

Acute Limb Ischemia



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KEYWORDS

- Acute limb ischemia • Aspiration devices • Catheter directed thrombolysis
- Percutaneous mechanical thrombectomy • Severe limb ischemia • Thromboembolectomy

KEY POINTS

- Acute limb ischemia is a vascular event presenting with sudden decrease in limb perfusion (of <14 days' duration) that threatens limb viability.
- Acute thrombosis of the native artery or graft makes up the bulk of etiopathogenesis.
- Prompt revascularization is the cornerstone of management of acute limb ischemia as long as the limb has not undergone irreversible tissue and nerve damage.
- Amputation is performed in patients with irreversible tissue and nerve damage.

INTRODUCTION AND EPIDEMIOLOGY

Acute limb ischemia (ALI) is considered a vascular emergency. It comprises 10% to 16% of the vascular workload.¹ Despite several advances in the management of peripheral arterial disease (PAD), the morbidity and mortality associated with ALI is high when compared with the other clinical syndromes of PAD. ALI is a clinical syndrome of less than 14 days' presentation, which is defined as a sudden decrease in limb perfusion in which the limb viability is threatened.² The term "acute ischemia" does not imply severe ischemia, but that the survival of the limb is in immediate jeopardy.^{3,4} There are approximately 13 to 17 cases per 100,000 persons per year.^{5,6} Earnshaw⁷ reports that a vascular unit serving a community of half a million people can expect to treat at least 75 cases of ALI in a year. The incidence is higher in regions with an older patient population with multiple medical comorbidities, especially with congestive heart failure and atrial fibrillation. It is also high among the PAD subpopulation that undergo endovascular and surgical procedures. Upper extremity ALI is uncommon because of the extensive collateral network and

the infrequency of atherosclerosis and accounts for only 17% of all the ALI cases.⁸ The annual incidence of upper-extremity ALI is reported at 1.2 to 3.5 cases per 100,000 persons per year.⁹ Men and women are equally affected. Patients tend to be middle aged and older.

ETIOLOGY

The different causes leading to ALI can be broadly categorized into 3 mechanistic categories, which include embolism, thrombosis, and other causes (as listed in **Table 1**). The approach to the etiopathogenesis of ALI also can be segregated as upper-extremity and lower-extremity ALI. In lower-extremity ALI, the proportion of cases from in situ thrombosis is on the rise and that of embolism has been on the decline in the past few decades. This trend is a consequence of the increasing number of endovascular and surgical procedures performed and the effective management of atrial fibrillation and congestive cardiac failure. Klonaris and colleagues¹⁰ found that 50% of ALI cases were due to in situ thrombosis, 40% were embolic in origin, and 10% were from other miscellaneous causes. When looking at the North

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Table 1
Causes of acute limb ischemia

Embolic (40%)	Thrombotic (50%)	Other Etiologies (10%)	Upper Extremity Etiologies
<p><i>I. Cardiac Source (80%)</i></p> <ul style="list-style-type: none"> a. Atrial fibrillation b. Left ventricular thrombus c. Left atrial myxoma or other cardiac tumors d. Valvular heart disease <ul style="list-style-type: none"> i. Infective endocarditis ii. Prosthetic valve thrombosis iii. Rheumatic valve disease e. Paradoxical embolism via patent foramen ovale <p><i>II. Vascular tree source</i></p> <ul style="list-style-type: none"> a. Aneurysms (aortic, iliac, popliteal) b. Atherosclerotic plaque <p><i>III. Procedure related</i></p> <ul style="list-style-type: none"> a. Coronary artery bypass b. Endovascular procedures <p><i>IV. Other</i></p> <ul style="list-style-type: none"> a. Air b. Amniotic fluid c. Tumor d. Fat e. Intra-arterial drug injection 	<p><i>I. Underlying PAD related</i></p> <ul style="list-style-type: none"> a. De novo plaque rupture (30%) b. Stent and graft thrombosis (70%) c. Thrombosed aneurysm d. Severe hypoperfusion from cardiogenic shock <p><i>II. Absence of underlying PAD</i></p> <ul style="list-style-type: none"> a. Arteritis with thrombosis <ul style="list-style-type: none"> i. Giant cell arteritis ii. Thromboangiitis obliterans b. Catheter associated c. Hypercoagulable <ul style="list-style-type: none"> i. Antiphospholipid antibody syndrome ii. Malignancy iii. Hyperviscosity syndromes d. Popliteal adventitial cyst e. Popliteal entrapment f. Vasospasm g. Ergotism h. Cocaine i. Vasopressor 	<ul style="list-style-type: none"> a. Arterial trauma b. Aortic or arterial dissection c. HIV arteriopathy d. Compartment syndrome e. Phlegmasia cerulea dolens (treat the underlying venous thrombosis) f. External compression 	<ul style="list-style-type: none"> a. Embolism (>75%); most (>70%) are cardioembolic b. Thrombosis c. Trauma d. Dissecting aneurysm e. Small vessel disease f. Radiation fibrosis g. Hypercoagulable states h. Inflammatory vasculitides i. Arterial catheterization j. Thoracic outlet obstruction

Data from Refs.^{2,3,7,8,84}

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