

## Case Report

## Treatment of Subclavian Steal Syndrome with Carotico-Subclavian Artery Bypass: A Rare Case

*Subklavian Çalma Sendromunun Karotiko-Subklavian Arter Bypass ile Tedavisi: Nadir Bir Vaka*

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### ABSTRACT

*Subclavian steal syndrome (SSS) is usually caused by unilateral subclavian artery (SA) occlusion or severe stenosis. Rarely seen bilaterally. Doppler ultrasonography (DUS) shows low antegrade blood flow of the right SA and retrograde flow of the left SA. Here we present a case of 'subclavian steal syndrome' in a 49 year old woman who had dizziness and syncope following exercise treated with left carotico-subclavian artery bypass.*

**Keywords:** *subclavian steal syndrome; carotid artery; subclavian artery; bypass*

### ÖZET

*Subklavian çalma sendromu (SÇS) genellikle tek taraflı subklavian arter (SA) tıkanıklığı nedeniyle oluşmaktadır. Nadiren bilateral görülür. Doppler ultrasonografide (DUS) sağ SA'da düşük antegrad ve sol SA'da retrograd akım saptanır. Biz burada egzersiz sonrası baş dönmesi ve senkop şikayeti olan SÇS tanısı konulan 49 yaşındaki kadın hastanın sol karotiko-subklavian bypass operasyonu yapılarak tedavisini sunduk.*

**Anahtar Kelimeler:** *subklavian çalma sendromu; karotis arter; subklavian arter; bypass*

### INTRODUCTION

Subclavian steal syndrome (SSS) has been first described by Contornil in 1960 as stenosis of the subclavian artery (SA) proximal to the origin of the vertebral artery (VA) thus, the blood flow became reversed so as to maintain the blood flow to the upper extremity via the distal subclavian artery (1).

The left subclavian artery stenosis is seen two fold than the right subclavian artery stenosis, generally occurs unilaterally, more frequently in males rather than females. The patients are usually older than 50 and 5% of patients are presented with limb ischemia. Transient ischemic attacks (TIA), nausea, vomiting, imbalance, diplopia, dizziness, syncope, digital ischemia due to distal embolization, weakness, arm pain, homonymous hemianopsia, myocardial ischemia, ataxia, reduced or absent pulses can be seen (2).

SSS is not only caused by arteriosclerotic vascular disease but also caused by Takayasu's Arteritis which is a chronic granulomatous form of vasculitis that affects large arteries such as the aorta and its branches and can result in the gradual progression of stenosis or occlusion in the affected arteries (3).

During physical examinations the upper extremity pulses, blood pressure measurements and auscultation of the carotid artery, subclavian artery should be examined. Doppler ultrasonography (DUS) is used for identifying reversal of flow of the vertebral arteries.

Noninvasive imaging with magnetic resonance angiography (MRA) or computed tomography angiography (CTA) can provide excellent imaging of the aorta and its branches however, digital subtraction angiography (DSA) remains the gold standard technique for diagnosis.

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## CASE REPORT

A 49 year old female was presented with dizziness and syncope following exercise of her left upper extremity for four years, was admitted. Vertigo was exacerbated with exercise.

She has a history of hypertension (HT) and was medicated with ACE inhibitor. Her left upper extremity artery pulses were absent and 32 mmHg difference was detected. Carotid artery DUS revealed left SA occlusion and was confirmed with CTA (Fig 1). Delayed retrograde filling of left VA was documented following contrast injection. After routine preparation for surgery was made and obtaining the informed consent, we decided to perform bypass surgery.

A left supraclavicular transverse incision extending lateral to the clavicular head of the sternocleidomastoid muscle was performed. That provides excellent exposure for both carotid artery and SA.

The SA was exposed by dividing the inferior insertion of the anterior scalene muscle (on the first rib). We took care to identify and protect the phrenic nerve. We ligated the thoracic duct and all its tributaries. We performed the carotico-subclavian bypass (CSB) with 6 mm

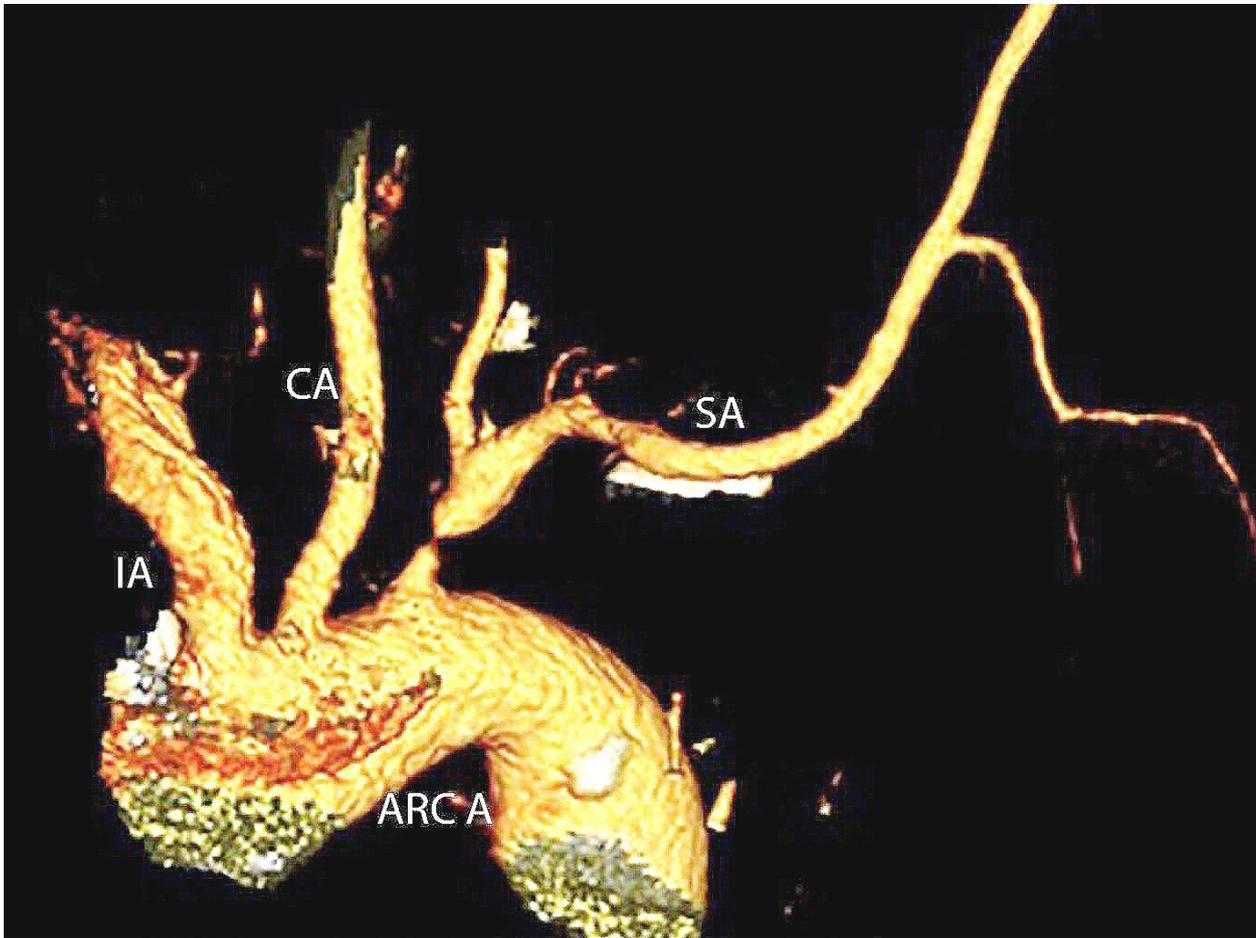
ringed polytetrafluoroethylene (PTFE) graft (passed under the jugular vein) (Fig 2). There was not any peri or post procedural complication. After the operation left brachial and radial artery pulses were palpable. The patients was discharged 7 days after the operation with 100 mg/daily aspirin.

## DISCUSSION

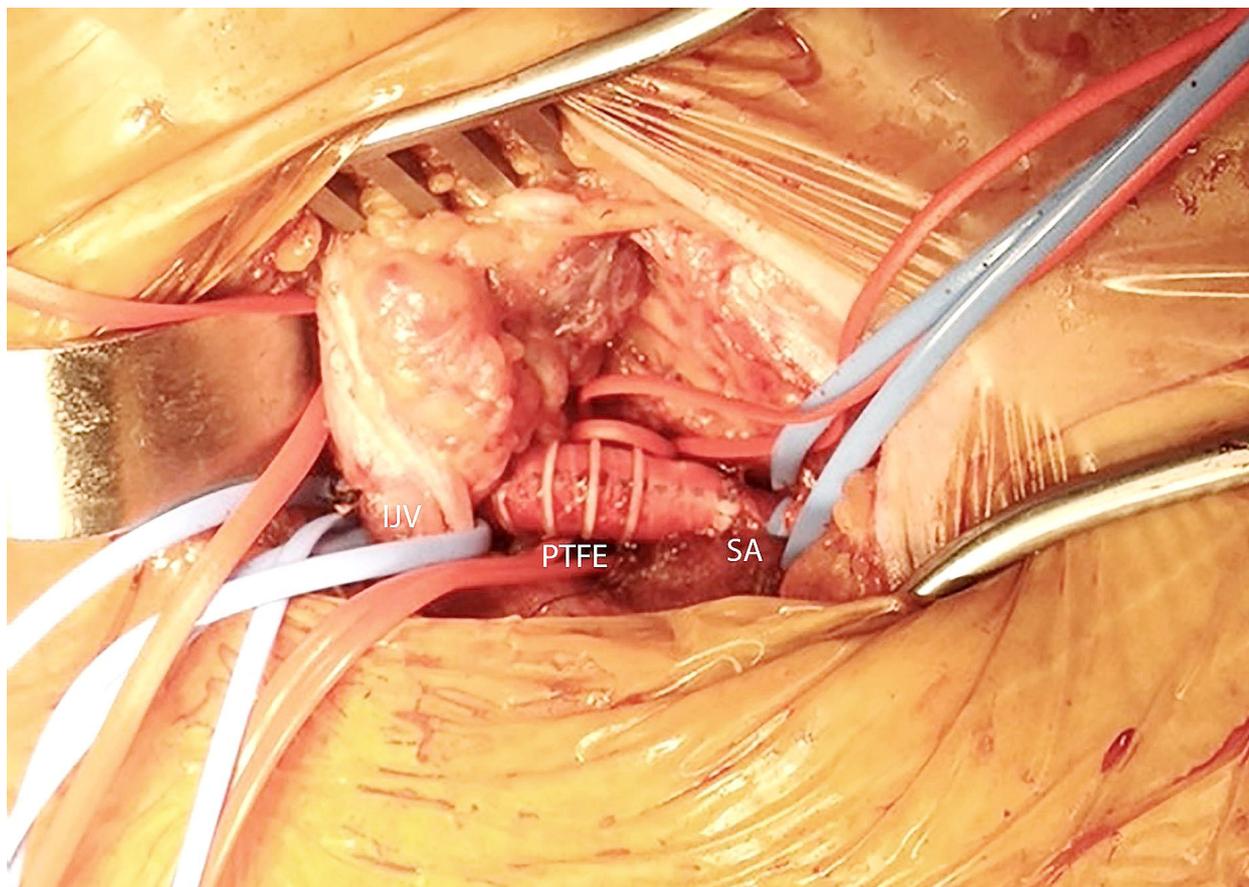
The surgical and interventional techniques can be performed to ameliorate the proximal stenosis of the subclavian artery. The main aim of the surgery is to restore the permanent antegrade flow and to prevent cerebral hypoperfusion. There is no need to open the thoracic cavity while performing CSB, for this reason non-diseased carotid and subclavian arteries should be selected for surgery to reduce mortality and morbidity rates (5).

Prosthetic grafts have superior patency and are used for major aortic reconstructions. However, vein grafts are often used for limb arteries, isolated renal artery and mesenteric artery revascularizations (6).

Some authors stated that long-term results are limited due to graft thrombosis with using prosthetic grafts (7).



**Figure 1:** Preoperative imaging of the left 'subclavian steal syndrome' and severe stenosis left subclavian artery on computed tomography angiography.



**Figure 2:** Peroperative configuration of the bypass with PTFE graft between left common carotid artery and the left subclavian artery.

On the other hand percutaneous transluminal angioplasty and stenting carry the risk for recurrent stenosis too (8). So it is essential to select the best treatment method for each patient.

Besides, patients who have history of the left internal mammary artery- left anterior descending bypass for coronary artery bypass graft surgery, reversal flow can lead to myocardial ischemia and angina due to subclavian-coronary steal syndrome and this condition should be ameliorated either by surgical or interventional (6-8).

In conclusion, we thought that the surgical treatment remains the gold standart technique.

### **Declaration of Conflicting Interests**

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