25mg, tab. Verapamil 120 mg, tab Penicillin G 400000 units, tab Torsemide 10 mg and tab Warfarin 4 mg since 2012.

On examination of vital parameters, pulse rate was 72 bpm with irregularly irregular rhythm and adequate volume. BP was 130/80 mmhg and oxygen saturation at room air 99%. CVS examination revealed mid-diastollic murmur in mitral area. Respiratory examination was normal.

All the routine laboratory investigations were within normal limits, with INR of 1.2. ECG was showing Atrial fibrillation and T wave inversion in leads II, III, aVF and V6. X ray chest was normal. 2Decho showed Moderate mitral stenosis with mitral valve area of 1.7 cm2 with moderate aortic valve stenosis, moderate PAH , well preserved RV and LV contractility with EF 65%. Atrial fibrillation with controlled ventricular rate.

Tab Warfarin was stopped 3 days prior to surgery and Inj low molecular weight heparin started subcutaneously.

Patient was accepted under ASA grade III. We decided the plan of anaesthesia as ilioinguinal and iliohypogastric nerve block.

Informed high risk consent obtained from patient.

Inj. LMWH was stopped 12 hours prior to surgery. After shifting the patient to operation theatre, monitors were attached and baseline vital parameters noted.

After giving comfortable supine position to the patient, procedure of ultrasound guided hernia block was explained to the patient.

Inj. midazolam 0.5 mg i.v. was given for anxiolysis. Inj fentanyl 50 mcg iv given and oxygen cannula was applied at 2lit/min.

After cleaning the inguinal region with all aseptic precautions, sterile linear high frequency ultrasound transducer was placed between the iliac crest and costal margin and abdomen was scanned from anterior-superior iliac spine (ASIS). ASIS was identified as hyperechoic osseous prominence on USG machine. Medial to ASIS, three layers of muscles- (from inside out) transversus abdominis muscles (TAM), the internal oblique (IOM), and the external oblique muscle (EOM) seen. Immediately below transversus abdominus muscle is the fascia transversalis. Peritoneum and

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bowel loops below, easily recognized as moving structures due to peristalsis are useful landmarks on the other side.

The iliohypogastric and ilioinguinal nerves pierce the TAM above the ilium and was seen as hypoechoic ovals in the plane between the TAM and the IOM. Deep circumflex iliac artery, in the same plane provides an additional landmark for the location of nerves.

After confirming with colour doppler and all the landmarks 15 ml of 0.5% ropivacaine was injected into the plane and around nerves using 100 mm stimuplex needle. Subcutaneous infiltration given with 10 ml 1% lignocaine at the medial end of incision or fan wise from the pubic tubercle to block contralateral innervations. Surgery started 20 minutes after the procedure for establishment of dense anaesthetic block. Intraoperative hemodynamic monitoring was done.

Patient tolerated the procedure well. Pulse rate, blood pressure was within normal limits throughout the procedure. Patient did not complain of pain during the surgery and did not require any change in plan of anesthesia.

At the end of surgery, inj.ondensetron 4 mg i.v. was given to avoid postoperative nausea and vomiting.

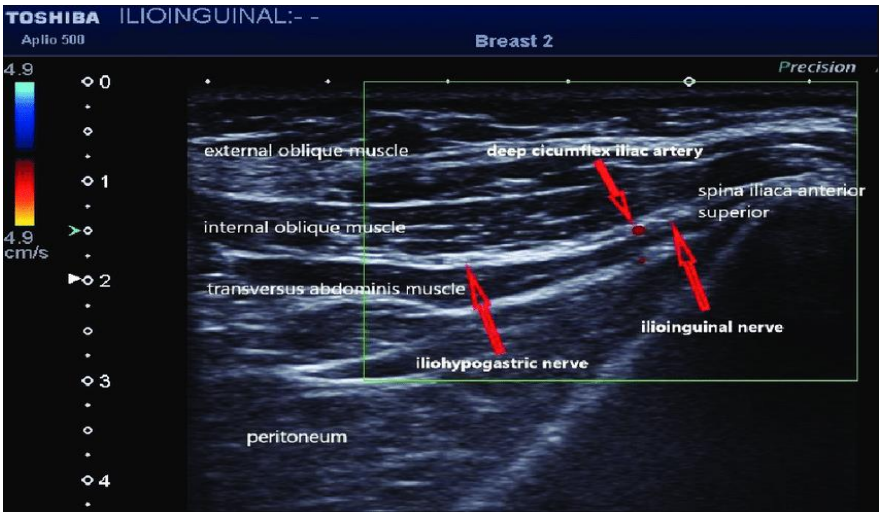

Fig 1:- Image showing USG landmarks of Ilioinguinal and iliohypogastric nerves.

III. DISCUSSION

Classification of valvular heart disease is based upon the etiology:

- Congenital valvular heart disease (stenosis, malposition, atresia, abnormalities of valve structure- bicuspid valves)
- Acquired heart valve disease
- Rheumatic heart disease
- Endocarditis (regurgitation more common)
- Senile calcific AS
- Myxomatous mitral valve prolapse leading to regurgitation (1)

The patient presented here, was a diagnosed case of Rheumatic heart disease with multiple valvular lesions.

Mitral stenosis is characterized by obstruction to left ventricular filling due to decreased size of mitral valve orifice. With mild stenosis, left ventricular filling and stroke volume are maintained by increase in left atrial pressure. (2) As the obstruction progresses, Pulmonary venous and arterial pressures are increased. This leads to compensatory right ventricular (RV) hypertrophy, RV dilatation and failure. (1)

Left ventricular function is usually preserved. If any other valve pathology accompany mitral stenosis, there is evidence of LV dysfunction. (2)

Aortic stenosis can develop because of two factors- Firstly, with aging there is degeneration and calcification of aortic leaflets causing valve orifice to get narrowed and Second factor is the presence of congenital Bicuspid aortic valve. Abnormal mechanical stresses in this valve promotes fibrosis and calcification. Obstruction to ejection of blood into the aorta will result in an increase in left ventricular pressure to maintain stroke volume. Transvalvular pressure gradient will rise, resulting in left ventricular hypertrophy and failure.

Aortic stenosis is almost always associated with some degree of aortic regurgitation.

Anaesthetic management for non-cardiac surgery in such patients is based on the likely effects of drug induced changes in heart rate, preload, afterload, myocardial contractility, systemic & pulmonary vascular resistance relative to the pathophysiology of the specific valvular lesion. (2)

Anaesthetic management in Mitral stenosis and Aortic stenosis should focus on control of heart rate and maintainance of cardiac output. In stenosed mitral valves, a slower heart rate is needed to transfer enough blood from the LA to LV. Any fast atrial rate or arrhythmias such as atrial fibrillation diminishes the left ventricular filling and cardiac output. (1) Fluid should be cautiously administered, as over transfusion will cause sudden pulmonary oedema. All

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measures to avoid increases in pulmonary arterial (PA) pressures (e.g., avoid hypoxia, hypercarbia, acidosis, lung hyper-expansion and nitrous oxide) should be done. (1) Hypotension reduces coronary blood flow resulting in myocardial ischaemia and further deterioration in left ventricular function and cardiac output. Drugs causing depression of myocardial contractility should be avoided in patients with stenotic valvular lesions.

Neuraxial anaesthesia causes sympathetic blockade and profound hypotension that can lead to reflex tachycardia. This will result in a spiral of poor myocardial perfusion and worsening cardiac function. (3) During general anaesthesia, Sympathetic stimulation and induction & maintenance drugs affecting heart rate and SVR should be avoided. (2)

So, in such patient with multiple valvular lesions, general anaesthesia is usually preferred over Neuraxial anaesthesia to avoid sudden sympathetic blockade. This makes the patient bear a wide range of shortcomings like sympathetic stimulation during endotracheal intubation, polypharmacy, delayed recovery, ICU admission and prolonged hospital stay.(4)

While deciding plan of anaesthesia for inguinal hernioplasty in this patient, Local infiltrative anaesthesia or regional nerve blocks are the suitable anaesthetic techniques. They are an excellent alternative for cardiovascular compromised patients who cannot tolerate the haemodynamic changes occurring because of spinal or general anaesthesia. (4) Ilioinguinal and iliohypogastric blocks can be used as anaesthetic technique for surgeries at the inguinal region and for lower abdominal surgeries. These blocks involve injection of local anaesthetic using either landmark technique or ultrasound guidance providing surface anaesthesia. (4)

The ilioinguinal and iliohypogastric nerves arise from the first lumbar spinal root. They innervate internal oblique and external oblique muscles and supply sensory fibres to the skin of the inguinal region and of the proximal, medial portion of the thigh. (5)

Ultrasonographic guided nerve blocks are more beneficial as they visually identify the nerves to be blocked. This technique gives more accuracy and drug requirement for nerve block is decreased. (6) These nerve blocks also provide postoperative analgesia.

IV. CONCLUSION

Ultrasound guided Ilioinguinal and iliohypogastric nerve block is a safe and effective anaesthesia technique for high risk valvular heart disease patients undergoing elective and emergency inguinal hernia surgeries.

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