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RESEARCH ARTICLE

ANESTHETIC CHALLENGES AND SUCCESSFUL MANAGEMENT OF UNCORRECTED TETRALOGY OF FALLOT (TOF) IN PREGNANCY

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Abstract

Cardiac diseases and pregnancy are always a nightmare to the anaesthesiologists as it involves multiple challenges without impairing the wellness of mother and child. TOF routinely gets manifested in pediatric age groups, but in some patients, it gets manifested in late stages due to the compensatory mechanisms. Uncorrected TOF in pregnancy and its successful management is briefly described in this case report.

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Introduction:-

The most common cyanotic congenital syndrome is Tetralogy of Fallot (TOF), contributing to 10% of cyanotic heart disease.¹ Most common manifestation is the presence of cyanosis, which necessitates further evaluation. TOF requires correction either as a palliative shunt or definitive surgery to correct the pathology. Uncorrected TOF is a rare entity; mostly being asymptomatic and presenting in early adulthood. Since the degree of obstruction is significantly less, the pathognomic mechanisms in the classical TOF would not be appreciable in uncorrected TOF.

Herewith we are reporting a case of an elderly pregnant parturient with uncorrected TOF with gestational diabetes posted for an emergency cesarean section done under spinal anesthesia.

Case Report

A 37-year-old term parturient, G3P1L1, complained of dyspnoea on mild activity (NYHA III) was diagnosed with TOF during evaluation for dyspnoea on exertion (NYHA II) at 3rd month of gestation in her previous pregnancy. No history of cyanotic spells and palpitations was noted previously and during the pregnancy. The first baby was delivered by vacuum-assisted vaginal delivery, and the patient's perioperative course in the hospital was uneventful. She was hemodynamically stable with grade IV pansystolic murmur heard over the left parasternal border. Room air SpO₂ was 83%. Transthoracic Echocardiography at 38 weeks of gestation revealed overriding of the aorta, large VSD with Right to left shunt, right ventricular outflow tract obstruction (RVOTO) with infundibular stenosis, Right Ventricular hypertrophy (RVH) with a pressure gradient of 60mm Hg.

On admission, her laboratory values were Haemoglobin of 14.1g%, total counts of 7,140/ mm³ and platelet count of 1.4 lakh. On examination pansystolic murmur with a clear chest was noted despite room air saturation of 83%. She was wheeled for an emergency cesarean section because of fetal distress. Considering pregnancy and uncorrected TOF, a subarachnoid block was planned. Optimal OT temperature was maintained, and a hot air warmer was applied to prevent shivering. Intravenous beta-blockers – Metoprolol, Lignocaine, and defibrillator were checked and kept ready. Using dynamic parameters, a pre-induction arterial line was placed under local anesthesia to monitor blood pressure and intravascular volume status. De-airing of i.v fluids was done to avoid air embolism. Oxygen was supplemented via Hudson's mask.

Subarachnoid block was administered with 0.5% heavy bupivacaine (1.5 ml) with fentanyl 25mcg (0.3ml). Phenylephrine infusion was started prophylactically before subarachnoid block at the rate of 0.5mcg/kg/min. Oxytocin infusion was slowly administered at a rate of 20 IU/h to avoid a sudden fall in SVR and tachycardia, and uterine contractility was ensured. Baby had an Apgar score of 9 and 10 at 1 and 5 mins. Total input and output of 800 ml and 600 ml (500 ml blood loss and 100 ml urine output) were noted. The intraoperative course was uneventful, with no cyanotic spells and hemodynamic instability. Intravenous Paracetamol 1g and intravenous morphine 4mg were given for postoperative analgesia. Inj. Ampicillin 1 g and gentamycin 60mg were given as a part of infective endocarditis prophylaxis. The patient was shifted to Obstetric ICU for postoperative monitoring. She was discharged later and advised to follow up in the cardiology clinic for further planning and management.

Discussion:-

TOF components are overriding of the aorta, VSD, RVH, and RVOT, causing Right to left shunt with change in SVR and PVR. Most TOF cases presents in early life. Uncorrected TOF in pregnancy is an infrequent entity. Polycythaemia, cyanosis, and cardiac decompensation, which occur in TOF, are aggravated during pregnancy, causing fetomaternal complications. Adverse fetal outcomes due to TOF are miscarriage, IUGR, IUD, and fetal loss, and adverse maternal outcomes are right and left ventricular dysfunction, CCF, severe pulmonary hypertension, and maternal loss could occur.²

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The physiological effects of pregnancy, like increased PVR, can cause an increase in right to left shunting, thereby aggravating TOF. Also, blood loss during vaginal or cesarean section would cause hypotension, worsening the shunt.³

Planning is complex for a pregnant patient with a cardiac anomaly because both the pregnancy and cardiac anomalies will alter the normal physiology, which will influence the anesthetic management. The management plan should be decided as general anesthesia or spinal anesthesia based on the following elements: clinical status of the patient – symptomatic/asymptomatic, hemodynamic stability, type of cardiac anomaly – congenital/acquired, valvular /non-valvular, other features associated with the disease.⁴ Spinal anesthesia is the preferred plan in obstetric patients, but general anesthesia is considered in high-risk patients with less tolerable hypotension, and when hemodynamic instability is anticipated. TOF case can be corrected or uncorrected; in uncorrected, the degree of sub valvular pulmonary stenosis with shunting would influence general anesthesia rather than spinal anesthesia, as spinal would cause a fall in SVR, leading to reversal of shunt.

Goals in a TOF case include maintenance of preload, avoiding fall in SVR, avoid increase in PVR, which must be borne in mind before taking up the case as they may cause an increase in the right-to-left shunt. Though it has some adverse effects, subarachnoid block is a better option in these patients when compared to general anesthesia.⁵ Hence, it would be wise to plan subarachnoid block or epidural with the maintenance of SVR. Phenylephrine had been used as a vasopressor to maintain the SVR, as it is directly acting alpha one agonist.⁶ Controlled use is recommended to avoid the adverse effects associated with it.

Moreover, spinal anesthesia overcomes the increase in PVR due to Positive pressure ventilation and PEEP associated with general anesthesia, intubation, and extubation response, and the use of nitrous oxide causing hemodynamic fluctuations. Intraoperative saturation levels were noted between 85 to 90 percent, indicating the shunt's severity. Caution should be there in managing blood loss and hypotension as it causes the collapse of the cardiac grid. Moreover, in cardiac cases, fentanyl is usually given before the intubation process to avoid laryngoscopic response, which might cross the placental barrier, causing decreased tone or respiratory depression in the fetus. Fall in blood pressure due to sympatholytic could be managed with vasopressor boluses or infusion to maintain SVR.

Oxytocin boluses should be avoided, and infusion should be given to prevent hemodynamic instability.⁷ Methergin causes tachycardia and hypertension and hence to be avoided. Invasive BP monitoring could be done depending on the patient's preoperative status. Prolonged fasting should be avoided as it could lead to dehydration and decreased volume status. Maintaining adequate fluid status and avoiding fluid overload is also critical in these cases. As these are high-risk cases, appropriate antibiotics should be given for infective endocarditis prophylaxis. Both has been done in our case.

Conclusion:-

Regional techniques shall be considered as anesthetic options in TOF patients to maintain the anesthetic goals and hemodynamic instability. Administration of spinal anesthesia can avoid polypharmacy. With the considerations mentioned above, spinal anesthesia is also safer than general anesthesia in pregnant parturients with cardiac anomalies.

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