

Acute Limb Ischemia Masquerading as Stroke: A Case Report

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ABSTRACT

Background: Acute limb ischemia is an uncommon condition and the diagnosis may be missed as it may mimic more common conditions that cause sudden loss of function in a limb. The aim of this case report is to highlight the possibility of this clinical presentation and improve awareness among practitioners.

Methods: A summary of the case records of a patient with acute limb ischaemia presenting to the emergency unit of the University of Uyo Teaching Hospital and a review of available literature on the subject using Medline, Google and electronic journal database for relevant literature search.

Result: A 56year old hypertensive female with complicated with chronic atrial fibrillation presented with a simultaneous ALI and a transient ischemic attack. ALI resulted in foot gangrene and the patient refused surgical intervention. She died from overwhelming sepsis from foot gangrene. Though ALI is rare, the associated complications of limb loss and even death makes early diagnosis and urgent revascularisation a priority in the management.

Conclusion: This is a rare condition and a high index of suspicion is required especially in patients with a high risk for peripheral artery disease. An early and thorough evaluation of the limbs is essential to prevent loss of the limb. The diagnosis is usually made clinically with imaging to guide management. The management is to re-establish circulation using endovascular or surgical techniques.

INTRODUCTION

Acute limb ischemia (ALI) is a clinical entity caused by sudden loss of blood supply to a limb. It is characterised by pain and the loss of limb functions. It is a rare condition and a literature search of this condition in Nigeria turned up very little. Although it is rare, acute limb ischemia is usually associated with common conditions such as diabetes mellitus (DM), cardiovascular diseases and chronic peripheral artery disease and its presentation may be concealed by the complications of these conditions. The prognosis of this condition is not very good especially in severe cases as such early recognition of this condition is very crucial to save patient's limb or life. This case report describes the clinical characteristics of a middle aged woman with a simultaneous ALI and a transient ischemic attack.

CASE SUMMARY

A 56year old widow presented in the accident and emergency unit of the University of Uyo Teaching Hospital (UUTH) with complaints of loss of speech of 12 hours, pain and inability to move the right leg of 1 day duration. Loss of speech was sudden while patient was discussing with a friend. Although patient could hear clearly she was unable to vocalise. There was no unilateral loss of vision, no abnormal sensation and no facial deviation. A few hours later patient noticed a sharp pain in the right leg. The pain occurred suddenly and progressively increased in intensity the pain was associated with weakness. There was no preceding history of a fall or trauma to the leg and no prior pain on walking in the leg and no limb swelling.

She is a known hypertensive diagnosed 12 years ago and was placed on anti-hypertensive agents but she is not regular on her medications and

clinic appointments. The hypertension was complicated with chronic atrial fibrillation three years later and she was subsequently placed on digoxin to control the ventricular response. She was diagnosed with diabetes mellitus 3 years ago when she complained of persistent burning sensation in both feet and was subsequently put on Neurovite; a cocktail of B vitamins but she is not on any medication for the diabetes. She has not had any prior hospital admission or surgery. She is a widow with seven children and she is ten years post-menopause. Her husband died 14 years ago from acute complications of diabetes. She neither takes alcohol nor smokes tobacco.

Physical examination revealed a middle aged woman, not pale, afebrile, anicteric, not dehydrated, obese with a BMI of 38.2 kg/m² and waist circumference of 118cm. There was no pedal oedema.

She had a pulse rate of 76 beats per minute with a completely irregular rhythm and a thickened arterial wall. The heart rate was 120 beats per minute with a pulse deficit of 44 beats per minute. The blood pressure was 170/110 mmHg in the supine position. The jugular venous pulse was not raised and the apex beat was located in the 6th left intercostal space in the mid-clavicular line it was not heaving. The heart sounds were S₄, S₁ and S₂ with variable intensity of A₂ and no murmur.

She was conscious and well oriented in time, place and person. Memory and intellect were preserved. The pupillary reflexes were normal and the cranial nerves were intact. There was no cranial nerve deficit. Power was grade three in the muscles of the thigh but zero in the muscles of the right leg. All other limbs were normal. Tone and deep tendon reflexes of the right leg could not be examined due to the pain but they were normal in the other limbs. The peripheral pulses in both limbs were present but diminished. The patient had been taken to a private hospital close to where she lived where she was diagnosed to have a stroke and she was given an intravenous anti-hypertensive and she was subsequently referred to the University of Uyo Teaching Hospital (UUTH) Accident and

Emergency unit. By this time the loss of speech had resolved but the pain and weakness of the right lower limb persisted.

She was initially diagnosed with a right leg monoparesis secondary to a stroke involving the left anterior cerebral artery. She was commenced on anti-platelet, anti-oxidant and a statin. Fluid intake was augmented with infusion of normal saline and cerebral decompression was achieved with infusion of manitol. Blood was taken for serum electrolytes, urea and creatinine. A random blood sugar done revealed a value of 18.7mmol/L and she was commenced on sub-cut soluble insulin. The haematocrit was 42%.

By the second day the right leg had become shiny with severe pain and tenderness from the knee downwards. It was cold to touch and there was a loss of sensation over the right leg. There were absent dorsalis pedis and posterior tibial artery pulsations with tenderness on palpation of the popliteal artery with absent pulsation. The assessment was reviewed to acute limb ischemia secondary to a multiple cardiac thromboembolic phenomenon involving the intra cranial and popliteal vessels.

The electrocardiogram (ECG) showed features of atrial fibrillation while a trans-thoracic 2D echocardiogram showed eccentric hypertrophy of the left ventricle with dilated left and right atria. Doppler study of the right lower extremity showed extensive plaque formation in the femoral and popliteal arteries with reduced flow in the right popliteal artery with no flow in the anterior and posterior tibial arteries of the right lower limb. The Doppler study of the left lower extremity showed normal flow. She was commenced on parenteral antibiotics and low molecular weight heparin (Clexane^R).

The patient was updated on the diagnosis and was counselled on the need for amputation of the right leg. The orthopaedic surgeons were invited and they informed the relations of the need to perform an above knee amputation. The relations refused consent for the surgery and she subsequently developed gangrene of the right

leg. (See Figure 1) She succumbed to an overwhelming sepsis after one week on Admission.

DISCUSSION

Acute limb ischemia can be defined as a sudden loss of blood supply to a limb that threatens the viability of that limb¹. The sudden loss of blood supply to the limb prevents the establishment of collateral vessels to circumvent the occlusion and without urgent revascularization, the limb may be lost. The incidence of this condition is approximately 1.5 cases per 10,000 persons per year in the America². In Nigeria the true incidence is unknown but there are a few case reports with varied etiology. Isezuo et.al. have described two cases of ALI from Northern Nigeria. The first case was secondary to a possible hypercoagulable state in a 30 year old grand multiparous woman with peri-partum cardiomyopathy³ and the second case was secondary to cardiac embolization⁴. Akiode et.al. in Sagamu, South-West Nigeria also described a case of ALI secondary to trauma⁵.

The symptoms of this condition may include a new or unusually more severe intermittent claudication in the limb or pain in the limb at rest. Other symptoms include abnormal sensation, muscle weakness and paralysis of the limb. On physical examination the limb may appear pale or the skin may show mottling. The limb will be cold to touch and the peripheral pulses will be absent distal to the occluded vessel. Neurological examination will reveal loss of sensation and limb weakness.

Acute limb ischemia may result from thrombosis of an artery or a bypass graft. It may also result from an embolus from the heart (atrial fibrillation, myocardial infarction, left ventricular aneurysm, scarred heart valves or prosthetic heart valves) or a large vessel. Patients with thrombophilic conditions may develop a thrombus in a normal vessel.

There is a high rate of complications among these patients. Despite early recognition and prompt treatment, limb amputation will occur in up to 15% of patients and about 20% of the

patients will be dead within a year of diagnosis^{6,7}

INITIAL ASSESSMENT

The initial evaluation a patient presenting with acute limb ischemia should begin with a good history to determine the presence of risk factors. A history of diabetes, systemic hypertension, and previous history of intermittent claudication may point to atherosclerosis. While a history of connective tissue disease will point to vasculitis. A history of cardiac failure, atrial fibrillation, myocardial infarction or prosthetic heart valves may point to the heart as the source of the embolus. A recent history of trauma is important as a traumatized vessel will encourage thrombus

Figure 1: Clinical Photograph



Table 1 stages of acute limb ischemia*

Stage	Description	Findings		Doppler	
		Sensory loss	Muscle weakness	Arterial	Venous
I	Viable limb, not immediately threatened	None	None	Audible	Audible
II	Limb threatened				
IIa	Minimally threatened, can be salvaged with prompt treatment	Minimal or none	None	Often inaudible	Audible
IIb	Immediately threatened, can be salvaged with prompt revascularisation	Moderate with pain at rest	Mild to moderate	Inaudible	Audible
III	Irreversible limb damage	Severe, anaesthetic	Complete paralysis	Inaudible	Inaudible

* Data are from the Society for Vascular Surgery standards

formation.

A detailed examination of the affected limbs is essential to detect signs of loss of vascular supply. This will, include pallor or a mottled appearance of the affected limb as well as reduced temperature on palpation. Sensory modalities as well as power should be assessed on the limb. Palpation of the peripheral pulses should be carried out and the flow of blood should be assessed with a Doppler device. If the flow is

audible, the perfusion pressure should be measured and if this is less than 50mmHg then limb ischemia is likely. Acute limb ischemia can be categorised into 4 groups based on the initial evaluation.

The stage of the disease will determine the next step: the need for further investigation and the management approach. A balance must be struck between the need for urgent revascularisation and the time it will take to perform imaging and other investigations. Due to the imminent threat to limb viability only imaging modalities that will localise the occlusion and determine the extent of it should be considered prior to intervention. A search for the cause will usually follow the relief of the occlusion.

Treatment

The treatment of acute limb ischemia is urgent revascularisation either by endovascular or open surgical means but may require a combination of the two more often than not.

Endovascular Revascularization

This involves the use of a catheter based technique to open up a blocked vessel with the use of drugs, mechanical device or both. The operator will have to position a catheter with multiple pores across the thrombosed vessel and deliver the thrombolytic agent directly into the thrombus. The thrombolytic agent is usually administered over a 24-48 hour period⁹. Currently used thrombolytic agents include alteplase, reteplase and tenecteplase. These agents work by the enzymatic conversion of plasminogen to plasmin, which then breaks down the thrombus¹⁰. Complete or partial revascularization with satisfactory clinical outcome may occur in up to 92% of patients using catheter based technique^{6, 11}. Distal embolization from the degrading thrombus usually occurs but this clears up during thrombolytic infusion⁶. Bleeding is the most common serious complication and a major haemorrhage may occur in up to 9% of patients¹². The risk of bleeding increases with intensity and duration of thrombolysis, age, low platelet count and hypertension¹³.

There are a number of percutaneous mechanical devices for aspiration, rheolysis, mechanical fragmentation, and ultrasonography-assisted fibrinolysis. These can be used alone or in combination with pharmacological thrombolytic agents. These devices have the potential to rapidly restore blood flow and shorten the duration of therapy¹⁴. The contra-indications to this therapy will include patients who require urgent revascularisation (less than 24 hours to loss of limb viability) non-viable limb, infected bypass graft and patients who cannot tolerate pharmacological thrombolysis².

Surgical Revascularization

Surgical approaches to the management of acute limb ischemia will include thromboembolectomy, bypass surgery, and adjuncts such as endarterectomy, patch angioplasty, and intraoperative thrombolysis.² A diseased vascular segment will promote thrombus formation and occlusion. If this is the case correction of the underlying vascular abnormality is essential.

The return of a palpable foot pulse, visible improvement of foot perfusion such as rubor, capillary refill and increased temperature as well as audible arterial Doppler signals suggest successful revascularisation. Therapeutic anticoagulation with heparin is reinstated after the procedure. If vasospasm supervenes, vasodilators such as nitro-glycerine may be useful.

The different treatment options have their pros and cons. A meta-analysis by Berridge et.al.¹⁵ comparing catheter-directed thrombolysis with surgery for acute limb ischemia showed similar rates of limb salvage, but thrombolysis was associated with higher incidence of haemorrhagic stroke and other major haemorrhages within one month. Based on available evidence, Creager et.al.² concluded that catheter-directed thrombolysis has the best results in patients with a viable or marginally threatened limb, occlusion no more than two weeks' duration, thrombosis of a synthetic graft or an occluded stent, and at least one

identifiable distal runoff vessel. Surgical revascularization techniques are generally preferred for patients with an immediately threatened limb or with symptoms of occlusion for more than two weeks¹⁶.

The restoration of blood supply may result in reperfusion injury to the target limb; limb swelling and acute compartment syndrome. This will present with symptoms and signs such as severe pain, hypoesthesia, and weakness of the affected limb¹⁷. If the compartment syndrome occurs, surgical fasciotomy is indicated to prevent irreversible neurologic and soft-tissue damage. These patients will require close monitoring after limb reperfusion to prevent renal, pulmonary and cardiac complications¹⁸.

Long-Term Management

After successful revascularisation, long term antiplatelet therapy will be required for patients with acute limb ischemia from a thrombus on an atherosclerotic plaque. Patients with thrombophilia or a cardiac embolism as the cause of the acute limb ischemia will require anticoagulation with warfarin.

CONCLUSION

ALI is a rare condition and the clinical features may be masked by features of other comorbidities in the early stages. A high index of suspicion is required to recognise this condition especially in the face of risk factors. The index patient had poor glycaemic control, hypertension, atherosclerosis, chronic peripheral artery disease and atrial fibrillation. It is pertinent to note that ALI though rare shares clinical features with some more common complications of DM such as stroke, diabetic polyradiculopathy and diabetic mononeuropathy. The initial patient presentation i.e. loss of speech with inability to move the right lower limb due to the simultaneous cerebral and peripheral artery occlusion, confounded the initial evaluation causing a delay in the diagnosis of ALI. Early recognition and the prompt institution of appropriate treatment are essential to prevent

limb loss and/or death.

REFERENCES

1. Norgren L, Hiatt WR, Dormandy JA, Nehler MR, Harris KA, Fowkes FG. Inter-Society Consensus for the Management of Peripheral Arterial Disease (TASC II). *J Vasc Surg* 2007;45 Suppl:S5-S67.
2. Creager MA, Kaufman JA, Conte MS. Acute Limb Ischemia. *N Engl J Med* 2012;366:2198-206.
3. Isezuo , Njoku CH, Airede L, Yaqoob I, Musa AA, Bello O. Case Report: Acute Limb Ischaemia and Gangrene associated with Peripartum Cardiomyopathy. *Niger Postgrad Med J*. 2005;12(3):237-40
4. Isezuo SA, Musa AA, Saidu SA. Multiple embolisations in rheumatic heart disease: a case report. *West Afr J Med*. 2009 ;28(4):274-6
5. Akiode O, Shonubi O, Musa A, Sule G. Major limb amputations: an audit of indications in a suburban surgical practice. *J Natl Med Assoc*. 2005; 97(1): 7478.
6. Eliason JL, Wainess RM, Proctor MC, Dimick JB, Cowan JA Jr, Upchurch GR Jr, et al. . A national and single institutional experience in the contemporary treatment of acute lower extremity ischemia. *Ann Surg* 2003;238:382-9.
7. Earnshaw JJ, Whitman B, Foy C. National Audit of Thrombolysis for Acute Leg Ischemia (NATALI): clinical factors associated with early outcome. *J Vasc Surg* 2004;39:1018-25.
8. Rutherford RB, Baker JD, Ernst C, Johnston KW, Porter JM, Ahn S, et.al. . Recommended standards for reports dealing with lower extremity ischemia: revised version. *J Vasc Surg* 1997;26:517-38. [Erratum, *J Vasc Surg* 2001;33:805.
9. Morrison HL. Catheter-directed thrombolysis for acute limb ischemia. *Semin Intervent Radiol* 2006;23:258-69.
10. Bachmann F. The plasminogen-plasmin enzyme system, in RW Colman (eds). *Hemostasis and Thrombosis: Basic*

