



TAKAYASU AORTOARTERITIS: ANESTHETIC MANAGEMENT OF LABOR ANALGESIA

*Dr. Nalini Jadhav, Dr. Shraddha Mathakar and Nilesh Wasekar

Department of Anesthesia, G. S. Medical College & KEM Hospital Mumbai.

* Corresponding Author: Dr. Nalini Jadhav

Department of Anesthesia, G S Medical College & KEM hospital Mumbai.

Article Received on 23/04/2016

Article Revised on 13/05/2016

Article Accepted on 02/06/2016

CASE REPORT

Takayasu aortoarteritis in a pregnant patient is often associated with severe life threatening complications. We describe the management of labor analgesia in a symptomatic parturient suffering from Takayasu aortoarteritis. Hypertension is seen in 33–83% of patients, generally reflecting renal artery stenosis, which is seen in 28–75% of patients.* The patient was managed with graded epidural analgesia instituted early in labor. Intermittent boluses of 0.125% bupivacaine with 2 µg/mL fentanyl were administered epidurally, which provided adequate analgesia without impaired hemodynamic status.

1. INTRODUCTION

Takayasu aortoarteritis (TA) is a nonspecific occlusive pan endarteritis of unknown origin, which causes thrombosis and occlusion of systemic and pulmonary arteries.¹ Pregnancy in TA is associated with severe life threatening complications and the maternal mortality rate is estimated to be 4.8%.^[2-4] TA may be associated with dilated cardiomyopathy (DCM) in 5% of cases,^[5] which may further complicate the pregnancy. The best anesthetic management for pregnant patients with TA is controversial and poses a challenge to the anesthesiologist.^[6] Several reports have described the safe use of neuraxial blocks for cesarean section in these patients^[6-9], although its use in labor analgesia is limited.^[10,11] Here, we report the successful use of low dose epidural bupivacaine with fentanyl for labor analgesia and instrumental delivery in a patient with TA.

2. CASE REPORT

A 36-year-old, G₂P₁A₀L₁ female (weight, 50 kg; height, 150 cm) with a known history of TA arrived at our outpatient department at 38 weeks of gestation. She diagnosed as TA 10 years back during her first pregnancy. She had type V disease and was being treated with Tab Amlodipine 5mg OD and Alpha methyl dopa 250mg TDS. Echocardiography revealed concentric LVH, good systolic function, mild AR, no significant PH, no regional wall motion abnormality, no pericardial effusion, IVC not congested, no LV diastolic dysfunction, LVEF 60%. Angiography showed diffuse narrowing of visualized portion of abdominal aorta with significant obstruction s/o non specific aortoarteritis diameter of aorta at diaphragm is 7.4mm, s/p right renal artery stenting, possibility of significant narrowing of the left subclavian artery.

On examination she was conscious, oriented with a pulse rate 80/min and a respiratory rate of 20 breaths/min. Her right radial, left carotid and lower extremity arteries were palpable with no radio femoral delay. The blood pressure in her right arm was 160/100 mmHg and in left arm 110/70 mmHg with a difference in the lower limbs of < 20 mmHg. Systemic examination revealed a diastolic murmur in aortic area, and respiratory system AEBE.

A joint decision for vaginal delivery with prophylactic outlet forceps was made. At the start of true labor, a peripheral central line was inserted to monitor central venous pressure. The patient was preloaded with 300 mL of lactated Ringer's solution and epidural catheterization was achieved at the L3–L4 intervertebral space under strict asepsis. Then, 10 mL of 0.125% bupivacaine plus 20 µg of fentanyl were administered epidurally in incremental boluses to achieve analgesia. An automated noninvasive blood pressure cuff was placed on her both the arms. The heart rate remained at 90–110 beats/min with a blood pressure ranging from 200/ 60 mmHg to 116/70 mmHg. After 2 hours, labor was augmented with intravenous oxytocin infusion. Analgesia was maintained with a bolus of 6–8 mL of 0.125% bupivacaine and 2 µg/mL fentanyl at the patient's request (visual analog scale score > 40 on a 100-mm scale, usually every 2 hours). Twelve hours later, outlet forceps was applied for delivery following a top-up with 10 mL of 0.125% epidural bupivacaine plus 25 µg fentanyl. A healthy male infant weighing 2.384 kg was delivered with Apgar scores of 8 and 10 at 1 minute and 5 minutes, respectively. The epidural catheter was removed after administration of a bolus of 6 mL of 0.0625% bupivacaine with 3 mg morphine. Overall, she received 51 mg of bupivacaine and 180 µg of fentanyl during

labor. She was discharged 7 days after delivery and recommended to undergo follow-up at a cardiology department.



Image 1

- **Angiography**
 - showed diffuse narrowing of visualized portion of abdominal aorta with significant obstruction s/o non specific aortoarteritis
 - diameter of aorta at diaphragm 7.4mm,
 - s/p right renal artery stenting, significant narrowing of the left subclavian artery



Image 2

- The blood pressure in her right arm was 207/78 mmHg



Image 3

Left arm BP was 154/82mmHg with a difference in the upper and lower limbs of < 20 mmHg.

3. DISCUSSION

TA is a rare chronic disease of unknown etiology and is characterized by obliterative panarteritis, which results in a variety of ischemic symptoms due to stenosis and thrombosis of major arteries. The characteristic features of TA include weakened or absent pulses (84–96% of patients), vascular bruit (80–94% of patients), hypertension (33–83% of patients), congestive heart failure and pulmonary artery involvement (14–100% of patients).^[5] Hypertension in TA is mainly of renovascular origin and may result in DCM.^[5] TA is classified according to the distribution of lesions^[12] and complications.^[1] Our patient was classified as having type V disease because of the combined features of type IIb and IV, which were confirmed by digital subtraction angiography.^[13] TA predominantly affects young women of reproductive age. Advancing pregnancy is associated with an increase in intravascular volume and cardiac output, which may lead to worsening of ischemic symptoms, exacerbation of hypertension, congestive heart failure and possibly cerebral hemorrhage in patients with TA.^[2,3] During labor and delivery, there is a further increase in cardiac output and peripheral vascular resistance and reduced uteroplacental perfusion because of the stress response to pain.^[14] These physiologic changes are often poorly tolerated in patients with TA and DCM because of their compromised cardiac function and can lead to pulmonary edema.^[15] Cerebral hemorrhage can also occur during the second stage of labor; hence, it may be better to shorten this stage of labor by using outlet forceps, as in our case.^[16] The mortality rate during pregnancy of patients with DCM ranges from 18% to 56%.^[17] In patients with TA, the rate of cesarean section is very high, and sustained hypertension was the most common indication for cesarean section in such pregnancies.^[18] An elective cesarean delivery can prevent complications that may occur due to labor pain and vaginal delivery. However, cesarean delivery should be reserved for events in which it is indicated, such as fetal distress or failure of labor to progress, because vaginal delivery has advantages such as low blood loss, greater hemodynamic stability,

avoidance of surgical stress and less chance of postoperative infection and pulmonary complications.^[18] Regional analgesia for labor and delivery may be advantageous in these patients because of reduced after-load and less fluctuation in cardiac output associated with uterine contractions and labor pain,^[19] particularly in parturient with DCM.^[15,20] Epidural analgesia offers distinct advantages, including preservation of fetal–maternal hemodynamic status, prevention of an increase in plasma catecholamines due to labor pain, easy conversion from labor analgesia to surgical anesthesia and possible direct suppression of arrhythmia by pharmacologically active plasma levels of a local anesthetic.^[21] Keeping the patient awake during labor is a simple and reliable method to monitor adequate cerebral perfusion.^[22] However, neuraxial analgesia may be associated with hypotension, which can be hazardous in TA because the resulting variations in regional blood flow may compromise organ perfusion.

Treatment with vasopressors is best avoided.^[2] Even in the setting of normotension, the use of epidural anesthesia may provide a steal-like phenomenon, which can adversely affect regional blood flow.^[23] Invasive arterial monitoring is controversial in TA because of the risk of vascular occlusion triggered by cannulation of the affected arteries.^[24] However, noninvasive blood pressure monitoring has been successfully used in these patients. If there is a significant preoperative discrepancy in readings between the upper and lower extremities, noninvasive blood pressure monitoring for both upper and lower limbs is recommended.^[18] In patients whose pulses are not clinically palpable, the use of Doppler blood flow signals is recommended.^[25] The hemodynamic status of patients with DCM should be optimized by careful fluid replacement under central venous pressure monitoring. Echocardiography can also be helpful in these cases to optimize fluid loading and avoid complications.^[15]

Our goal was to provide labor pain relief, while maintaining maternal consciousness, to allow the mother to actively participate in labor and to limit the total dose of local anesthetics. We administered graded, intermittent bolus epidural analgesia because it is safe, efficacious and leads to reduced bupivacaine consumption and less motor block compared with continuous infusion.^[26,27] Wong et al.^[28] found that patients had greater satisfaction with programmed intermittent epidural boluses than continuous infusions for labor analgesia.

Crofts and Wilson^[11] administered 10 mL of 0.375% bupivacaine with a cumulative dose of 127 mg without fentanyl for labor analgesia in a patient with TA, but they were unable to ameliorate the hypertensive response. In a patient with TA, McKay and Dillard^[10] administered a bolus of 10 mL of 0.25% bupivacaine with 5 µg/mL of fentanyl, followed by infusion of 0.125% bupivacaine with 1 µg/mL fentanyl at 8 mL/hr. Their patient

manifested a higher level of sensory block and experienced one episode of hypotension. In our patient, 0.0625% bupivacaine plus 2 µg/mL fentanyl provided adequate analgesia without any unwanted cardiovascular effects. Administration of low-dose local anesthetics also helped to prevent local anesthetic toxicity, which can occur in pregnant patients with heart failure.^[29] Epidural analgesia using a combination of lowdose bupivacaine and fentanyl in a parturient with TA can provide effective pain relief without maternal and fetal complications.

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