

## MISDIAGNOSIS OF CERVICOBRACHIAL SYNDROME WITH SUBOCCLUSION OF THE LEFT SUBCLAVIAN ARTERY

Georgiev Antonio<sup>1</sup>, Kalpak Oliver<sup>1</sup>, Pejkov Hristo<sup>1</sup>, Boshev Marjan<sup>1</sup>, Jovanoski Mario<sup>1</sup>, Bojovski Ivica<sup>1</sup>, Manev Nikola<sup>1</sup>, Mitevski Goran<sup>1</sup>, Nikolovski Robert<sup>1</sup>, Jovanovski Srceva Marija<sup>2</sup>, Georgieva Daniela<sup>3</sup>, Dzoleva Tolevska Roza<sup>3</sup>

<sup>1</sup>University Clinic for Cardiology, Skopje, Faculty of Medicine, Ss. Cyril and Methodius University in Skopje, Republic of North Macedonia

<sup>2</sup>University Clinics for Traumatology, Orthopedic Disease, Anesthesiology, Reanimation, and Intensive Care Medicine and Emergency Department, Skopje, Faculty of Medicine, Ss. Cyril and Methodius University in Skopje, Republic of North Macedonia

<sup>3</sup>University Clinic for Orthopedic Disease, Faculty of Medicine, Ss. Cyril and Methodius University in Skopje, Republic of North Macedonia  
*e-mail: antoniogeorgiev@yahoo.com*

### Abstract

**Introduction:** Cervical spondylosis (degenerative osteoarthritis) and subclavian occlusion, mostly caused by atherosclerosis, share similar symptoms. Both are diseases of the advanced age. Thus, there are similarities of overlapping or misdiagnosis of both diseases.

The aim of this case report was to present diagnosis and treatment of subclavian subocclusion and possibility of misdiagnosis with cervicobrachial syndrome.

**Case report:** We present the case of a 71-year-old woman with noncontrolled hypertension. For many years she complained of occasional pains and tingling in her neck, left shoulder, and hand, coolness in the fingers of the left hand, headache and occasionally dizziness. An x-ray finding of the cervical spine was in favor of spondyloarthrosis on the neck vertebrae, and after consulting an orthopedic specialist, she was diagnosed and treated as cervicobrachial syndrome for many years without success. Cardiology examination detected different high blood pressure readings in both arms and that induced us to perform a computerized angiography (CT). CT showed subocclusion on the left subclavian artery after which our patient underwent angiography and stent implantation. After the procedure, the blood pressure difference decreased and the symptoms disappeared.

**Conclusion:** Due to similar symptoms, whenever cervicobrachial syndrome is diagnosed, the blood pressures in both arms should be measured. In case of their difference, subclavian stenosis should also be considered and appropriate investigations should be made, especially if the difference in pressures is high.

**Keywords:** cervicobrachial syndrome, subclavian subocclusion, diagnosis, treatment.

### Introduction

Cervical spondyloarthrosis is a degenerative osteoarthritis of the bones, disks and joints in the cervical spinal vertebrae. It is characteristic of the aging population and one of the causes of cervicobrachial syndrome. Symptoms are headache, weakness in the arms, numbness in shoulders, arms, or hands, trouble with balance, etc. Treatment includes physical therapy, nonsteroidal antirheumatic drugs (NSAID) and muscle relaxant<sup>[1]</sup>.

Subclavian artery occlusion is an underdiagnosed disease because it is usually asymptomatic and when it progresses and symptoms appear, it is misdiagnosed as a musculoskeletal or neurological disease<sup>[2]</sup>. The prevalence of subclavian artery stenosis is 2% and in patients over 70 years 15%<sup>[3]</sup>. Patients with subclavian artery thrombosis have a 50% chance of having concomitant coronary artery disease, 27% lower artery disease, and 29% carotid artery disease because of common risk factors and pathogenesis<sup>[2]</sup>. It can be caused by atherosclerosis, aortic dissection, thoracic outlet syndrome, congenital deformities, acute arterial thrombosis, autoimmune vasculitis, radiation, neurofibromatosis, fibromuscular dysplasia, or mechanical causes (injury or compression disorders)<sup>[4]</sup>. Patients with >50% stenosis of the subclavian artery may have subclavian steal syndrome with symptoms of the upper limb, ophthalmic and neurological symptoms.

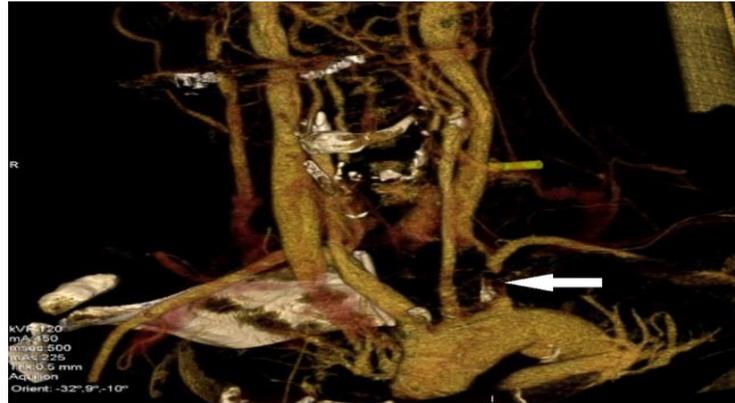
Subclavian steal syndrome occurs when the pressure after the stenosis is lower than the pressure in the contralateral vertebral or carotid artery so the blood flow is reversed in the vertebral artery on the side of the occlusion (the blood is “stolen” through the circle of Willis and basilar artery)<sup>[5-7]</sup>. The left subclavian artery is more likely to be affected because it branches off the aorta directly and has a more acute angle of origin<sup>[3,5,8]</sup>. Symptoms can vary from arm claudication, paresthesias, coolness, a discrepancy of blood pressure between arms, dizziness, diplopia, nystagmus, absent or diminished pulses, splinter hemorrhages of nails bed, hearing loss, gangrenous skin to transient ischemic attack<sup>[2,3,5,6]</sup>.

### Case report

We present a case of a 71-year-old woman who came for a cardiology consultation because of noncontrolled hypertension. For many years she complained of transitory pains and tingling in her neck, left shoulder and hand, coolness in the fingers of the left hand, headache and occasionally dizziness. That's why she visited an orthopedic specialist and because of osteoporosis and cervical spondyloarthritis on C4-C5, C5-C6 and C6-C7, which was confirmed with a cervical spine X-ray, the diagnosis of cervicobrachial syndrome was made. For many years she was treated with NSAID medications but without success. The patient regularly takes tbl. Bisoprolol a 5 mg 1x1, tbl. Enalapril a 5 mg 2x1 and tbl. Diclofenac a 50 mg 1x1.

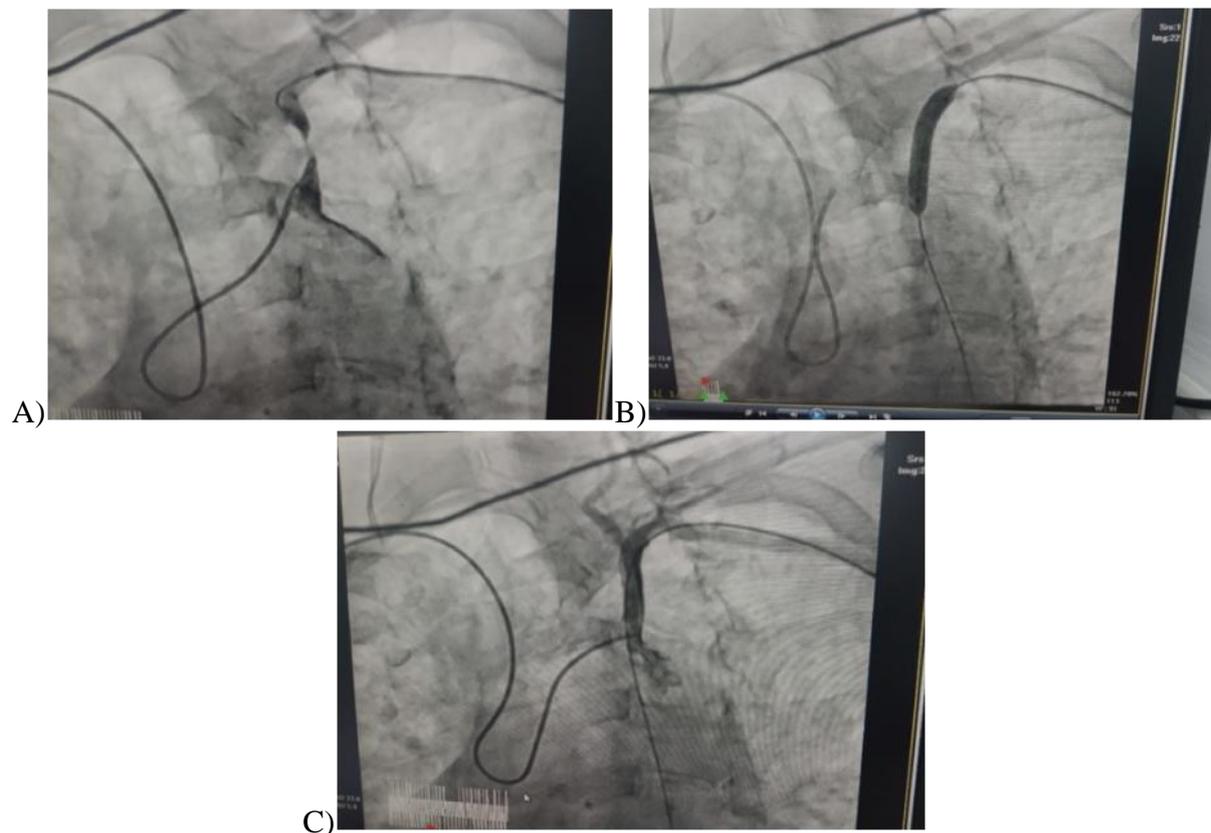
Due to the worsening of the abovementioned symptoms, the patient came for a cardiology examination. On physical examination, her blood pressure on the right hand was 150/90 mmHg and on the left hand 230/120 mmHg. ECG was normal and echocardiography showed a normal dimension of the heart with a normal ejection fraction (EF 65%), a moderate mitral regurgitation and a mild aortic regurgitation. The patient was advised to undergo CT angiography.





**Fig. 1.** Subclavian occlusion on CT and 3D reconstruction

A CT angiography scan was performed (Figure 1). It showed occlusion at the initial segment of the left subclavian artery up to 15 mm in length and atheromatous plaque on both carotid bifurcations with stenosis of 30% on the internal carotid artery and 50% on the external carotid artery. This CT was strongly suggestive of subclavian steal syndrome after which percutaneous transluminal angioplasty (PTA) was scheduled.



**Fig. 2.** A) Verification of subclavian stenosis B) Balloon dilatation and stent implantation C) Verification of successful procedure

The patient was subjected to angiography at the University Clinic for Cardiology in Skopje, by a transradial approach, and left subclavian subocclusion with 99% stenosis was confirmed. PTA with placement of Stent OMNILink 6x40 mm with 14-atmosphere pressure was deployed at the site of the stenosis (Figure 2). Coronarography showed no significant

stenosis. After the procedure, the blood pressure difference decreased and the symptoms disappeared. She was discharged in a stable clinical condition and in good health.

### Discussion

In medicine, there are several health conditions that need to be analyzed and separated by differential diagnosis. It is very important to establish a timely diagnosis and initiate an appropriate treatment for the given condition. Kirch and Schafii in their interesting study of autopsy results during 4 medical decades surveyed reported about 10% of misdiagnoses. Correct physical examination and good information about a patient's family and medical history is crucial for establishing the right diagnosis in 60-70% of cases<sup>[9]</sup>.

Overlaps or misdiagnoses of cervicobrachial syndrome with occlusion of the left subclavian artery is a rare but possible situation. In our case, subclavian occlusion was initially misdiagnosed as cervicobrachial syndrome. This is supported by the fact that the symptoms of these two diseases overlap such as headaches, occasional dizziness and numbness in the hand. The X-ray finding of the cervical spine was in favor of spondyloarthritis cervicalis. But the large discrepancy of blood pressure readings between both arms led us to think about other diseases, such as aneurysm of the artery, diabetes, Takayasu disease, chronic kidney disease, heart defect, coarctation of the thoracic aorta or as in our case subclavian artery occlusion.

The discrepancy in blood pressure readings between arms was the main symptom that led to the correct diagnosis. The greater the difference, the greater the suspicion for subclavian occlusion. A difference in systolic blood pressure of 10 mmHg has a 13% positive predictive value. But when the difference is  $\geq 15$  mmHg, it has 90% specificity and 50% sensitivity for diagnosing subclavian occlusion. If the difference between blood pressure is  $< 10$  mmHg, subclavian stenosis can be excluded with 99% certainty<sup>[2,10]</sup>. The other symptoms are nonspecific and often are attributed to other conditions as is in our case. Most patients are asymptomatic and the progression of the occlusion is slow, but when symptoms occur the stenosis is significant and intervention should be considered.

For patients who have used the left internal mammary artery (LIMA) for CABG, subclavian occlusion may present as myocardial ischemia because the internal mammary artery arises from the subclavian artery and can be affected by proximal subclavian stenosis (it can cause reverse blood flow in the LIMA graft and this phenomenon is called coronary steal syndrome) although the incidence of subclavian stenosis in these patients is 0.44-1.1%, and the incidence of steal syndrome is 0.07-0.44%<sup>[2,7]</sup>. Asymptomatic patients are treated with antithrombotic therapy. For symptomatic patients, endovascular intervention or surgical bypass can be considered<sup>[11]</sup>. Pharmacomechanical thrombectomy is also a choice (either with catheter-directed thrombolysis or prolonged infusion)<sup>[3]</sup>. In a study by Yajun Liu on endovascular therapy for total occlusion of the subclavian artery, technical success was achieved in 77.6% of patients, and primary patency rate was 98.2%, 94.3%, and 92.1% at 1, 2 and 3 years with endovascular, compared to the technical success of 100% and primary patency of 100%, 96.3% and 93.1% at 1, 2 and 3 years, respectively<sup>[12]</sup>. In Guochen Niu's review of endovascular treatment for CTO of the subclavian artery, the successful recanalization rate of the antegrade approach was 68.2%, and of the retrograde approach 75%. The left subclavian artery was more often affected (66-80%)<sup>[13]</sup>.

There are several forms of subclavian bypass surgical procedures: carotid-subclavian, carotid transposition or transposition of the subclavian artery, and axillo-axillary. Axillo-axillary has the best prognosis for morbidity and mortality but significantly lower patency rates and so it is reserved for patients with elevated perioperative risk<sup>[3,6]</sup>. If the lesion is in the proximal site of the subclavian artery, endovascular treatment is recommended<sup>[3]</sup>. Complications associated with PTA are stroke, arterial rupture, stent migration, and re-occlusion. PTA is

minimally invasive and has a lower rate of complication compared to surgical vascular intervention<sup>[8]</sup>.

Medical therapy includes ACE inhibitors (or ARB), HMG-CoA reductase inhibitors, acetylsalicylic acid or clopidogrel, statins, and  $\beta$ -blockers. Also, control of the risk factors like hypertension, smoking, glycemia, healthy body weight, cholesterol, etc. is very important<sup>[2,3,6]</sup>. Subclavian stenosis is an independent risk factor for increased total (hazard ratio 1.4) and cardiovascular mortality (hazard ratio 1.57)<sup>[6,11]</sup>.

### Conclusion

Subclavian occlusion and cervicobrachial syndrome have similar symptoms. These conditions affect the same age groups, which is why there are opportunities to be misdiagnosed. Whenever cervicobrachial syndrome is diagnosed, the blood pressures in both arms should be measured. In case of their difference, among other things, subclavian stenosis should be considered and appropriate investigations should be made, especially if the difference in the pressures is large. This will lead to timely diagnosis and appropriate treatment, thereby reducing unnecessary medications, relieving patients of symptoms and restoring their well-being.

*Conflict of interest statement:* None declared.

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