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Palliative balloon dilation of native coarctation of the aorta in a preterm infant

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Abstract

The role of balloon dilation for native coarctation in neonates is controversial, due to the relatively high recurrence rate. Balloon dilation may however provide adequate palliation in preterm infants, by relieving symptoms and allowing somatic growth until definitive surgical repair can be performed. We report successful balloon angioplasty, on 2 occasions, in a preterm neonate with coarctation of the aorta and associated left ventricular cardiomyopathy.

MeSH: Angioplasty, Balloon, Aortic Coarctation/diagnosis/*therapy, Child, Recurrence

Introduction

Balloon dilation of native coarctation in neonates and infants has been considered to be of unproven benefit, in view of the high recurrence rate.[1] We report successful palliation by balloon dilation of native coarctation in a 1.0 kg preterm neonate with severe left ventricualr cardiomyopathy.

Patient

The patient was a 29 week gestation preterm female infant with a birth weight of 940 grams. Coarctation of the aorta was diagnosed at routine neonatal ultrasound screening. Sufficient anterograde flow across the coarctation was present, and no intravenous prostaglandin was administered. At weekly echocardiographic follow-up, the patient was seen to develop progressive left ventricular dilation and cardiomyopathy (LVEDD 23mm; fractional shortening 21%), with relatively low gradient across the coarctation (25 mm Hg) on Doppler sonography. As the duct had already closed spontaneously in the first postnatal week, intravenous prostaglandin E infusion to maintain patency of the duct for several weeks was not considered. At 3 weeks of age (weight 1000 grams), balloon angioplasty was undertaken to relieve the coarctation, and allow the patient to grow further prior to definitive surgical repair.

Via a cutdown of the right axillary artery a 3F sheath was introduced into the aorta. Angiography performed with a 3F Judkins catheter confirmed severe coarctation (fig. 1).

The directly measured systolic pressure gradient was 35 mm Hg (53 mm Hg in ascending aorta vs 19 mm Hg in descending aorta). Over an 0.014” guidewire, a 4mm diameter coronary balloon was positioned across the coarctation and inflated thrice (fig. 2), with an excellent result (fig. 3).

Fig. 1 Aortic angiogram via the right axillary artery, confirming severe localised coarctation.

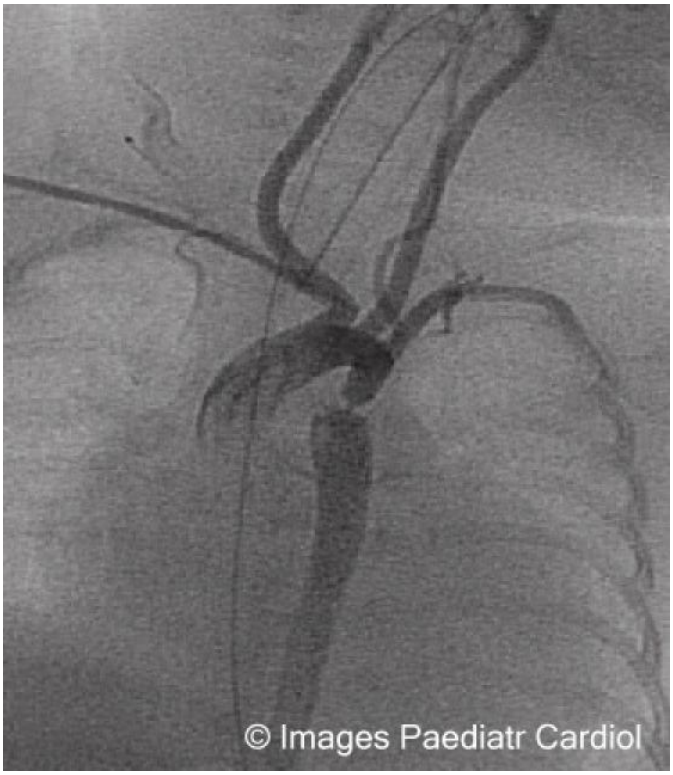


Fig. 2 A 4 mm coronary balloon is positioned across the coarctation and fully inflated.

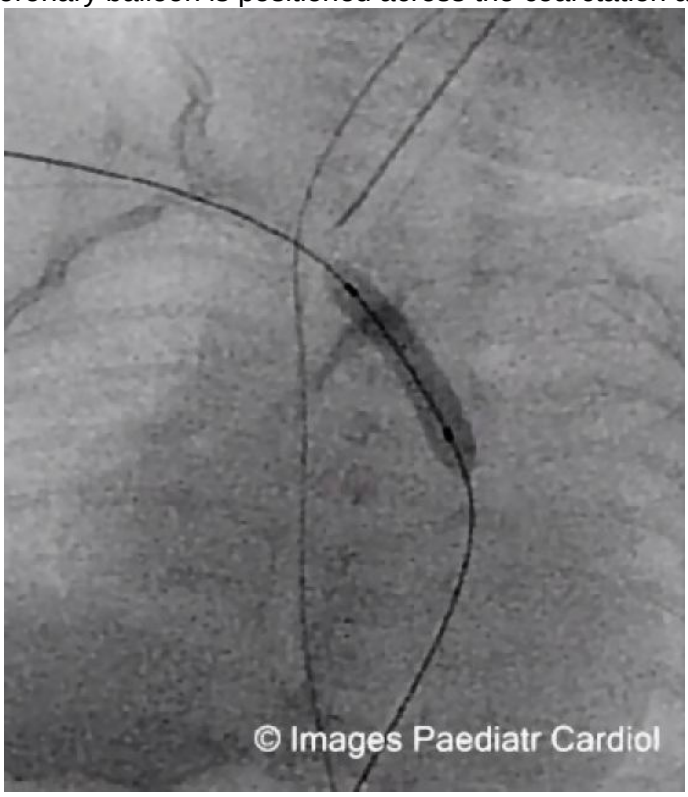
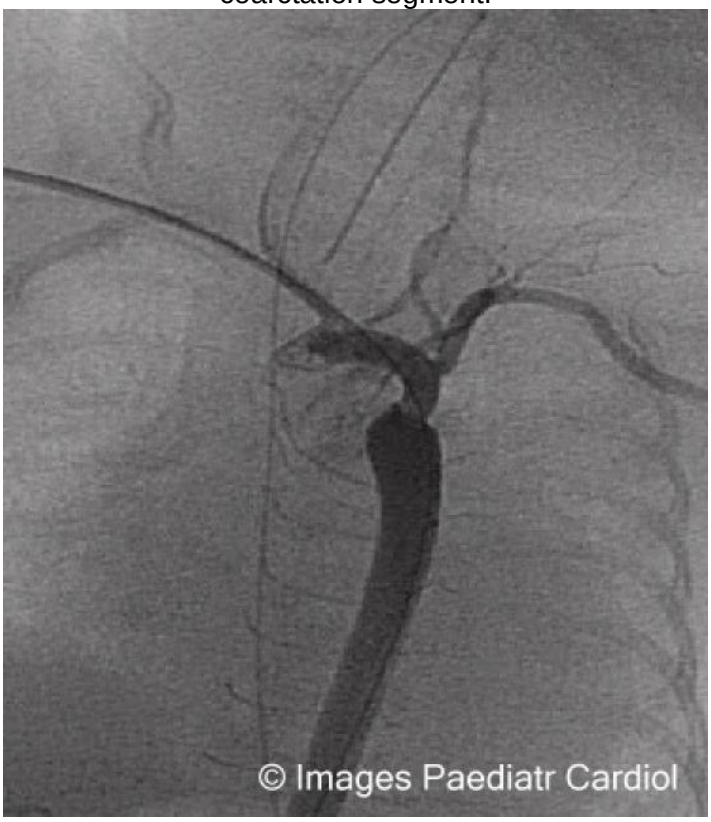


Fig. 3 Post-dilation angiogram confirming definite improvement in the diameter of the coarctation segment.



The post-dilation gradient was 14 mm Hg (53 vs 39 mm Hg). The entry site in the axillary artery was maaged by simple compression, followed by suture closure of the skin. Measurable improvement in left ventricular function was observed within 7 days of balloon angioplasty. At 4 weeks of follow-up (age 7 weeks, weight 1240 grams) recurrence of coarctation was observed. Repeat balloon angioplasty was performed in an identical fashion, via the right axillary artery, with similar results. Despite a mild residual gradient, left ventricular function improved following redilation, and marked somatic growth was observed. At 13 weeks of age (weight 2.1 kg) elective surgical repair with resection of the coarctation segment and end-to-end anastomosis was successfully performed. The postoperative course was uneventful. Follow-up examination at 3 months confirms a good repair. The patient is on no medications, and has a normal resting blood pressure for age.

Discussion

In preterm neonates with coarctation, intravenous prostaglandin therapy for several weeks, until the patient has achieved a suitable weight for definitive surgical repair, should always be considered. As the patient was thought to have mild coarctation, with sufficient anterograde flow, this therapy option was not carried out. Within the first 7 days the duct had closed spontaneously, and thereafter left ventricular failure was progressive. Although balloon dilation of neonatal coarctation is associated with a high recurrence rate,[1,2] and cannot therefore be considered to be definitive therapy, palliative balloon dilation has a role in the management of preterm and severely sick neonates with impaired ventricular function. The right axillary artery approach is relatively straightforward, and the artery does not require suture repair even after surgical cutdown (on 2 occasions in our patient). Successful dilation followed by improvement of ventricular function and further gain in weight allowed definitive surgical repair to be safely postponed.

References

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