Aortic Aneurysm, Dissection, or Rupture: Which One?

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A 16-year-old boy was brought to the clinic because of persistence of vomiting. The only positive point was a history of an uneventful car accident 3 months earlier. Chest computed tomography scan showed aneurysmal structure obliterating the esophagus. Further delineation of the aortic anatomy with transesophageal echocardiography disclosed it as pseudoaneurysm of aorta. He was taken to the operating department where the rupture of aortic isthmus with a large pseudoaneurysm was discovered. The torn segment was excised and was replaced with a prosthetic graft.

**Keywords:** Rupture, Aorta, Pseudo aneurysm, Trauma

**CASE REPORTS**

A 16-year-old boy was brought to the outpatient clinic because of persistence of vomiting for 2 weeks. His vomiting was nonbilious and postprandial without any change in bowel habits. There was not any history of abdominal surgery. The only positive point was an uneventful high-speed accident 3 months earlier. Physical examination revealed normal findings. Chest radiography showed mediastinal widening. Chest computed tomography scan showed aneurysmal structure obliterating esophagus (figure 1). Transesophageal echocardiography (TEE) examination of descending thoracic aorta revealed a flap masquerading as an aortic dissection (Figure 2), but with retraction of the probe, a large disruption in aortic wall (Movie 1 and Figure 3) with blood flow in both chambers was detected (Movie 2). He was taken to the operating department immediately and full-thickness aortic tear in isthmus with concomitant pseudoaneurysm (Figure 4) was discovered. Torn segment was excised and replaced with a Dacron graft. The patient made an uneventful recovery.

**DISCUSSION**

Chronic aortic pseudoaneurysms may remain asymptomatic or can gradually enlarge and cause dysphagia, hoarseness, or cough, and can present with rupture at any time. The gold standard for the diagnosis of pseudoaneurysm is angiography; however, newer noninvasive imaging techniques, such as magnetic resonance angiography, computed tomography, and TEE, are currently used more frequently.
They provide information not only about the lumen but also about the vascular wall.3 Vignon et al,4 in 1995, classified traumatic disruption of aorta (TDA) into the following 4 distinct types according to TEE findings.

**Traumatic Aortic Intimal Tears**

In these lesions, the integrity of the aortic medial and adventitial layers is preserved. Traumatic tears appear as thin, mobile intraluminal appendages of the aortic wall, located at or in the immediate vicinity of the aortic isthmus. Because these lesions are too small and superficial to exert excessive pressure on the adventitial layer, the diameters and contour of the aortic isthmus remain unchanged. Color flow mapping usually fails to demonstrate a mosaic of colors because of the absence of blood flow turbulence surrounding the aortic intimal tear. As a result of spontaneous regression, conservative management with use of serial clinical and TEE follow-up is proposed.

Subadventitial TDA involves the entire aortic intimal and medial layers. In these lesions, the threat of adventitial rupture causing massive hemorrhage is constantly present. Depending on the extent of the traumatic aortic wall tear, there are 3 distinct types, as follows.

**Partial aortic disruption** These injuries appear as a limited discontinuity of both intimal and medial layers. They can be associated with or without pseudoaneurysm formation.

**Subtotal aortic disruption** These lesions involve more than two thirds of the aortic wall circumference (such as in our patient). A narrow band of aortic wall, usually found in the posterior aspect of the aorta, secured the disrupted aortic segments a few centimeters apart.

**Complete aortic disruption** These lesions involve the entire aortic circumference.

The diagnosis of subadventitial TDA requires the presence of a disrupted aortic wall (Movie 1) with blood flow on both sides of the disruption (Movie 3). Two-dimensional TEE findings consist of the presence of an abnormal intraluminal “thick flap” (consisting of intimal and medial layers of aorta also called “medial flap”) (Figure 2) usually accompanied by a regional deformity of the aortic isthmus contour caused by the formation of an acute localized pseudoaneurysm (Figure 3). Despite the presence of the localized deformity, the aortic isthmus size usually remains within the normal range. In subtotal subadventitial aortic disruptions (such as in our case), the medial flap appears in the transverse view as a linear structure completely traversing the lumen of the aortic isthmus5 (Figure 2). In longitudinal views, the medial flap was always near perpendicular to the isthmus wall, vertically traversing aortic lumen (Figure 3). Color flow mapping depicted similar blood flow velocities on both sides of the medial flap (Movie 2), and a mosaic of colors was always observed at the site and vicinity of the aortic wall disruption, because of local blood flow turbulence (Movie 3). Because patients with subadventitial aortic disruptions may die suddenly secondary to a rupture of the aortic adventitial layer, these patients should be considered for immediate repair. Surgical treatments of chronic pseudoaneurysms include direct aortic replacement or extra-anatomic bypass (eg, ascending aorta-to-descending aorta). Recently, favorable results (in comparison with those of surgery) have been described for endovascular graft placement.6 However, our limited experience prevented such an approach for this patient. Because the lesion was large and without calcification, the surgeon concluded that excision of the pseudoaneurysm would be the best option.

**Conclusion**

The examining physician should be aware of the remote possibility of pseudoaneurysm as a delayed complication of trauma. Because of its accuracy, safety, and high sensitivity and specificity, TEE could be the first-line imaging modality for evaluation of patients with a history of trauma and suggested chronic TDA.
REFERENCES


