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Azygous Vein Rupture and Descending Aortic Intramural Hematoma after Blunt Thoracic Trauma

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Abstract

Most injuries to thoracic great vessels are caused by penetrating trauma but can occur after blunt trauma as well. Combined injury of azygous vein and descending thoracic aorta is rare. A 56 year-old woman suffered a motor vehicle accident. Computed Tomography (CT) revealed rupture of the azygous vein with bilateral serial rib fractures. The azygous vein was suture ligated. Repeat CT showed new intramural hematoma of the descending aorta causing compression of the celiac trunc. A Terumo Relay® aortic stent was implanted transfemorally. Early repeat CT can detect additional vascular injuries after major thoracic trauma and allows for combined open and endovascular management of such injuries.

Keywords: Thoracic trauma • Azygous vein • Thoracic aorta stenting • Surgery

Introduction

Thoracic great vessels may be injured by blunt or penetrating trauma. Blunt thoracic trauma may cause significant vascular injury inapparent at first evaluation. The overall incidence of mediastinal vascular injuries remains unclear, because patients frequently die out of hospital. While roughly 50 published case reports of traumatic azygous vein injury exist, there is only one case of simultaneous azygous vein and aortic injury [1].

Management of such patients has evolved with diagnostic improvements, namely widespread computed tomography and endovascular approaches.

Materials and Methods

A 56 year-old woman was admitted after frontal collision with a truck and on site cardiopulmonary resuscitation with bilateral chest tube insertion but no bloody output. CTA showed a rupture of the azygous vein with a contained hematoma (Figure 1), bilateral serial rib fractures without significant hemothorax, pelvic fractures and head trauma with subdural hematoma, several skull fractures without need for neurosurgical intervention. The vertebral column was intact, the aorta inconspicuous.

Emergency right-sided posterolateral thoracotomy with suture ligation of the azygous vein and stabilization of ribs 3-7 was performed. Due to the severity of the trauma, the patient underwent immediate repeat CTA postoperatively. A new intramural hematoma of the descending thoracic aorta causing compression of the celiac trunc was detected (Figure 1).

The patient was transferred to our interventional radiologists and thoracic endovascular repair (TEVAR) with a 150mm Terumo Relay® aortic stent (30 mm diameter) plus coiling of a lumbar artery was performed transfemorally (Figure 2). The patient received a percutaneous tracheotomy on POD 6 and was transferred to a neurological rehabilitation facility on day 10 after confirmation of stable intracerebral hematoma and partial neurological recovery with posttraumatically decreased strength of her right arm. The patient was discharged to a nursing home after 5 months of rehab therapy without regaining full self-control of daily routine activities.

Discussion

Since azygous vein injuries are often part of a massive trauma, these

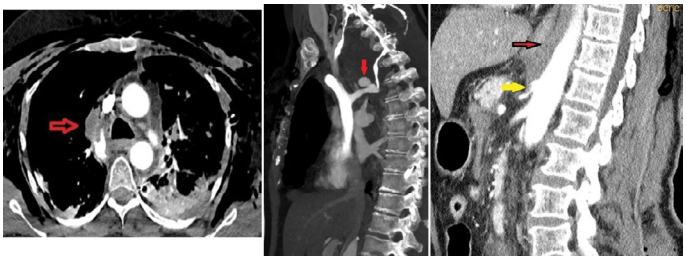

Figure 1. Ruptured azygous vein with contained hematoma (red arrow, left), reconstructed rupture site (red arrow, middle), intramural hematoma of the descending thoracic aorta (red arrow, right) compressing the celiac trunc (yellow arrow, right picture).

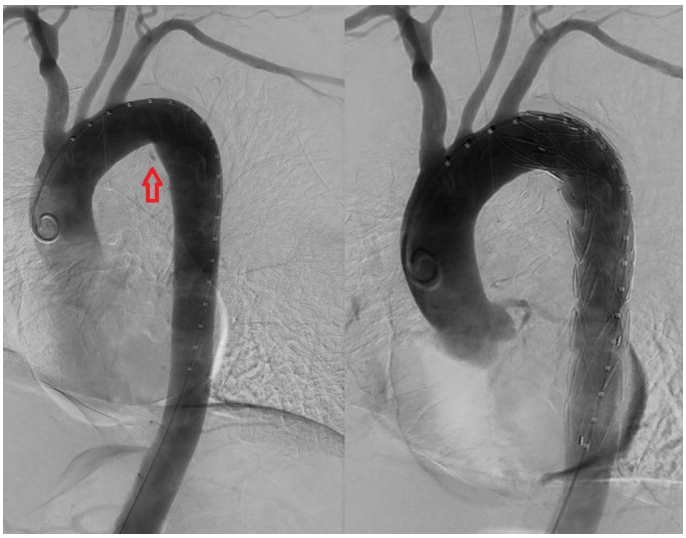

Figure 2. Angiography with entry site of intramural hematoma (red arrow) and after aortic stent deployment.

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injuries are often fatal. Haq AA, et al. [2], reported 3.3% azygous vein injuries in high-impact torso injuries. Approx. 50 cases of isolated vein injury have been reported, mostly treated by open surgery. Recently, successful endovascular treatment of traumatic azygous vein injury was described [3].

Rapid deceleration thoracic vein injury is caused by increased venous pressure from compression of the heart, injury from fragments of adjacent ribs or vertebrae and/or shearing since the azygous vein is mobile. The same injury mechanisms apply to traumatic aortic injuries of the descending aorta, in particular due to the relative immobility of the aortic isthmus compared to the aortic arch.

The experience with simultaneous injury of great thoracic veins and arteries is limited to a case of azygous vein injury plus aortic transection [1] and another with concomitant injury of the right subclavian artery [4].

Lack of right-sided hemothorax on radiologic studies despite rupture of the azygous vein is described in 23% of all patients with this injury (5) and should not lead to exclusion of such injury based on chest tube output alone. Early repeat diagnostic work-up after severe thoracic trauma is recommended [5] as work-up for further great vessel injuries.

In the patient presented early repeat CTA established the diagnosis of descending aortic intramural hematoma with compression of the celiac trunc after previous ligation of the azygous vein and led to rapid TEVAR. The management of such complicated acute intramural hematoma by TEVAR is a class I, level of evidence B-nonrandomized indication according to STS/AATS guidelines on the management of type B aortic dissection [6]. The combination of endovascular and open surgical techniques enabled the multidisciplinary team to treat the patient without adding another major open surgical intervention and trauma.

Conflicts of interest

None declared.

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