Case Report

Marfan Syndrome - Acute Aortic Dissection Due to Giant Aortic Aneurysm

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ABSTRACT: Marfan syndrome is a genetic disorder with an estimated prevalence of 1/5000 births. Clinical manifestation and disease progress can vary among individuals affected therefore serial follow-up examinations are mandatory in order to prevent serious complications. We report a case of giant proximal aorta aneurysm with associated aortic dissection in a young patient with Marfan syndrome who neglected medical advice to undergo periodic medical evaluation. Given the fact that clinical manifestations may differ among patients making prediction of disease progression very difficult, the patient with Marfan syndrome should be carefully monitored.

KEYWORDS: *Aorta, aneurysm, dissecting, Marfan Syndrome*

Introduction

Marfan syndrome is an autosomal dominant connective tissue disorder affecting both genders equally [1]. Mutation of the gene fibrillin-1 (FBN1) represents the genetic substrate of the disease in up to 93% of the cases [2-4] and genetic studies have identified over 2000 mutations of FBN1 [5-7].

In a small percent of cases, usually in the presence of ectopia lentis, the gene mutation was identified at the level of growth factor beta receptors (TGFBR1 and TGFBR2) [8,9]. Although in the vast majority of cases the disorder is inherited, in about a quarter of the patients there is no evidence of family history.

Genetic tests are complex and not routinely performed therefore attention was directed to the establishment and continuous refinement of clinical diagnostic criteria.

Currently, Ghent criteria [10], published in 1996 and recently revised, allow with high specificity the establishing of Marfan syndrome diagnosis. In 97% of patients who meet these clinical criteria the genetic mutation is subsequently identified [11]. This diagnostic algorithm correlates family history with clinical manifestations of the connective tissue, skeletal, muscular, eye, cardiovascular and pulmonary systems grouped into major and minor criteria. Major criteria include features with higher diagnostic power, which are not commonly present in the general population, such as ectopia lentis, dural ectasia and aortic dilation. Minor criteria are included in the category of low specificity manifestations that can be found in other pathologies.

According to the system, in the absence of a family history of Marfan syndrome, association between two major criteria and one minor criterion is sufficient for diagnosis. A known diagnosis of Marfan syndrome in a family member or an identified genetic mutation in the presence of major or minor criteria are also enough to establish the diagnosis.

Case report

A 29-years old male presents to Emergency Room of Emergency County Hospital, Craiova with severely altered general condition, dyspnea, polypnea and tachycardia. Patient history revealed that he was diagnosed with Marfan syndrome at the age of eleven, when he underwent surgical intervention for subluxation of the crystalline lens. He never underwent an imagistic assessment of heart and vessels. According to the patient's statements, he was asymptomatic until two weeks prior to hospital presentation when he developed progressive dyspnea. The patient was admitted to Craiova Cardiology Center for detailed evaluation and management.

Physical examination revealed marfanoid constitutional type, with decreased body weight when compared to height. The anthropometric measurements revealed a height of 205cm, body weight of 58kg, body mass index of 14.5kg/m^2 and body surface area of 1.91m^2.

Clinical examination of the musculoskeletal system demonstrated thoracic kyphoscoliosis, funnel chest (pectus excavatum) (Figure 1. a, b), mandibular retrognathia, dental crowding, limited extension at the elbow, flat foot, and arachnodactyly (Figure 1. c).

The apex beat was displaced to the mid-axillary line. An intense aortic diastolic murmur and a grade 3/6 apical systolic murmur were also

present. Systolic blood pressure varied between 130 and 100mmHg with undetectable diastolic pressure.

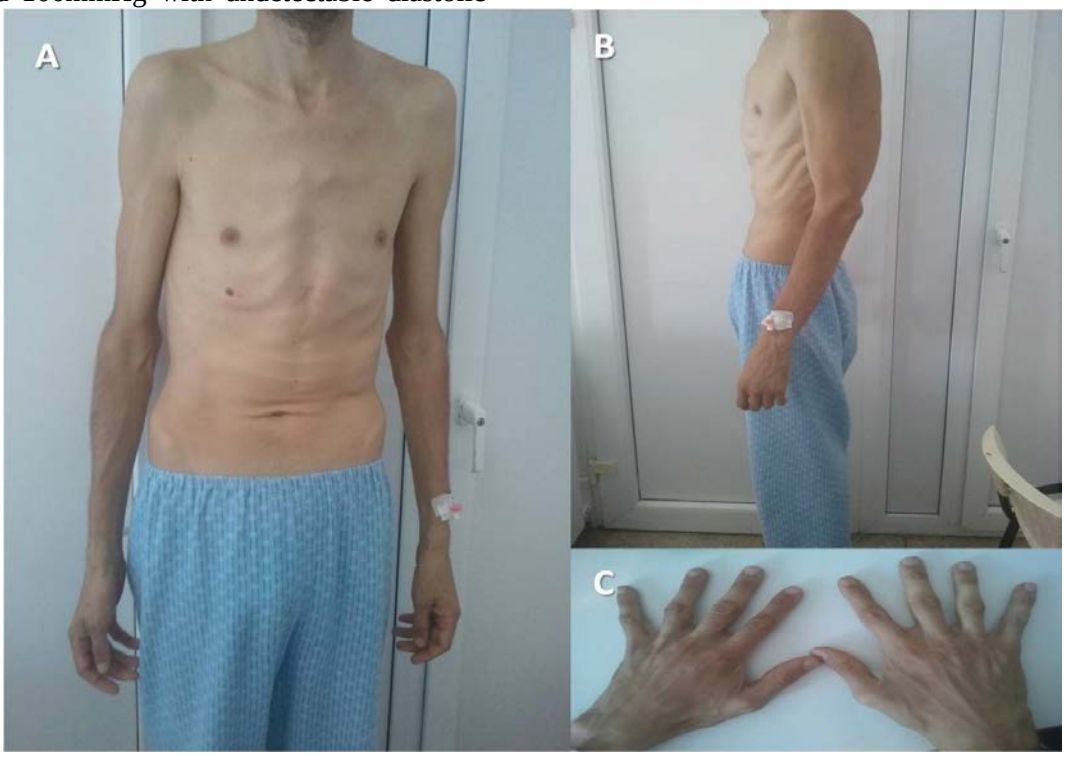

Figure 1. a-c. Antero-posterior (a) and lateral image of the patient in supine position (b). Arachnodactyly (c)

Eye examination showed palpebral ptosis and enophtalmia.

Cardiopulmonary radiography was performed and revealed dilated heart, elongated aorta, left basal pachypleuritis and bullous emphysema.

Bidimensional transthoracic echocardiography showed severe dilatation of proximal thoracic aorta. Aortic annulus diameter was measured to be 39 mm (Fig. 2. a) while aortic root and ascending aorta expressed similar degree of dilatation measuring 82 mm respectively 81 mm (Fig. 2. b). Descending aorta presented with normal diameter.

The geometric changes of the aorta led to tethering of aortic valve cusps and deficit of coaptation causing severe aortic regurgitation (Fig. 2. c, d).

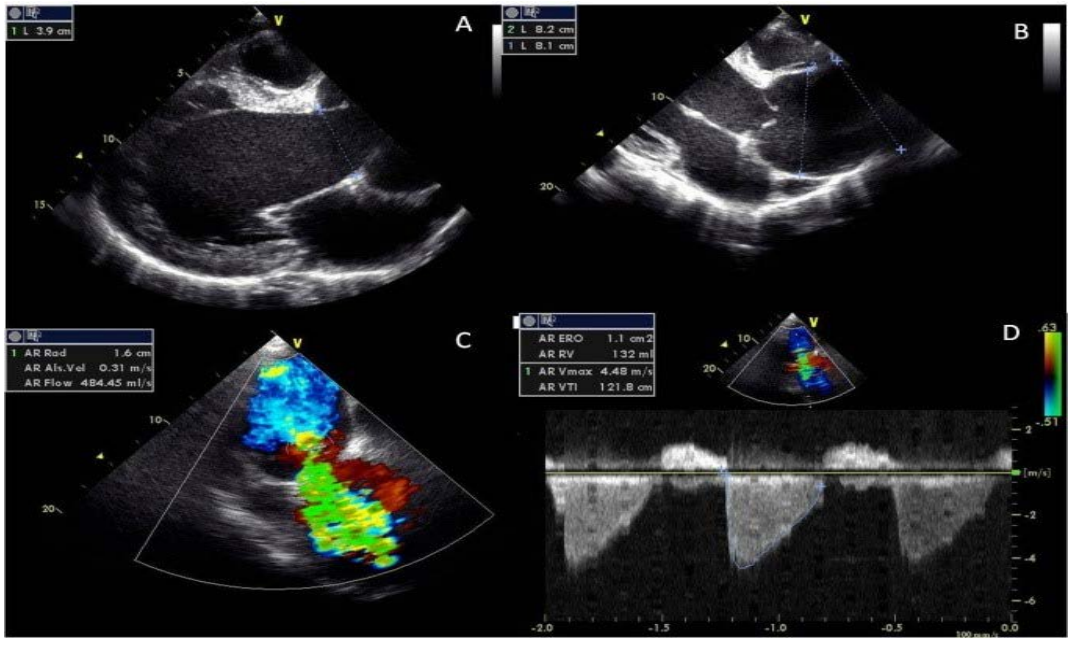

Figure 2. a-d. Echocardiographic assessment of proximal aorta. Morphology (a, b); aortic regurgitation (c, d)

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Thorough examination of the proximal thoracic aorta revealed an image of intimal flap suggesting aortic dissection. Other findings included severe left ventricle dilatation with diffuse hypokinesia and severe depression of left ventricle ejection fraction, moderate mitral and tricuspid secondary regurgitation, moderate pulmonary hypertension and increased pulmonary capillary wedge pressure.

Transesophageal echocardiography evaluation was not possible due to patient general condition. Given the sudden onset of the patient's symptoms and the echocardiographic image suggestive for dissection a computerized tomography scan was recommended. The exam confirmed the ascending aortic aneurysm without strong evidence of aortic dissection intimal flap. Descending and abdominal aorta had normal diameters.

The patient was referred to a specialized institution for surgical treatment. He underwent an emergency Bentall procedure (Fig. 3) involving replacement of the aortic valve with a mechanical prosthesis, aortic root and ascending aorta, with re-implantation of the coronary arteries into the graft and distal anastomosis at the level of brachiocephalic trunk. Intimal dissection of the ascending aorta was revealed intraoperatively

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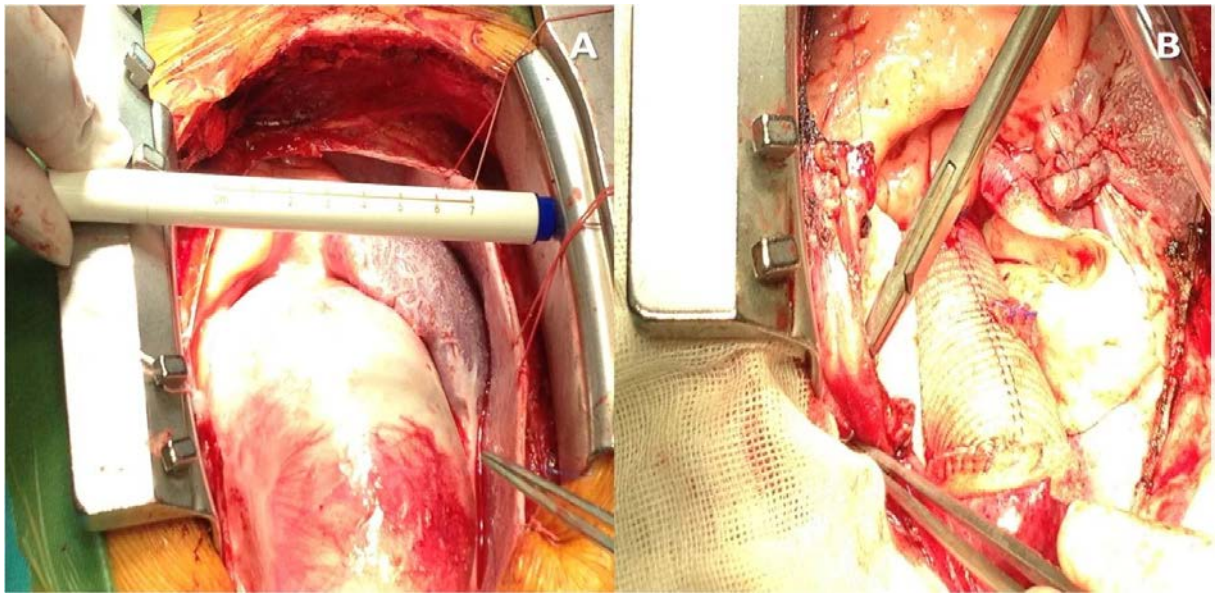

Figure 3. a-b. Intraoperative image. Before inserting the graft (a). After graft replacement (b)

Echocardiographic evaluation performed 14 days after surgery found no residual aortic regurgitation; however, mild mitral regurgitation as well as tricuspid regurgitation were still present. Left ventricle ejection fraction also remained severely reduced.

Discussion

This case emphasizes the crucial importance of systematic clinical and imaging evaluation of patients diagnosed with Marfan syndrome. Correct timing for surgery is very important in order to prevent mortality and morbidity associated with aortic dissection. Since an absolute diameter over 50 mm is associated with high risk of aortic dissection [11-13], current guidelines recommend prophylactic surgery in these patients even without other clinical manifestations. Also, surgical therapy should be considered in Marfan syndrome when aortic root diameter is greater than 45 mm and there is family history of aortic dissection, when there is evidence of a rapid increase in size of ascending aorta with more than 5-10 mm per year or in the presence of severe aortic regurgitation.

New insights in medical therapy demonstrated that a slower progression of aortic root dilatation was achieved by administrating losartan and beta-blockers in patients with Marfan syndrome [14].

The peculiarity of the case follows from the fact that the patient had normal exercise tolerance maintained in the presence of important anatomical and functional changes. Given genetic determinism of the disease, all first-degree members of patients were assessed clinically and echocardiographically without finding evidence of disease thereby placing the patient in the 26% [15] of Marfan syndrome patients presenting de novo genetic mutation. Transthoracic echocardiography in these patients

was the most sensitive imaging tool for the diagnosis of aortic dissection. Although surgical intervention was considered a success in our case, long-term prognosis remains reserved considering the late hospital presentation and major cardiac remodeling.

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