Case Reports

Balloon Dilatation of Native Coarctation of Aorta in Infancy

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The utility of balloon coarctation angioplasty for treatment of unoperated coarctation of the aorta remains controversial. Some authors have advocated angioplasty for unoperated coarctation as the treatment of choice in neonates as well as older children (l,2) whereas others have refrained from using angioplasty in this clinical setting because of concerns about restenosis and aneurysm formation (3). We present a case report of balloon dilatation of native coarctation of aorta in a two month old infant who got admitted with congestive cardiac failure.

Case Report

A 2-month-old infant (weight 2.9 kg) was admitted with history of failure to thrive since birth. It was a full term normal delivery and the mother gave history of increased respiratory activity and sweating over forehead while feeding. On examination, both femoral pulses and left radial pulse were not palpable(4). The systolic blood pressure in right upper limb was 100 mm of Hg. Despite being on medical treatment, the patient was in congestive cardiac failure. On cardiovascular system examination, patient had cardiomegaly with cardiac apex in the sixth intercostal space outside midclavicular line, left ventricular third heart sound and a grade 2/6 ejection systolic murmur in the left second intercostal space. Chest examination showed bilateral basal crepitations. Echocardiographic and doppler studies were performed using 5 MHz transducer. The peak instantaneous gradient across the coarctation site was measured from suprasternal view with a continuous wave doppler and was found to be 40 mm of Hg. Patient had grade I mitral regurgitation with estimated pulmonary artery systolic pressure of 60 mm Hg. The left ventricular dimensions in systole and diastole measured 16 mm and 20 mm, respectively. The left ventricular ejection fraction was 45%. The coarctation segment measured 2.3 mm and the size of the isthmus was 3.8 mm.

After taking informed written consent from the parents, the procedure was performed under general anesthesia. Balloon dilatation of the coarctation was performed using percutaneous retrograde femoral arterial approach. A 5 French high flow pigtail catheter over a 0.035" guide wire was positioned in the ascending aorta after crossing the coarctation segment with 5F multipurpose catheter. The pressure gradient across the coarctation segment was recorded to be 40 mm Hg. Aortic arch angiogram was done in 70° left oblique view *(Fig. 1).* The size of the coarctation segment and isthmus measured 2 mm and 4 mm, respectively. A balloon catheter was passed over an exchange guide wire left in ascending aorta. Since the isthmus measured 4 mm and the aortic diameter at the

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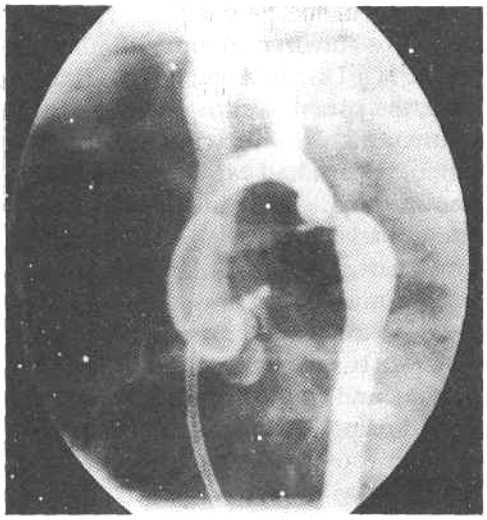

Fig. 1. Aortogram in LAO view showing coarctation.

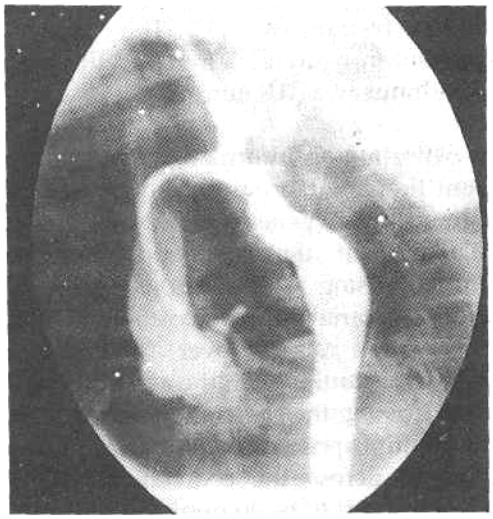

Fig. 2. *Aortogram in LAO view after balloon dilatation procedure.*

level of diaphragm measured 8 mm, a 6 mm balloon (shaft size 5F, length 4 cm.) was used(5,6). As there was no adequaterelief of pressure gradient with two inflations of 30 seconds each at 4 atm pressure, a 8 mm balloon (shaft size 5F, length 4 cm) was taken and one inflation of 30 seconds at 4 atm was made. The balloon catheter was withdrawn and 5 French pigtail catheter was reinserted over the guide wire and repeat angiography was performed *{Fig. 2).* The gradient across the coarctation segment dropped from 40 mm Hg to zero mm Hg. Post-angioplasty angiogram showed excellent dilatation or coarctation segment with faint trickling of dye in left subclavian artery. Patient had uneventful course after balloon angioplasty procedure. There were no local arterial complications after the procedure.

The patient was kept for monitoring of cardiac failure for one week during which it was observed that the patient's cardiac failure ameliorated very rapidly within the first forty-eight hours and he continued to show improvement in physical signs of heart failure during the remaining period of hospital stay. We discharged the patient on maintenance dose of digitalis without any diuretics.

Discussion

Our result shows that balloon dilatation relieved severe coarctation in this patient with no residual gradient and excellent angiographic appearance immediately after the procedure. This child was a high surgical risk case as he was in congestive cardiac failure.

Coarctation of aorta in infants continues to represent a challenging problem for surgeons and cardiologists. Direct comparison of surgery and angioplasty is difficult because the surgical series includes consecutive patients whereas patients in most angioplasty reports represent selected groups. The higher mortality rate reported in surgical series as compared to angioplasty may be secondary to other cardiac defects and reflects selection bias for patients in balloon dilatation reports. Surgical approach as compared to angioplasty results in fourfold lower recoarctation rate for native coarctation of the aorta in infants (7).

The initial results of balloon angioplasty in neonates and infants were discouraging (8,9), but subsequent reports have shown that immediate results in patients less than one year of age are excellent (l,2,10,ll). However,

restenosis is an important problem on follow up particularly in neonates (10,ll). Surgical correction can safely be undertaken after unsuccessful balloon angioplasty of aortic coarctation(12). Rao *et al.* have suggested repeat balloon angioplasty as an acceptable alternative to surgery if results of initial balloon angioplasty are inadequate or unsuccessful or true recurrence of coarctation occurs (6). Another major concern of angioplasty has been,the incidence of aneurysm formation in patients under-going this treatment modality(13,14). Although long-term results are unknown, the intermediate-term follow up shows no significant progression of these aneurysms (13,14).

Sometimes, an infant with isolated coarctation does not manifest congestive cardiac failure. Many authors advocate elective surgical treatment of coarctation of aorta after 2 years of age. However, recently Waldman *et al.* have recommended therapy for coarctation (beyond the first month of life) for a resting systolic pressure (right arm) of 140 mm Hg even without other signs and symptoms (15).

Thus, only a prospective, randomized study comparing balloon coarctation angioplasty and surgical treatment of native coarctation of the aorta will compare the efficacy and safety of these two modes of treatment particularly in neonates and infants. Nevertheless, our case shows that balloon dilatation can be done safely with excellent immediate results.

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