

A Left Subclavian Artery Compressed by Left Anterior Scalene Muscle: A Case Report

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ABSTRACT

About 1% of Thoracic Outlet Syndrome (TOS) cases are arterial. It is due to compression of the subclavian artery over the first rib. This case report describes a left subclavian artery compressed by the left anterior scalene muscle. The patient was a 20 years old male complaining of coldness and cyanosis of the left hand upon standing in a military position. We performed the left thoracic outlet decompression from the supraclavicular incision. We preserved it. We resected the left anterior scalene muscle and released the left subclavian artery and then closed the layers in anatomic position. The next day we visited the patient. He expressed complete recovery from previous symptoms. His left hand was warm and there was no decrease in radial upon left arm abduction. The supraclavicular approach is a safe and effective approach to treating arterial TOS. It results in good functional outcomes in most patients, and it doesn't have serious complications. This method can be used as the approach of choice in patients selected properly.

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Introduction

The subclavian artery and the brachial plexus in their passage through the cervical region come to lie between the scalenus anterior and the scalenus medius and the first rib (1). The subclavian vein lies in front of the scalenus anterior, but runs more or less parallel to the artery, the space formed between the first rib, the clavicle and the scalene muscle group. This site is an

anatomically narrow site and may give compression of the subclavian artery, which can lead to circulatory disturbances of the upper extremity (2). Occasionally, though rarely, a thrombus in the right subclavian artery grows in a proximal direction and occludes the right carotid artery (3). This case report describes a left subclavian artery compressed by left anterior scalene muscle. The existence of these cases is very rare and their diagnosis and treatment panel have great importance.

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Case

The patient was a 20 years old male complaining of coldness and cyanosis of the left hand upon standing in a military position. His symptoms had begun some months ago. On physical examination Adson test and Ross test were positive. There were no supraclavicular pulsations nor were any bruits in the auscultation. Radial pulse was normal and symmetric with the right side in neutral position. There were no sensory nor any motor deficits. Doppler ultrasonography shears decrease in left radial Pressure support ventilation (PSV) from 35 cm/sec to 76 cm/sec on abduction and external rotation of the left arm. Computerized tomography (CT) angiography sheared that left subclavian artery is compressed by left anterior scalene muscle and the Thoracic Outlet Syndrome (TOS) was diagnosed. We performed left thoracic outlet decompression from the supraclavicular incision. We preserved it. Afterwards, We resected the left anterior scalene muscle and released the left subclavian artery and then closed the layers in anatomic position. The next day we visited the patient. He expressed complete recovery from previous symptoms. His left hand was warm and there was no decrease in radial upon left arm abduction. In figure 1, CT angiography of the patient is displayed (Figure 1), and figure 2 presents the left subclavian artery surgery (Figure 2).

Discussion

About 1% of TOS cases are arterial (4). This is due to compression of the subclavian artery over the first rib. In half of the cases, cervical rib is the etiology and in one-third of the patients soft tissue anomalies are the causative factors (5). The artery can be compressed in three anatomic areas: the scalene triangle, the costoclavicular space and the sub-coracoid space. The borders of scalene triangle are anterior scalene muscle, the middle scalene muscle and the first rib.

Compressive mechanism should be promptly corrected, in order to manage TOS. In patients with ischemia and in asymptomatic patients with arterial injury, interventions are mandatory (6). There are three steps in surgical management of TOS: The first step is removing the source of arterial compression and it usually consists of resection of the first rib (7). However, sometimes scalenectomy alone is sufficient and produces similar results. There is insufficient data regarding that which approach is better. The second step is inspection of the subclavian artery for the damage caused by compression (8, 9). The last step is reconstruction of the artery to restore blood flow (9). In a case report by Qaja et al, a 65 year old male with TOS was presented. They had not reported muscle hypertrophy being the culprit of aneurysmal degeneration of the subclavian artery causing TOS and thrombolytic therapy had been used effectively in the acute management (10).

Supraclavicular approach is a safe and effective approach to treat arterial TOS. It has good functional results in most of the patients and there are no serious complications from this approach. This method can be used as the approach of choice in patients who are selected properly.



Figure 1. CT angiography of left subclavian artery, Compression of left subclavian artery by anterior scalene muscle.

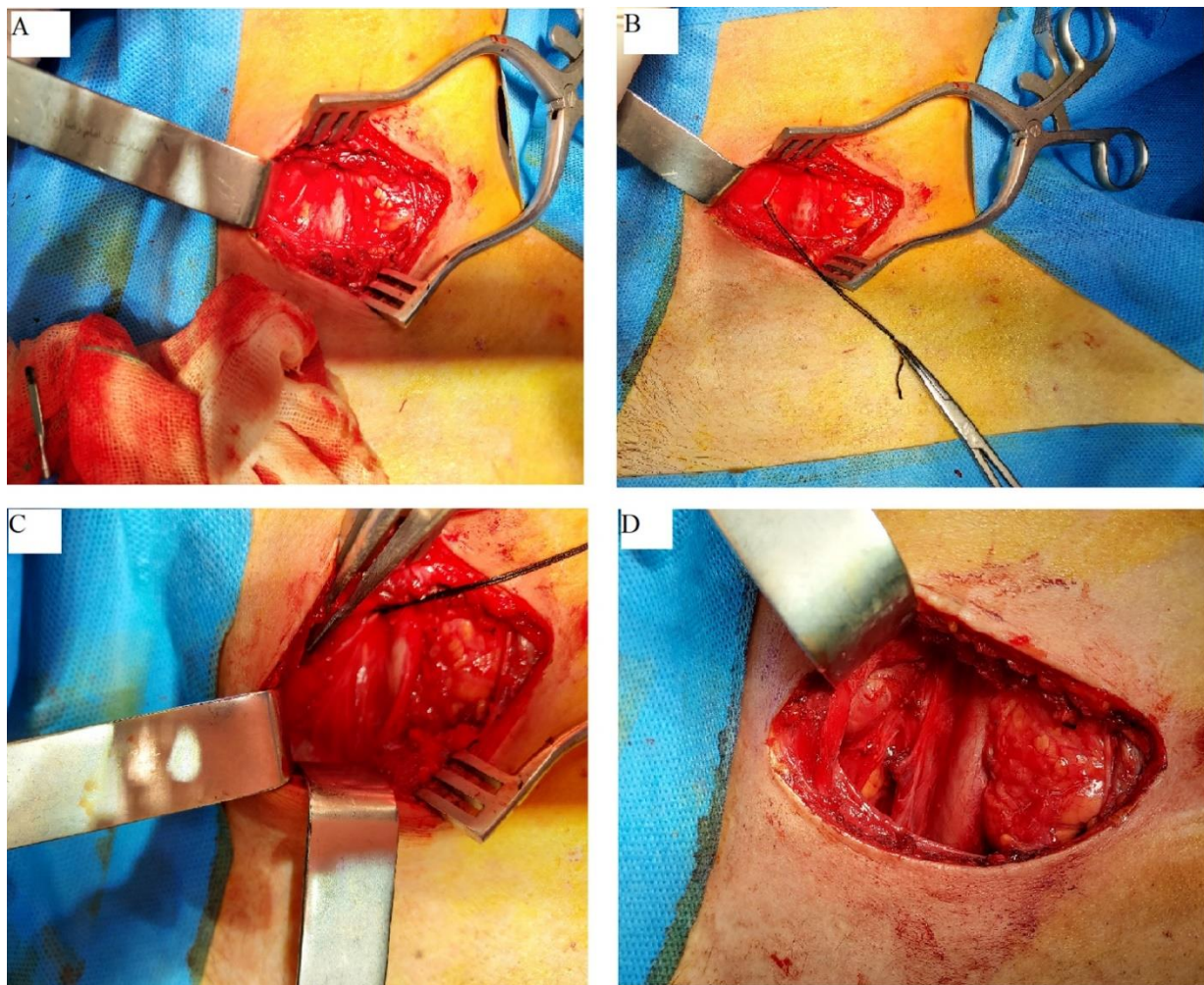


Figure 2: Left subclavian artery compressed by left anterior scalene muscle during surgery, **A:** left phrenic nerve dissected and preserved; **B:** Resection of left anterior scalene muscle; **C:** Left anterior scalene muscle resected; **D:** Release of left subclavian artery.

Ethics Approval

This study was performed with the informed consent of the patients, before the start of the study and all stages of this study have been done with the approval and supervision of the Medical Ethics Committee of Mashhad University of Medical Sciences (the manuscript is in accordance with the Helsinki Declaration and with local ethical guidelines).

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