

## Traumatic Left Subclavian Arterial Thrombosis – A Case Report

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### ABSTRACT

Subclavian Artery Thrombosis (SAT) typically arises secondary to some form of injuries and atherosclerosis. The contributing factors are coagulopathies and emboli and, the conserving blood is naturally reflowed from circle of Willis. A cold, painful, cyanosis, and pulseless upper extremity are proved as the symptoms. Recently, a 42-years-old smoker, diabetic, and hyperlipidemic woman was admitted with severe headache, vomiting, feeling weak, vertigo, decreasing of level of consciousness. Her left hand was pulseless, cold and painful and her blood pressure and force were significantly decreased. CT Angiography showed a large free gelatinous floating mass. The clot was completely removed by surgery and after that, left hand pulses and consciousness returned gradually. An unusual reason of acute upper extremity ischemia is thrombosis of subclavian artery. The percentage of symptomatic lesions is less than 1, but the same percentage in autopsy cases embraces 9% of the patient who have substantiate stenosis or obstruction of subclavian artery. All symptomatic patients should be treated emergently.

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### Introduction

Subclavian Artery Thrombosis (SAT) is a severe condition in which the blood flow through the vessel is occluded. The obstruction typically occurs secondary to damages to the intima of the artery and external muscular compression. Also, repetitive stress to the artery and atherosclerotic changes to the vessel may cause this damage. The recognized contributing factors are coagulopathies and embolic disorders. Signs and symptoms typically happen secondary to the absence

of bloodstream in the affected extremity. In order to conserve blood supply to the extremity, blood is naturally reflowed from cerebral arterial circle arteries (the vertebral, carotid, and internal mammary arteries or circle of Willis), which may lead to different kinds of steal syndromes. Subclavian artery thrombosis is more common among young athletic individuals who exert significant amount of upper body activities. (1)

An unexpected obstruction from emboli succeeded by thrombosis of the artery is

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common among people who have the sign and symptoms of significant atherosclerotic disease. Patients with acute subclavian artery obstruction usually have a history of heavy and massive use of or stress damage to the upper extremity on the affected side and always some kind of claudication in upper-extremity can be found in patients' history. In conditions where the occlusion is caused by atherosclerosis, the acute artery thromboses are commonly asymptomatic. Actually, in 9% of autopsy cases, the left subclavian artery was either narrowed or obstructed. The most common symptom is upper-extremity claudication on the affected side. The patient may also have a history of blackout, vertigo, or imbalance. Likewise, some visual disorders or hemi-sensory dysfunction might be an indicative of subclavian steal syndrome. The noticeable fact is that in 2% of cerebral angiogram studies, subclavian steal syndromes are observed and they cause no symptoms. (2)

Other symptoms of acute subclavian artery occlusion include cold, painful, cyanosis, pulseless upper extremity. In general, the axillary, brachial, and radial pulses are not detectable or diminished and blood pressure between the affected and unaffected sides are mostly different (3).

#### **Laboratory and Imaging Studies**

These Laboratory studies are required: Complete blood cell count, prothrombin time, activated partial thromboplastin time, antithrombin III level, alpha-macroglobulin, plasminogen levels, fibrinogen, factor VII and VIII levels, protein C and S levels and factor V Leiden and factor II C20210-a level. So as to evaluate the arterial system, these procedures should be performed definitely: Arteriography, Computerized Axial Tomography Scanning (CATS), Magnetic Resonance Arteriography (MRA), and Color Doppler Sonography (CDS). (4)

#### **Treatment**

Subclavian artery thrombosis has two types of treatment, one of them is Medical Therapy and the other one is Surgical Therapy. As a general rule, at early diagnosis stage the purpose of medical therapy is to prevent gangrene and disability of upper extremity ischemia. After that, surgical intervention and anticoagulation might be employed as supplemental therapy. Subclavian artery thrombosis can be treated by means of surgery and in fact surgery is the treatment of choice for this condition. The

surgery involves embolectomy, angioplasty, stent implanting, and catheter-directed thrombolytic therapy. Some different bypassing procedures such as subclavian-carotid, subclavian-subclavian, and axillary-axillary can be utilized convincingly. (5)

#### **Case Report**

A 42-years-old woman was admitted to Ghaem hospital (Mashhad, Iran) with the following history started the day before: she woke up with severe headache and she vomited. After a short time, she ended up by feeling weak, vertigo, and her level of consciousness was decreased. She had articulation disorder as well. Observing her history, it was found that she had fallen down recently which caused some trauma to the left side of her body and had broken her left hand about 2 months earlier. This patient had a history of smoking, diabetes, and hyperlipidemia for 5 years. She denied habitual abortion or any cardiac diseases. She has been taking some medicine as prednisolone (for alopecia), indomethacin, lovastatin, OCP and some various kinds of herbal tea.

On examination, her left hand was cold, and painful on active and passive movements. Her left brachial, radial and ulnar pulses were not detected but some bruit was found out around her neck. Blood pressure in her left arm was significantly lower than the right arm (right arm Bp=120/80), (left arm Bp=86/41), and the pulse rate of both was 60 per minute. Furthermore, the force of the left hand obviously and meaningfully were decreased and there was an approved fracture at her forearm. Although no enlarged lymph nodes were detected at her neck, but the thyroid gland was slightly enlarged. Heart sounds were normal without any added sounds or murmurs. There were some suggestive widespread wheezing and rales in her lungs. Moreover, examination of her hair and skin revealed many alopecia areas of different size and at different spots on her scalp, and she had some distinctive spots on her complexion.

A full blood counts revealed hypochromic and microcytic anemia, while other factors of hematology profile were at normal measures. Her blood sugar was high although the blood urea nitrogen (BUN), creatinine, Natrium (Na), and Kalium (K) were normal. Prothrombin time and partial thromboplastin time were normal. Serum homocysteine, Anti-Nuclear Antibody, Anti-

cardiolipin, and Anti-Scleroderma Antibodies were normal, as well.

Electrocardiography (ECG) results were normal. Although at admission time an echocardiography was done which reflects the possibility of an aortic dissection, but ECG results rolled that out.

Afterwards, the CT Angiography displayed a large free and floating mass (4×1.5) with gelatinous appearance and central liquefied just at proximal part of DAO extended to the left subclavian artery. Subsequently, this highly mobile mass was conveyed to have bidirectional movement to the arch and DAO side. Besides, a distinct thickened thrombus was revealed at the left subclavian artery which led to severe arterial stenosis, augmented turbulence and transarterial gradient (Max, V=1.87m/s). However, no pericardial effusion, intact IAS, no ASD, and no LA/LAA clot were revealed and all PVS were proved to be normal. Finally, the CT Angiography conveyed a differential diagnosis as post traumatic subclavian dissection (SAD) which had extended to peri-arterial segments and led to a large free floating clot in distal part of arch and proximal part of DAO with severe LSA stenosis.

During operational procedure, an extensive blood clot (about 4×2 cm) was seen which had entirely barred LSA, plus a tiny tearing was found at the orifice of LSA. The clot was completely removed through our surgical mass removal procedure, and the tearing was repaired.

After surgery, left hand pulses plus radial, ulnar and the level of consciousness returned gradually. New brain CT-Scan did not demonstrate any disorders except the lesion that she had in her cerebellum before surgery. Trans Esophageal Echocardiography (TEE) didn't show any abnormality and her EF was reported to be 60%.

## Discussion

An unusual reason of acute upper extremity ischemia is thrombosis of subclavian artery. Correspondingly faulty formation of the aortic arch is uncommon (6). Although less than 1 percent of patients show symptomatic lesions, but it has been proved that 9 percent of the individuals who suffer from substantiated stenosis or obstruction of subclavian artery, generally the left subclavian is involved and the manifestations occurs secondary to the blockage of blood flow in the affected extremity (4).

Typically, a correct diagnosis is conducted based on arteriography of the subclavian artery. In addition, the hand should be held in hyperabduction position (7). All symptomatic patients must be treated, and disabling upper extremity ischemia and gangrene must be prevented by primeval diagnosis and subclavian artery thrombosis therapy (4). Embolectomy and thrombolysis are suggested for critical period (7). Applying catheter-directed thrombolytic therapy might be needed for superimposed clot formation in an area of stenosis. Long term anticoagulation therapy is not sufficient for a significant mechanical problem but it can be used as supplemental therapy after surgical intervention.

Corrective Surgery in subclavian artery thrombosis is a treatment of delicate. Angioplasty and stenting of stenotic and even obstructed arteries have been undertaken successfully with efficient patency rates and minimal morbidity. An effective method for treating subclavian artery stenosis, a method that has been approved, is Percutaneous Transluminal Angioplasty (PTA) (4). A following up comprising subclavian restenosis after PTA in a period of 5 years, demonstrated that restenosis rate was 6.67% in the first group and 40.75% in the second. Patients with a complete subclavian artery occlusion presented a higher risk of subclavian restenosis (8).

The obstructed artery may need a bypass procedure, depending on the occlusion location. The bypass alternatives include subclavian-carotid, subclavian-subclavian, and axillary-axillary bypasses. Other possible bypass choice is transposition of the subclavian artery to the ipsilateral carotid artery. Preoperative prophylactic antibiotic therapy in the form of a first-generation cephalosporin is indicated. Immediately after the operative procedure, the distal upper extremity pulses should be checked. The presence of Chylothorax is indicative of thoracic duct injury.

Accordingly, it is necessary to evaluate the postoperative effusions to check the presence of chyle. Similarly, it is required to perform post procedural angiography at prescribed times after the operative intervention in order to assess the patency of the graft or stent (4).

## Conclusion

An unusual reason of acute upper extremity ischemia is thrombosis of subclavian artery. Corrective Surgery in subclavian artery

thrombosis is a treatment of delicate.

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### Conflict of Interest

The authors declare no conflict of interest.

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