UDC: 616.132-007.64-089.853
Review article

AORTIC DISSECTION IN 26 YEARS OLD MALE WITH BICUSPID AORTIC VALVE ASSOCIATED ANEURYSM: CASE REPORT

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Abstract

Aortic dissection is a very dangerous, fatal and emergency condition which requires immediate surgical intervention. It mainly affects patients after 50 years old, and is very unusual in younger patients. It has been traditionally associated with other pathological conditions such as: trauma, Marfan syndrome, Ehlers-Danlos syndrome, bicuspid aortic valve and pregnancy.
The patient is a 26-year-old male who was presented in the emergency department with acute chest pain, epigastric discomfort and nausea. ECG showed sinus tachycardia (110 bpm) other findings were normal. Cardiac ultrasound showed an ascending aortic aneurysm at 60 mm, a possible presence of an intimal tear in the ascending aorta as well and a suspect bicuspid aortic valve with moderate aortic regurgitation. The patient was admitted to another hospital where the diagnosis of acute aortic dissection type A (De Bakey I) was confirmed with CT angiography of the chest. He was emergently operated with simultaneous replacement of the aortic valve and ascending aorta with a composite and had a satisfactory clinical course.
Acute aortic dissection in young adults is very rare condition. The disease may be easily misdiagnosed for other cardiac, muscular, neurological, esophageal or renal diseases. The presence of bicuspid aortic valve is associated with dilatation of proximal aorta increasing their risk of aortic dissection 8 -fold. Prompt surgical intervention with replacement of the affected part of the aorta offers a survival benefit for the patient.

Keywords: Aortic dissection, Bicuspid aortic valve, Cardiac ultrasound, Computed tomography angiography

1. Introduction

Aortic dissection is potentially life – threatening condition in which disruption of aortic intima allows dissection of blood into vessel wall (Jameson J et al, 2020).

There are at least two important pathologic and radiologic variants of aortic dissection: intramural hematoma without an intimal flap and penetrating atherosclerotic ulcer (Jameson J et al, 2020).

It may involve ascending aorta (DeBakey type II), descending aorta (type III), or both (type I).

The most commonly used classification is by Stanford: Type A – dissection involves ascending aorta; Type B – limited to transverse and/or descending aorta (Jameson J et al, 2020).

Acute aortic dissection mainly affects patients after 50 years old, and is very unusual in younger patients (Aziz F et al, 2011).

Aortic dissection type A occurs almost twice as frequently in men (Rylski B et al, 2021).

Bicuspid aortic valve (BAV) associated with aortopathy is the most common congenital heart disease in the general population (Junco-Vincente A et al, 2021).

The aim of this report was to raise the awareness of physicians working in an acute care setting, particularly in an emergency room, about disorders predisposing to acute aortic dissection in the young adult population.

2. Case presentation

The patient was a 26-year-old male who came in our emergency department presenting a sudden onset of retrosternal pain radiating to the back, epigastric discomfort and nausea. The history taken from the patient revealed that he suffers from chronic allergic laryngitis, for which he regularly takes antihistamine drugs and inhaled corticosteroids. No history of heart diseases in his family was reported. Early vital signs of the patient at the time of visiting our emergency department were: blood pressure: 150/90 mmHg; pulse rate: 110 beats per minute; body temperature: 36,7 ℃; respiratory rate 22 breaths per minute; SpO2=95%. The patient's BMI were 26,1 kg/m2, corresponding with a slightly overweight condition.

From physical examination, we revealed a slightly reduced left radial artery pulse, a diastolic murmur along the left sternal border in the third intercostal space and a present epigastric pain on abdominal palpation. Electrocardiography revealed a sinus tachycardia with normal ST/T wave morphology.

Laboratory findings were normal, except for plasma D dimer, which was nearly threefold increased from normal values. We performed an urgent echocardiography and we revealed an ascendant aortic aneurysm with diameter of 60 mm, a presence of an intimal flap (tear) in the ascending aorta and a suspect bicuspid aortic valve with moderate aortic regurgitation presented below in figure 1. The left ventricular function was normal with no disturbance of the segmental kinetics.

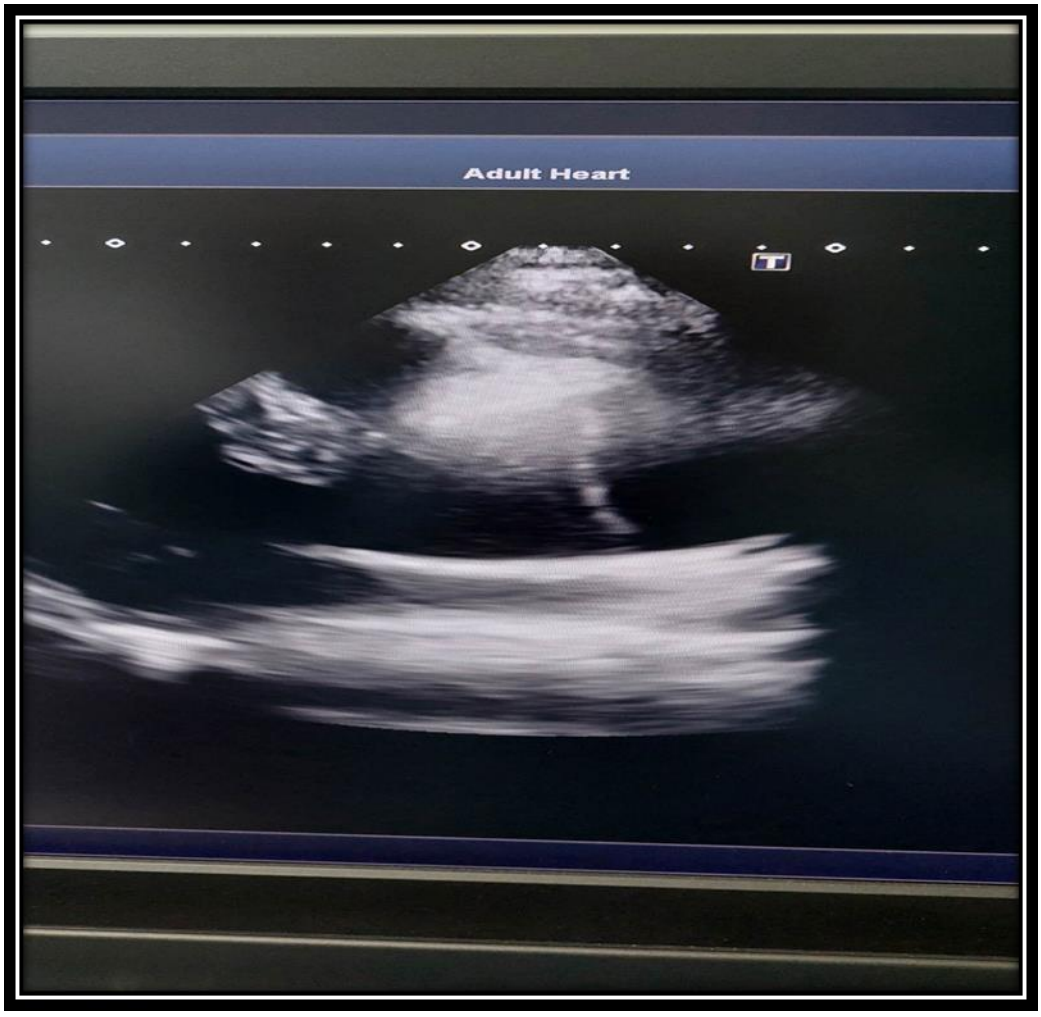

Figure 1. Transthoracic echocardiography demonstrating ascending aortic dissection. The dissection flap is present in dilated ascending aorta.

Limitation: To confirm the diagnosis of acute aortic dissection we needed to perform a CT angiography, but since the device is not reachable for us and the patient at our institution, the patient was sent to another institution to perform the required diagnostic procedure which is with higher specificity and sensitivity comparing with echocardiography. The patient was emergently admitted to the Department of Cardiac Surgery at Hospital "Acibadem Sistina" – Skopje, for further evaluation and treatment.
The diagnosis of acute aortic dissection type A (DeBakey I) was confirmed with CT angiography of the chest. The presence of bicuspid aortic valve was confirmed with transesophageal echocardiography. Patient was emergently operated with simultaneous replacement of aortic valve and ascending aorta with a composite (Bentall procedure with carbomedics mechanical aortic valve graft 27 mm/30 mm) and he had a satisfactory clinical course.
Antiplatelet therapy, 5 mg of nebivolol and 4 mg of perindopril tablets were prescribed for newly diagnosed arterial hypertension.

3. Discussion

Acute aortic dissection is a very dangerous, emergency and fatal condition which requires immediate surgical intervention (Shafiee M et al, 2021). It has been estimated that mortality approaches 1% per hour for the first 48 hours and exceeds 80% during the first month (Patel HJ et al, 2008).
Predisposing high – risk factors for non – traumatic aortic dissection include:

- Hypertension (occurs in 70% of patients with distal Standford type B AAD)
- Genetic conditions including Marfan syndrome, Ehlers-Danlos syndrome, Turner syndrome, bicuspid aortic valve and coarctation of the aorta.
- Pre-existing aortic aneurysm
- Atherosclerosis
- Pregnancy and delivery (risk compounded in pregnant women with connective tissue disorders such as Marfan syndrome)
- Family history
- Aortic instrumentation or surgery (coronary artery bypass, aortic or mitral valve replacement, and percutaneous stenting or catheter insertion)
- Inflammatory or infectious diseases that cause vasculitis (syphilis, cocaine use). (Levy D et al, 2023)

In this study, we identified a case of a young adult with acute aortic dissection. The risk factors observed in this patient were his gender and the presence of bicuspid aortic valve.
In the emergency setting, transthoracic echocardiography, despite low sensitivity (59% to 83%) and specificity (63% to 93%) for the diagnosis of aortic dissection than other modalities, it may be performed rapidly and can help asses features dissection, such as intimal flap, aortic regurgitation, pericardial effusion and tamponade (Bonow RO et al, 2012). Although not very common, aortic dissection may occur in BAV-associated aortal pathology (Arcos LS et al, 2020).
The risk of aortic dissection in patients with bicuspid aortic valve is five to nine times higher than the general population (Bonow RO et al, 2012). A bicuspid aortic valve is an often under recognized risk factor for ascending aortic aneurysm and dissection and is present in 5% to 7% of aortic dissections, even more commonly among ascending dissections in younger patients (Bonow RO et al, 2012).

4. Conclusion

Type A aortic dissection with bicuspid aortic valve associated aneurysm in young adults is a rare and dangerous condition. Early diagnosis of this disease plays an essential role on its treatment.
The presence of acute chest and/or back pain associated with pulse deficits and aortic regurgitation, as in our case, may suggests the possibility of aortic dissection.
According to our case, we strongly suggest the use of transthoracic echocardiography in the emergency setting, when it has a suspicion on aortic dissection. However, the most definitive method for diagnosing aortic dissection is CT angiography.
Prompt diagnosis and surgical intervention with replacement of the affected part of the aorta offers a survival benefit for the patient.

Abbreviations

BAV: Bicuspid Aortic Valve;
AAD: Acute Aortic Dissection
BMI: Body Mass Index;
CABG: Coronary Artery Bypass Graft,
CT: Computed Tomography;
ECG: Electrocardiography.

Competing interests: The author(s) declare that they have no competing interests.

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