



Anaesthetic Management of Patients with Takayasu's Arteritis for Open Cholecystectomy: a Report of Two Cases

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ABSTRACT

Takayasu's arteritis is a well known yet rare form of large vessel vasculitis.¹ This inflammatory disease often affects the ascending aorta and aortic arch, causing obstruction of the aorta and its major arteries.² Anaesthetic management for these patients is complicated by severe hypertension, end-organ dysfunction, stenosis of major blood vessels and difficulties in monitoring blood pressure.¹ We present two patients who underwent open cholecystectomy under neuraxial anaesthesia. We have discussed about various perioperative issues and their management.

Keywords: anaesthetic management; takayasu's arteritis.

INTRODUCTION

Takayasu's arteritis (TA) is a rare, chronic progressive panendarteritis involving the aorta and its main branches, leading to stenosis, thrombosis and the formation of aneurysms. Hence it is also known as aortic arch syndrome or pulseless disease. The major clinical finding is loss of palpable pulses in the upper limbs and neck. It has female predilection and involves mainly the Asians.³ There are anaesthetic implications of this disease as it involves the vascular system leading to involvement of various organs. We present the successful anaesthetic management of two cases undergoing elective open cholecystectomy under regional anaesthesia.

CASE REPORT

First case

A 28 years old lady, a known case of symptomatic cholelithiasis, presented with on and off right upper quadrant pain for last six months. She was a diagnosed case of Takayasu's arteritis for last six years, on treatment with oral Prednisolone 20 mg daily. She was taking tablet Amlodipine 5 mg daily for hypertension since last six months.

Preoperative physical examination revealed impalpable bilateral radial, brachial and carotid pulses. Her

bilateral lower limb pulses were palpable. Her blood pressure was 180/80 mmHg at her right leg. Other physical examination findings were normal. Laboratory investigation reports including ECG and chest X-ray were normal. CT angiogram of aortic arch and arch vessels showed critical stenosis (near total occlusion) of whole of right brachiocephalic trunk and right common carotid artery and whole of left common carotid artery.

Surgery was planned under epidural anaesthesia. Right posterior tibial artery was cannulated for invasive arterial blood pressure monitoring. Epidural catheter was inserted at T₈₋₉ interspace and 3ml of 2 % lignocaine with adrenaline was given as test dose. Epidural was activated with 0.5% Bupivacaine 5 ml and Morphine 2 ml (2 mg). Level of block was obtained from T₂ to T₁₀ dermatome. Hydrocortisone 25 mg IV was administered for perioperative steroid supplementation. Surgery was started. Oxygen was supplemented via face mask at 5 L/min. Intraoperatively 10 ml of 0.25 % Bupivacaine was sprinkled between liver and diaphragm. After half an hour of starting of surgery, 0.25% of Bupivacaine infusion was started via epidural catheter at 6 ml/hour. Intraoperative course was uneventful with intact

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neurological status monitored clinically. Total duration of surgery was one and half hour. Post operative epidural analgesia was administered with continuous infusion of 0.125% Bupivacaine and 2 mcg/ml Fentanyl combination at 6 ml/hour. Epidural catheter was removed on third postoperative day. She had uneventful postoperative period and was discharged home on fourth postoperative day.

Second case

A 33 years old female, a case of symptomatic cholelithiasis, presented with right upper abdominal pain for 3 months. She was diagnosed case of Takayasu's arteritis 11 years back when she presented with fatigue and discomfort of upper extremity muscles while in use, absence of pulse in upper limbs, syncope, hypertension, dyspnea and palpitation. She was on treatment with oral Prednisolone, Amlodipine, Atenolol, Hydrochlorothiazide and Enalapril.

On, physical examination, all peripheral pulses were palpable, blood pressure was 140/90 mm Hg in upper limb and diastolic murmur was appreciable on auscultation of precordium which was most marked in aortic area. Echocardiography revealed severe aortic regurgitation. Carotid Doppler showed 20% stenosis of left carotid artery.

After routine preoperative preparation and infective endocarditis prophylaxis with injectable Ampicillin 2 gm and Gentamicin 80 mg, right radial artery was cannulated for continuous invasive arterial blood pressure monitoring. Epidural catheter was inserted at T₉₋₁₀ interspace and 3 ml of 2 % lignocaine with adrenaline was given as test dose. Subarachnoid block was given at L₃₋₄ space with 3 ml of hyperbaric bupivacaine 0.5% and Fentanyl 0.5 ml (25 mcg). Sensory block upto T₄ dermatome with Bromage grade IV motor block was attained. Surgery was initiated. Total of 7 ml of 2% lignocaine was topped up through epidural catheter during 1 hour 10 minutes of surgery. One episode of hypotension was treated with fluid bolus and Mephentermine 6 mg. Patient was intact neurologically, which was assessed clinically. Postoperative analgesia was attained with continuous infusion of 0.1% Bupivacaine and Fentanyl 2 mcg/ml at 5 ml/hour. Postoperative course was uneventful. Epidural catheter was removed on third postoperative day and patient was discharged home on fifth postoperative day.

DISCUSSION

Takayasu's arteritis is an uncommon vasculitis characterized by a focal stenosis of the arterial lumen leading to distal ischemia and loss of pulse distal to the site of the lesion. It is more common in women

of reproductive period. The exact etiology remains unknown but it may have an autoimmune basis. The disease initially have preocclusive phase of rheumatic or systemic symptoms. This is followed by occlusive phase with segmental arterial involvement in several sites.⁴ The disease is rarely diagnosed in preocclusive phase. Takayasu's arteritis is classified on the basis of distribution of affected vessels. Type I involves the aortic arch and its main branches. Lesions in type II are restricted to the descending thoracic and abdominal aorta. Patients with Type III show features of both types I and II. Patients with type IV show additional involvement of the pulmonary artery.⁵ Ishikawa graded Takayasu's arteritis based on presence of four major complications i.e., hypertension, retinopathy, aneurysm formation, and aortic regurgitation. In stage I, none of these complications were present, stage IIa patients had only one of these (in a milder form), stage IIb had only one of these complications but a rather severe one, and in stage III more than one complications were present.⁶

Both of our patients were female with mean age of 30.5 years. Both of them were hypertensive. One of them developed aortic regurgitation. However, neither of them have retinopathy or aneurysm formation. Hence both of them were of type I. According to Ishikawa grading, first case was in stage IIb while the second case was in stage III.

Hypertension is the major complication affecting anaesthetic management. It is commonly renovascular in origin.⁷ Hypertension also results from reduced elasticity, narrowing of aorta and major arteries and abnormal function of carotid and aortic sinus baroreceptors. These patients often require multidrug treatment. If remain uncontrolled, they may require surgical management.

Various anaesthetic techniques have been implicated. The choice of regional versus general anaesthesia depends upon patient's general condition and types of surgery. There are reports of use of regional anaesthesia and analgesia as an adjuvant to general anaesthesia. The main concern during conduction of anaesthesia in patients with TA is the maintenance of blood pressure during the perioperative period.

General anaesthesia may result in wide swings in blood pressure like during endotracheal intubation and extubation or due to inadequate depth of anaesthesia. These periodic surges in blood pressure may result in cerebral haemorrhage, infarction or myocardial dysfunction. There are reports of successful surgery under general anaesthesia with different intraoperative neurological monitorings.^{8,9,10,11} However, there are also reports of uncomplicated neurological outcomes in which general anaesthesia was used without specialized

neurological monitoring.^{12,13,14} There was one report of postoperative cerebral dysfunction.¹⁵

Regional anaesthesia may be advantageous in terms of neurological monitoring as awake patients provides reliable monitor of cerebral perfusion. However, it may be associated with hypotension, further compromising regional perfusion in the presence of preexisting stenosed vessels. Epidural anaesthesia is preferred over spinal anaesthesia as it is associated with gradual onset of sympathetic block and a gradual decrease in blood pressure. Measures to attenuate regional anaesthesia induced hypotension like prehydration with crystalloid, slow administration of local anaesthetics and titration of the local anaesthetics to the desired level avoid precipitous decrease in blood pressure. Hypotension can be treated with infusion of fluids, Trendelenburg position and intravenous ephedrine. It is best to avoid vasopressors in patients with preexisting compromised organ perfusion.

In both cases we chose regional anaesthesia. Both cases were similar in terms of type of surgery and involvement of carotid artery. As stated earlier, regional anaesthesia is advantageous in terms of neurological monitoring. Further, different neurological monitoring were not available in our setup. In the first case, epidural anaesthesia was used alone. There was severe carotid occlusion bilaterally and small haemodynamic compromise may lead to neurological impairment. So we decided to titrate anaesthetics gradually to the desired level and neurological assessment was done clinically. In second case we used combined epidural and spinal anaesthesia. Low dose combined spinal-epidural technique combines the reliability of intrathecal block and flexibility of epidural anaesthesia. It helps to deliver titratable anaesthesia with stable haemodynamics.¹⁶ Combined epidural spinal anaesthesia was found to provide superior analgesia and surgical conditions when compared with epidural technique alone.¹⁷ Further, Shrestha GS et al have reported a case describing the safety and efficacy of combined epidural spinal in a patient of dermatomyositis with valvular heart disease undergoing total abdominal hysterectomy.¹⁸

There may be other problems complicating the anaesthetic management. Cardiac dysfunction, if

present is mainly because of hypertension. Some may have occlusive changes in coronary arteries leading to myocardial ischemia. If there is involvement of renal artery, they may have feature of renal dysfunction. They should be evaluated for Cushingoid features preoperatively as they often receive chronic steroid therapy. These patient require perioperative steroid supplementation.

Blood pressure monitoring can sometimes be challenging. If there is palpable peripheral pulses, non-invasive blood pressure monitoring, usually oscillometric method, can be used. Most of the times upper limb blood pressure correlates with lower limb blood pressure. There were reports with significant difference in arterial pressure between upper and lower limbs (more than 20 mmHg).^{19,20} These patients require blood pressure monitoring in both upper and lower limb. There patients required cautious use of regional anaesthesia. In patients with weak or absent peripheral pulses, other measures like pulse oximetry, automated non-invasive blood pressure monitoring and Doppler flow signals can be used to record blood pressure. In our first case, pulses were not palpable in upper extremities. She had developed cushingoid features due to long term use of steroid. The available non-invasive blood pressure cuffs were not of appropriate size to record her lower limb blood pressure. So we decided to cannulate her posterior tibial artery for blood pressure recording. In second case, though she had palpable pulses in the upper extremity, we opted for invasive blood pressure recording because of cardiac involvement.

In conclusion, Takayasu's arteritis with multisystem involvement may complicate anaesthetic management. Maintenance of adequate perfusion pressure is crucial during the procedure. Intraoperative neurologic monitoring should be considered in patients with carotid artery involvement. Cautiously performed neuraxial anaesthesia can be safe and effective in patients with Takayasu's arteritis with carotid involvement, with the provision of intraoperative clinical neurological monitoring and postoperative analgesia.

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