



Case Report

Acute upper limb ischemia following subclavian artery thrombosis: A Case Report

Nikhil Choudhary*, **Hailu Abera****, **Ranajit Naik*****

Consultant Interventional Cardiologist, **Assistant Professor, *Post graduate student in Cardiothoracic Surgery
Narayana Multispecialty Hospital, Jaipur, India*

***St. Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia*

Abstract

Introduction: Subclavian artery thrombosis is a rare cause of acute upper limb ischemia. It occurs in one of the subclavian arteries and patients present with upper limb pain, coldness, and pallor.

Case Presentation: We present a case of 32-year- male, who presented with left upper limb pain of eight hours duration. On examination, he had cold left hand, reduced left radial pulse and slightly pale fingers. Computed tomography angiogram and invasive angiogram of his left subclavian artery revealed a 40-50% occlusion of proximal left subclavian artery with big mobile thrombus filling 80-90% of the lumen.

Conclusion: Although acute subclavian artery thrombosis is uncommon, it is prudent to suspect in a young patient who present with sudden onset of upper limb pain. Intra-arterial thrombolysis is very effective for rapid revascularization of acutelimb ischemia. (Indian J Cardiol 2022;25 (1-2):58-61)

Key words: Acute limb ischemia, Subclavian artery Thrombosis, thrombolysis

Background

Acute subclavian artery thrombosis in the young age group is very rare. The causes of acute symptoms are embolism from the heart or aorta, trauma, and in-situ thrombosis from rupture of an atherosclerotic plaque. A patient with an acute occlusion of subclavian artery presents with upper limb pain, cold and feeble or absent radial pulse, and numbness of fingers. Unless diagnosed early, the limb can develop severe ischemia which subsequently progress to irreversible gangrene¹.

Case presentation

A 32-year-old Indian male presented to Narayana Multispecialty Hospital, Jaipur in February 2018 with a complaint of left upper limb pain of eight hours

duration. He had associated tingling and numbness over his fingers. His past medical history showed previous myocardial infarction and primary angioplasty and stenting of his left anterior descending coronary artery (LAD) in June 2010. He had since been on erratic follow-up and medication. He stopped his antiplatelet and statin therapy one month ago and continued cigarette smoking. On examination, blood pressure was 140/80 mmHg on right arm and 120/70 mmHg on left arm; pulse rate was 68 beats per minute and regular; chest was clear and resonant; the left radial pulse was feeble; the fingers were slightly cyanotic and cold, jugular venous pressure was not elevated; heart sounds were heard and there was no murmur or gallop rhythm. On investigation, complete blood count, urinalysis, liver and renal

Address for Correspondence :

Dr. Ranajit Naik, Narayana Multispecialty Hospital, Jaipur E mail- drranajitbn@gmail.com

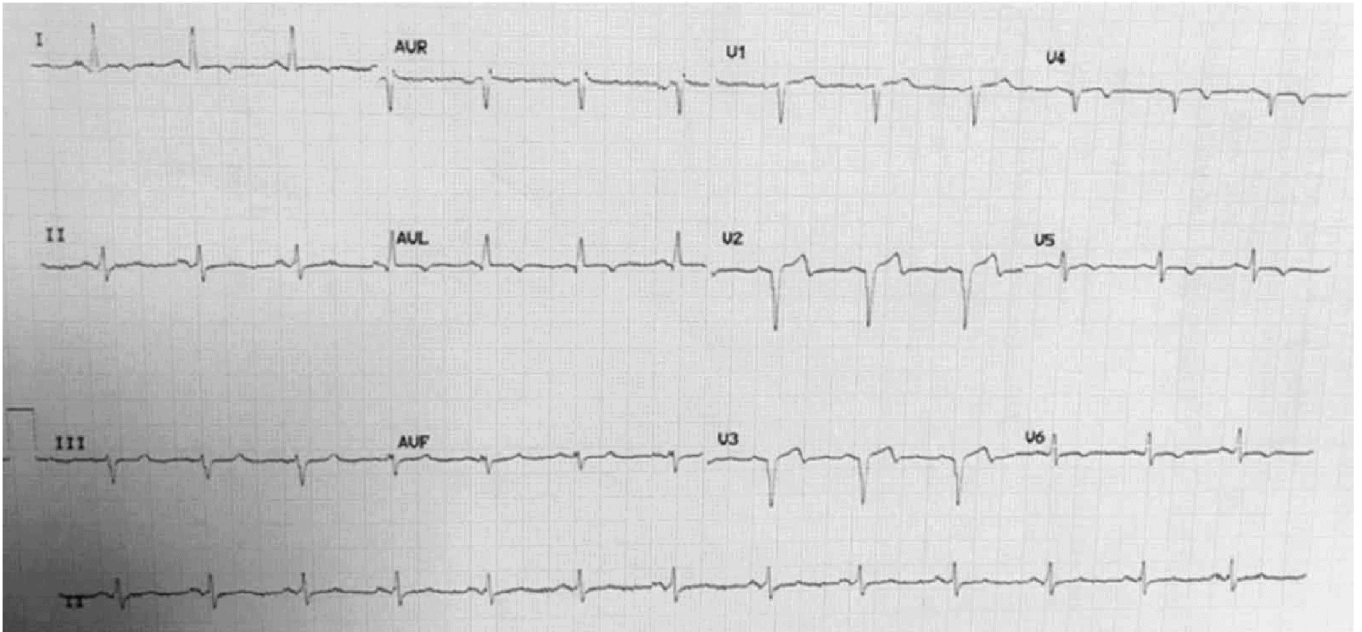


Fig. 1 : Electrocardiogram of the patient showing sinus rhythm, Q-waves from leads V1 to V4, and T-wave inversion on leads I, aVL, and V2-V6

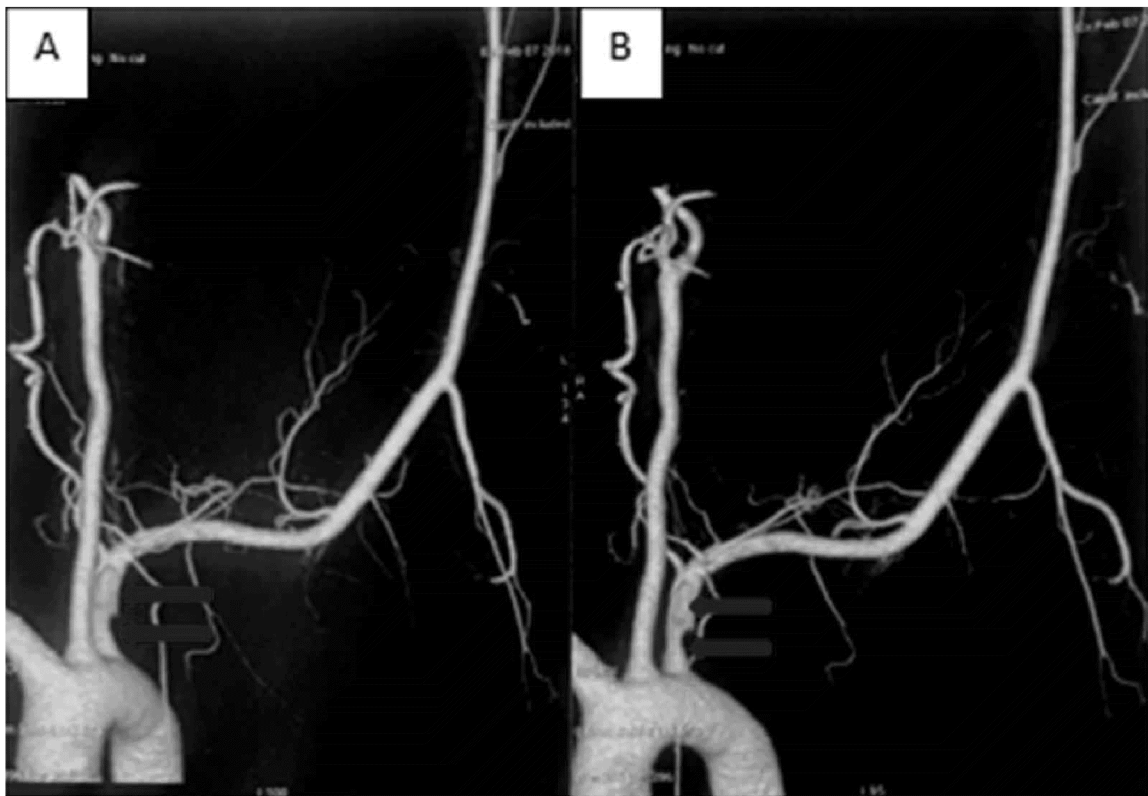


Fig. 2 : Left subclavian artery computed tomography angiogram showing partially occluded filling defect in the ostio-proximal segment and thrombus filling the lumen (red arrows).

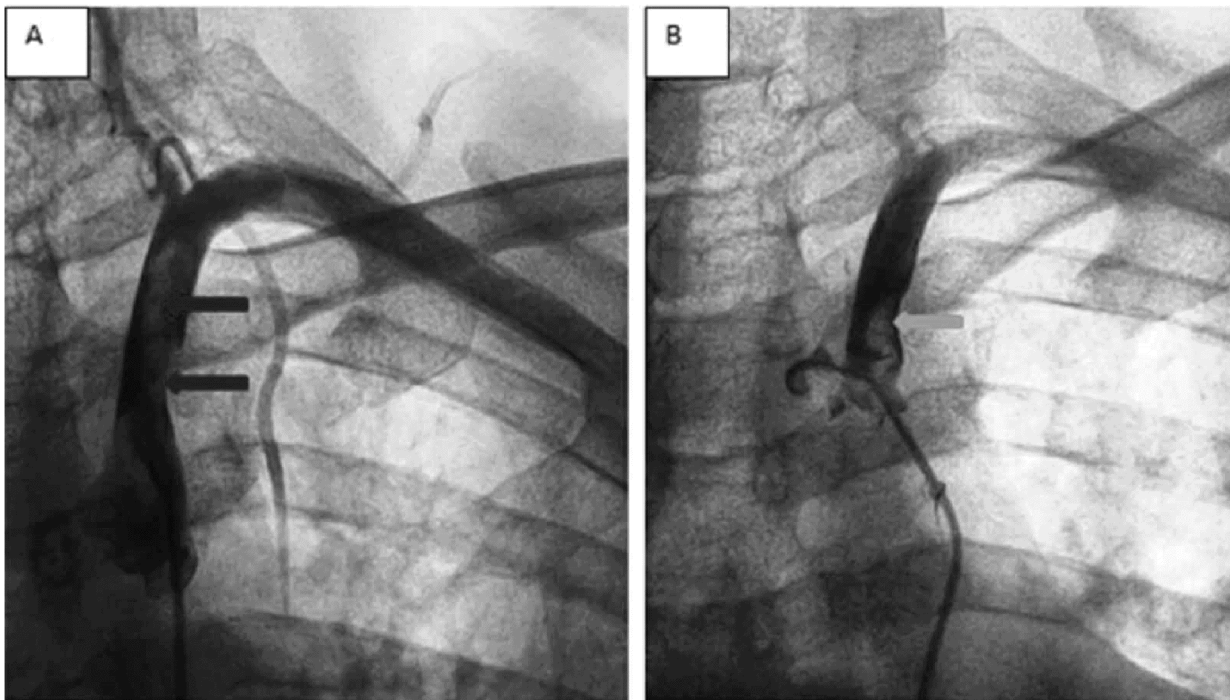


Fig. 3 : Left subclavian artery arteriogram showing (A) Ostio-proximal 40-50% stenosis with central thrombus filling 80-90% of the lumen before thrombolysis (red arrows), and (B) small remnant thrombus at ostio-proximal segment of left subclavian artery after thrombolysis (blue arrow).

function tests, serum electrolytes, and blood glucose levels were normal. His lipid panels showed total cholesterol 236mg/dl, LDL-cholesterol 143 mg/dl, HDL-cholesterol 51mg/dl, and triglyceride 210mg/dl. Thyroid stimulating hormone (TSH) was 23.1 μ IU/ml (normal range: 0.35-5.5). Electrocardiogram showed sinus rhythm, left axis deviation, Q-waves from leads V1 to V4, T-wave inversion on leads I, aVL, and V2-V6 [Figure 1]. Echocardiogram showed LAD territory hypokinesis, mild mitral regurgitation, and left ventricular ejection fraction (LVEF) of 30-35%. There was no left atrial or ventricular thrombus. Left upper limb computed tomography (CT) angiogram revealed hypodense (5mm by 25mm) partially occluded filling defect in the ostio-proximal segment of the left subclavian artery suggestive of partly occluding thrombus with proximal edge attached to the wall and distal edge floating freely in the lumen [Figure 2; A and B]. With a diagnosis of acute limb ischemia, the patient was advised to have immediate peripheral angiography and intra-arterial thrombolysis but he did not accept the offer. He was then admitted and started on intravenous unfractionated heparin infusion. After nearly 12 hours of heparin infusion

the patient had continuous pain on the left fingers and agreed for angiography. His peripheral angiography revealed proximal left subclavian artery 80-90% thrombotic occlusion [Figure 3; A and B]. Then a 5F Judkins right diagnostic catheter was put proximal to the thrombus and patient was started with intra-arterial alteplase infusion of 1mg/hour for 20 hours. Repeat angiography after the end of infusion showed significant dissolution of the thrombus [Figure 3; A and B]. The patient was also free of pain, and subsequently discharged with aspirin, clopidogrel, nicoumalone, rosuvastatin, metoprolol, ramipril, eplerenone and levothyroxine in stable condition.

Discussion

Acute upper limb ischemia constitutes 10-15% of all acute extremity occlusions. The commonest cause of upper limb ischemia is emboli in 90% of the cases. In the rest 10%, atherosclerosis and acute thrombosis are the main causes. Subclavian artery thrombosis is an uncommon cause of acute upper

limb ischemia with estimated prevalence below 1% in the general population and the commonest site involved is the left subclavian artery. On the other hand, emboli originate from the heart and end up obstructing the axillary artery or brachial artery. However, the primary lesions of atherosclerosis and acute thrombosis are located in the brachiocephalic trunk or in the subclavian artery. Embolization to the right arm is more frequent than to the left due to the vascular anatomy. Other less common causes of acute upper limb ischemia are inflammatory arteritis, thromboangitis obliterans, and coagulation disorders².

The most common symptom of subclavian artery thrombosis is upper extremity claudication on the affected side. The patient may also complain of vertigo, dizziness, loss of balance, or visual disturbances, indicative of a subclavian steal syndrome, a phenomenon of reversed flow in the vertebral artery ipsilateral to a hemodynamically significant stenosis or occlusion of the subclavian artery resulting in brain ischemia. However, atherosclerosis related upper limb occlusion is usually asymptomatic due to well-developed collaterals around the shoulder joint until thrombosis or distal embolization occurs³. Although our patient has obvious risk factors (coronary artery disease, dyslipidemia, and hypothyroidism) for the development of atherosclerotic plaque at the proximal segment of the left subclavian artery, thrombus formation at the site of lesion was the main reason for symptom onset.

The diagnosis of acute upper limb ischemia is usually apparent on the basis of detailed history and physical examination. The classic signs and symptoms of acute limb ischemia as represented by the "six P's" are pain, pallor, paralysis, pulse deficit, paresthesia, and poikilothermia. As seen in our patient, the most common findings on physical examination are cold extremity and diminished or absent radial pulse. Rest pain and gangrene are seen only when the obstruction is distal to the elbow and affects both of the paired arteries in the fingers. The diagnosis can be made easily with Duplex ultrasound or CT angiography of the affected limb. ECG and echocardiogram are useful to find out cardiac causes of emboli and peripheral angiography is the gold standard investigation that should then be performed to reveal the site and extent of the lesion. It may also help to distinguish an embolic occlusion from an in situ thrombosis^{1,3}.

The management of acute limb ischemia had

been limited to open surgical interventions that include balloon catheter thrombectomy, bypass, endarterectomy with or without patch angioplasty and intraoperative isolated limb thrombolysis. However, pharmacologic thrombolysis and percutaneous mechanical thrombectomy are now being practiced in numerous clinical settings. Randomized controlled trials have shown that percutaneous endovascular therapies are more effective in patients with ischemia of less than 2 weeks' duration. On the other hand, symptoms of greater than 2 weeks' duration are better managed with non thrombolytic techniques. Thrombolytic agents (mainly tissue plasminogen activators: alteplase and reteplase) are now widely used and have been successfully employed to dissolve occluding thrombi, reconstitute blood flow, and improve the status of the tissue bed supplied by the involved vascular segment. For patients with fresh thrombus or proximal location, thrombolysis should be the first choice. Intra-arterial thrombolytic therapy is administered through a catheter-directed approach to achieve local thrombus dissolution with very minimal systemic fibrinolysis. On the other hand, anticoagulation and control of risk factors are important in preventing thrombus propagation and recurrence^{4,5}.

In conclusion, even though acute subclavian artery thrombosis is a rare clinical entity, clinicians should suspect acute subclavian artery thrombosis in a young patient presenting with sudden onset of upper limb pain and numbness. Intra-arterial thrombolysis is an effective treatment strategy for rapid revascularization of the ischemic limb.

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