

Marfan's Syndrome (MFS) with Dilated Cardiomyopathy Associated with Giant Heart: A Case Reports and Brief Overview

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Abstract—Marfan syndrome is inherited disease, initially characterised by overgrowth of long bone, thin extremities, frequent association of loose joints, cardiovascular system and ectopia lentis as an ocular manifestation and mostly caused by mutation of fibrillin synthesis which impairs in association with FBN1 gene loci of 15th chromosome. Cardiovascular system is the leading cause of mortality and morbidity among all. Most common contributors to mortality include annulo-aortic ectasia with or without aortic dissection, aortic aneurysm, pulmonary artery dilatation, aortic valve insufficiency and mitral valve prolapse. We reported a case of biventricular heart failure in a patient with MFS complicated by dilated cardiomyopathy and severe valvular insufficiency. In this review we enlightened some features of marfan syndrome stressing the uncommon cardiovascular aspects with giant heart.

Keywords—Marfan's syndrome; dilated cardiomyopathy; mitral regurgitation; giant heart; FBN-1 gene.

I. INTRODUCTION

Marfan syndrome is an disorder of the connective tissue with multi-system involvement, mostly caused by mutations of the fibrillin gene on chromosome 15 [1]. The overall prevalence in general population with no preference regarding ethnicity, sex or race is 1/10,000 inhabitants. The connective tissue disorder is a most common inherited disorder of marfan syndrome [1]. Most characteristic alterations are the cardiovascular, skeletal, ocular and lungs. Cardiovascular alterations especially aortic aneurysm is most severe manifestation of the disease in adults. Most of affected individuals often presenting as tall and slender, arachnodactyly, scoliosis and either of a funnel chest or pigeon chest and ectopia lentis in an eyes [3]. Regardless of how crippling may be the skeletal deformity the predominant factor in determining the survival rate is involvement of the ascending aorta. The major cause of morbidity and mortality is cardiovascular system. In fact, the degree of skeletal deformity does not necessitate correlation with severity and extent of the cardiovascular disease. Indeed patient might present with severe cardiovascular disease and mild skeletal deformities or vice-versa. The usual cardiovascular manifestations in MFS may be categorized morphological as affecting the aorta, myocardium, valves or pulmonary arteries [4]. Mitral valve prolapsed in children is major cause of death, often an earliest manifestation and since they cause severe valvular failure. Generally aortic valve dysfunction is late event and often seen as secondary to aortic root enlargement. Here we present you a case of marfan syndrome in patient with dilatation of chambers, severe mitral valve regurgitation as revealed by an echocardiography, a massive non-coronary sinus of Valsalva aneurysm, a trivial tricuspid septal leaflet cleft, mild aortic regurgitation, pericardial effusion and left ventricular dysfunction. Therefore, awareness of atypical presentations earlier in life is very critical for all clinicians and

understanding the pathophysiology and natural history of cardiovascular disease in MFS.

II. CASE REPORT

A 26 years old male patient was admitted in 1st affiliated hospital of Yangtze University department of cardiology with complains of palpitation, diarrhea, nausea and vomiting for 2 days. Physical examination revealed long limbs, Arachnodactyly (spider fingers) and myopia. Vital signs at presentation were blood pressure 110/70mmHg, heart rate 142bpm with irregular rhythm and respiratory rate 25/min. Jugular venous distention was rather evident. Precordial movement with visible and palpable apical pulse at the 7th left intercostal space at the mid-axillary line. On auscultation, inspiratory crackles were heard at both lung bases and irregular heartbeats, grade III/IV systolic murmur was audible over the entire precordial area but louder at the apex with thrill. Tricuspid or pulmonary auscultation was not remarkable because of the rapid irregular heartbeats. Chest X-ray showed a cardiothoracic index of 80%; ECG revealed atrial fibrillation with criteria suggestive of biventricular dilatation. Transthoracic echocardiogram (TTE) showed dilatation of entire cardiac chambers. Left ventricular end diastolic and left ventricular end systolic dimensions are 9.20cm and 7.70cm respectively with entire heart was severely dilated and hypokinetic with Left ventricular ejection fraction (LVEF) 35%. The dimensions in right atrium, right ventricular and left atrium are 5.90cm, 3.10cm and 7.80cm respectively. The mitral valve leaflets were normal, there was no mitral valve prolapse, abnormal thickening or calcification of mitral valve, but the degree of mitral regurgitation was severe. There were only a mild tricuspid regurgitation and aortic regurgitation. The aortic root and ascending aorta were normal in diameters, but a large non-coronary sinus of Valsalva aneurysm was 5.27×4.45cm in size measured by echocardiography. In addition, tricuspid septal leaflet cleft was observed. Ocular

examination revealed dislocation of both lens. With intravenous diuretics, vasodilators and nasal oxygen, symptomatic relief was achieved. During his hospital stay, clinical condition was stabilized. Regular monitoring of valvular function, aortic diameter, and early initiation of long term adrenergic blockade to reduce hemodynamic stress on the proximal aorta are standards care for those after hospital discharge.

III. FAMILY HISTORY

According to Ghent criteria and history revealed three affected family members over three generations two of whom were deceased and proband of a 26 yrs male diagnosed with marfan syndrome. The descriptive information from the proband's uncle, in all affected members had similar skeletal deformities such as tall stature, long limbs, arachnodactyly and both of them appeared decreased vision.

IV. DISCUSSION

Marfan syndrome is a rare hereditary connective tissue disorder affecting many system of the body. Establishment of diagnosis is based on the Ghent criteria, which involves evaluation of major and minor systemic manifestations. Major and minor criteria have been defined based on family history, clinical features in the various systems, genetic and molecular analysis. They clinically are pleiotropic and highly variable with the affected systems being involved to different degrees. MFS typically involves cardiovascular, musculoskeletal and ocular systems. According to these criteria, a diagnosis of MFS requires first degree relative affected and involvement of two systems with major signs or in the absence of a family history the involvement of three systems with major signs in at least two. Present case affected in all three systems (skeletal, ocular and cardiovascular), where we found major signs in the skeletal system (arachnodactyly, walker wrist and thumb signs), the ocular (ectopia lentis) and the cardiovascular system (a large saccular aneurysm of the non-coronary sinus of Valsalva). Therefore with positive family history the criteria for diagnosing marfan syndrome in our patient could be completely fulfilled.

All the clinician usually gained attention of skeletal manifestations as cardinal signs of marfan's syndrome. However the most serious complication which determine the prognosis and survival in marfan syndrome is cardiovascular manifestation. The aortic root dilation and mitral valve prolapse are significant clinical findings in patients with marfan syndrome [8] which has been recognized as prevalent as ocular defects in Marfan syndrome [10]. Sisk et al [11] found aortic root dilation and mitral valve prolapse in all their 15 cases of marfan syndrome in which those presented at ages of less than four years. Here we reported a case of marfan syndrome, stressing the uncommon cardiovascular aspects. In our patient, a large saccular aneurysm of the non-coronary sinus was observed without the dilatation or dissection of the ascending aorta. In addition echocardiography revealed dilation of the four cardiac chambers and global hypokinesia. Left ventricular ejection fraction (LVEF) was 35% with left

ventricular end diastolic dimension (LVEDD) and end systolic (LVESD) dimension of 9.20cm and 7.70cm respectively. Recently the left ventricular dimensions and systolic function were studied using echocardiography in 234 patients with marfan syndrome without significant valvular regurgitation. Left ventricular dimensions with systolic function were found to be normal in most patients having marfan syndrome [12]. There were mild tricuspid regurgitation with normal systolic pulmonary arterial pressure. The valvular insufficiencies in mitral valve only were not able to cause such a severe dilation of all cardiac chambers. Besides, there was no finding indicating an either of myocarditis or coronary artery obstruction secondary to the dilation of the four cardiac chambers. Other significant disorders known to affect the myocardial function such as rheumatic heart disease, diabetes mellitus, anemia, thyroid disorders, renal or hepatic impairment were all evaluated and excluded.

As we know, dilated cardiomyopathy is a primary disease of the myocardium defined by the presence of left ventricular dilatation and left ventricular systolic dysfunction in the absence of abnormal loading conditions (hypertension, valvular disease) or coronary artery disease sufficient to cause global systolic impairment [13]. Also it has been reported that dilated cardiomyopathy in the absence of severe valvular dysfunction is a rare feature of MFS [14]. In our patient, it may be due to the severe mitral regurgitation leading to increased left atrium and left ventricular preload and is associated with the left atrium and left ventricular dilation. But without the severe tricuspid regurgitation or elevated pulmonary arterial pressure, it's hard to explain the reason for the right atrium and right ventricular dilation. And the left ventricular end diastolic dimension of 9.20 is noteworthy. Therefore we hypothesize the severe cardiac chambers dilatation primarily to the MFS, in other words, dilated cardiomyopathy may be exist in patient of marfan's syndrome with or without the typical mitral valve prolapse.

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