

Balloon Mitral Valvuloplasty in Mirror Image Dextrocardia with Rheumatic Mitral Stenosis with Suprasystemic Pulmonary Arterial Hypertension

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Abstract

32 years old male with history of mirror image dextrocardia with situs inversus and history of rheumatic fever at age of 12 years on penicillin prophylaxis till 25 years of age presented with history of dyspnea on exertion NYHA class 2 since last five years. Cardiac colour Doppler 5 years back was suggestive of rheumatic mitral stenosis with mitral valve area 2 cm² with mirror image dextrocardia with mild pulmonary arteriolar hypertension in normal sinus rhythm. Patient was put on medications and was advised regular follow up. Patient did not follow up regularly. Cardiac colour doppler 5 years later showed mitral valve area of 0.8 cm² with suprasystemic pulmonary arterial hypertension of 130 mmHg. Hence was advised percutaneous balloon mitral valvuloplasty. Balloon mitral valvuloplasty was done successfully without inverting the images on fluoroscopy using left femoral approach. Post balloon mitral valvuloplasty mitral valve area increased significantly with mild mitral regurgitation and regression of pulmonary arterial pressures to half the original values.

Introduction

Distorted cardiac anatomy offers technical difficulties during fluoroscopy-guided transcatheter procedures. This is even more the case with balloon mitral valvuloplasty, where the cardiac malpositions considerably increase the complications involved in interatrial septal puncture and left ventricular entry. Though it has been established as the procedure of choice in a selected subset of patients with rheumatic mitral stenosis (MS), there are only a few reports on successful PTMC in altered cardiac anatomy using the standard Inoue technique.¹⁻⁶ Here we describe a case of a 32-year-old male with *situs inversus* dextrocardia with severe rheumatic mitral stenosis [mitral valve area 0.8 cm²] with suprasystemic pulmonary arteriolar hypertension, where balloon mitral valvuloplasty was successfully done without inverting the fluoroscopic images.

Case

32 years old male with history of mirror image dextrocardia with situs inversus and history of rheumatic fever at age of 12 years on penicillin prophylaxis till 25 years of age presented with history of dyspnea on exertion NYHA class 2 since last five years. Cardiac colour Doppler 5 years

back was suggestive of rheumatic mitral stenosis with mitral valve area 2 cm² with mirror image dextrocardia with mild pulmonary arteriolar hypertension in normal sinus rhythm. Patient was put on medications and was advised regular follow up. Patient did not follow up regularly. Cardiac colour doppler 5 years later showed mitral valve area of 0.8 cm² with suprasystemic pulmonary arterial hypertension of 130 mmHg with NYHA class 3 symptoms. Hence was advised percutaneous balloon mitral valvuloplasty. Transoesophageal echocardiography was done to rule out left atrial appendage clots.

Because of *situs inversus* dextrocardia cardiologists usually tend to modify imaging using different softwares.

In cases which have been reported the operator had difficulty in atrial septostomy as well as entry across the mitral valve. Although this software was available with us as a default it was not used. To keep it simple left femoral access was used (arterial and venous) Interatrial septum in left lateral view on imaging under fluoroscopy is same as it is in right lateral view The descent for interatrial septum was done using the fluoroscopy guide with needle pointing towards the spine and keeping the pointer of the Brockenbrough needle

at 7 to 8 o' clock position A 6 Fr pigtail catheter was placed in the noncoronary aortic sinus and the septal puncture was done in a lateral view The transit across the mitral valve was done with ease in left anterior oblique view without using pseudoimaging (i.e. right anterior oblique view) just by using either clockwise or counter clockwise guidewire movement Balloon size and inflation was done appropriately as per the guidelines based on height and body surface area of the patient Simultaneous transthoracic echocardiography guidance was used for interatrial puncture as well as the trans mitral valve left ventricular access Post balloon mitral valvuloplasty the mitral valve area increased to 2.16 cm² with a substantial decrease in pulmonary arterial pressure to 60 mmHg Left atrial pressures reduced from 35 mmHg at the start of the procedure to 12 mmHg post balloon mitral valvuloplasty Patient was NYHA class 1 at one month follow up

Discussion

The efficacy, safety and applicability of Inoue balloon technique for balloon mitral valvuloplasty are clearly established worldwide in selected subset of patients with rheumatic mitral stenosis. Mirror-image dextrocardia like our case has been estimated to occur with a prevalence of 1:10,000 patients. In geographical areas with a high prevalence of rheumatic heart disease, the coincidence of rheumatic MS and dextrocardia is a chance occurrence (Figure 1). Distorted cardiac anatomy and cardiac malpositions considerably increase the complications involved in interatrial septal puncture and left ventricular entry during balloon mitral valvuloplasty. Previous authors have employed various modifications

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Fig. 1: Chest X-ray showing dextrocardia

to suit the abnormal anatomy in such patients.¹⁻⁵

Transseptal catheterization was performed from the left groin to reduce the puncture needle angulation at the confluence of the iliac veins to the left-sided inferior vena cava.

Septal descent was done by rotating the external indicator of the needle at 120°, *i.e.*, the 7 o'clock position. The delineation of the IAS is the most important and difficult step in the procedure

The catheter placed in the noncoronary aortic sinus marked the antero-superior limit of the interatrial septum also. We did not use TEE, as it requires mild sedation and is time-



Fig. 2: 12 lead ECG of the patient

consuming. The radiographic images were acquired without inverting the fluoroscopic images (Figure 3).

These modifications were supplemented by contrast injection into the septum to delineate the IAS.

The usefulness of intracardiac echocardiography (ICE) in preventing serious complications in transseptal procedures when the cardiac anatomy is unusual or distorted has also been highlighted recently. However, an ICE facility was not available to us at the time of PTMC in this patient.

Conclusion

The coincidence of rheumatic mitral stenosis and situs inversus with dextrocardia is a rare occurrence. Most of the cases are deferred for surgery in view of the complicated anatomy. This case demonstrates the safety and efficacy of balloon mitral valvuloplasty without inverting the images on fluoroscopy in such patients.



Fig. 3: Fluoroscopic image showing the balloon inflated

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