

Anaesthesia for a patient with Co-arctation of aorta undergoing cesarean section

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Abstract

Pregnancy and its associated challenges in cardiovascular physiology present a unique challenge in a woman with an underlying heart disease. In this case a 23 year old primi-granida, 38 weeks of gestational age, with coarctation of aorta was posted for elective caesarean section. 2D-Echo showed EF=62%, concentric LVH, bicuspid aortic valve, coarctation of aorta distal to left, mild AS, mild AR. During the procedure, intraoperatively hemodynamics were monitored and B.P remained stable throughout (111/70 to 130/82 mm Hg). At the end of surgery the patient reversed and extubated successfully. New-born APGAR SCORE was of 8 and 10 at 1 and 5 min respectively. Coarctation of aorta in a pregnant patient is a unique challenge to the obstetricians and anaesthesiologists and requires a thorough understanding of the impact of pregnancy on hemodynamic response to coarctation of aorta. Purpose of this paper is to provide an overview of the preoperative and intraoperative implications of CHD for the anaesthesiologist involved in the care of adults with CHD undergoing non cardiac surgery.

Key Words: Coarctation of aorta, cesarean section, Congenital Heart Disease (CHD).

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Received Date: 10/07/2017 Revised Date: 22/08/2017 Accepted Date: 18/09/2017

DOI: <https://doi.org/10.26611/1015335>

Access this article online

Quick Response Code:



Website:

www.medpulse.in

Accessed Date:
24 September 2017

and safety outcome remains controversial. We report a case of Co-arctation of aorta in a parturient who underwent elective-cesarean section under general anesthesia.

CASE PRESENTATION

A 23 year old primi-granida with 38 weeks of gestational age, with coarctation of aorta posted for elective caesarean section. She was found to have unexpected hypertension during her her regular ANC follow ups due to which cardiologist opinion was sought and after complete evaluation and 2D-Echo reports, she was diagnosed with coarctation of aorta. Thereby she was on regular follow up with her cardiologist. In pre anesthetic evaluation, she was found to have NYHA class 3, grade of dyspnoea. On auscultation medium pitched systolic blowing murmur was heard with clear and equal air entry both side. Patients vitals showed a pulse rate of 110/m, B.P of 160/80 mm of Hg in right upper limb, left lower limb 100/60 mm Hg, Respiratory Rate of 20/min. Her routine Blood investigations were within normal limits. Her ECG showed sinus Rhythm with left axis deviation. 2D-Echo showed EF=62%, concentric LVH, bicuspid Aortic valve, coarctation of aorta distal to left, mild AS, mild AR. CxR showed left ventricular enlargement.

INTRODUCTION

Pregnancy and its associated changes in cardiovascular physiology present a unique challenge in a woman with an underlying heart disease. Coarctation of aorta is a congenital narrowing of descending thoracic aorta at or near the connection of the ductus arteriosus. Maternal hypertension, particularly of the upper body is the principal concern. Pregnant woman with uncorrected coarctation or a residual decrease in aorta diameter are at high risk for left ventricular failure, aortic rupture or dissection. In such pregnancies, fetal mortality rate may reach up to 20% because of decreased uterine perfusion distal to the aorta lesion. The ideal anesthetic technique is based on the severity of the disease, maternal preferences

Patient was posted for elective Cesarean section under ASA grade 3 High Risk. Post op ICU and ventilator bed were kept ready. She had received Infective Endocarditis prophylaxis, Injection Ranitidine and Injection Metoclopramide i.v. in the pre op room.

In the operating room, ECG and Pulse Oximeter were connected. Radial Artery was cannulated for invasive Blood Pressure monitoring. Patient was pre oxygenated with 100% oxygen for 3 min and premedicated with injection Midazolam 0.25 mg i.v. Rapid sequence induction was performed with injection Fentanyl 100 mcg i.v, injection Propofol 40mg and injection Succinylcholine 100 mg i.v. Patient was intubated with a 7.0 mm size oral cuffed endotracheal tube and ventilated. Ventilator settings were adjusted to maintain normocarbida. Anaesthesia was maintained with oxygen/air mixture (50:50), Sevoflurane (0.4-0.6%) and Vecuronium 6 mg i.v. After delivery of baby, injection oxytocin 20 U i.v infusion was started and injection Carboprost 0.25 mg i.m was administered to achieve uterine contraction. Analgesia was achieved with additional doses of injection Fentanyl 25 mcg i.v and injection paracetamol 1gm i.v. infusion. Intraoperatively hemodynamics were monitored and B.P remained stable throughout (111/70 to 130/82 mm Hg), but there was tachycardia in the range of 140/min to 110/min following delivery which persisted even after supplementing with analgesics and injection Midazolam 1g iv. Estimated blood loss was 350 ml and patient received 650 ml of crystalloid. Injection Furosemide 10 mg i.v was given intra operatively. At the end of surgery, Bupivacaine 0.25% was infiltrated at the incision site and patient was reversed with 2.5 mg Neostigmine and 0.5 mg Glycopyrolate. She was extubated and shifted to ICU for hemodynamic monitoring. The new-born APGAR SCORE was of 8 and 10 at 1 and 5 min respectively. Patient was hemodynamically stable in the ICU and was shifted on the next day and the baby was breastfed. Further course in the hospital was uneventful and the patient was discharged 5 days later and advised to follow up with the cardiologist.

CASE DISCUSSION

Coarctation of aorta in a pregnant patient is a unique challenge to the obstetricians and anaesthesiologists and requires a thorough understanding of the impact of pregnancy on hemodynamic response to coarctation of aorta. The most common cause of maternal death-embolism and hemorrhage, have remained unchanged over the past decades, but there has been an increase in maternal mortality from cardiac causes. Due to reduced cardiopulmonary reserve in pregnancy, women with cardiovascular disease have an increased rate of abortion

and a higher incidence of small for gestational age children. Predictions for cardiovascular complications during pregnancy include:

1. Earlier cardiovascular events or arrhythmias (cardiac decompensation, stroke, Transient Ischemic attack.)
2. Heart failure with New York Heart Association (NYHA) classification of more than 2 or cyanosis.
3. Ejection fraction less than 40%

The goal of anesthesia includes avoidance of Bradycardia, decrease in Systemic Vascular resistance, hypertension and maintenance of left ventricular filling. Stroke volume is relatively fixed and there is limited capacity to compensate for decreases in SVR. In addition while blood flow proximal to the Coarctation may be adequate, distal flow may be severely limited and further decrease may lead to critically low utero-placental blood flow. Vasoconstrictor may be needed to offset any decreases of SVR associated with anesthetic use. When SV is fixed, cardiac output becomes dependent on HR. Vagal stimulations, medications or anesthetic will result in decreases in HR which may be poorly tolerated and should be avoided. Decrease in HR should be treated by removing positive stimulus and pharmacologic treatment with ephedrine or glycopyrolate. As SV is relatively fixed by stenosis, in the aorta, adequate end diastolic volumes are critical in maintaining SV. Avoid hypovolemia or other causes of reduction in pre load. Avoidance of myocardial depression during general anesthesia and avoiding aorto caval compression are very important. Securing arterial line for invasive Blood Pressure monitoring before induction is very useful in such conditions associated with compromised cardiac output. Despite the risk of foetal depression, in the interest of maternal safety, opioid based induction can be used. We used injection Fentanyl and titrated low dose of Propofol for induction to achieve hemodynamic stability. Bradycardia is deleterious in these patients as cardiac output is dependent on HR and should be treated promptly. Oxytocin should be administered judiciously as infusion and bolus should be avoided, considering its vasodilatory effects. Adequate analgesia is equally important in achieving the goal. Labour and assisted vaginal deliveries are preferred. Cesarean deliveries are reserved for obstetric indication. The choice between neuraxial and GA have been a matter of debate. Historically, neuraxial anesthetic has been thought to be relatively contraindicated in patients with COA considering hazards of simultaneous decrease in preload and after load associated with it. GA remains gold standard.

CONCLUSION

Caesarean delivery in association with COA, can be accomplished with a balance general anesthetic technique while strictly maintaining the anaesthetic goals. Invasive monitoring should be used in proportion to the patients disease severity. Patients with severe stenotic lesions may benefit from pre and post – stenotic B. P. Monitoring As per/current recommendations antibiotic prophylaxis for endocarditis and endarteritis is recommended. Identification, Anticipation and Preparation for potential intraoperative problems and timely intervention are important in achieving the desired goals.

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Source of Support: None Declared
Conflict of Interest: None Declared