

# Emergency PDA Stenting in a Neonate with Tricuspid and Pulmonary Atresia

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**Abstract:** *Duct dependent circulation in a newborn baby presents as a life –threatening emergency. Their circulation is maintained through flow in patent ductus arteriosus (PDA). These patients can survive only if duct patency is reliably maintained for sometime before they can be taken up for staged cardiac surgical repair. Here, we report a case of an 8 days old male baby with history of profound cyanosis and acidosis along with sepsis. On auscultation, grade - III systolic murmur was heard. Radiological investigations revealed Tricuspid and pulmonary atresia and tiny closing duct at pulmonary artery end. Practically, Duct dependent pulmonary circulation physiology. To prevent closure of the duct, prostaglandin infusion was started, inotropes, IV antibiotics started Ductal stenting was planned as surgical shunt would have associated with much higher risk. The patient showed good surgical outcome. The patient later developed 2 episodes of convulsions with CSF showing bacterial meningitis picture. The patient was treated with antiepileptics and antibiotics. The patient was successfully discharged and showed good improvement on one month of follow up. It is reasonable to assume that PDA stenting is a growing noninvasive approach for initial palliation of ductal dependent pulmonary circulation with acceptable outcome and smoother post procedure care.*

**Keywords:** ductal ligation

## 1. Introduction

Duct dependent circulation in a newborn baby present as a life –threatening emergency. Neonates with pulmonary valve atresia or aortic valve atresia are born normal at birth. Their circulation is maintained through flow in patent ductus arteriosus (PDA). These patient can survive only if duct patency is reliably maintained for sometime before they can be taken up for staged cardiac surgical repair. We present a newborn baby who had pulmonary valve atresia and tricuspid atresia and was duct dependent. Baby was successfully managed with ductal stenting.

## 2. Case Details

8days old male baby weighing 3.1kg was brought to NICU with history of profound cyanosis (30 - 40%) and acidosis. Baby also had severe sepsis. General examination did not reveal any abnormality. A grade III systolic murmur was heard over left second intercostal space. Suspecting a heart disease, we got chest radiograph of baby which showed normal cardiac size with oligoemic lung fields. Echocardiography revealed Tricuspid and pulmonary atresia and tiny closing duct at pulmonary artery end. Practically, a duct dependent pulmonary circulation physiology. To prevent closure of the duct, prostaglandin infusion was started along with inotropes and IV antibiotics started. Prostaglandin E1 infusion was started immediately at rate of 0.01microgram/kg/min. Oxygen saturation was in between (75 - 85%). In view of associated sepsis and fragile state high risk, percutaneous intervention of ductal stenting was planned. As surgical shunt would have associated with much higher risk. Ductal stenting is putting coronary stent in Ductus Arteriosus to keep duct open and ensure good pulmonary blood flow.

The procedure was performed under general anaesthesia. Right femoral artery was catheterized and a5french sheath was introduced by Schlesinger technique. A right coronary guiding catheter was placed in aorta with its mouth near the aortic duct. Prostaglandin infusion was now stopped so as allowed the duct to constrict. This constriction of duct prior

to stent deployment is important for better opposition of stent in valve of duct. After confirming the position stent was deployed by inflating the balloon at 18 ATM pressure. Repeat angiography was performed after stent deployment to confirm the procedure. To prevent the stent thrombosis heparin infusion was given for 24 hours followed by antiplatelet therapy. However baby developed few episodes of convulsion and required to antiepileptic drugs. CSF assessment showed picture of meningitis. The patient was successfully discharged after complete course of antibiotics and showed good improvement on one month of follow up.

## 3. Discussion

Duct dependant cardiac lesions like aortic valve atresia and pulmonary atresia usually present as an emergency. Their early recognition and timely management is important to save the life. Prostaglandin E1 infusion can keep the duct patent and should be started early in these patients. Prostaglandin may cause apnea in small babies. Hence ventilator support should be kept ready.

Surgical aorto - pulmonary shunt (modified BT shunt) used to be important palliation in such case but due to complication associated with surgery, stenting of PDA is better alternative to eliminates the problem associated with surgery<sup>1</sup>. Surgical aorto - pulmonary shunt (modified BT shunt) used to be an important first stage palliation in such cases. Pleural effusion, phrenic nerve palsy, congestive cardiac failure associated with increased pulmonary blood flow and stenosis because of kinking, thrombosis or narrowing at anastomotic site are all known complications associated with this surgery<sup>1</sup>. Stenting of the PDA is a better alternative to modified BT shunt as it eliminates problems associated with thoracotomy in neonatal period and long - term problems of scarring, which may cause major difficulty in future definitive surgery<sup>2</sup>. Initial results with ductal stenting were discouraging but with improvement in stents design and growing experience in proper positioning of stent the results are encouraging. Though an editorial described role of ductal stenting for restricted pulmonary blood flow in neonates to have a very limited role in clinical practice<sup>4</sup>.

several studies which compared ductal stenting with modified BT shunt (MBTS) showed that stenting is as effective as modified BT shunting in duct - dependant pulmonary circulation. Stent ensured an even distribution of the pulmonary blood flow and more balanced pulmonary vascular development than MBTS<sup>5,6</sup>.

#### 4. Conclusion

It is reasonable to assume that PDA stenting is a growing noninvasive approach for initial palliation of ductal dependent pulmonary circulation with acceptable outcome and smoother post procedure care. On the midterm follow - up, the procedure was successful in achieving its target in 70% of cases with results comparable to surgical shunt.

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