

A vascular phenomenon which should be kept in mind: subclavian steal syndrome

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ABSTRACT

The subclavian steal syndrome is a rare, yet well-known phenomenon which presents when a steno-occlusive lesion of the proximal subclavian artery results in the flow reversal of the vertebral artery, giving rise to vertebrobasilar insufficiency. A 50-year-old male patient was admitted to our clinic with complaints of the left arm coldness and pain on exertion. Physical examination revealed a cold, pale and pulseless left arm. We performed carotico-subclavian bypass with a 6 mm ringed polytetrafluoroethylene graft. Postoperative radial and ulnar pulses were palpable and his complaints resolved.

Keywords: Carotid artery; steal phenomenon; subclavian artery.

The subclavian steal syndrome (SSS) is a rare yet well-known phenomenon which presents when a steno-occlusive lesion of the proximal subclavian artery results in the flow reversal of the vertebral artery, giving rise to vertebrobasilar insufficiency. It was first described in 1961 by Reivich in the New England Journal of Medicine.^[1] The author reported a patient with a neurological symptom which was directly attributed to this reversal phenomenon. However, the term “subclavian steal” was introduced by Miller Fisher, on an editorial paper few months later.^[2]

Subclavian steal phenomenon is a functional result of the proximal subclavian artery steno-occlusive disease with subsequent retrograde blood flow in the ipsilateral vertebral artery. The symptoms related to the compromised vertebrobasilar and brachial blood flows constitute the SSS and include paroxysmal vertigo, drop attacks or claudication on arm. Once thought to be rare, the emergence of novel imaging techniques has improved its diagnosis and prevalence. The syndrome, however, remains characteristically asymptomatic and solely poses no serious danger to the brain. Recent studies have shown a linear correlation between increasing arm blood pressure difference and the development of the symptoms. Atherosclerosis is the most common cause of subclavian steal syndrome and it is more common on the left side, possibly due to a more acute origin of the left subclavian artery, resulting in accelerated atherosclerosis caused by increased turbulence.^[3] Doppler ultrasound is a useful screening tool, however, the diagnosis must be confirmed by computed tomography or magnetic

resonance angiography. Conservative treatment is the initial therapy for this syndrome and surgery is needed for refractory symptomatic cases. Other treatment modalities include percutaneous angioplasty and stenting, rather than bypass grafts of the subclavian artery.

CASE REPORT

A 50-year-old male patient was admitted to our clinic with complaints of left arm coldness and pain on exertion. Physical examination revealed cold, pale and pulseless left arm. Doppler ultrasonography of the left upper limb showed monophasic flow in both radial and ulnar arteries. We applied digital subtraction angiography which revealed proximal subclavian artery occlusion and retrograde filling through vertebral artery (Figure 1). A carotico-subclavian artery bypass was scheduled. Before surgery, a carotid artery Doppler ultrasonography was applied for screening of carotid plaque. Under general anesthesia, patient was positioned in supine position, the left arm was adducted

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and the left shoulder was slightly elevated. The incision started from sternoclavicular joint to acromioclavicular joint parallel and 1.5 cm above to clavicle. Dissection made through platysma and anterior scalene muscles. Below to the anterior scalene muscle, the proximal subclavian artery was exposed. Particular attention was given to preserve phrenic nerve and thoracic duct. In the anterior to the sternocleidomastoid muscle, the carotid artery was exposed. After systemic heparinization, both arteries were clamped and a 6 mm ringed polytetrafluoroethylene graft was anastomosed end-to-side. Postoperative radial and ulnar pulses were palpable and his complaints resolved (Figure 2). In the postoperative third day, the patient was discharged uneventfully.

DISCUSSION

Due to the rarity of the SSS, suspicion is crucial for the diagnosis of the disease. The clinician must receive a detailed history. A careful physical examination is essential looking for common SSS findings to distinguish from the differential diagnosis which includes intracranial vascular disease, carotid artery disease, vertebral artery disease, brain tumors and subdural hematomas.^[4-8] The SSS may present

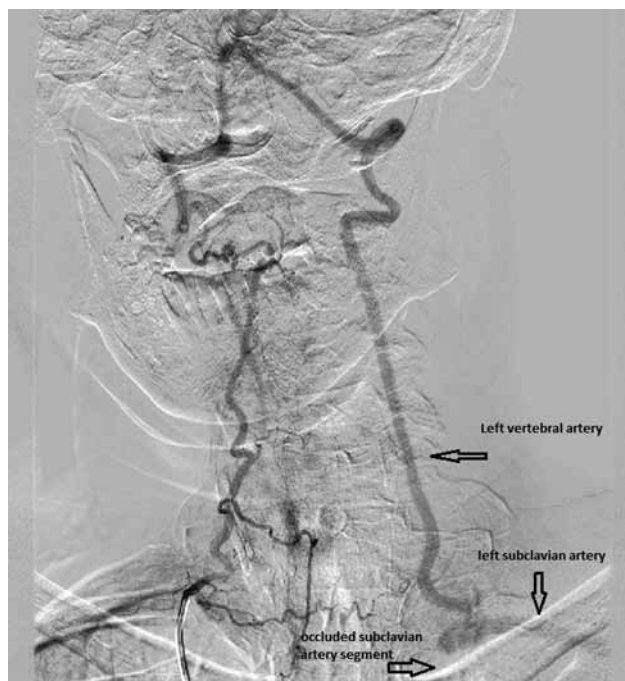


Figure 1. Digital subtraction angiography image showing proximal subclavian artery occlusion and retrograde filling through vertebral artery.

with absence or diminished ipsilateral radial pulse, cervical or supraclavicular bruits or thrills, and the presence of a systolic blood pressure difference >20 mmHg between two upper limbs.^[9]

There are two surgical treatment options in the management of SSS. Subclavian-subclavian bypass is the first choice in patients with carotid artery stenosis or plaques, in particular. The major disadvantage of subclavian-subclavian bypass is difficulty of exposure, while another disadvantage is the requirement of long graft length. The second management option is carotico-subclavian bypass featured in patients without a carotid lesion, in particular. Short graft length and high long-term patency rates are the main advantages of carotico-subclavian bypass. In our case, the carotid artery was patent and there was no plaque compromising flow, therefore, we performed carotico-subclavian bypass. In the literature, there are some reports which described effectiveness of percutaneous treatment options.^[10,11]

In conclusion, subclavian steal syndrome is a rare vascular phenomenon which occurs due to a steno occlusive disease of subclavian artery and it can be treated with surgery or percutaneous angioplasty and stenting. Suspicion is crucial for the diagnosis of the disease. For this reason physicians should raise their awareness for this rare vascular disease. We hope this case report will help clinicians to improve life quality of their patients.

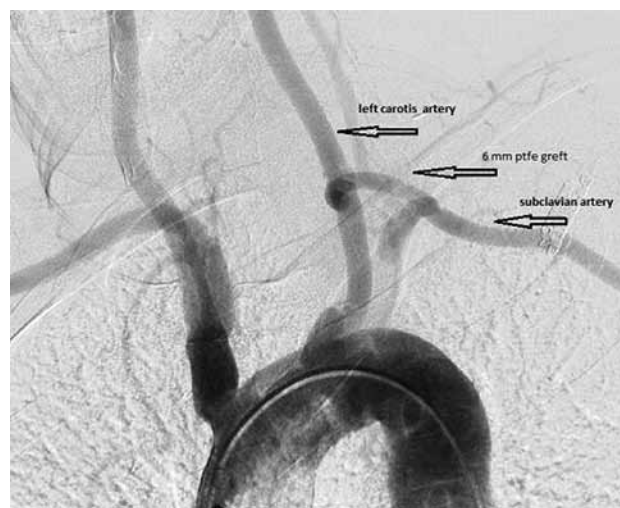


Figure 2. Digital subtraction angiography image showing carotico-subclavian bypass with a 6 mm ringed polytetrafluoroethylene graft.

Declaration of conflicting interests

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