

Case Report

Lower Limb Ischemia in Atrial Fibrillation: Unusual Presentation

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Abstract

Introduction: Thrombosis and embolism are the common causes of acute arterial occlusion. Thrombosis mostly arises from underlying cardiac disease such as atrial fibrillation while arterial occlusion by embolism. Thus, an ischemic limb can result from acute arterial occlusion. Early proper diagnosis and prompt treatment within critical time by emergency physician at the initial clinical interviewing is important in saving the affected leg and the life, thus, avoiding limb amputation and death. This paper reports a case in which the cause of acute ischemia of limb was proved with some diagnostic tests to be atrial fibrillation.

Keywords: Atrial fibrillation, Ischemia of Lower limb, Thromboembolism

Introduction

Acute lower limb ischaemia (ALI) occurs when there is a sudden lack of blood flow to a limb.¹ It is caused by embolism or thrombosis.² Thrombosis is usually caused by peripheral vascular disease while an embolism is usually of cardiac origin.³

It occurs when arterial occlusion results in the sudden cessation of blood flow to an extremity. The severity of ischemia and the viability of the extremity depend on the location and extent of the occlusion and the presence and subsequent development of collateral blood vessels.

It can occur in patients through all age groups. People who are smoker and have diabetes mellitus are at a higher risk of developing acute limb ischaemia. Most cases involve people with atherosclerosis problems.⁴ The Symptoms of acute limb ischaemia are referred with the six P's, i.e.: pain, pallor, paresthesias, perishingly cold, pulselessness, and paralysis.⁵ Proper management of acute lower limb ischemia is determined by the underlying etiology (embolic

or thrombotic). Correct diagnosis of variable clinical clues can prevent improper surgical intervention and repeated events.¹ Prompt diagnosis and revascularization can lead to limb salvage whereas delayed recognition can place patient at high risk of significant morbidity including limb loss and potentially mortality.

Valvular atrial fibrillation (AF) is the most common cardiac arrhythmia, with an overall prevalence of about 1%. The prevalence increases with age and coexisting cardiopulmonary disease. AF predisposes to thrombus formation, especially in the left atrial appendage, with risk for subsequent thromboembolism ranging from ischemic stroke to acute limb ischemia. Thus, atrial fibrillation can be one of the most important causes of lower limb ischaemia. Early detection with immediate proper medical and surgical care can prevent permanent disability.

Case Report

A 45 year old female patient was admitted to the Emergency ward of BPKIHS with complains of progressive bilateral leg pain and difficulty in walking and standing for three days.

Her medical history showed hypertension on irregular medication for few years. But, she had

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no history of diabetes, peripheral vascular disease, valvular heart disease, atrial fibrillation, hypercoagulable disorder, or smoking. Family history did not yield any remarkable findings.

On physical examination, the patient's blood pressure was 130/90 mmHg; pulse 140 beats per minute; temperature and respiratory rate were normal. Her bilateral legs had no pulsation on femoral, popliteal and dorsalis pedis artery, and had cold mottled skin. She had normal heart sound, with no murmurs.

A thorough blood investigation including coagulation profile was found normal. The chest X-ray revealed mild cardiomegaly without active lung lesions. ECG showed atrial fibrillation with controlled heart rate (figure 1), later, restored to normal sinus rhythm (figure 2).

Echocardiography was normal without any clots, vegetation and septal defects.

On further evaluation, MRI of brain showed cerebellar infarcts. In order to find vascular lesions of the affected limb, we performed Venous Doppler study which was also normal. On further evaluation, the contrast-enhanced computer tomographic angiography of bilateral lower limbs arteries revealed intraluminal hypodense material with complete occlusion of left external iliac and common femoral arteries, left proximal peroneal and posterior tibio-peroneal trunk (Fig. 3, 4). The cause of ischemic limbs of the patient proved an embolic episode by atrial fibrillation. The patient was treated successfully with oral anticoagulant and antihypertensive drugs without need of any surgical intervention.

Clinical Photography:

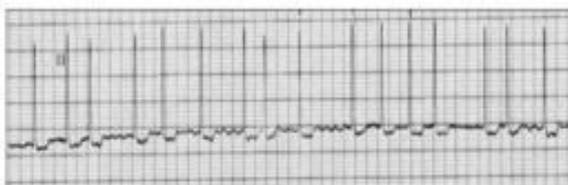


Figure 1: The paroxysmal atrial fibrillation was shown on electrocardiogram, when she visited an emergency room with lower limb weakness



Figure 2: The rhythm was converted to normal sinus rhythm



Figure 3: Computer tomographic angiography of low extremities shows occlusion of the right popliteal artery



Figure 4: Computer tomographic angiography of low extremities

Discussion

In our context, atrial fibrillation (AF) is the most common cardiac rhythm disturbance observed increasingly at the elderly population and has numerous potential complications; such as: stroke, thromboembolism leading to lower limb ischaemia. In a large cohort study of AF, the stroke rate in patients with paroxysmal AF (PAF) is same with that in patients with permanent AF.² These results imply that the patients with Paroxysmal atrial fibrillation (PAF) should be treated like persistent or permanent AF.³

It is the most common sustained arrhythmia in the general population and is associated with increased rates of morbidity and mortality.^{6,7,8} The prevalence of AF in patients with risk factors for atherothrombosis or established atherothrombosis, such as peripheral artery disease, is substantially higher compared with the general population.⁹ Patients with a history of both AF and established atherothrombosis or with multiple risk factors for atherothrombosis have an approximately two fold increase in the composite of cardiovascular death, myocardial infarction, or stroke compared with patients without AF.¹⁰ Patients with AF have an additional incidence of aorto-iliac and lower-extremity arterial thrombo-embolism of about 0.4%/ year.^{1,2} In the developed countries, acute lower limb ischaemia (ALI) is estimated to occur in 14 out of every 100,000 people per year.⁴ With proper surgical care, ALI is a highly treatable condition; however, delayed treatment beyond 6 to 12 hours can result in permanent disability, amputation, and/or death.

Acute limb ischemia (ALI) is characterized by an acute onset of pain, paralysis, paresthesia, pulselessness and paleness.^{1,3,4} Physical findings

include loss of pulses distal to the occlusion, cyanosis or pallor, mottling, decreased skin temperature, muscle stiffening, loss of sensation, weakness, and/or absent deep tendon reflexes.

The severity of symptoms varies considerably among patients, depending on the location, duration, and the extent of arterial occlusion as well as the volume of collateral perfusion.^{3,5} The classic progression of symptoms in atherosclerotic lower extremity ischemia is decreased pulses without any symptoms¹, intermittent claudication², rest pain³, and arterial ulceration or gangrene⁴. Peripheral arterial occlusive disease due to atherosclerosis is the most common cause of lower extremity ischemia in developed countries with 3% to 6% of the population over the age of 65 suffering from symptomatic disease.⁶ Limb ischemia should always be considered in the evaluation of the older patient who presents with a non healing ulcer of the lower extremities, or with an extensive or persistent skin or soft tissue infection of the foot.

The physician should examine all peripheral pulses on patient's both legs with supine position to determine the level of arterial occlusion. Gold standard of diagnosis is arteriography. The imaging modalities are duplex ultrasound, computed tomographic angiography and magnetic resonance angiography which are used to confirm and demonstrate the location and extent of arterial occlusion.^{1,14}

Embolic arterial occlusion is the etiology of the acute ischemia in 15% of the patients while arterial thrombosis is found to be in 85% of patients, most of whom have atherosclerotic disease. With embolic occlusion, a cardiac

origin is the source of emboli in 80-90% of cases, usually in the setting of AF or acute myocardial infarction. Embolic occlusion brings dramatic limb ischemia and is the most frequent cause of acute limb ischemia.¹⁴ The treatments for acute limb ischemia are clot removal by catheter-directed thrombolysis with or without percutaneous mechanical thrombectomy, surgical thromboembolectomy followed by correction of underlying arterial lesions, and anticoagulation with continued observation.¹⁵ Embolic occlusion occurred recurrently in 9% of patients who were appropriately anticoagulated compared with 31% of patients who were not anticoagulated.¹⁶

Arterial thromboembolism is the most serious complication of AF, especially ischemic strokes. Stroke rates are similar among paroxysmal, persistent and permanent AF.¹¹⁻¹³ AF is one of causes of the arterial embolism on lower limb. In AF, the annual incidence of acute limb ischemia is 0.4% (lethality 16%).^{17,18} Thus, atrial fibrillation is thought to be the cause of lower limb vessel embolism on this reported case.

The AF Clopidogrel Trial with Irbesartan for prevention of Vascular Events (ACTIVE W) showed that oral anticoagulation with warfarin is superior to the combination of Clopidogrel plus Aspirin for the prevention of vascular events.¹⁹ In AF, Warfarin reduces the risk of thromboembolic stroke by < 50%, also halves the risk of systemic thromboembolism.²⁰ Therefore, the patient's history, symptoms and clinical findings strongly suggest ischemic limb or foot such as an arterial embolism of lower extremities. So, an immediate diagnostic work-up and initiation of treatment or the consultation

to specialists are necessary to avoid complications.

Conclusion

Atrial fibrillation is prevalent in patients with lower limb ischaemia and is associated with substantial long-term risk of cardiovascular events. Patients with lower limb ischaemia and atrial fibrillation require special attention to reduce complications and improve outcome. Thus, High index of suspicion and prompt treatment can limit or even prevent permanent disability.

References

1. Gregory WT. Acute Limb Ischemia. *Techniques in Vascular and Interventional Radiology*. 2009; 12(2): 117129. doi:10.1053/j.tvir.2009.08.005. PMID 19853229.
2. Creager MA, Kaufman JA, Conte MS. Acute Limb Ischemia. *New England Journal of Medicine*. 2012; 366 (23): 2198-2206. doi:10.1056/NEJMcpl006054. PMID 22670905.
3. Klonaris C, Georgopoulos S, Katsargyris A, Tsekouras N, Bakoyiannis C, Giannopoulos A, Bastounis E. Changing patterns in the etiology of acute lower limb ischemia. *International Angiology: A Journal of the International Union of Angiology*. March 2007; 26 (1): 49-52. PMID 17353888.
4. Marcus B, Jenkins MP. Acute and chronic ischaemia of the limb. *Surgery (Oxford)* 2008; 26 (1): 17-20. doi:10.1016/j.mpsur.2007.10.012.
5. Brearley S. Acute leg ischaemia. *BMJ (Clinical Research Ed.)*. May 8,

2013. 346: f2681. doi: 10.1136/bmj.f2681. PMID 23657181.
6. Camm AJ, Kirchhof P, Lip GY, Schotten U, Savelieva I, Ernst S et.al. Guidelines for the management of atrial fibrillation: the Task Force for the Management of Atrial Fibrillation of the European Society of Cardiology (ESC) European Heart Rhythm Association; European Association for Cardio-Thoracic Surgery *Eur Heart J*, 2010; 31(19): 2369-2429.
 7. SCL Hart, DJ Hole, JJ McMurray. A population-based study of the long term risks associated with atrial fibrillation: 20-year follow-up of the Renfrew/Paisley study *Am J Med*, 2002; 113(5): 359-364.
 8. Pokorney SD, Piccini JP, Stevens SR, Patel MR, Pieper KS, Halperin JL, et.al. ROCKET AF Steering Committee & Investigators, ROCKET AF Steering Committee Investigators. Cause of death and predictors of all-cause mortality in anticoagulated patients with nonvalvular atrial fibrillation: data from ROCKET AF *J Am Heart Assoc*, 2016; 5(3): e002197 [CrossRefGoogle Scholar](#)
 9. Goto S, Bhatt DL, Rother J, Alberts M, Hill MD, Ikeda Y et.al. Prevalence, clinical profile, and cardiovascular outcomes of atrial fibrillation patients with atherothrombosis. *Am Heart J*, 2008; 156(5): 855-863.
 10. Ruff CT, Bhatt DL, Steg PG, Gersh BJ, Alberts MJ, Hoffman EB, et.al., REACH Registry Investigators Long-term cardiovascular outcomes in patients with atrial fibrillation and atherothrombosis in the REACH Registry *Int J Cardiol*, 2014; 170(3): 413-418.
 11. O'Connell JB, Quiñones-Baldrich WJ. Proper evaluation and management of acute embolic versus thrombotic limb ischemia. *Semin Vasc Surg*. 2009; 22: 10-16.
 12. Hart RG, Pearce LA, Rothbart RM, McAnulty JH, Asinger RW, Halperin JL Stroke Prevention in Atrial Fibrillation Investigators. Stroke with intermittent atrial fibrillation: incidence and predictors during aspirin therapy. *J Am Coll Cardiol*. 2000; 35: 183-187.
 13. Hohnloser SH, Pajitnev D, Pogue J, Healey JS, Pfeffer MA, Yusuf S, et.al. Incidence of stroke in paroxysmal versus sustained atrial fibrillation in patients taking oral anticoagulation or combined antiplatelet therapy: an ACTIVE W Substudy. *J Am Coll Cardiol*. 2007; 50: 2156-2161.
 14. Walker TG. Acute limb ischemia. *Tech Vasc Interv Radiol*. 2009; 12: 117-129.
 15. Rutherford RB. Clinical staging of acute limb ischemia as the basis for choice of revascularization method: when and how to intervene. *Semin Vasc Surg*. 2009; 22: 5-9.
 16. Green RM, DeWeese JA, Rob CG. Arterial embolectomy before and after the Fogarty catheter. *Surgery*. 1975; 77: 24-33.
 17. Saliba W. Incidental atrial fibrillation and its management. *Postgrad Med*. 2011; 123: 27-35.
 18. Menke J, Luthje L, Kastrup A, Larsen J. Thromboembolism in atrial fibrillation. *Am J Cardiol*. 2010; 105: 502-510.
 19. ACTIVE Writing Group of the ACTIVE Investigators. Connolly S, Pogue J, Hart R,

- Pfeffer M, Hohnloser S, et al. Clopidogrel plus aspirin versus oral anticoagulation for atrial fibrillation in the Atrial fibrillation Clopidogrel Trial with Irbesartan for prevention of Vascular Events (ACTIVE W): a randomised controlled trial. *Lancet*. 2006; 367: 1903-1912.
20. Hart RG, Pearce LA, Aguilar MI. Meta-analysis: antithrombotic therapy to prevent stroke in patients who have nonvalvular atrial fibrillation. *Ann Intern Med*. 2007; 146: 857-867.