Balloon-assisted stent strut dilation in branch pulmonary artery stenosis following ductal stenting: An observation from tertiary care center in Eastern India

In cyanotic neonates with duct-dependent pulmonary circulation, patency of the duct is very important for the survival of the patient. The duct is often vertical and tortuous in these diseases.[1] Smooth muscles with contractile properties often migrate from the duct to the proximal part of the branch pulmonary artery (PA) in fetal life, resulting in stenosis of the latter or even discontinuity of the branch PAs.[2] Stenting of the duct is a well-established procedure for duct-dependent pulmonary circulation as an alternative to the high-risk Blalock–Taussig shunt.[3] Branch PA stenosis is considered a relative contraindication for ductal stenting, as it may result in immediate unequal pulmonary flow distribution to the lungs in the short term and discrepancy of branch PA growth in the future.[4] The utility of side-strut dilation of the ductal stent to prevent the jailing of either branch PA has been shown by Koneti *et al.* in their series.[5]

In our experience, we attempted stent strut dilation after successful stent deployment in fourteen cases with vertical patent ductus arteriosus and branch PA stenosis (8 cases left pulmonary artery and 6 cases right pulmonary artery) [Figure 1a] of a total of 142 ductal stent procedures over the past 5 years. In seven of the fourteen procedures, we withdrew the balloon after successful stent deployment, and then, the same angulated preshaped coronary guide wire, which was placed in the nonstenotic branch PA initially for stent deployment, was used to cross the stent strut to enter the stenosed branch PA, in contrast to the double- or buddy-wire technique.

Crossing the stent strut by the floppy angulated tip of the coronary guide wire was often difficult, especially when the distal end of the stent was placed at a nonstenosed branch PA, as the torque applied to the guide wire did not get transmitted to its tip. This resulted in either failure to cross the side strut or prolonged the procedure. This technique achieved successful side-strut cannulation in four of the seven patients. After crossing the side strut, a short monorail coronary balloon with a 2.5-mm or 3-mm diameter was chosen to dilate the stent strut to restore adequate blood to the stenosed branch PA. To avoid the difficulty of crossing the stent strut with the floppy tip of the coronary wire, we adopted the balloon-assisted technique. Instead of completely removing the deflated balloon after stent deployment, we partially withdrew it.

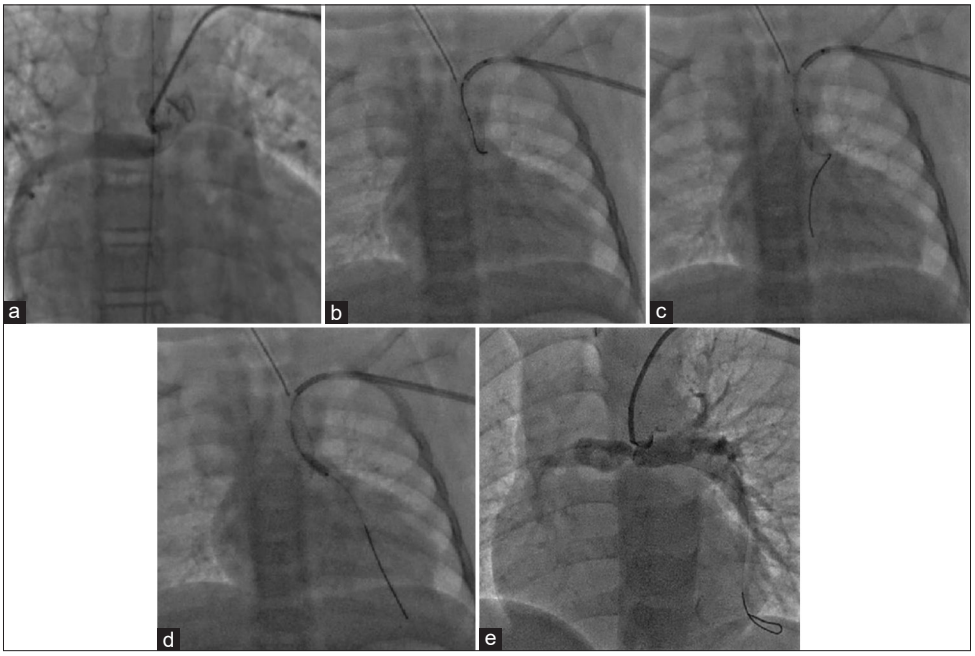

Figure 1: (a) No flow through the left pulmonary artery (LPA). (b) Balloon tip positioned at the LPA origin. (c) Coronary wire manipulated through strut with balloon support to stenosed LPA. (d) Strut dilation with coronary balloon. (e) Good flow across both branch pulmonary arteries. LPA: Left pulmonary artery

We kept the distal end of the balloon tip at the level of the stenosed branch PA origin [Figure 1b], and the same coronary guide wire was manipulated with the support of the balloon to cross the stent strut [Figure 1c]. In this technique, the floppy coronary wire supported by the balloon shaft transmitted the torque and aided in crossing the stent strut with less difficulty. This balloon assisted coronary wire manipulation and helped to cross the stent strut in all the remaining seven cases. This was followed by gradual dilation of the stent strut by a coronary balloon [Figure 1d] and resulted in adequate flow through the stenosed branch PA [Figure 1e]. We found crossing the side strut of the ductal stent easier with the support of the coronary balloon.

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Conflicts of interest

There are no conflicts of interest.

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