COMPLICATION WITH VITAL RISK IN MARFAN SYNDROME.
CASE REPORT

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Abstract

Background. Aortic dissection is a life-threatening disorder and up to 20% of patients die before receiving medical care. Marfan syndrome is noted in 5–9% of individuals who suffer from aortic dissection.

Case presentation. We present the case of a 53 years old woman, with undiagnosed Marfan syndrome, addressed to our clinic complaining about thoracolumbar pain appeared 4 days ago, after a trauma. According to the revised Ghent criteria for the diagnostic of Marfan syndrome she had a positive family history and more than 7 points of systemic findings. She was also diagnosed with extensive aortic dissection and right pneumothorax. Because of the cachexia and important scoliosis, the operative and post operative risk was high and we decided a medical management. She remained haemodynamically stable, with a false lumen partially trombosed, and was discharged home after 23 days.

Discussion. The particularity of our case represent the diagnostic of Marfan syndrome after the appearance of a vital risk vascular complication – aortic dissection, the emergency surgical intervention being limited by the clinical and prognostical particularities of these two comorbidities.

Conclusion. Aortic dissection in Marfan syndrome represents a diagnostic and therapeutic challenge for interdisciplinary practitioner physicians.

Key words: Marfan syndrome, aortic dissection, trauma, pneumothorax, clinical case.

INTRODUCTION

Marfan syndrome, a variable, autosomal dominant disorder of the connective tissue caused by mutations in the extracellular matrix protein fibrillin 1, is noted in 5–9% of individuals who suffer from aortic dissection (1). The definition of the syndrome has evolved throughout the 20th century, illustrating the difficulty in diagnosis (2). It is one of the major inherited disorders that weaken the aortic wall, lead to higher wall stress, which can induce aortic dilatation and aneurysm formation, eventually resulting in aortic dissection or rupture (3, 4). Aortic dissection occurs as the result of a tear within the intimal lining of the aorta, leading to exposure of the intima to elevated aortic pressures with resultant separation of the intima from
the aortic wall to form a false lumen (5). Exposure of the intima to elevated aortic pressures ultimately results in propagation of the dissection antegrade, retrograde or in both directions from the site of the initial aortic tear. Acute aortic dissection typically occurs in the setting of an underlying pathologic defect of the aortic wall.

Marfan syndrome affects both males and females equally worldwide and has an estimated frequency of 5/10,000 and a neomutation rate of 20% of reported cases (i.e., 20% of the affected patients have no parents affected) (2). An accurate incidence has been impossible to define because of the age dependency of many of the features, the common occurrence of some features in the general population (such as scoliosis; lean, tall habitus; mitral valve prolapse; myopia), and shifting diagnostic criteria (6). The diagnosis of Marfan syndrome relies on defined clinical criteria (Ghent nosology), outlined by international expert opinion to facilitate accurate recognition of this genetic aneurysm syndrome and to improve patient management and counseling. These Ghent criteria, comprising a set of major and minor manifestations in numerous tissues including the skeletal, ocular, cardiovascular, and pulmonary systems and the dura, skin and integument, have proven to work well since with improving molecular techniques, confirmation of the diagnosis is possible in over 95% of patients. Aortic root aneurysm and ectopia lentis are the cardinal clinical features. In the absence of findings that are not expected in Marfan syndrome, the combination of ectopia lentis and aortic root enlargement/dissection should be sufficient to make the diagnosis. All other cardiovascular and ocular manifestations of Marfan syndrome and findings in other organ systems, such as the skeleton, dura, skin and lungs, contribute to a ‘systemic score’ that guides diagnosis when aortic disease is present but ectopia lentis is not (7).

Over the last few years, important advances have been made in the diagnosis, medical and surgical care of affected individuals: new diagnostic criteria have been proposed, new clinical entities recognised and life expectancy increased but, yet substantial morbidity and premature mortality remain (8).

Anomalies of the cardiovascular system, which account for a significant part of the reduced life span of patients with Marfan syndrome (9), were initially outlined by McKusick (10). The most common cardiovascular manifestation of Marfan syndrome is dilation of the ascending aorta at the level of the aortic sinuses. This progressive aortic sinus enlargement leading to aortic aneurysm is present in 50–60% of adult Marfan patients (11).

**CASE REPORT**

We present the case of a woman 53 years old, with undiagnosed Marfan syndrome, addressed to our clinic complaining about thoracolumbar pain appeared 4 days ago, after a trauma. Initially, the family history of the patient was noncontributory (we did not have some anamnestic or medical data) but, further history (after we examined her sister) revealed
that she has also Marfan syndrome.

At admission, her vital signs were as follows: blood pressure (BP) at left arm 160/90 mmHg and 155/90 mmHg at the right arm, heart rate (HR) 96, respiratory rate (RR) 14 and an oxygen saturation of 94% at room air. Otherwise, pulses were present and undiminished, and vital signs were stable. She was alert and oriented without acute distress. Heart sounds were regular, with no murmur, click, bruit or rubs noted. Percussion of the basal right chest was hyperresonant with the breath sounds diminished at this level. Her abdomen was soft, nontender, with no pulsatile mass, rebound or guarding.

The patient was identified as having features clinically suggestive of Marfan syndrome.

The Ghent nosology, last revised in 2010, summarizes genetic analysis and clinical symptoms, allowing standardized and reproducible diagnoses. In the revised nosology, new diagnostic criteria have been defined for a sporadic patient and for an index patient with a positive family history (7).

According to the revised Ghent criteria for diagnosis of Marfan syndrome (7) our patient had the following traits on history and physical exam:

- wrist AND thumb sign, arachnodactyly - 3 (Fig.1);
- pectus carinatum deformity - 2;
- hindfoot deformity - 2;
- pneumothorax - 2;
- scoliosis - 1 (Fig. 2);
- reduced elbow extension - 1;
- facial features (3/5) - 1 (enophthalmos, downsllanting palpebral fissures, malar hypoplasia, retrognathia);
- skin striae - 1;
- myopia > 3 diopters - 1;
- presence of family history of Marfan syndrome (her sister).

Because of a positive family history of Marfan syndrome and more than 7 points of systemic findings, our patient was diagnosed with Marfan syndrome.

Electrocardiogram showed normal sinus rhythm and her blood results
were unremarkable, in particular cardiac enzymes were not elevated. Chest X-ray showed an important thoracolumbar scoliosis with right supradiaphragmatic pneumothorax with the thickness of 2 centimeters (Fig. 3).

A transthoracic echocardiogram demonstrated normal left ventricular function with ejection fraction of 60%, mild aortic, mitral and tricuspid insufficiency, with dissection of the ascending aorta and aortic arch, but the descending aorta was not visible (Fig. 4).

The aortography demonstrated aortic dissection involving the ascending aorta, aortic arch and the origin of left common carotid artery, with extension into the thoracic, abdominal aorta and bifurcation of the both common iliac arteries (Fig. 5).

Given the presence of right pneumothorax, the patient was transferred to the cardiothoracic surgery service. After resolving the pneumothorax by pleurotomy, the patient was readdressed complaining of chest and back pain.

The patient had a certain indication for the surgical treatment, but because of the cachexia (Body mass index = 16.6 kg/m²) and important scoliosis, the operative and post operative risk was high and we decided a medical management.

At the cardiology hospital, she remained haemodynamically stable and the blood pressures were well-controlled with antihypertensive medications. She

Figure 3. Chest X ray. Important thoracolumbar scoliosis with right supradiaphragmatic pneumothorax with the thickness of 2 cm.

Figure 4. Two-dimensional parasternal short-axis (A) and long axis (B) echocardiographic view of the heart with a flap in the ascending aorta.
complained of ongoing chest and back pain which settled with analgesia.

Some repeat Doppler were done which showed persistent dissections of ascending aorta, aortic branch and descending aorta, with a false lumen partially trombosed. Patient was finally discharged home on antihypertensive medications after 23 days of hospitalization.

**DISCUSSION**

Extensive aortic dissection and right pneumothorax discovered after a trauma in a patient with undiagnosed Marfan syndrome is rare in the existing literature. Beside a history of trauma, our patient had no other significant predisposing factors for acute aortic dissection, such as a history of hypertension, prior cardiac surgical intervention, or known connective tissue disease.

Cardiovascular complications are recognized to be the major cause of morbidity in patients with Marfan syndrome. Aortic dissection or rupture accounts for most of the premature mortality, a risk that rises steeply during adolescence, resulting in death for as many as 50% of undiagnosed and untreated Marfan patients by the age of 40 years (11). Dissection of the aorta remains an issue for adult Marfan syndrome patients. Men are more prone to aortic root dilation and thus more prone to aortic dissection (12). Aortic root dilation is more common in early conspicuous Marfan syndrome than in those cases diagnosed in adulthood (13).

Most patients who have Marfan syndrome are usually diagnosed incidentally when they present for a routine physical examination (14). Less frequently, the diagnosis is made when a patient presents with complications of the syndrome, such as aortic dissection or with involvement of the pulmonary, skin or nervous systems. However, as noted by Ramanath et al. in a very comprehensive review on acute aortic syndromes, a key point for clinicians is that nearly 30% of patients later found to have

![Figure 5. Aortography with intimal flap in abdominal aorta (A) and bifurcation of the both common iliac arteries (B).](image)
acute aortic dissection are initially diagnosed as having other conditions (15).

Approximately two thirds of patients with acute aortic dissection are male and mean age at presentation ranges between 62 and 67 years (16). Among patients less than 40 years of age with aortic dissection, risk factors such as Marfan syndrome, previous aortic aneurysm, and bicuspid aortic valve are common (17). The presence of Marfan syndrome has been associated with adverse outcome among survivors of type B dissection (18).

This is a rare case of extensive aortic dissection involving the left common carotid artery, the ascending, thoracic, abdominal aorta and bifurcation of the both common iliac arteries. The risk of death is high in untreated aortic dissection. While the risk is very high in the first 24 hours of the event, those that survive the initial event still have an elevated mortality compared to age- and sex-matched controls. It is estimated that up to 20% of patients with aortic dissection die before receiving medical care, and mortality estimates within the first 48 hours of treatment have been as high as 1% to 1.4% per hour (19, 20). This is not surprising considering the fact that type A of aortic dissection, by definition, must involve the ascending aorta and are therefore more prone to catastrophic complications such as cardiac tamponade, myocardial infarction, and aortic regurgitation (21). Among patients with aortic dissection, the majority of deaths occur within the first 7 days of presentation, if not within the first 48 hours (1).

A few case reports of dissection of common carotid arteries do exist; however, none to the same extent of aortic involvement as our case exists. Lee et al. reported a case of a 61-year-old man with history of chronic hypertension presented with a one-day history of chest pain, vertigo, left facial drooping, and left hemiparesis with continuous, extensive aortic dissection involving the bilateral common carotid arteries, the ascending, thoracic, and abdominal aorta and bifurcation of the right common iliac artery (21). Yeh et al. reported a case of a 56-year-old woman with vague chest pain and focal neurologic deficits whose decreased mental status on initial presentation made it difficult for a thorough medical history to be obtained. Diagnosis relied on CT angiography which delineated a type A of aortic dissection involving both common carotid arteries (22). Similarly, Demiryoguran et al. reported a 63-year-old female with a predominant symptom of vertigo who was also found to have aortic dissection involving the ascending aorta, aortic arch, and bilateral common carotid arteries (23).

Our paper demonstrates the importance of a complete workup of all major aortic branches after aortic dissection at a specific location such as the common iliac artery has been confirmed. Unlike the aforementioned cases of bilateral common carotid arteries dissection, our patient had additional dissection of the entire length of the aorta down to the bilateral common iliac arteries. Even in the absence of trauma, it is equally imperative that all branches of the aorta be scanned for ancillary involvement in order to better delineate
the extent of the dissection and plan for medical or surgical management accordingly (21).

Because the risk of death due to aortic dissection is highest in the first few hours after the dissection begins, the therapeutic strategies differ for treatment of an acute dissection compared to a chronic dissection. An acute dissection is one in which the individual presents within the first two weeks. If the individual has managed to survive this window period, his prognosis is improved. About 66% of all dissections present in the acute phase. Individuals who present two weeks after the onset of the dissection are said to have chronic aortic dissections. These individuals have been self-selected as survivors of the acute episode, and can be treated with medical therapy as long as they are stable (24).

Today, cardiovascular manifestations of Marfan syndrome remain among the central issues in diagnosis and management, but it is incumbent on the physicians who encounter these patients to stress the prophylactic monitoring and therapies that now can result in a nearly normal life expectancy. Although the revised Ghent criteria of 2010 are easier to apply, they do raise some issues that need to be addressed (25).

The diagnostic evaluation for Marfan syndrome is unavoidably complex due to the highly variable presentation of affected individuals, the age dependent nature of many of its manifestations, the absence of gold standards, and its extensive differential diagnosis. While diagnostic criteria should emphasise simplicity of use and the desire for early diagnosis, accuracy receives highest priority in order to avoid the deleterious and often irreversible consequences of ungrounded or erroneous assignment (7).

Despite the morbidity and mortality associated with Marfan syndrome, appropriate medical and surgical management can improve and extend the lives of many patients. Tomorrow’s therapies are tried in clinics, or on animal models (26).

**In conclusion,** the particularity of our case represent the diagnostic of Marfan syndrome with chronic aortic dissection, a vital risk vascular complication. The indication of surgical intervention is limited by the clinical and prognostic particularities of these two comorbidities. The aortic dissection in Marfan syndrome represent a diagnostic and therapeutic challenge for interdisciplinary practitioner physicians.

**Conflict of interest**

We declare that there is no conflict of interest.

**References**