# Endovascular treatment of left carotid artery to left subclavian vein AV fistula due to stab injury: case report

## Bıçaklanma sonrası sol karotis ve sol subklaviyan ven arasında gelişen AV fistülün endovasküler tedavisi: Olgu sunumu

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Penetrating injuries to the neck have high morbidity and mortality rates because of the multiple vital structures present within this anatomic region. Endovascular treatment of an AV fistula of left common carotid artery and left subclavian vein subsequent to stab injury of the left supraclavicular region is presented in this case report.

***Key Words:*** AV fistula; carotid; endovascular treatment.

Boyundaki penetran yaralanmalar, bu anatomik bölgede yer alan birçok vital yapı nedeniyle yüksek morbidite ve mortaliteye sahiptir. Bu olgu sunumunda sol supraklaviküler bölgedeki bıçaklanma sonrası gelişen sol ana karotis ve sol subklaviyan ven arasındaki AV fistülün endovasküler tedavisi anlatıldı.

***Anahtar Sözcükler:*** AV fistül; endovasküler tedavi; karotis.

Laceration of the carotid and vertebral arteries is one of the major factors that determine the prognosis and outcome of patients with penetrating trauma to the neck. Injuries of the aortic arch vessels close to their origins are particularly difficult to control and surgical exposures that are used include supra- and infraclavicular dissection, clavicular transection, thoracotomy and median sternotomy.[1]

Patients with false aneurysms or AV fistulas seem to be the ideal candidates for endovascular repair. This report describes our experience in a patient with an AV fistula between the left carotid artery and the left subclavian vein, managed by endovascular stent-graft.

## CASE REPORT

A twenty-two-year-old male had been admitted to the emergency unit of another hospital with a stab wound in the left supraclavicular region. The wound had been sutured primarily after his physical examination. He had been kept under observation for 24 hours and discharged from the hospital. Hoarseness and dizziness had occurred 6 weeks later and continuous bruit was determined in his examination. He was referred to our hospital, and aortography was performed and revealed the diagnosis of traumatic AV fistula between the left carotid artery and the left subclavian vein (Fig. 1a). Regarding the anatomical region and the diameter of the carotid artery proxi-

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Presented at the 5th National Trauma and Emergency Congress (November 16-20, 2005, Antalya, Turkey).

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V. Ulusal Travma ve Acil Cerrahi Kongresi'nde sunulmuştur (16-20 Kasım 2005, Antalya).

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mal and distal to the fistula orifice, endovascular repair was planned.

The procedure was performed in the radiology suite with both an interventional radiologist and a vascular surgeon in attendance. Facilities were available for immediate conversion to open repair if necessary. Routine preprocedural heparin (50 units/kg) and prophylactic cefazolin were given and continued for 24 hours. The Seldinger technique was used to insert a 7F introducer under local anesthesia and left carotid artery was catheterized selectively. A balloon expandable covered-stent (Coverstent, Jomed, GmbH, Germany) was advanced over the guide wire and implanted with ease. Control angiography revealed good apposition of covered-stent and total occlusion of the orifice of the fistula (Fig. 1b-d). The patient was discharged on the following day without any complication. Clopidogrel 75 mg/day for two months along with life-long ASA 100/day were ordered. He is in good condition fourteen months after the operation.

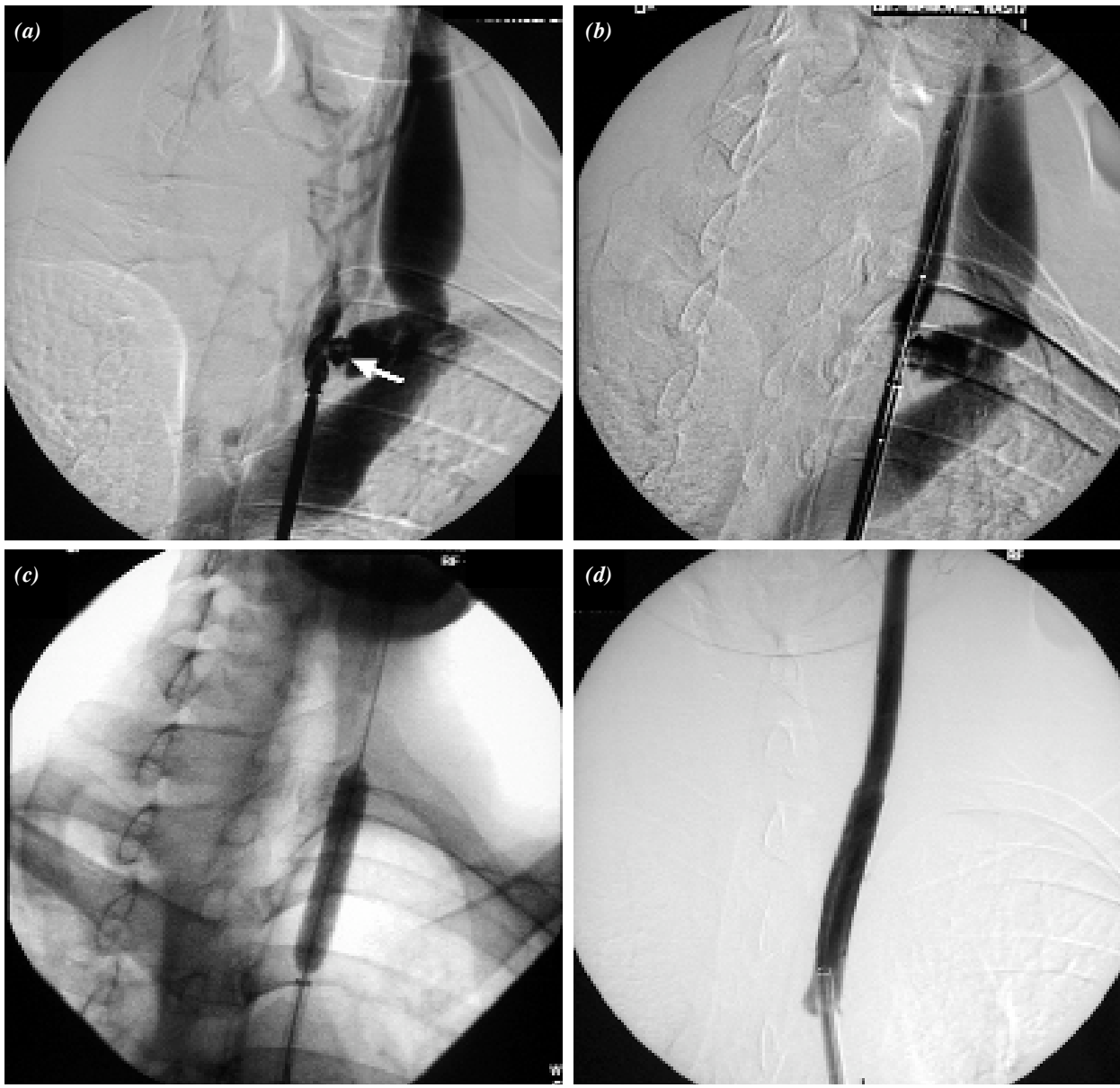


**Fig. 1.** **(a)** Traumatic AV fistula between the left carotid artery and the left subclavian vein. **(b)** Balloon expandable covered-stent was advanced over the guide wire. **(c)** Balloon was inflated in order to place the stent-graft and occlude the fistula. **(d)** Control angiography revealed the good apposition of the stent-graft and occlusion of the AV fistula.

## DISCUSSION

Injuries to the arteries of the thoracic outlet constitute 5-10% of arterial trauma.[2] The difficulty in access for controlling lacerated vessels and attempts to treat these lesions often cause lethal hemorrhage and death. Reported morbidity and mortality rates range from 5-30%.[3]

Traumatic AV fistulas are usually seen after partial transection of an adjacent artery and vein and tend to be more prominent clinically. Typically, they are not seen in the acute phase but rather enlarge over time and are diagnosed with specific signs such as bruit or compression symptoms.[4] Without treatment, these lesions may cause serious complications such as rupture, thrombosis, distal embolization and cerebrovascular ischemic incidents. Conventionally the arterial injuries require surgical treatment; however endovascular repair of lesions such as pseudoaneurysm and arteriovenous fistula is now becoming popular in many centers.[5-8] The inaccessibility of the arteries located in the thoracic outlet makes stent-graft treatment of injuries to these vessels particularly favorable.

In 1990, Juan Parodi and colleagues reported the first endovascular treatment of abdominal aortic aneurysms in humans.[9] Since then, rapid improvement of endovascular techniques and graft technology have led to wide application of this treatment method.

The most important feature of successful stent-graft repair of thoracic outlet arteries is patient selection. First of all, the patient should be hemodynamically stable. Angiography and facilities for endovascular procedures should be available. The surgeon and the invasive radiologist should work in attendance. Anesthetic management should be stand-by. The arterial diameters proximal and distal to the lesion should be similar. AV fistulas usually cause diameter reduction in the distal part of the artery in the long term. Consequently, the old lesions may not be suitable for endovascular treatment because of the size discrepancy and failure of good stent-graft apposition.

One of the most striking articles about endovascular repair for injuries of thoracic outlet arteries was reported by du Toit et al.[10] Angiography was performed in fifteen of the 41 patients who were hemodynamically stable and 10 were qualified for stent-graft implantation. There was a laceration in the subclavian artery in seven patients, in the carotid artery in two patients and in the axillary artery in one patient. The stent graft treatment was successful in all patients without any complication in mean follow-up of seven months.

The successful treatment of this patient supports that the endovascular treatment of traumatic thoracic outlet arterial injuries is an effective and less invasive mode of therapy. Long term follow up of a large number of such patients is required.

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