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Case Report

Balloon dilatation of isolated severe tricuspid valve stenosis

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ABSTRACT

Tricuspid valve stenosis is mostly rheumatic in origin. It almost always occurs in association with mitral valve disease. There are only few case reports of isolated tricuspid valve stenosis. We report a case of isolated tricuspid valve stenosis, which was treated with balloon dilatation.

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1. Introduction

Rheumatic heart disease (RHD) is still a common cause of heart disease in India. Most common valve involved in RHD is mitral valve, followed by aortic valve. Tricuspid valve (TV), when involved, is almost always associated with mitral valve disease.

2. Case

A 25-year-old female presented with periorbital puffiness and easy fatigability for the past two years. She developed swelling over both the lower limbs for the past two weeks. On examination, her vital signs were stable. The jugular venous pressure (JVP) was found to be raised, 8 cm above the sternal angle, with prominent A wave and slow Y descent. The apex

beat was in the 5th intercostal space, medial to mid clavicular line. The intensity of the first heart sound was loud and 2nd heart sound was normal. There was mid diastolic murmur, medial to apex, with presystolic accentuation, which increased on inspiration. There was no other murmur. Liver was enlarged 5 cm below costal margin with prominent diastolic pulsations.

ECG showed right atrial (RA) enlargement.

X-ray chest showed cardiomegaly with RA enlargement and a prominent superior vena caval shadow.

Echocardiography showed normal mitral, aortic, and pulmonary valves. TV was thickened and doming along with thickened and fused chordae (Fig. 1). The peak gradient across TV was 15 mm Hg and mean gradient was 12 mm Hg. RA was dilated, but RV was small. The diameters of tricuspid annulus and pulmonary annulus were 32 mm and 16 mm, respectively. There was no atrial septal defect or patent foramen ovale. Oxygen saturation of the patient was 95%.

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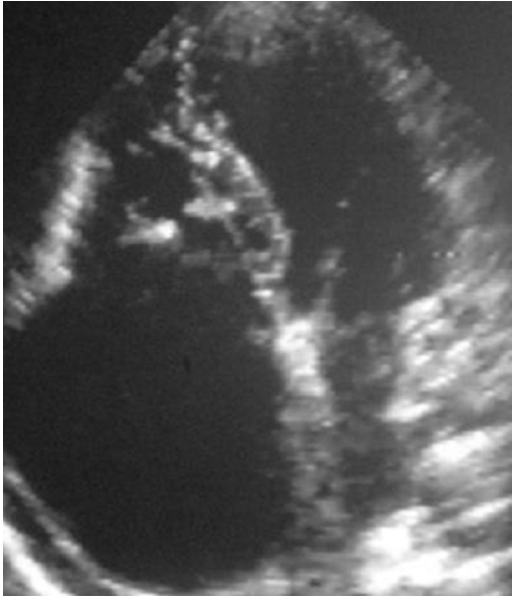


Fig. 1 – Echocardiography in 4 chamber view showing thickened and doming tricuspid valve with normal mitral valve.

So the final diagnosis was isolated tricuspid valve stenosis (TS).

Uncommon causes of isolated TS were excluded by various investigations,¹ and possibility of rheumatic origin was kept. Since the tricuspid annulus and its leaflets were of normal size and the patient presented at 23 years of age, the possibility of congenital origin was very low.

Some of the special investigations done were:

5 Hydroxyindole acetic acid (5-HIAA) in urine: 1.19 mg/g creatinine (normal < 10.00)

Antiphospholipids antibody, IgM: 2.54 MPL/ml (normal < 10.00)

Lupus anticoagulant: absent

The patient was taken up for balloon dilatation of TV through right femoral venous approach and Inoue balloon was placed in RA. But even after struggling for around two hours, we could not negotiate the balloon across TV. So at this stage the procedure was abandoned. The patient was again taken up for balloon tricuspid valvotomy (BTV) after one month. This time, with the help of multipurpose catheter, 0.018 in. guide wire was negotiated across the TV into RV. But as soon the effort was made to push the catheter into the RV, wire came back into the RA. This happened every time while attempting to push any catheter across the TV. Subsequently, with great difficulty, the wire was negotiated into pulmonary artery (Fig. 2). We then tried to pass 23 mm × 40 mm balloon across the tricuspid valve, but the stenosis was so severe that we could not cross this balloon. So we crossed 7 mm × 40 mm balloon and dilated the TV with this (Fig. 3). Now we could pass 23 mm × 40 mm balloon and inflated it across TV (Fig. 4). Subsequently we passed another 0.018 in. guide wire across TV

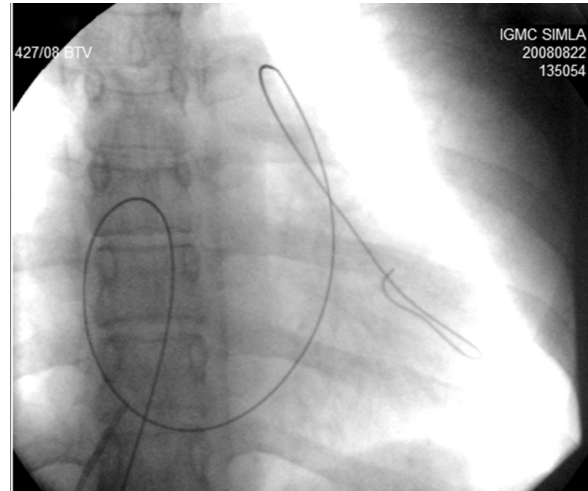


Fig. 2 – Guide wire passed across TV, PV into PA.

into the pulmonary artery and did double balloon dilatation with 23 mm × 40 mm and 17 mm × 40 mm balloons (Fig. 5). The mean gradient across TV decreased from 12 mm Hg to 4 mm Hg.

The patient had marked improvement in symptoms and was discharged on third day after the procedure.

Table 1 shows the hemodynamic data of the patient before and after balloon dilatation.

3. Discussion

Isolated TS is a rare condition. TS is mostly rheumatic in origin and in that case, almost always associated with mitral valve disease. Congenital TS is very rare and presents early in life. There are very few case reports of isolated TS of rheumatic etiology in literature.^{1,2} Morgan et al. did first surgical commissurotomy of isolated TS of rheumatic etiology.² Before

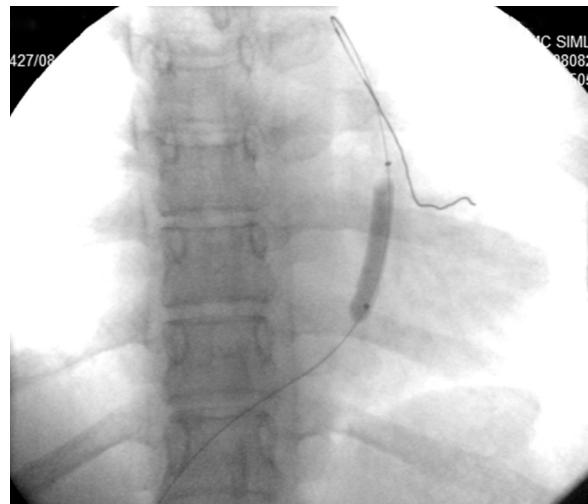


Fig. 3 – Balloon dilatation with 7 mm × 40 mm balloon.

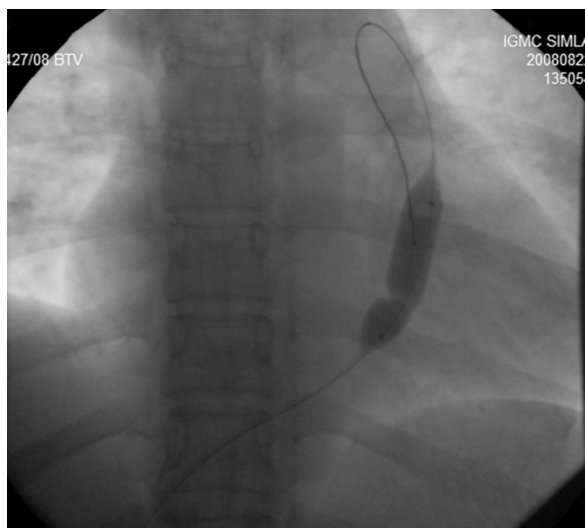


Fig. 4 – Balloon dilatation with 23 mm × 40 mm balloon.

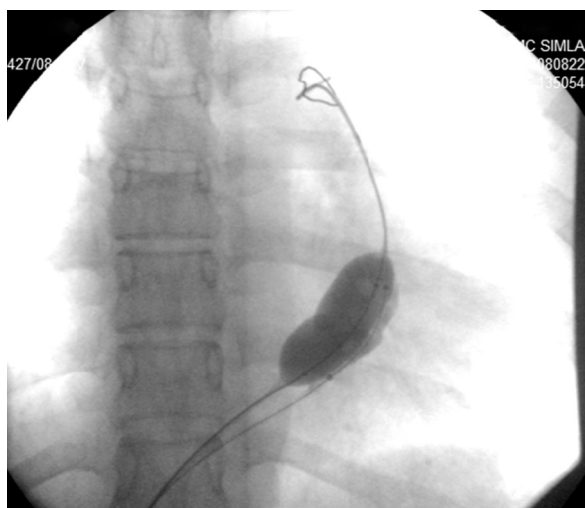


Fig. 5 – Balloon dilatation with two balloons (23 mm × 40 mm and 17 mm × 40 mm).

this, all three cases of isolated TS, who underwent surgical commissurotomy, had TS of congenital origin.³ All of these cases had subsequent clinical improvement. Longest follow-up was of 14 months, and this patient had persistent gradient across TV. Jaibag et al. reported the first percutaneous treatment of isolated TS of rheumatic origin by double balloon technique.⁴ They did valvotomy by keeping two wires across TV, in the right ventricle. Lokhandwala et al. performed the first successful valvotomy of congenital TV stenosis.⁵ They also did it with two balloons placed between RA and RV. We

Table 1 – Pressure data on cardiac catheterization (in mm of Hg).

	Predilatation	Postdilatation
Femoral artery pressure	140/98/117	136/94/114
Right atrium pressure (mean)	25	16
Right ventricle end diastolic pressure	9	14
Mean gradient across tricuspid valve	12	4
Pulmonary artery pressure	15/8/13	18/10/15

have also reported a case of isolated tricuspid stenosis.⁶ This was the same case we took for balloon valvotomy. Since the RV was small and TV was very narrow, we could not keep the balloon in RV. We had to take the wire into pulmonary artery and required to do dilatation with smaller balloon, then with larger balloon and finally with two balloons.

Since isolated TS is a very rare entity, with only few case reports of balloon dilatation, there are no guidelines of what balloon size is to be used. Whether jugular approach will be more suitable for crossing the tight stenosis of tricuspid valve is also not clear but may be tried if femoral approach is unsuccessful.

4. Conclusion

Isolated tricuspid valve stenosis is very rare and is mostly congenital in origin. Most of the cases have been treated surgically. Our report shows that percutaneous treatment, though difficult, is a good alternative.

Conflicts of interest

The authors have none to declare.

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