

# Anaesthetic Management of a Parturient With Uncorrected Tetralogy of Fallot with Pulmonary Artery Hypertension for Cesarean Section

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## ABSTRACT

Tetralogy of Fallot (TOF), a common cyanotic congenital heart disease (CHD) in pregnant women, comprises of unrestricted ventricular septal defect, overriding aorta, Right Ventricular Outflow Tract Obstruction (RVOTO) and resultant right ventricular hypertrophy. Patients with uncorrected TOF cope poorly with cardiovascular changes of pregnancy, with 10% mortality. PAH further increases the risk of cardiovascular adverse events. We report a rare case of a 30 year old primigravida, with uncorrected TOF and severe PAH at 37 weeks of gestation with dyspnea. Cesarean section was performed under Combined Spinal Epidural (CSE) anesthesia with invasive monitoring, with a favourable maternal and neonatal outcome.

**Keywords:** Tetralogy of fallot; Pregnancy; Cesarean; Blalock shunt; Spinal epidural; Anesthesia

## ABOUT THE STUDY

A case of TOF with Patent Ductus arteriosus, diagnosed at 6 months, she underwent modified Blalock and Tausig (BT) shunt at 14 months, and PDA ligation at 24 months. She was NYHA class 2 pre-conceptions which worsened to NYHA class 3. 2D echo revealed dilated right atrium, right ventricle, severe PAH and RVSP-76 mmHg. Therefore, an emergency cesarean section was planned [1].

Her pulse rate (PR) was 96/min, BP 123/84 mmHg, SpO<sub>2</sub> in 88%-90% on room air. Investigations revealed Hb 10.8 g/dl, other laboratory parameters within normal limits. ECG revealed RBBB with strain pattern. Inj. ampicillin and gentamycin were administered for infective endocarditis prophylaxis. ASA recommended monitors were attached, 18G intravenous cannula secured and the left radial artery cannulated [2]. Co-loading with crystalloid @60 ml/hour was done and oxygen inhalation by facemask ensured. After confirming loss of resistance through 18G Tuohy needle, 7.5 mg hyperbaric bupivacaine with 20 µg fentanyl was deposited in the subarachnoid space. Intraoperatively vitals were maintained to avoid hypoxia, hypotension, hypercarbia, hypothermia and prevent i.v. air entrapment. After delivery, Inj. Syntocin infusion @5 IU/hour was started. After 10 minutes of delivery, she developed breathlessness with SpO<sub>2</sub> 88% but hemodynamics stable. Head end of the table was elevated and

injection lasix 20 mg i.v administered. Subsequently she became comfortable but developed hypotension, PR 110/min, BP 85/60 mmHg. Phenylephrine infusion was started @ 20-25 µg/min. Intraoperatively 600 ml fluid was infused and urine output was 110 ml. Post-surgery, she was moved to ICU with phenylephrine @15 µg/min for further monitoring and care. Postoperative course was uneventful.

TOF patients tolerate physiological changes of pregnancy depending on corrective or palliative procedure, whether any residual defects remain after the procedure, the functional status of the patient pre-conception and presence of PAH. Interestingly, in previously asymptomatic patients, cardiovascular challenges imposed by pregnancy unmask the recurrent or residual defects.

BT Shunt, a systemic to pulmonary shunt, has been described for palliative treatment of TOF. Prior BT shunt may be associated with future catheterizations with worsening RVEF. Therefore, primary repair or early second stage definitive repair is recommended [3]. In our case, poor functional status pre-conception was probably due to a complicated BT shunt, in absence of definitive correction.

Managing uncorrected CHD during pregnancy requires understanding of pathophysiology and patient based decision making [4]. GA is the classical technique in TOF due to better control of hemodynamics. However, CSE and epidural anesthesia

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have been successful [5,6]. Our case developed PAH and TOF, which probably led to minimal R→L shunt. Therefore, a small dose subarachnoid block was planned. Disadvantages of GA including risk of difficult airway, aspiration risk, hemodynamic response to intubation and extubation and perturbations of the ventilation perfusion ratio due to positive pressure ventilation could be prevented. Anesthetic goal was to maintain the precarious balance between SVR and PVR. Hypotension was managed by strictly titrated infusion of phenylephrine, to not raise pulmonary arterial resistance. Patient had pulmonary hyperemia and PAH, necessitating restricted fluid therapy, instead of pulmonary oligemia associated with TOF. An oversized BT shunt can be one of the common causes of shunt regurgitation and pulmonary over circulation [7]. To conclude, anesthetic management of a patient of uncorrected TOF with PAH for cesarean section is complex, with key steps being regional anesthesia, judicious fluid therapy, invasive arterial monitoring and early use of vasopressors.

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#### CONFLICTS OF INTEREST

There are no conflicts of interest.

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