

Vertical vein stenting as a therapeutic strategy for obstructed supracardiac total anomalous pulmonary venous connection

Sir,

A 5-day-old, 2.3 kg newborn, presented with tachypnea, lethargy, and was intubated and transferred to us on intermittent positive pressure ventilation. On evaluation, the child was diagnosed to have obstructed supracardiac TAPVC with obstruction at the level of PV confluence joining VV with a mean gradient of 16 mmHg and an atrial septal defect measuring to be 4 mm. He was observed to have an intracranial bleed (Grade II Intraventricular hemorrhage) on cranial ultrasound.

The child was saturating at 70%. In view of poor hemodynamic status and intracranial bleed child, he was considered high risk for surgical intervention and was taken for palliative VV stenting.

Right femoral vein (RFV) access was taken, and 4F valved short sheath was inserted. Initial hemodynamics showed a withdrawal gradient of 12 mmHg across the VV. There was pulmonary artery (PA) hypertension, with PA pressures of the mean of 50 mmHg (against systemic systolic pressures of 65 mmHg). A 4F sheath was upgraded



Figure 1: Antegrade cardiac catheterization from the inferior vena cava to superior vena cava to VV to pulmonary venous confluence showing constriction at the VV (marked by arrow). VV: Vertical vein, PVC: Pulmonary venous confluence

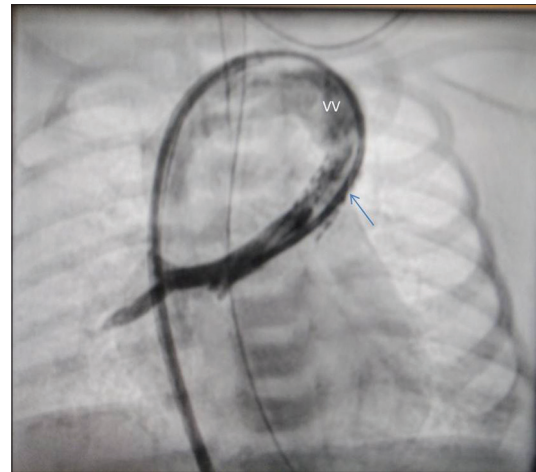


Figure 2: Antegrade cardiac catheterization from the inferior vena cava to superior vena cava to VV to pulmonary venous confluence showing the stent *in situ* with well open VV (marked by arrow). VV: Vertical vein, PVC: Pulmonary venous confluence

to 6F sheath. Initial angiogram (RFV-RA-superior vena cava-Innominate Vein- VV) showed severe obstruction at the level of PV confluence draining into VV [Figure 1]. 6F MPA1 Guide catheter was taken over 014 Whisper Coronary wire and was parked in innominate vein. Through this catheter, 4F Judkins Right Catheter was taken across (Mother-Child Technique) and parked in VV. Once the 4F catheter was stabilized, a support Xience 2.5 mm × 20 mm coronary balloon was taken across and inflated at 8 atm to form the track. This initial balloon dilatation was being done due to technical difficulty in crossing the stenosis. Once the track was formed after previous balloon dilatation, 4F Judkins right catheter was advanced into the confluence, and angiogram showed severe obstruction at the level of VV above the entry of left upper pulmonary vein into the PV confluence. Furthermore, all the pulmonary veins were profiled; and the MPA1 Guide catheter was pushed further. A 4F Judkins right catheter and 014 coronary wire were exchanged with 018 Nitrex wire. Nitrex wire was parked deep into the right lower pulmonary vein. Using this assembly of MPA Guide catheter over Nitrex wire, Premounted 6 mm × 12 mm Cook's formula stent was taken over the wire. The stent was chosen to sufficiently cover the obstruction and avoid jailing of the left upper pulmonary vein. The position of the stent was confirmed with check angiography, and the stent was deployed under fluoroscopic guidance. Post stenting angiogram showed stent in position with the unobstructed flow at PV confluence-VV junction [Figure 2]. Balloon atrial septostomy was done by 5F Fogarty septostomy catheter followed by atrial septal dilatation with 6 mm × 20 mm Tyshak II balloon. Post stenting PA pressures were measured to be 20 mmHg against systemic pressures of 62 mmHg and saturation rose to 92%. Postprocedure child was kept on heparin at 10U/kg/h targeting ACT of 150-200. There was no

bulging of anterior fontanelle noted on the central nervous system evaluation. Ultrasonography (USG) of the cranium was done twelve hourly till the child was on IV heparin. Postprocedure USG cranium showed the child to have Grade II intraventricular hemorrhage, the same as preprocedure. Postprocedure child remained hemodynamically stable and was extubated the next day after the procedure. Postprocedure echocardiography showed stent in a good position with no residual stenosis with a mean gradient of 2 mmHg at the level of the stent. The child was discharged on Day 3 of the procedure on breastfeeds. The child was kept on close follow-up and was taken up for elective TAPVC repair at 3 months of age, weighing 4 kg at the time of the surgery, which was done successfully.

About 40% of the supracardiac TAPVC may have obstruction.^[4] Kilgore *et al.*^[5] reported stent implantation in VV of 6-week-old child. Palliative VV stenting acts as a life-saving measure, allow for the growth of the baby with an increase in weight-reducing morbidity and mortality at the time of surgery, as was seen in our case.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

**Gaurav Kumar, Romila Chimoriya,
Neeraj Awasthy, KS Dagar**

Department of Pediatric Cardiology and CTVS, Max Superspeciality
Hospital, Saket, Delhi, India.
E-mail: n_awasthy@yahoo.com

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