CLINICAL VIGNETTE

Aortic Dissection in a Patient with Vascular Ehlers-Danlos Syndrome

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A 52-year-old woman was referred for aortic disease. Her mother died suddenly at age 41, and the autopsy showed an aortic dissection. In the past year, the patient's 17-year-old son was diagnosed with a murmur during a routine physical. Transthoracic echocardiogram (TTE) showed no valvular abnormalities, however, detected an incidental ascending aortic aneurysm. Given the family history, the patient's son underwent genetic testing and was found to have vascular Ehlers-Danlos syndrome. Our patient was concerned that she carried the gene and was at risk for aortic aneurysm or dissection.

Aortic dissection is one of the most devastating complications of thoracic aortic disease. The incidence of thoracic aortic dissection as reported in a British study is 6 cases per 100,000.[1] Most dissections are due to medial degeneration of the aorta. This is characterized by loss of elastic fiber and loss and reorganization of smooth muscle cells in this layer as well as proteoglycan deposition.[2,3] As circumstances occur which increase the tension within the aortic wall, using Laplace's law, wall tension (T) equals pressure (P) multiplied by radius (R), the aorta loses distensibility, which may lead to a dissection.

Dissections can occur independently of aneurysms or as sequelae to aneurysms. Patients with conditions that contribute to the degeneration of the medial layer, including Marfan's syndrome, Loeys-Dietz syndrome, and the vascular form of Ehlers-Danlos as found in this patient and her family, are at increased risk for dissections. Independent of genetic disorders, aortic dissection can also occur when the aorta is subject to physical trauma as in a motor vehicle accidents or falls, in addition to hypertension, which increases the wall stress.

Vascular Ehlers-Danlos is an autosomal dominantly inherited disorder in the gene that encodes the chains of type III collagen (COL3A1), a major protein in the walls of blood vessels and hollow organs.[4-6] The initial diagnosis is usually suspected based on family history, arterial rupture or dissection, rupture of the large intestine, or pregnancy complications at a young age. As blood vessels are affected, there is often easy bruising from a young age, sometimes prompting concerns of child abuse in young children. In addition to physical findings, the diagnosis can be made by genetic testing. The median survival rate in patients with vascular Ehlers-Danlos is 48 years, with the major cause of death being arterial dissection. Even when aneurysm or dissection is diagnosed early, the fragility of the tissue often creates difficulty during surgery and can lead to significant post-operative complications.[5-8]

In the absence of symptoms, an aortic aneurysm or dissection can initially be diagnosed on a TTE. This modality is somewhat limited in that it yields finite views of the aorta and is dependent on the skill of the sonographer and patient habitus. A transesophageal echocardiogram can give more comprehensive views and does not have the same limitation of patient habitus. For viewing the entirety of the aorta, computed tomography (CT) with contrast as well as magnetic resonance imaging (MRI) with gadolinium contrast are most often used and can be used in comparison when serial imaging is completed for surveillance. The normal aortic diameter for a patient is variable based on age, gender, and body surface area.[9,10]

Medical treatment for patients with both aneurysms and dissection starts with reducing blood pressure, controlling lipids, and smoking cessation. Patients should be cautioned against strenuous exercise. Beta-blockers are often used in aneurysms with conflicting information showing the extent of benefit.[10-12] Once dissection has developed, there is reportedly a distinct survival benefit associated with beta-blocker administration.[13] Multiple trials have assessed the efficacy of angiotensin II receptor blockers (ARBs) on reducing aortic growth.[14-16] So far, the studies have shown less expansion of aortic growth when patients are treated with ARBs; however, most studies were limited to patients with Marfan's syndrome.

Surgical therapies for dissection were first developed in the 1950s and have evolved significantly since then, with endovascular repair now an option for certain patients. Studies have shown that the risk of rupture with dissection increased sharply with aortic diameters >6cm at the ascending aorta and >7cm at the descending aorta. Thus, many professional societies recommend 5.5cm as the threshold for surgical referral in asymptomatic patients, and even earlier if there is a defined genetic disorder, especially with a family history of dissection.[9,17-20]

The questions I had regarding my asymptomatic patient were: what was the best initial screening algorithm for this asymptomatic patient and what should I do for further surveillance if these results were normal? After reviewing the available data, I sent the patient for a transthoracic echocardiogram to assess the structure and integrity of the aortic valve and proximal aorta. I also requested a CT scan of the aorta with contrast to evaluate the dimensions of the aorta. These both returned normal, with a well-functioning aortic valve visualized on TTE and a normal-sized aorta without dissection seen on CT. I discussed genetic testing for the patient, which she declined.

The plan was for follow-up in the office in 6 months with subsequent imaging. One month after the initial visit and imaging, I received notification that the patient had died suddenly of an aortic dissection.

As vascular Ehlers-Danlos is a rare but usually fatal genetic disorder at a young age, it is difficult to generate large study populations to evaluate optimal surveillance, treatment, and outcomes of these patients. The patient's son is being closely followed and we have recommended that all relatives be screened as well.

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