



BMH Med. J. 2018;5(2):47-50 **Case Report**

Anaesthesia for Coarctation of aorta in pregnancy- A challenge

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Introduction

Coarctation of thoracic aorta is present in approximately 5-7% of patients with congenital heart disease [1]. Coarctation of aorta (CoA) is usually characterised by a discrete narrowing of the aorta distal to the subclavian artery. Diagnosis is made during infancy or childhood in 80% of the cases and most of them survive into adulthood. Females with previously corrected coarctation of aorta may present with pregnancy. Uncorrected CoA may also present for the first time during pregnancy as hypertension. Pregnancy with heart disease presents unique challenges to the anaesthesiologist as well as to the obstetrician.

We report the successful management of a parturient with CoA undergoing lower segment Caesarian section.

Case report

A 21 year old primigravida at 38 weeks and 3 days of gestation with regular antenatal checkup was posted for lower segment Caesarian section. She was diagnosed to have CoA and bicuspid aortic valve for which stenting was done at the age of 11 years. She was found to be free of any cardiac symptoms after the procedure. When she became pregnant she was found to have hypertension for which she was started on tablet labetalol 50 mg twice daily. On examination she was comfortable at rest with dyspnoea only on severe exertion. Her heart rate was 85/ minute, regular, good volume and equal on both sides. Her upper limb blood pressure was found to be 140/60 mm Hg on the right side and 120/60 mmHg on the left. Blood pressure in her lower limb was 116/58 mm Hg. A systolic murmur was present in her left sternal border. ECG was normal and Echo showed CoA post angioplasty with residual gradient of 40 mm Hg. In addition bicuspid aortic valve was present. There was no aneurysm. Left ventricular ejection fraction was 62%. As the patient was term it was decided to do an elective lower segment Caesarian section. The patient was fasted overnight. Infective endocarditis prophylaxis was given as injection Ampicillin 2 gram and Gentamicin 80 mg half hour before surgery. Monitors included pulse oximetry, 5 lead ECG, end tidal capnography and non

invasive blood pressure in the upper and lower limbs. Oxygen was administered at 4 litres/ minute using a poly mask.

As the patient had a good left ventricular function with normal coagulation profile we decided to provide graded epidural anaesthesia which will maintain stable hemodynamics. Under aseptic precautions epidural block was given at the level of L3-L4. A 3 ml test dose of 2% lignocaine was given to rule out intravascular and intrathecal block. After confirming the position of the epidural catheter, 10 ml of 0.5% bupivacaine was given in incremental doses till a sensory level of T6 was obtained. A Caesarian section was performed and a female infant with APGAR score of nine at one minute was delivered within five minutes of incision. Intravenous Oxytocin 20 units in 500 ml normal saline was started slowly and given over 1 hour. A good uterine tone was achieved. Haemodynamically the patient remained stable intraoperatively. Vasopressors were not needed throughout the perioperative period. Patient was shifted to post operative ICU for monitoring. Post operative analgesia was provided by epidural infusion of 0.2% ropivacaine at 4 to 6 ml/hr. Patient was observed for 2 days in the postoperative ICU and then shifted to the room.

Discussion

Coarctation of aorta was first described by Morgagni in 1760 [2]. CoA is the fifth most common congenital heart defect with an estimated incidence of 1 in 2500 births with a higher incidence in males. Mean life expectancy of untreated patients is 35 years [3].

CoA is a discrete narrowing of the thoracic aorta at the junction of the ductus arteriosus and the aortic arch, just distal to the subclavian artery. CoA has been found to be associated with other congenital cardiovascular abnormalities including bicuspid aortic valve (85%), intracranial aneurysms (3-10%), intrinsic abnormalities of the aorta, aortic arch hypoplasia, ventricular septic defects, patent ductus arteriosus, aortic stenosis at valvular, subvalvular and supra valvular levels and mitral valve abnormalities. There is an increased familial risk with increased prevalence in Turners syndrome, maternal phenylketonuria syndrome and Kabuki syndrome [4].

There are infantile and adult types of CoA. The infantile type, which presents in infancy and is associated with other serious defects. This requires a patent ductus arteriosus for survival. Unless corrected early in life, it is not compatible to survival to adult life. Girls diagnosed with CoA should be screened for Turner's syndrome due to the frequent association between the two.

Patients with less severe coarctation may go unrecognised till late childhood when a cardiac murmur is heard or hypertension is detected. In such cases, there are collaterals that develop from internal thoracic and subclavian arteries, thyrocervical trunk, vertebral and the anterior spinal arteries to the descending thoracic aorta. Undiagnosed adults with coarctation may present with hypertension, headaches or claudication in the lower extremities with exertion. These patients may present with reduced lower extremity pulses and a systolic pressure gradient between the upper and the lower extremities. In the presence of extensive collaterals, femoral pulses and the lower extremity blood pressures may be only minimally reduced.

The delayed complications of CoA include persistent hypertension (30% at 10 years and 66% at 40 years), premature coronary artery disease (25%) and Berry aneurysms (2-3%). Restenosis of the coarctation site may also occur in upto 35% of the patients who have undergone repair [5].

Pregnancy is associated with normal physiological changes like increase in the plasma volume, heart rate, stroke volume and cardiac output and a decrease in the systemic vascular resistance. There is a fear that the cardiac decompensation may occur in patients with cardiac disease during pregnancy. Although major cardiovascular complications are not very frequent in pregnant patients with coarctation of aorta, maternal and neonatal outcomes remain a source of concern. Histological changes in the wall of ascending aorta together with the physiological and hormonal changes during

pregnancy predispose these patients to increased risk of aortic dilatation, rupture or dissection of aorta. There is also increased chance for restenosis which can be assessed by echocardiography and MRI.

Adults with CoA should have a lifelong follow-up by a cardiologist. Patients who have had surgical or interventional correction of the coarctation should be assessed annually with echocardiography to rule out complications like aortic dilatation and aneurysm formation. In a CoA patient with systemic arterial hypertension brachial and femoral pulses should be palpated simultaneously. This will help to determine the timing and amplitude of both the pulses and to detect radiofemoral delay. The differential pressures in the brachial arteries of the upper limbs and the popliteal arteries in the lower limbs should also be evaluated. Initial imaging and hemodynamic evaluation by transthoracic echocardiography is recommended in cases of suspected coarctation of aorta.

Thiazides diuretics and angiotensin converting enzyme inhibitors are contra indicated in pregnancy. Labetalol is an alpha blocker with non selective beta blocking properties. It does not have any effect on the uteroplacental blood flow and results in good and sustained control of blood pressure. It is the preferred antihypertensive in CoA.

Our anaesthetic plan was graded epidural anaesthesia with continuous hemodynamic monitoring. Titrated epidural drug administration is a safe and effective alternative to general anaesthesia in this case, though we should be prepared to deal with an occasional fall in blood pressure. So the goals of anaesthesia were the maintenance of an adequate intra vascular volume, avoiding any compromise on the maternal myocardium, maintaining the uteroplacental circulation and finally to provide adequate perioperative analgesia to prevent any further stress on the cardiovascular system.

Through a multidisciplinary approach, we were able to successfully manage a challenging case of coarctation of aorta in pregnancy. In this case, we opted for elective Caesarian section. This was to avoid the second stage of labour and also to reduce the need for Valsalva manoeuvre. These mechanisms with their associated increase in the blood pressure runs the risk of rupture of berry aneurysm.

Conclusion

Successful management of a parturient with coarctation of aorta involves a team approach involving the cardiologist, obstetrician and the anaesthesiologist. Also here there is an increased risk of infective endocarditis. So it is mandatory that antibiotics are prescribed at the time of surgery. These patients are often hypertensive. So it is essential to maintain proper blood pressure control to ensure maternal well being as well as adequate fetal growth.

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