

## **Case Report**

# **Anaesthetic Management of Total Hip Replacement in a Patient with Ankylosing Spondylitis**

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**Abstract:** This is a case report of successful anaesthetic management of a 56 year old male patient with ankylosing spondylitis with bamboo spine, hypertrophic obstructive cardiomyopathy, diabetes mellitus and hypertension posted for total hip replacement under general anaesthesia.

**Keywords:** Ankylosing spondylitis, Hypertrophic obstructive cardiomyopathy, Total hip replacement, General anaesthesia, Diabetes mellitus, Hypertension.

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## **INTRODUCTION**

Ankylosing spondylitis is an autoimmune inflammatory arthritic condition of spine and sacroiliac joint. This patients present specific challenges to anaesthetist due to limited mobility leading difficult airway management and positioning. Hypertrophic cardiomyopathy is a relatively common genetic malformation of the heart with a prevalence of approximately 1 in 500 [1]. Sudden death is a recognized complication [2].

The mortality after hip arthroplasty surgery has been reported to range from 0.4% to 4.6% that depends on primary versus revision replacement [3]. Parvis and colleagues reported 6.4% incidence of serious postoperative complications including cardiac arrest, tachyarrhythmia, pulmonary edema or congestive heart failure, myocardial infarction, hypotensive crisis, pulmonary embolus, acute renal failure, stroke, bowel obstruction or perforation and pneumothorax associated with primary unilateral lower-extremity arthroplasties in 1636 patients [4]. Cardiac complications are a major cause of postoperative morbidity. Belmont PJ Jr. et al. that an age of eighty years or more, hypertension requiring medication and a history of cardiac disease as the most significant predictors for the development of postoperative cardiac complications and stated that preoperative cardiology evaluation and co-management in the perioperative period for individuals with these risk factors should be considered [5].

## **CASE REPORT**

56 year old male patient k/c/o ankylosing spondylitis, diabetes mellitus, hypertension since 16 years came with complaints of bilateral hip pain more on left side since 3 months. He gave a history of fall from height 16 years back and sustained lumbar vertebral fracture which healed with conservative management. He had two episodes of chest pain, for which he was evaluated and found to have hypertrophic obstructive cardiomyopathy. Since then he is on Tab Ramipril 1.25 mg 0-0-1, Tab Metoprolol XL 50 mg 1-0-0. He was on oral hypoglycemic drugs. As his glycemic status was poorly controlled, started insulin therapy.

- On examination: Pulse 80/min, BP-150/100mm Hg.
- Patient has fixed flexion deformity of both hips and knee joint. He cannot sit erect.
- Systemic examination: Cardiovascular system-S1, S2 heard normally, pansystolic murmur heard in all areas
- Respiratory system, Abdominal system-No abnormality detected.
- Spine examination-obliteration of both cervical and lumbar lordosis.
- Airway assessment-MP-2, mouth opening normal, thyromental distance, temporomandibular joint normal, teeth normal.

- Neck movements limited; flexion upto 40 degree, extension 30 degree and lateral flexion 50 degree. Require 2-3 pillows to support head and neck in supine position.
- All blood investigations were within normal limits.
- ECG showed T inversion in all leads, ECHO- Hypertrophic obstructive cardiomyopathy, asymmetrical septal hypertrophy, moderate LVOT

obstruction, SAM present, Mild MR, Trivial TR, EF-60%.

- X-ray chest-showed prominent bronchovascular markings, cardiomegaly present. X-ray cervical, thoracic, lumbar spine showed features of ankylosing spondylitis.
- Pulmonary Function Test showed restrictive lung disease.



**Fig. 1: Posturing deformities of the patient**



**Fig. 2: X-ray of cervical and lumbar spines**



**Fig. 3: Chest X-ray and ECG**

Patient was posted for surgery after optimizing blood sugar level and blood pressure status. High risk

informed written consent for anaesthesia was taken. On the previous night Tab. Ranitidine 150mg, Tab

Alprazolam 0.5mg HS was given, kept nil per oral . On the day of surgery, patient reassessed and shifted to premedication room. 18 G cannula on left forearm and one 16 G IV cannula secured on right forearm, IV fluid Normal saline and Ringer lactate connected. Emergency airway cart, emergency drugs, tracheostomy set, fiberoptic bronchoscope, defibrillator were all set in operation theatre. Premedicated with Inj. Ranitidine 50 mg, Inj. Metoclopramide 10mg IV 30 minutes before surgery. With adequate support to spine with pillows, patient was made to lie on a trolley and transferred to operation theatre. Connected to all preinduction monitors. Preoxygenated for 10 minutes. Inj Midazolam 1mg, Inj. Fentanyl 100mcg iv given. As patient couldnot stand, we considered weight as 60kg and induced with Inj. Propofol 120 mg slow iv, ventilation assisted. Since mask ventilation was possible, Inj. Succinyl choline 100mg IV given and ventilated. Head placed over two pillows, Direct laryngoscopy done and direct visualization of vocal cord was possible (Cormack-Lehane classification-Grade 2a), 8mm ID flexometallic endotracheal tube inserted, position confirmed, cuff inflated, fixed at 22cms and connected to circle system with O<sub>2</sub>, N<sub>2</sub>O and

Isoflurane 0.4%. Muscle relaxation maintained with Inj. Vecuronium 5 mg initially and repeated doses. Patient was positioned to right lateral decubitus. All pressure points were well padded. Patient was hemodynamically stable intraoperatively. Around 1000ml blood was lost. Intraoperatively 2000 ml of crystalloids were transfused. Urine output was adequate. Continuous meticulous monitoring done intraoperatively to avoid tachycardia, hypertension, hypotension, hypoxia, hypercarbia. Surgery took 150minutes. At the end of procedure, reversed with Inj. Neostigmine 2.5 mg, Inj. Glycopyrrolate 0.4 mg. When patient completely recovered, extubated. Post operatively patient developed mild hypotension which was managed with IV fluid (normal saline) and one unit of whole blood transfusion. Post operative analgesia maintained with Inj. Morphine 5mg Q8h. Next day he was ambulated. Postoperative blood investigations were all within normal limit except Hb-9.7 gm/dl, PCV-29%, which was corrected with one unit of packed red cell transfusion. Patient was shifted to ward on 3<sup>rd</sup> postoperative day, he was hemodynamically stable. He was discharged on 13<sup>th</sup> postoperative day.



**Fig. 4: Patient positioned in right lateral decubitus**

## DISCUSSION

Ankylosing spondylitis is a chronic inflammatory arthritic disease resulting in fusion of the axial skeleton. It involves ossification of the axial ligaments that progress from the sacral lumbar region cranially that results in loss of spinal mobility. These patients have reduced movement of their cervical spines and their temporomandibular joints. Awake fiberoptic endotracheal intubation is required for general anesthesia in most of the cases. The ossification of the spinal ligaments closes the intervertebral spaces that lead to difficulty in access to epidural and subarachnoid space. Extraskelatal manifestations include aortic insufficiency, cardiac conduction abnormalities, iritis, upper lobe fibrobullous disease and pleural effusions. Attention should be given to intraoperative positioning in order to avoid fracture of the fused spine with concomitant spinal cord trauma [6].

In hypertrophic cardiomyopathy, hypertrophy develops initially in the septum, extending to the free

walls and often concentric hypertrophy occurs. The Left Ventricular Outflow Tract (LVOT) obstruction leads to increased LV pressure that aids a vicious cycle of further hypertrophy and increased obstruction. The three basic mechanisms include increased contractility, decreased afterload, and decreased preload. They exacerbate the degree of systolic anterior motion of the mitral valve (SAM)-septal contact. It produces the dynamic obstruction characteristic of patients with hypertrophic cardiomyopathy (HCM). The common pathway is a reduction in ventricular volume that increases the proximity of the anterior mitral valve leaflet to the hypertrophied septum. Factors that usually impairing contractile performance (myocardial depression, systemic vasoconstriction, and ventricular over distention) improve systolic function in patients with HCM and outflow tract obstruction. Most clinically apparent manifestation of the relaxation abnormalities is poor diastolic compliance. Intraoperative arrhythmias require aggressive therapy. Cardioversion is preferred when already the mean

arterial pressure is very low. Concurrent administration of phenylephrine is advisable. This drug is almost always a choice for the hypotensive patient with HCM. It augments perfusion, may ameliorate the pressure gradient. It often elicits a potentially beneficial vagal reflex when used for the treatment of tachyarrhythmia-induced hypotension. Hypotension occurs almost always the result of hypovolemia, potentially exacerbated by anesthetic-induced vasodilation. Inotropes,  $\beta$ -adrenergic agonists, and calcium are contraindicated. They worsen the systolic obstruction and perpetuate the hypotension [1].

There is a controversy whether regional anesthesia has an advantage over general anesthesia. It has been debated for decades without clear evidence reporting superiority of one method. The incidence of major perioperative complications with certain surgical procedures may be reduced by regional anesthesia. In addition, it leads to superior pain relief postoperative pain management, after orthopedic procedures [7].

Total hip arthroscopy may be performed via an anterior or lateral approach [8]. Most surgeons prefer the lateral posterior approach placing the patient in the lateral decubitus position, surgical side up for performing the operation. This approach may compromise oxygenation, particularly in obese and severe arthritis patients, owing to ventilation-perfusion mismatch. An anterior roll or pad must be placed beneath the upper thorax in order to prevent excessive pressure on the axillary artery and brachial plexus by the dependent shoulder [7].

Blood loss during Total hip arthroscopy can be significant. The patient can lose 1-2 L of blood. Controlled hypotensive epidural anesthesia with mean arterial pressures of 50-60 mm Hg can reduce intraoperative blood loss for primary Total hip arthroscopy [7, 9]. Additionally, hypotensive anesthesia may improve the cement prosthesis to bone fixation by limiting bleeding in the femoral canal [7, 10]. "Bone-cement implantation syndrome" complicates the cemented fixation of the femoral prosthesis that may result in intraoperative hypotension, hypoxia, cardiac arrest and fat embolism syndrome (FES) postoperatively [7, 11].

## CONCLUSION

This case reports a successful management of total hip replacement in a patient with ankylosing spondylitis, hypertrophic obstructive cardiomyopathy, diabetes mellitus, hypertension with a team of anaesthesiologists and orthopaedicians under general anaesthesia. In our case, patient had fused spine and limited mobility, high chance of epidural technique failure, and in view of hypertrophic cardiomyopathy, hypotension cannot be tolerated. Taylor's approach could have tried in this patient, but considering cardiomyopathy, we opted for general anaesthesia

inspite of anticipated difficult intubation and our patient was hemodynamically stable throughout the procedure. The end result of managing such a high risk patient is a result of proper preoperative assessment, preparation, meticulous monitoring and team work.

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