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CASE PRESENTATION / OLGU SUNUMU

Endovascular Repair of Traumatic Thoracic Aortic Dissection: A Case Report

Travmatik Torasik Aort Disseksiyonu Endovasküler Tamiri: Olgu sunumu

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ABSTRACT

Traumatic thoracic aortic dissections are usually life-threatining injuries in at least 75 % of victims. Open surgical graft interposition has been accepted as a traditional treatment option of those injuries, but conventional open surgery is commonly unreliable in emergent conditions due to coincident injuries. Open surgery has also high mortality rates. Endovascular repair of traumatic aortic disruption is a safer alternative treatment modality having low mortality rates than conventional repairs. We reported a case of successful repair of traumatic thoracic aortic dissection with endovascular stent graft-caused by a traffic accident.

Keywords: Aorta; thoracic; dissection; endovascular.

ÖZET

Travmatik torasik aort disseksiyonları genellikle hayatı tehdit eden ve maruz kalanların % 75 inin kaybedildiği ciddi yaralanmalardır. Açık cerrahi ile greft interpozisyonu geleneksel kabul görmüş tedavidir. Ancak acil multitravmalı hastalarda ek yaralanmalar nedeni ile uygulama alanı azdır ve mortalite oranlarıda yüksektir. Travmatik torasik aort yaralanmalarında endovasküler greftleme ile tamir, konvansiyonel açık cerrahiye göre düşük mortaliteye sahip güvenli bir alternatiftir. Bu yazıda endovasküler stent greft ile tamir edilen travmatik torasik aort disseksiyonlu bir olguyu sunduk.

Anahtar Kelimeler: Aort; torasik; disseksiyon; endovasküler.

INTRODUCTION

Aortic dissections caused by blunt trauma are rarely encountered but usually life-threatening situations needing urgent diagnosis and treatment. High-speed deceleration injury, predominately caused by motor vehicle accidents, is the primary cause of blunt traumatic aortic injury. Most blunt aortic injuries occur in the proximal thoracic aorta with some exsanguinations. It's early survival rate was found as from 10 % to 30 %. It has very poor prognosis with the hospital mortality rate to 32 % during the first day, 61 % within the first week and 74 % after 2 weeks. Most surviving blunt aortic injuries, if not treated, had a 30 % risk of late traumatic thoracic aortic aneurysm rupture (1).

Although surgical repair has been the traditional management of blunt aortic injury, immediate surgical intervention is usually unreliable due to concomitant injuries (2). Fortunately, acute and chronic traumatic lesions of the descending aorta can now be treated via an endovascular approach in specialized centers, with low morbidity and mortality rates (3). This report discusses a patient with a traumatic aortic dissection treated by endovascular grafting in the Afyon Kocatepe University Hospital.

CASE PRESENTATION

An 18-year-old male was referred to the emergency department suffered from a traffic accident while in a car. His mental status was confused but non-specific findings were found in brain CT. He was consulted by general surgion for abdominal injury, but no any abdominal pathology was found on physical examina

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tion, abdominal ultrasonography or CT. He had no known any chronic disease history. He was hemodynamically stable, but agitated. His arterial blood pressure was in normal ranges (123/62 mm Hg). A 12-lead electrocardiogram (ECG) showed normal sinus rhythm with 94 beat/min. His serum kidney function tests and electrolyte levels were in normal ranges. Creatinine kinase (CK) was 372 U/L and CK-MB was 36 U/L but, serum troponin I level was normal. 2-dimensional echocardiography (2DE) showed no pericardial effusion with normal left ventricular function, but thorax CT angiogram (CTA) showed traumatic aortic dissection in proximal descending thoracic aorta/distal aortic arch around aortic isthmus with pseudoaneurysm and mediastinal hemorrhagic areas (Figure I, II). We planned to perform thoracic endovasculer aortic replacement (TEVAR) procedure. Therefore, we performed a thoracic aortagraphy. It showed an aortic dissection originating distal to the subclavian artery, for this lesion, under local anesthesia, via surgically explored right femoral artery, a 22×150 mm relay thoracic stent-greft was implanted. For safety and efficacy of stent graft positioning, during procedure, induced hypotension is required. For this purpose, rapid artificial cardiac pacing or farmacologically induced hypotension may be used. We induced hypotension by using sodium nitroprusside. Following procedure, an aortogram was made for cheking-up and we could'nt find any leakage. Follow-up thorax CTA showed that vascular stent graft was placed properly and aortic lumen was seen clearly (Figure III). No any complication were seen after the procedure, the patient was discharged on 4th day and has been followed up at the outpatient clinic.

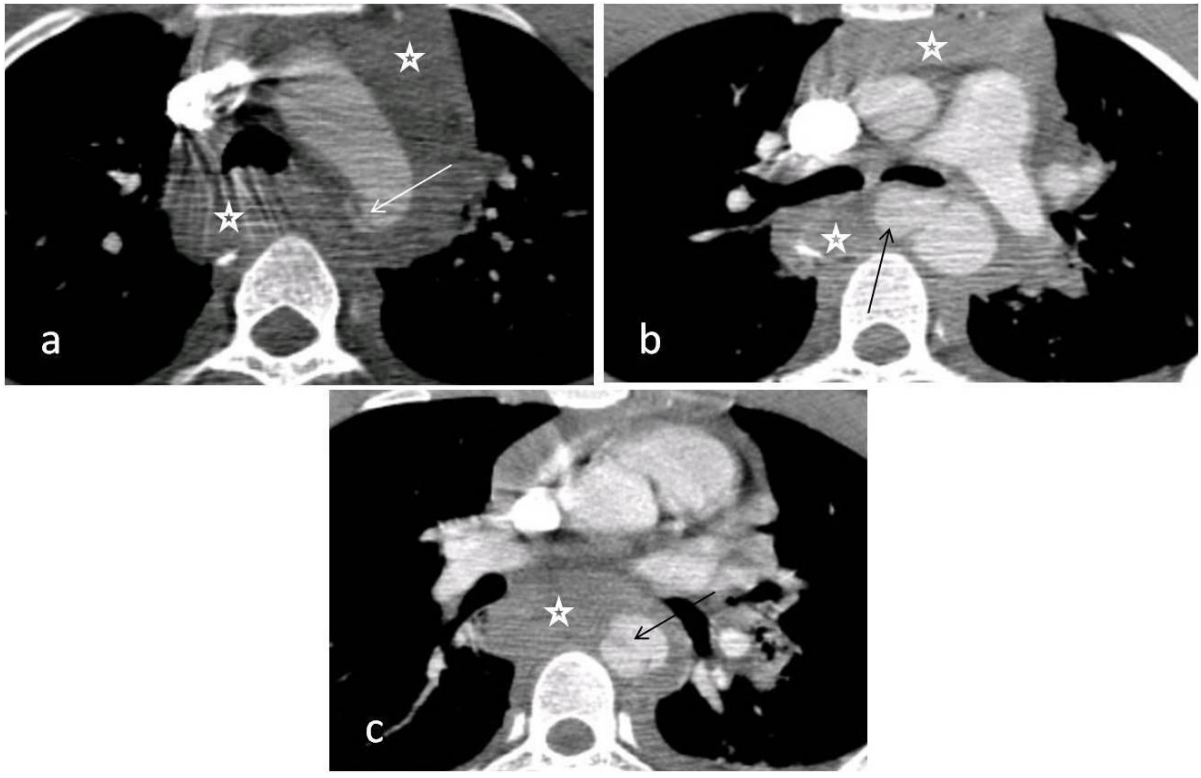

Figure I: Axial CT sections of thorax with intravenous contrast material; a) aortic arch level, b) pulmonary conus level, c) cardiac base level. Intimal flep related with posttraumatic aortic dissection at proximal dessending aorta (a,c arrow) and pseudoaneurysm originating from medial aortic wall (b arrow) ☆: Mediastinal hemorrhagic areas

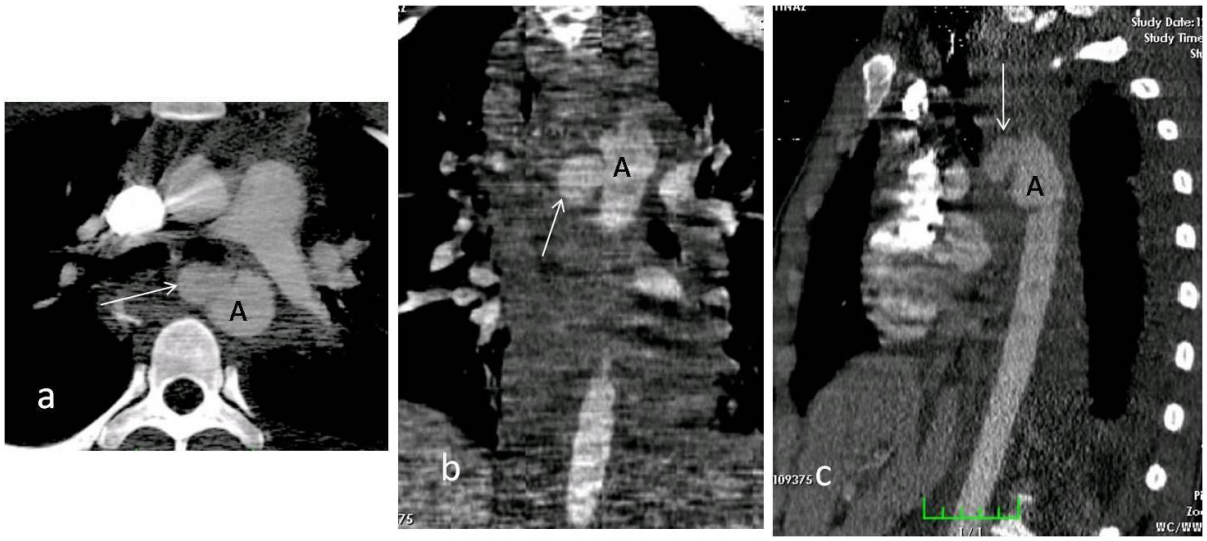

Figure II: Thorax CT with contrast material a) axial, b) coronal reformation, c) oblique saggital reformation CT images. Pseudoaneurysm originating from medial aspect of proximal thoracic aorta is seen (arrow). A: aorta.

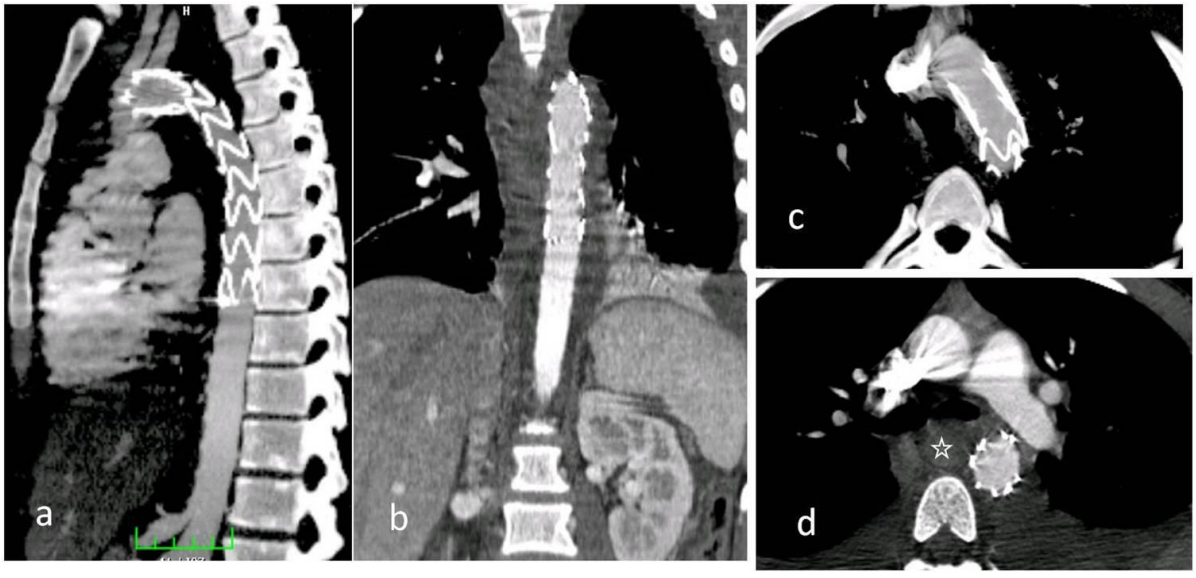

Figure III: CT images after the procedure; a) saggital reformation CT, b) coronal reformation CT, c) and d) axial CT sections of aortic arch and pulmonary conus level. Place of stent and aortic lumen were seen clearly. Mediastinal hemorrhagic areas were regressed and pseudoaneurysm was thrombosed.

DISCUSSION

Traumatic aortic dissection is a rare but frequently important entity in trauma management in the emergency department. İt is one of the most catastrophic conditions leading to death while in a car (4)**.** Prognosis is poor without any surgical or interventional management especially since most patients present with severe coincident injuries. The main etiology of aortic injury in thoracic blunt trauma is rapid acceleration and deceleration. The trauma mechanisms described have included shear forces applied at the ligamentum arteriosum, acute compression by the diaphragm, torsion of the aorta, acute intravascular hypertension and/or compression of the aorta between the sternum and spine (osseous pinch) (5)**.**

Traumatic thoracic aortic injuries are usually located distal to the left subclavian artery. Because of the presence of intercostal arteries, pleura and the ligamentum arteriosum, the descending aorta is fixed more rigidly than the aortic arch and the heart during its course through the vertebral sulcus. During a horizontal deceleration trauma, the descending and other parts of the aorta move at different speeds. As a result, the isthmic part of the aorta is under maximum stress, and thus may yield total or partial rupture of the vessel (6).

A meta-analysis comparing recent reports of repair of traumatic aortic dissection showed that mortality, paraplegia, and stroke rates were significantly less after endo-repair than after open-repair. Procedure-specific complications were also less common after endorepair than open-repair (13 % vs 17 %). Although length of intensive care unit stay, frequency of acute respiratory distress syndrome and other pulmonary complications, bleeding complications and operative time were not specifically commented on in most articles, they also likely favor endo-repair because open thoracotomy, therapeutic heparinization, and single-lung ventilation are not required (7).

Endovasculer repair offers many practical advantages compared to conventional open repair. Because most thoracic aortic injuries are located in the proximal portion of the descending thoracic aorta, endovascular exclusion with a stent-graft is a logical consideration. In patients with thoracic aortic injuries who have adequate proximal and distal aortic landing zones, deployment of a stent-graft to cover a focal lesion can be performed straightforwardly. Endovasculer repair should not be undertaken in patients with trivial aortic injury or one based on computed tomography screening alone (8).

Despite great achievements from endovascular stent grafts, several complications of endovascular stenting have remained. Although complications do not occur frequently, endoleak, stent collapse, subclavian occlusion, stroke, embolization, bronchial obstruction, implant syndrome, dissection, migration, and paralysis may develop (9). In our case, proximal and distal landing zones of stent graft were found suitable in aortography and CT angiography and after procedure, blood flow to left subclavian artery was not disturbed by the endovascular stent. Occlusion of the left subclavian artery orifice with a stent graft is well tolerated. The decision for revascularization can be made postprocedurally if left arm claudication or subclavian steal symptoms develop (10). Any procedure-related complications did not develop.

More reports and follow up data about endovascular stenting in traumatic thoracic aortic injury have been presented recently. Endovascular treatment for acute traumatic aortic dissection is feasible and represents a valid alternative to conventional open surgery in selected patients.

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