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CASE REPORT

Diagnostic and Treatment Algorithm in a Plurivascular Patient – Case Report

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ABSTRACT

Introduction: Atherosclerosis represents the main cause of arterial stenosis, mostly affecting the arteries of the lower extremities. Atherosclerotic arterial disease presents multiple localizations, including the carotid, subclavian, coronary, and kidney arteries. The severity of the stenosis does not always correlate with the symptomatology. **Case report:** We present the case of a patient with multisite atherosclerotic disease. A 70-year-old smoker male patient, with a history of myocardial infarction and renal artery stenosis, presented in the emergency department complaining of vertigo, chest pain, and intermittent claudication. The diagnostic and treatment algorithm represented a challenge. Imaging assessment showed atherosclerotic lesions in a new vascular territory, which involved the left subclavian artery with a stenosis of 70%. **Conclusions:** Subclavian artery stenosis can be a hidden form of atherosclerotic disease, often undiagnosed, which needs urgent interventional treatment and can be easily unmasked using simple tools such as measuring the blood pressure on both arms. Patients with atherosclerotic lesions must undergo comprehensive screening for multisite atherosclerotic disease.

Keywords: peripheral artery disease, subclavian stenosis, carotid stenosis

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INTRODUCTION

Peripheral artery disease (PAD) is most commonly manifested in the lower limbs. However, atherosclerosis is a multivessel disease, and a comprehensive assessment of the arterial branches is generally missing in these patients. Although risk factors for PAD in different vascular territories are common, the impact on patient prognosis is variable.[1] The subclavian artery is the most common location for atherosclerosis in the upper extremity, usually with focal involvement of the left side. Subclavian artery stenosis has been shown to affect about 9% of patients with known PAD.[2] Also, half of patients with subclavian artery disease might have coronary artery disease,[3] and renal artery stenosis often is associated.[4] The symptoms caused by each stenotic segment are well known, but prioritizing the investigations and interventional treatment for each atherosclerotic involvement can be a challenge, especially if they are diagnosed in the same patient simultaneously.

CASE PRESENTATION

We present the case of a 70-year-old non-diabetic male patient who was admitted as an emergency to the medi-

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cal ward complaining of vertigo associated with elevated blood pressure (BP), chest pain, as well as pain in the lower limbs with a claudication index of 200 m. The patient presented obesity grade 1, was a former smoker, with a past medical history of myocardial infarction 16 years prior to the current presentation, and grade 2 arterial hypertension for 18 years. The patient also presented lower extremity artery disease stage IIA Fontaine, atherosclerosis of the abdominal aorta, asthma, and atrophy of the right kidney. BP was measured on both arms, revealing a difference of 70 mmHg (190/100 mmHg on the right and 110/80 mmHg on the left arm), which raised the suspicion of a left subclavian artery stenosis. After the hypertensive emergency was solved, in order to confirm the diagnosis, a computed tomography (CT) angiography of the upper thorax and cervical region was performed (Figure 1), which showed diffuse atherosclerotic lesions of the aortic arch and of the origin of its branches. On the left subclavian artery, a 70% stenosis was revealed, and the vertebral arteries were visualized bilaterally.

However, the patient did not display other neurological signs of a possible cerebrovascular event, and the neurological examination was negative. In order to evaluate a possible multivessel disease and hypertension-mediated organ damage, a carotid artery duplex ultrasound was carried out, which showed bilateral severe carotid artery stenosis, with a 90% stenosis of the left common carotid artery and an average intima-media thickness of 1.4 mm. Given the presence of carotid artery lesions and the left subclavian artery stenosis responsible for elevated BP values and vertigo, in order to prioritize treatment of the culprit lesion, carotid artery angiography was performed, which revealed a 70–80% stenosis of the right proximal internal carotid artery, a 90% stenosis of the mid segment of the left common carotid artery, as well as a 70–80% stenosis of the right proximal internal carotid artery. Catheter-based repermeabilization of the subclavian and carotid arteries was attempted without success.

In order to assess the severity of the lower extremity artery disease, the ankle-brachial index was measured, with reduces values on both sides, 0.61 on the right and 0.7 on the left limb. Duplex ultrasound of the legs showed an occlusion of the mid segment of the right superficial femoral artery and significant stenosis of the left external iliac artery, as well as severe stenosis of the left common femoral artery before the bifurcation. Given the pain in the lower limbs suggestive for lower extremity artery disease, the patient was scheduled for lower limb invasive arteriography in order to quantify the severity of the lesions in the legs. The examination revealed severe stenosis of the right proximal external iliac artery and of the left common iliac artery, which were treated by implanting a Zeus CC 7.0/40 mm stent and a 9.0/40 mm stent, respectively. Further interventional treatment addressed the distal occlusion of the left superficial femoral artery, where percutaneous transluminal balloon angioplasty was performed by using an Armada 5.0/60 mm balloon at 6 ATM and 8–10 ATM, respectively, with favorable angiographic result and residual occlusion of the left interosseous and posterior tibial artery.

In order to assess hypertension-mediated organ damage and to search for further vascular damage, a 12-lead electrocardiogram (ECG) was performed, which showed sinus rhythm, heart rate of 82 beats/minute, left axis deviation, Q waves in DIII, V2, and V3 leads, as well as negative T wave in aVL. The transthoracic 2D echocar-

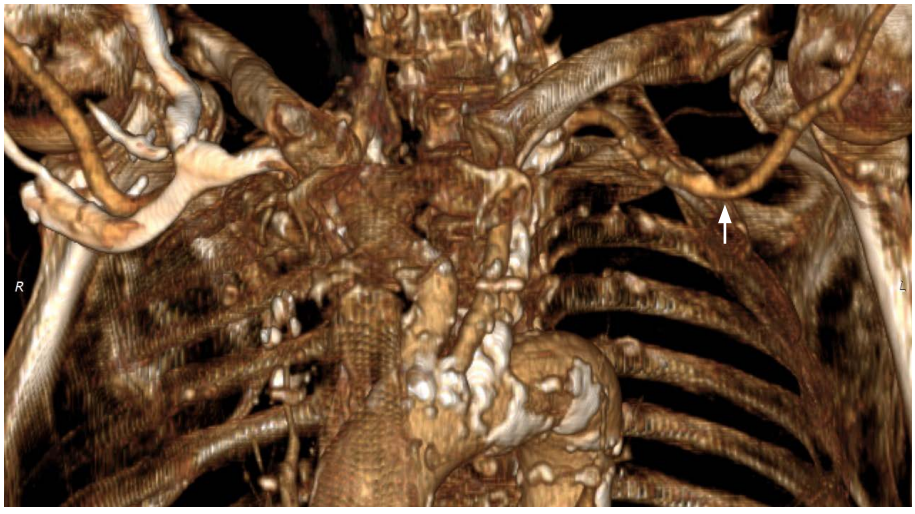


FIGURE 1. Focal stenosis of the left subclavian artery (white arrow)

diography showed left ventricular hypertrophy with preserved systolic function (ejection fraction of 60%), no wall motion abnormalities or valvular dysfunctions. Although echocardiography did not reveal wall motion abnormalities, given the patient's complaints of chest pain and his medical history of inferior myocardial infarction in 2005, coronary angiography was performed, which revealed a 50% eccentric stenosis of the left main coronary artery, a proximal chronic total occlusion of the left anterior descending artery, as well as a 50–75% stenosis of the proximal segment and a 50% stenosis of the mid segment of the obtuse marginal artery. Revascularization was not attempted.

The abdominal ultrasound evaluating the abdominal aorta and the kidneys revealed atrophy of the right kidney with a longitudinal diameter of 78 mm. With the aim of assessing BP control, a 24-hour ambulatory BP monitoring (ABPM) was performed with the following results: mean 24-hour BP 128/55 mmHg, daytime BP 126/57 mmHg, nighttime BP 128/51 mmHg, diurnal/nocturnal index 2%, with a non-dipper profile, morning surge of 18 mmHg, pulse pressure 73 mmHg.

The assessment of the biological cardiovascular profile of the patient with laboratory tests revealed an LDL-cholesterol of 96.1 mg/dL, HDL-cholesterol 58.9 mg/dL, triglycerides 75 mg/dL, creatinine 1.07 mg/dL, estimated GFR 70 mL/min/1.73 m^2, blood sugar 110 mg/dL. The patient was initiated on a single antiplatelet regimen, direct oral anticoagulants, statins, angiotensin converting enzyme inhibitor/thiazide-like diuretics/dihydropyridine calcium-channel blockers, nitrates, and a selective beta-blocker. After overall vascular assessment with imaging tools, the therapy was supplemented by adding a second antiplatelet drug (clopidogrel) and an antihypertensive drug (rilmenidine).

DISCUSSION

We presented the case of a patient who presented in the emergency department and was admitted to the internal medicine ward for a hypertensive emergency associated with dizziness and intermittent claudication. The patient presented a medical history of inferior myocardial infarction, and after vascular imaging, a left subclavian artery stenosis as well as severe bilateral carotid artery stenosis, significant multivessel coronary artery disease, and lower extremity arterial stenosis were found. Generally, subclavian artery stenosis is more likely to affect the origin and the proximal part of the vessel, and the most common symptoms include subclavian steal syndrome, claudication of the affected arm, vertigo or syncope. The symptoms usually appear when the occlusion is greater than 50%.[5]

The particularity of this case with multisite atherosclerotic disease was that it involved a rarely affected vascular area, the subclavian artery. Taking into consideration the hypertensive emergency at admission, finding the etiology of vertigo represented a real challenge. Screening for carotid artery stenosis and blood pressure measurement on both arms played a key role in the diagnosis of subclavian artery stenosis, which was confirmed by imaging methods.

Current literature describes a positive correlation between the degree of stenosis in the lower extremities and the involvement of the carotid artery and renal artery,[4] which has been confirmed in the case of our patient. Another study revealed that visceral artery stenosis may coexist in almost 50% of patients with peripheral artery disease.[6]

Both symptomatic subclavian artery stenosis and stenosis above 50% of the carotid artery associated with symptoms have indication for interventional treatment,[1] which also represented the first step in the management of our patient. Of particular importance is that peripheral arterial occlusive disease associated with coronary or cerebrovascular disease significantly increases the risk of mortality caused by cardiovascular or cerebrovascular events.[7] Prioritizing interventional treatments of specific arterial segments was a challenge in the case presented above, the main focus remaining on the management of the subclavian and internal carotid arteries.

Finally, we consider that the differential diagnosis of vertigo had a major importance in the management of this case, shifting the diagnosis from hypertensive emergency to significant stenosis of the subclavian and internal carotid artery. This was achieved through a complete clinical examination, including BP measurement on both arms, but also complex imaging techniques.

Likewise, the left ankle-brachial index of 0.7 could have deflected our diagnosis and the indication of interventional treatment had the coexistence of stenosis on both lower limbs and left subclavian artery not been taken into account. The diagnostic and treatment algorithm represented a challenge in this case.

CONCLUSIONS

Subclavian artery stenosis can be a hidden form of atherosclerotic peripheral artery disease, but with a careful physical examination, including blood pressure measurement in both arms, it is easy to unmask. Also, patients

with known atherosclerotic lesions should undergo a comprehensive evaluation and screening for multisite artery disease.

CONFLICT OF INTEREST

Nothing to declare.

REFERENCES

1. Aboyans V, Ricco JB, Bartelink ML, et al. 2017 ESC Guidelines on the Diagnosis and Treatment of Peripheral Arterial Diseases, in collaboration with the European Society for Vascular Surgery (ESVS). European Heart Journal. 2018;39:763-816. doi: 10.1093/eurheartj/ehx095.
2. Jahic E, Avdagic H, Iveljic I, Krdzalic A. Percutaneous Transluminal Angioplasty of Subclavian Artery Lesions. Med Arch. 2019;73:28-31. doi: 10.5455/medarh.2019.73.28-3.
3. Peterson SH, Bishop MA, Qaja E. Subclavian Artery Stenosis. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing 2022.
4. Zierler E, Bergelin RO, Polissar NL, et al. Carotid and lower extremity arterial disease in patient with renal artery atherosclerosis. Arch Intern Med. 1998;158:761-767.
5. Rajan AG, White JC. Brachiocephalic and subclavian stenosis: Current concepts for cardiovascular specialists. Progress in Cardiovascular Diseases. 2021;65:44-48. doi: 10.1016/j.pcad.2021.03.004.
6. Streckenbach F, Meinel FG, Ammermann F, et al. Prevalence of visceral artery involvement in patients with peripheral artery disease found on run-of MRA. BMC Med Imaging. 2021;21:93. doi: 10.1186/s12880-021-00615-2.
7. Poredos P. Interrelationship between peripheral arterial occlusive disease and carotid atherosclerosis. e-journal of Cardiology Practice. 2003;2. https://www.escardio.org/Journals/E-Journal-of-Cardiology-Practice/Volume-2/Interrelationship-between-peripheral-arterial-occlusive-disease-and-carotid-athe