SHORT REPORT

Endovascular Management of Aortic Arch Injury After Blunt Thoracic Trauma

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Thoracic aortic injury resulting from blunt trauma is a potentially life threatening complication and is often associated with multiple, complex injuries such as cerebral trauma, abdominal trauma and multiple bone fractures. These associated lesions may adversely affect outcome after standard surgical repair of the thoracic aorta which requires thoracotomy, cardiopulmonary or left heart bypass, and systemic heparinization. The postoperative mortality can be assumed high, ranging from 10 to 30%. We present the case of a blunt aortic injury, with a pseudoaneurysm extending from the aortic arch including the origin of the subclavian artery. This was successfully treated by endovascular stent-graft repair.

Keywords: Blunt thoracic trauma; Endovascular therapy; Aortic arch injury.

Introduction

Aortic injury resulting from blunt trauma is a potentially life threatening complication and is often associated with multiple, complex injuries such as cerebral trauma, abdominal trauma and multiple bone fractures. These associated lesions may adversely affect outcome after standard surgical repair of the thoracic aorta, which requires thoracotomy, cardiopulmonary bypass (CPB), or left atriofemoral bypass and systemic heparinization. The postoperative mortality can be assumed high, ranging from 10 to 30%. We present the case of blunt aortic injury which is successfully treated by endovascular stent-graft repair in our clinic.

Case Report

A 34 year old tourist man was injured during a head-on car crash accident and was brought to our department. In the emergency room he presented conscious and in stable condition. Conventional X-ray revealed multiple bone fractures, cranial CT showed cerebral contusions. Thoracic CT showed 2×3 cm² pseudoaneurysm extending from the aortic arch including the origin of the subclavian artery (Fig. 1), evidence for pulmonary contusions and pleural effusion. Cervical, and abdominal tomography revealed no additional major organ injury. The patient kept under intensive care observation. In the following days a decrease in hemoglobin levels was observed and pleural effusion increased on chest X-ray. A repeat CT scan was performed the size of the pseudoaneurysm was not changed but also a periaortic haematoma 4×3 cm² was observed, suggesting the presence of a contained rupture of the pseudoaneurysm. The systolic blood pressure was maintained at 120 mmHg. Due to increasing dyspnoea, a chest tube was inserted into left pleural cavity. Due to respiratory failure intubation was necessary on the 3rd day of hospitalization. Endovascular treatment of the thoracic aortic lesion was chosen as the treatment modality, because of the presence of multiple bone fractures, pulmonary and cerebral contusions. The dimensions of the stent-graft were determined by using CT and angiographic images. The stent-graft (Gore-Excluder, 26×100 mm²) was placed in the aortic arch covering the contained

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ruptured segment. The procedure lasted for 60 min, the stent-graft system was passed over a guide wire through right femoral artery by the help of a femoral cut-down. The stent-graft was positioned by using intraoperative DSA (Siemens Multistar T.O.P). The day after stent-grafting bone fractures were stabilized in a second operation. The postoperative course was uneventful. The patient was extubated on postoperative day 1, after the second operation and was discharged from ICU on the third postoperative day. Aspirin and low molecular heparin were used as thrombosis prophylaxis. A postoperative CT scan of the thoracic aorta performed on postoperative day 4 showed the stent-graft in position. There were no signs for endoleaks (Fig. 2). The patient was discharged in good condition on the 18th day of hospitalization and repatriated.

**Discussion**

The descending thoracic aorta is the most commonly involved segment of the aorta after blunt trauma to the chest. Isolated aortic arch injury after blunt thoracic trauma can be anticipated in 8% of the cases. Despite there were no initial physical signs, radiological findings led to the diagnosis. It is not uncommon that patients with thoracic aortic trauma present without initial physical signs, the evidence of external chest trauma was obvious in only 42% of cases. The patient is treated for hypertension. In recent reports it is pointed out that treatment of hypertension is an advantage to delay the aortic repair but it will not prevent the rupture of a aortic pseudoaneurysm. The standard treatment for aortic injury is urgent open surgery. In cases with associated co-morbidities such as cerebral injury, multiple bone fractures open surgery is risky. In these cases endovascular stent-grafting may be a good choice. Aortic arch injury is uncommon. The common site for arch tear is the origin of the posterior part of left common carotid artery. Endovascular stent-grafting is an improving technology which offers an alternative to open surgical procedures for patients with blunt aortic injury. We share the idea that endovascular stent-grafting will be a popular choice of treatment for aortic arch injury especially in high risk patients.

**References**


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