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Stent implantation for coarctation facilitated by the anterograde trans-septal approach

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MeSH: coarctation of aorta, stent therapy

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Case Report

A 42 year old woman was admitted with angina. Cardiac catheterization via the femoral artery was undertaken, with a view to performing coronary angiography, but the ascending aorta could not be reached. A diagnosis of coarctation of the aorta was made, and the patient referred for catheter intervention.

The femoral artery was percutaneously cannulated with a 6F introducer. A 6F endhole catheter was advanced to the descending aorta where angiography confirmed the diagnosis of coarctation. (figures 1,2).

Figure 1 Frontal and lateral cineangiogram in the descending aorta demonstrating abrupt termination of contrast flow, and confirming the diagnosis of severe coarctation.

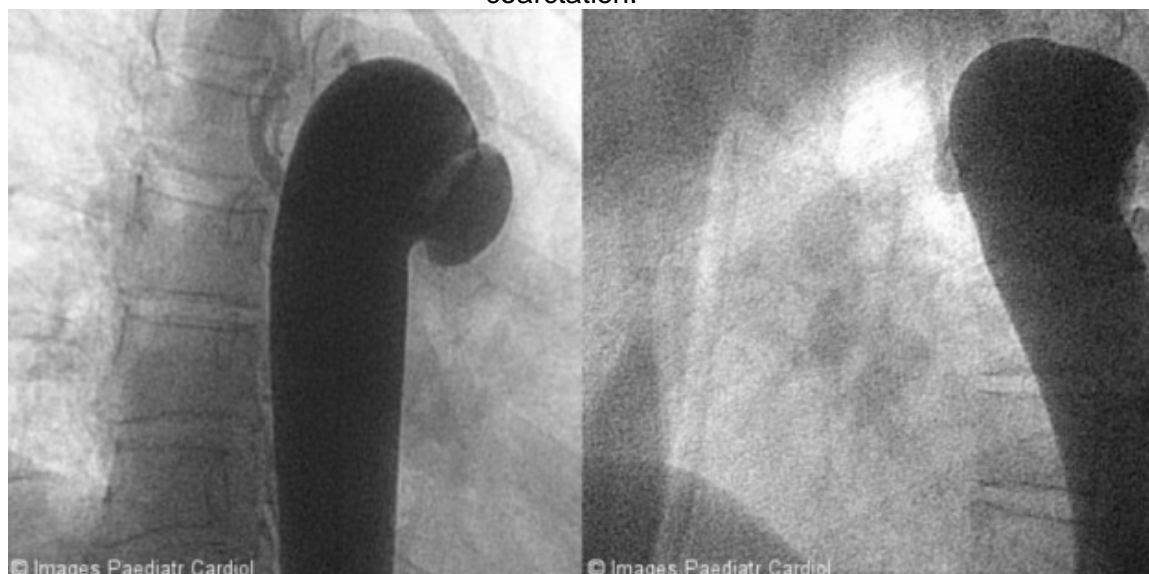
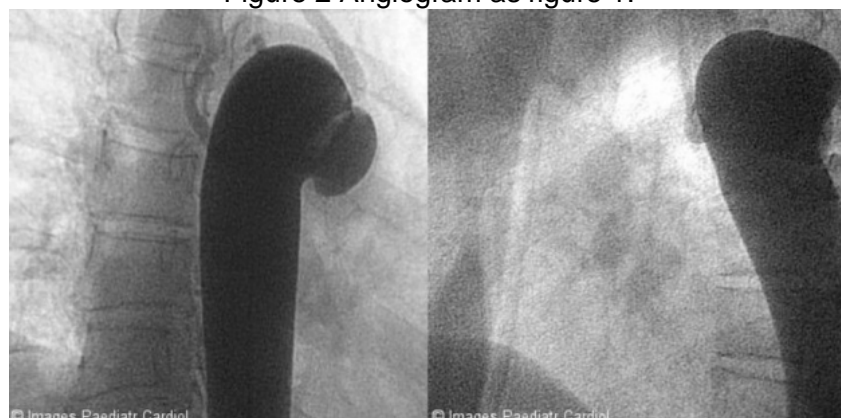


Figure 2 Angiogram as figure 1.



As the coarctation segment could not be crossed retrogradely with various combinations of catheters and guidewires, the femoral vein was cannulated. Transseptal puncture was performed using a Brockenbrough needle within an 8F Mullins (Cook, USA) long sheath, and the sheath was advanced to the left atrium. A 6F pigtail catheter was introduced via the sheath into the left ventricle. The left ventricular systolic pressure was 280 mm Hg, compared with a femoral arterial pressure of 100 mm Hg (gradient 170 mm Hg). Left ventricular angiography demonstrated patency of the coarctation (figure 3 - arrow).

Figure 3 Left ventriculogram performed after trans-septal puncture, demonstrating patency of the aortic arch, with a tight coarctation.



Via the catheter in the left ventricle, an 0.035" guidewire (260 cm long) was advanced into the ascending aorta, through the coarctation and into the descending aorta. The wire was snared using a 20mm snare device (PFM, Germany) and exteriorised via the femoral artery, establishing a continuous arteriovenous guidewire loop (figure 4). Over this wire, a 14F Mullins sheath was advanced from the femoral artery, across the coarctation and into the ascending aorta. A Palmaz P4014 stent (Johnson & Johnson, USA), mounted on a 20mm diameter balloon (Cordis, USA) was delivered to the coarctation (figure 5), and appropriately deployed (figures 6,7). The post implantation left ventricular systolic pressure was 180 mm Hg, with a residual gradient of 10 mm Hg. There were no procedure related complications. The

patient underwent coronary artery bypass grafting for a severe stenosis of the left anterior descending artery 3 days later.

Figure 4 The coarctation has been crossed with a long (260 cm) 0.035" guidewire, and a femoral arteriovenous loop established.

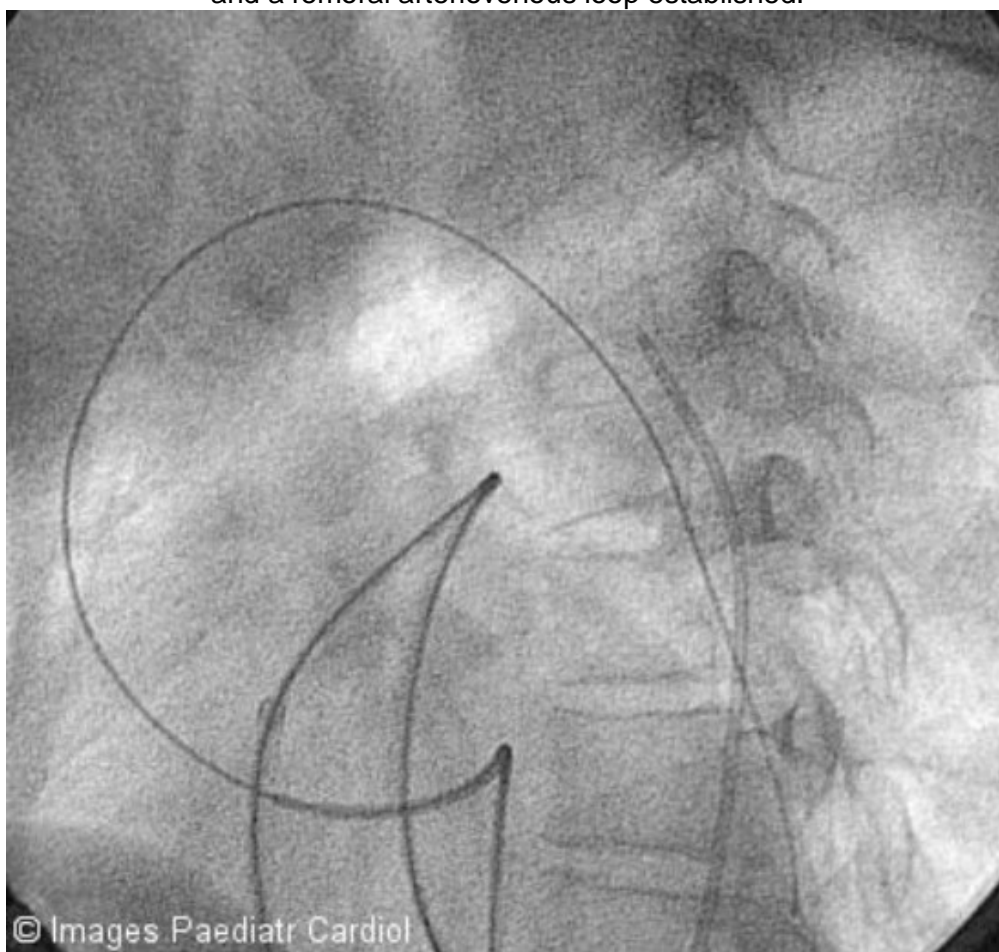


Figure 5 A Palmaz P4014 stent, mounted on a 20mm diameter (4 cm long) balloon is positioned across the coarctation, and optimal position confirmed by angiography.

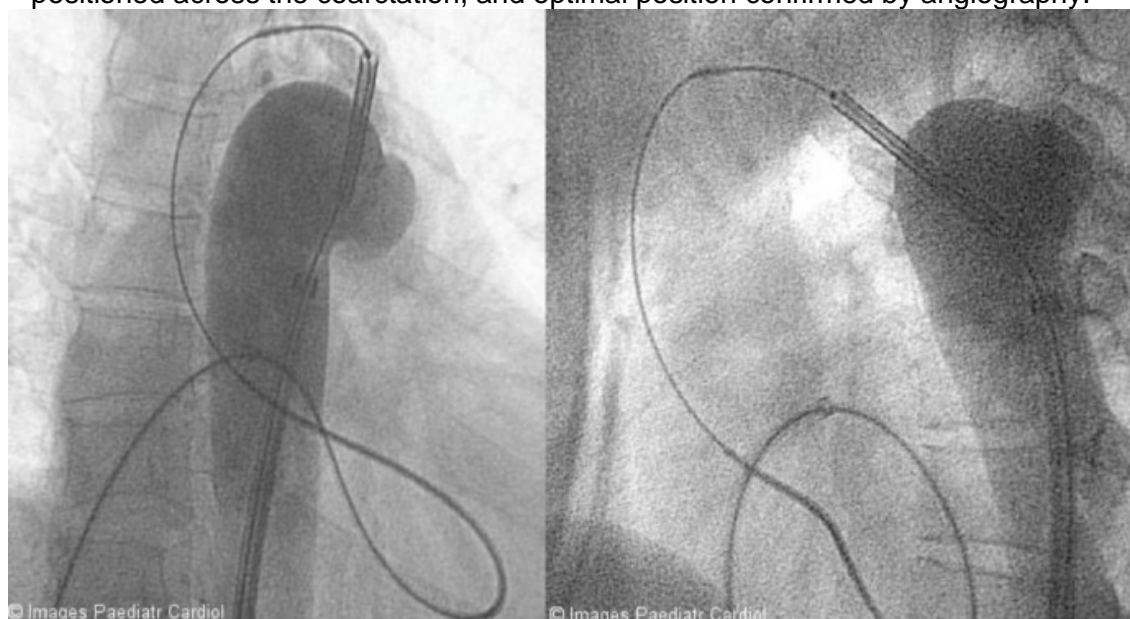


Figure 6 Stent inflation.

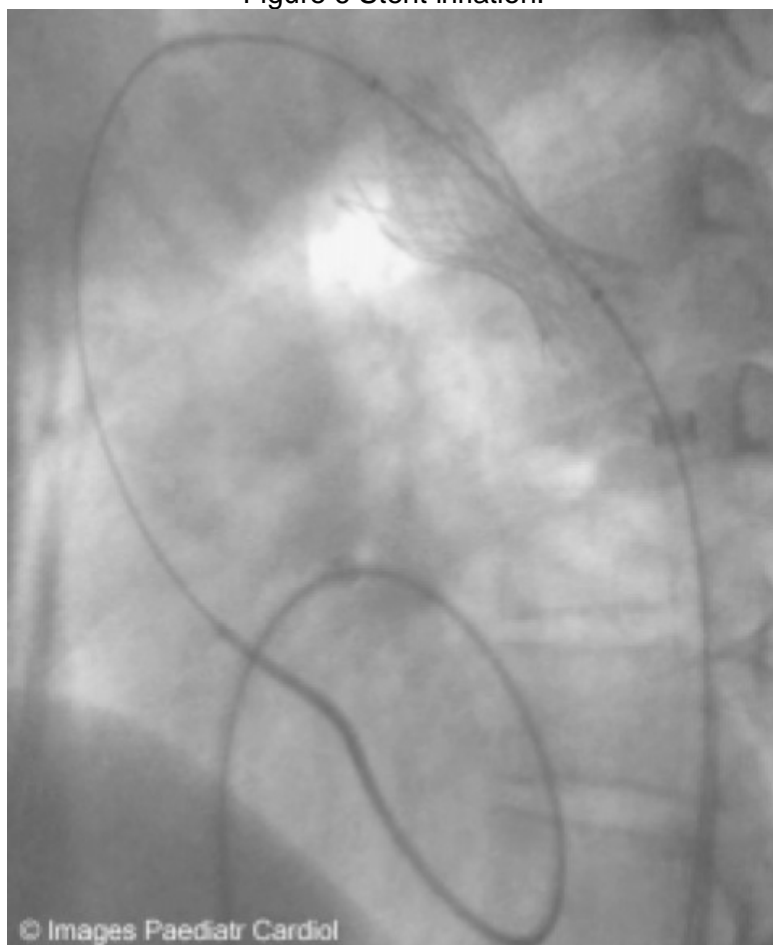
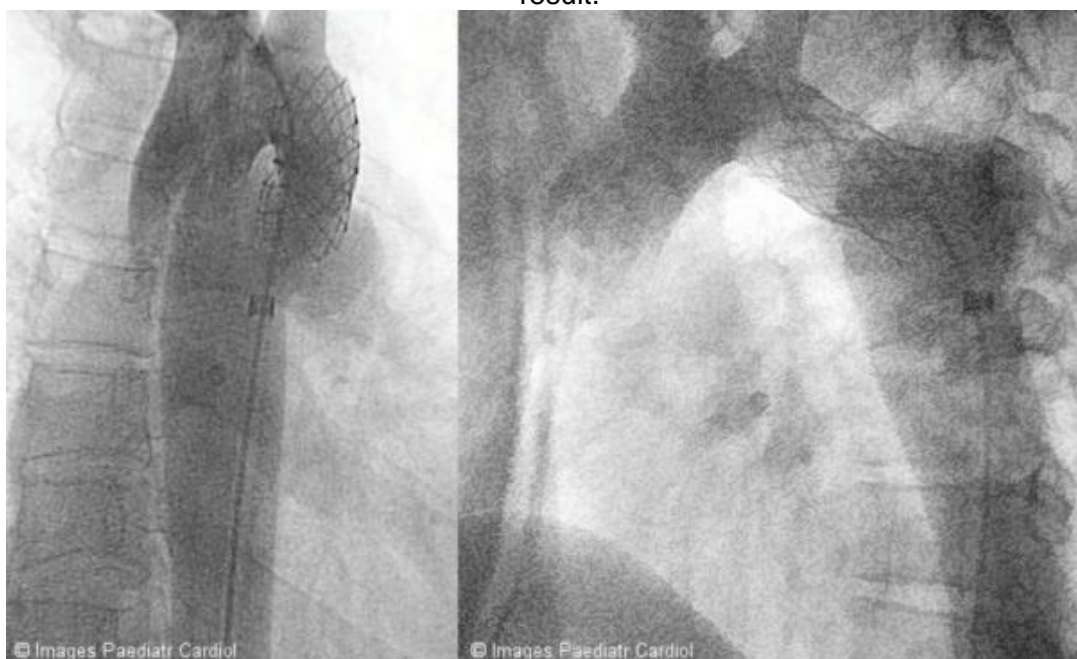


Figure 7 Aortic angiography following stent deployment, confirming an excellent result.



Discussion

Stent implantation is established therapy for coarctation of the aorta in older children and adults.^{1,2} When the coarctation segment cannot be crossed, the antegrade trans-septal approach should be used, to confirm whether the arch is truly atretic, or still patent. In the case described here, continuity of the arch was confirmed by left ventricular angiography. It was possible to cross the coarctation antegradely with a guidewire, facilitating subsequent stent placement. Atresia of the aortic arch can be successfully recanalised. Although balloon angioplasty has been successfully performed following recanalisation, the use of covered stents may avoid bleeding complications and provide a better long-term outcome.^{3,4}

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