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A Syndrome of Prolapsed Leaflets

Authors

**Dr. Shivashankara T H, MD¹, Dr. Deepak pujar MD²,
Dr. Cholenahally Nanjappa Manjunath MD, DM³**

^{1,2}Dept of Cardiology, Sri Jayadeva Institute of Cardiovascular Sciences and Research, Bangalore, India

³Professor, Dept Cardiology, Sri Jayadeva Institute of Cardiovascular Sciences and Research, Bangalore

Corresponding Author

Dr. Shivashankara T H, MD

Sri Jayadeva Institute Of Cardiovascular Sciences and Research, Banneru ghatta Road, Jayanagar 9th Block,
Bangalore, Karnataka, India 560069

PH: 9886230507, Fax: Fax: +91-80-2653-4477

Email: drshivashankarath@gmail.com

Abstract

Marfan syndrome is a variable autosomal dominant disorder with characteristic cardiovascular, eye and skeletal features. Progressive aortic dilatation, usually maximal at the sinus of Valsalva, associated with aortic valve incompetence leads to aortic dissection or rupture and is the principal cause of mortality. We report a case of marfan syndrome with prolapse of all valves with severe aortic regurgitation. Occurrence of prolapse of all cardiac valves is not commonly seen.

Key Words: *Marfan syndrome; mitral valve prolapse; aortic root dilation; aortic regurgitation*

Introduction

Marfan syndrome is a variable autosomal dominant disorder with characteristic cardiovascular, eye and skeletal features. Progressive aortic dilatation, usually maximal at the sinus of Valsalva, associated with aortic valve incompetence leads to aortic dissection or rupture and is the principal cause of mortality,¹but mitral

valve prolapsed with incompetence may be significant, and lens dislocation, myopia, and arthritis associated with chronic joint laxity can cause substantial morbidity. Children affected by the Marfan syndrome carry a mutation in one of their two copies of the gene that encodes the connective tissue protein fibrillin-1 (FBN 1).²The diagnosis is commonly considered in a young

person with a tall, thin body habitus, long limbs, arachnodactyly, pectus deformities, and sometimes scoliosis. Previously Ghent criteria were used to diagnose a Marfan patient. Now these criteria are modified and revised Ghent nosology criteria are being used to diagnose Marfan syndrome. Marfan syndrome can affect all valves. Cases of mitral, tricuspid, and aortic leaflets prolapse has been described.

Case Report

We report a twenty four year male presented with easy fatigability of NYHA class four since six months, palpitation of six months duration. He had no complaints of chest pain or dyspnoea or PND. There was no past history of rheumatic fever or recurrent respiratory tract infection. No one in the family had cardiac disease or sudden deaths. This patient was non smoker and non alcoholic. Physical examination revealed him to be a tall, thin male with long fingers, who appeared much older than his stated age. Pulse was 90 beats per minute, with a regular rhythm and a collapsing character, Blood pressure was 160/80 mmHg .with other signs suggestive of peripheral aortic run off. On Closer examination of the hands showed some arthritic changes such as incurving of last two fingers of both hands. Characteristic Marfan bony changes in the form of wrist and thumb signs were noted as well as a mild pectus excavatum and kypho –scoliosis (Fig 1). His arm span was more than his height. This patient had high arched palate but no dental abnormalities were present. There were no skin striae, ectopia lentis, or other skeletal

abnormalities. Upon assessment of the precordium, a hyperdynamic displaced LV type of apex beat was felt in the 6th intercostal space lateral to midclavicular line. A grade three early diastolic murmur was heard over the aortic area. S1 and S2 were both audible, however S1 was louder.

We performed detailed 2D echocardiography for this patient. 2-D Echocardiography revealed dilated left ventricle and atrium. Anterior and posterior mitral leaflets were prolapsing greater than 2 mm during LV systole with thick and redundant mitral leaflets. And also tricuspid leaflets both septal and anterior leaflets prolapse noted. Both the anterior and septal leaflets appeared redundant and prolapsed beyond the level of the tricuspid ring during systole (fig.2 &3).

In Parasternal view aortic cusps (RCC and NCC) were seen prolapsing to LVOT during diastole, a body of closed leaflets clearly protruded into the left ventricular outflow tract across the aortic annulus, the point of coaptation descended toward the level of the aortic ring. Aortic root was dilated (4.72 cm). Pulmonary valve was thick redundant with mild degree of prolapse. Pulmonary artery was dilated. Colour Doppler study revealed severe aortic regurgitation, mild mitral, tricuspid and pulmonary regurgitation. His left ventricular systolic function was reduced with ejection fraction of 45%.

Discussion: Fibrillin is an important component of the microfibrillar system that acts as a scaffold for elastogenesis. Classical Marfan syndrome is associated with a mutation in FBN1, the gene that

encodes for fibrillin-1. The pathophysiological outcomes of the degeneration of elastic fibers in Marfan syndrome seem to explain the majority of manifestations of this condition. Stiffness and distension of aorta to pulse pressure is the most important mechanism of damage to aorta in Marfan syndrome giving rise to aortopathy. Recently Transforming growth factor β (TGF β), a cytokine that regulates the morphogenesis of cells has been implicated in the pathogenesis of aortopathy and phenotypic expression of the Marfan's syndrome. Abnormal fibrillin causes failure of the sequestration of the inactive latent precursor of TGF β , resulting in excessive TGF β activation, and thus producing the phenotypical manifestations of Marfan's. It has also prompted the idea that TGF β antagonism will be a productive treatment strategy in Marfan syndrome and perhaps in other related disorders.³

Skeletal manifestations are the principal signs of Marfan syndrome and usually get the notice of a physician. The most common features include tall stature with the lower segment of the body greater than the upper segment and long, slender limbs; thin body habitus with increased arm span-to-height ratio; long, slender fingers, or arachnodactyly; deformities of the chest, such as pectus carinatum or pectus excavatum, scoliosis and high arched palate with crowded teeth and dental malocclusion. Other uncommon manifestations include hyper mobility of joints, flat foot (pes planus), reduced extension of elbows (<170°), and elongated face (dolichocephalia). Most of the features were seen in the present case except upper segment to lower segment ratio and

flat foot (pes planus). Patients should be examined for arachnodactyly; positive wrist or Walker's sign (the distal phalange of the first and fifth fingers of the hand overlap when wrapped around the opposite wrist); and positive thumb or Steinberg sign (the thumb projects beyond the ulnar border while completely opposed within the clenched hand which were positive in both the cases).

Cardiovascular manifestations are the gravest complications and decide the prognosis and survival in Marfan syndrome. Abnormalities like aortic root dilatation, aortic regurgitation, aortic dissection, and aortic aneurysm, most commonly involving the ascending aorta but can involve the descending aorta as well. Mild dilation of aortic annulus and root with aortic regurgitation, MVP with mitral regurgitation, infective endocarditis predisposition are seen.

Here we report a case where all the three valves were prolapsing with severe aortic regurgitation and dilated aorta. Involvement of all the valves is not common in Marfan syndrome as one or two valves are more affected than all the valves.

To make a diagnosis of Marfan syndrome more consistent and of more prognostic value, the Berlin diagnostic criteria of 1988 were revised and the clinical features codified as the Ghent nosology in 1996, which was again revised in 2010.⁴

Figure 1: Showing skeletal abnormalities in Marfan syndrome.



Figure 2: Showing prolapsing Aortic cusps, mitral leaflets, (M- Mode in right lower image)

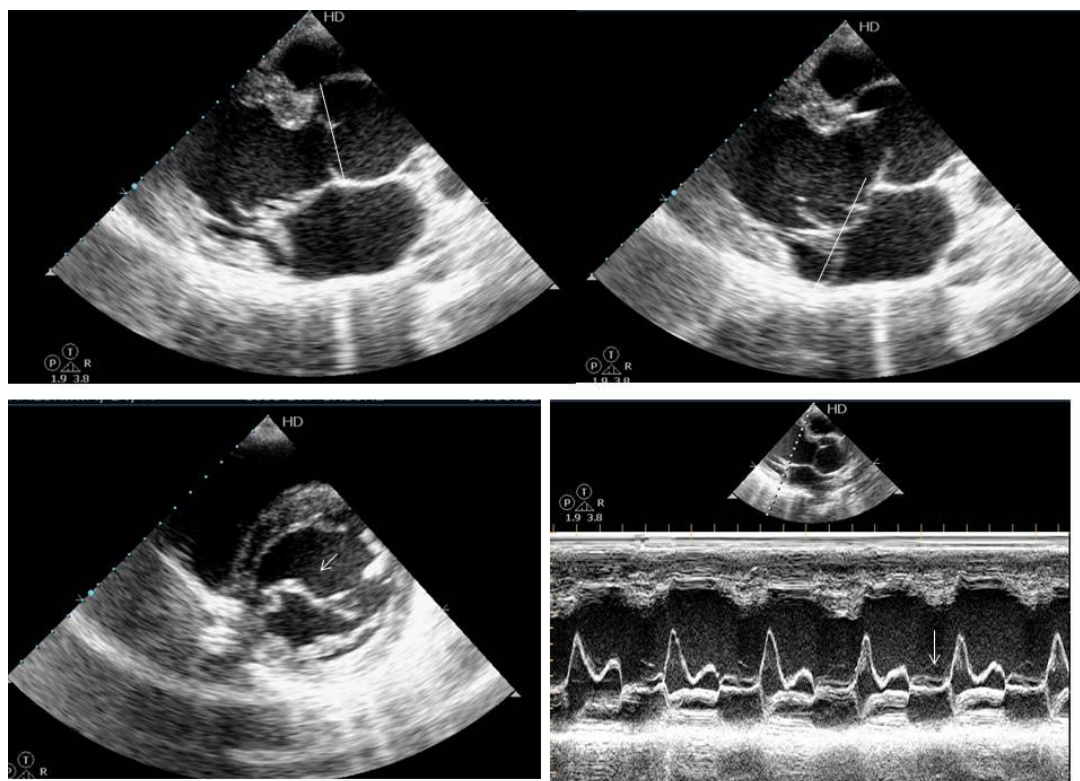
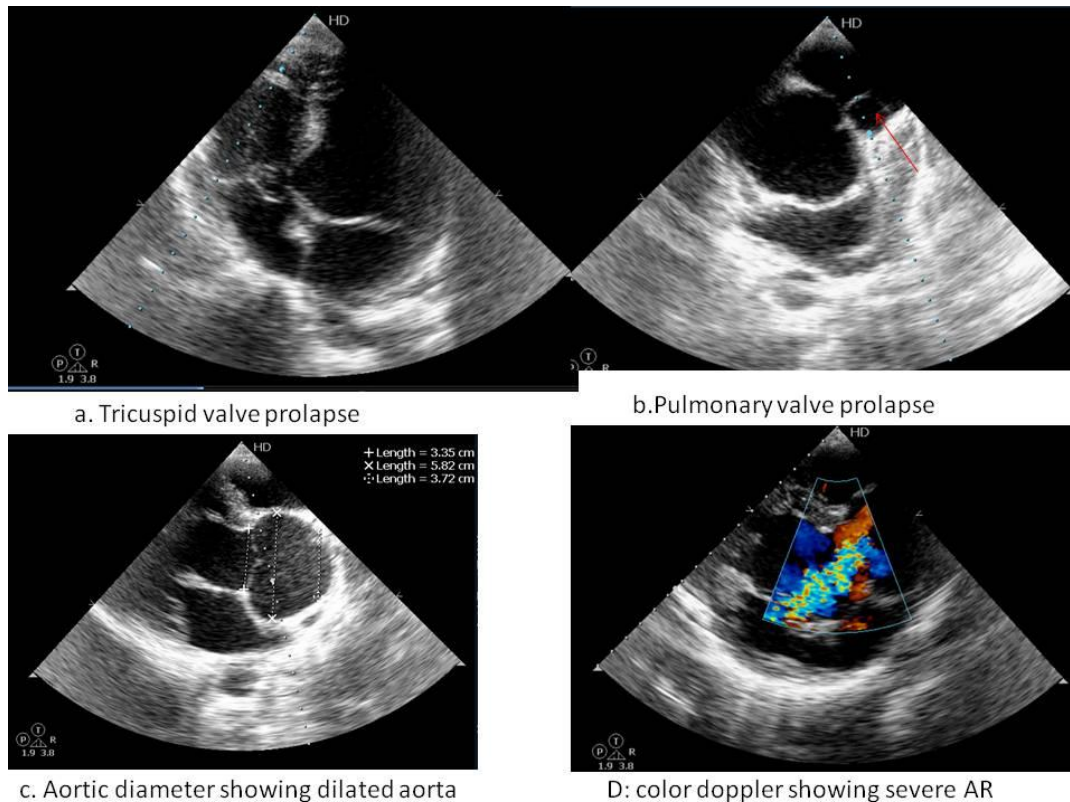


Figure 3: Prolapse of tricuspid and pulmonary valves and colour Doppler showing severe AR

Conclusion

Marfan syndrome is an uncommon hereditary connective tissue disorder which is transmitted as autosomal dominant manner with variable penetrance. It can present in diverse forms but cardiovascular manifestations determine the mortality and morbidity of the patient. Despite the morbidity and mortality associated with Marfan syndrome, appropriate medical and surgical management can improve and extend the lives of many patients. Further research in this field is required to understand the pathogenesis and to prevent further progression and reverse the clinical features.

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