



SPECTRUM
VASCULAR & GENERAL SURGERY
血管外科及综合外科



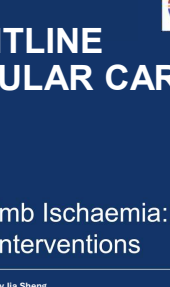
FARRER PARK
HOSPITAL

FRONTLINE VASCULAR CARE 2026

Acute Limb Ischaemia: Critical Interventions



Dr. Tay Jia Sheng
MBBS (Singapore), M.Med (Surgery), FRCSed (Gen Surg), FAMS
MCR No. M11772B
Vascular, Endovascular & General Surgeon



COMFORT. FAITH. VALUE.



Overview

- Definition
- Clinical Presentation
- Etiology
- Classification
- Investigations
- Management

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Definition of Acute Limb Ischemia

- Sudden decrease in limb perfusion causing potential threat to limb viability
- 6Ps
 - Pain
 - Pallor
 - Paraesthesia
 - Pulselessness
 - Paralysis
 - Perishingly cold
- Time is tissue

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Etiology

- Arterial Thrombo-embolism
 - AF
 - LV thrombi post AMI
 - Proximal aneurysms/plaque
- Acute thrombosis
- Endovascular stent/bypass graft occlusion
- Iatrogenic
- Aortic dissection

Box 8.1 • Aetiology of acute lower limb ischaemia

Thrombosis

- Atherosclerosis
- Popliteal aneurysm
- Bypass graft occlusion
- Endovascular stent or stent graft occlusion
- Iatrogenic (localised arterial dissection post endovascular intervention, e.g. arterial closure device failure)
- Thrombotic conditions

Embolism

- Atrial fibrillation
- Mural thrombosis
- Vegetations
- Proximal aneurysms
- Atherosclerotic plaque

Rare causes

- Dissection
- Trauma (including iatrogenic)
- Illicit drug use
- External compression
- Popliteal entrapment
- Cystic adventitial disease
- Lympho-endothelitis

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 Etiology		
Table 1. Uncommon causes of acute limb ischaemia¹⁰⁻¹²		
Cause	Pathology	Signs to look for
Vasculitis	Inflammation of the arteries	Bilateral disease. Systemic symptoms (e.g., fever). Signs of connective tissue disease.
Popliteal entrapment syndrome	The popliteal artery is compressed by muscle or tendon during plantar flexion	Young active patient, no atherosclerotic risk factors. History of claudication pain.
Adventitial cystic disease	Cyst in the vessel wall, occluding blood flow	Acute arterial thrombosis (usually popliteal) in a young person. No atherosclerotic risk factors.
Paradoxical embolism	Atrial septal defect, venous thrombo-embolism (often with pulmonary hypertension)	Venous thrombo-embolism, cardiac bruit, and pulmonary embolism
Tumour embolism	Tissue like embolic material	Signs of tumour or malignancy (usually advanced) in heart or lung
Acute compartment syndrome	Swelling of tissues within fascial compartment (especially the anterior compartment of leg) compressing arteries	History of revascularisation or prolonged surgery. Pain on passive movement
Foreign body embolisation	Gangrene in multiple fingers or toes, often associated with infection or intravenous drug use	Intravenous drug users
Thrombophilia	Arterial thrombosis without risk factors	Young patients, often with a family history
Low cardiac output syndromes	Low blood flow to the extremities, worsened by disease. Common causes: hypotension, shock, and sepsis	Patients with severe cardiac failure, intra-aortic pump devices, extracorporeal membrane oxygenation (ECMO)

¹⁰ Bhatnagar A, Khan MM. Connective tissue diseases and peripheral vascular disease. *Journal of Vascular Medicine and Biology*. 2010;22(1):1-10.

¹¹ Davies D, Cooper J, Maheshwari S, Papanicolaou DA, Al-Jarrah B, et al. Atherosclerotic disease: regional variation for acute limb ischaemia: a systematic review and meta-analysis of observational, Canadian Data Year 2017/2018.

¹² Wessely D, Davies D, Cooper J, Maheshwari S, Papanicolaou DA, Al-Jarrah B, et al. Atherosclerotic disease: regional variation for acute limb ischaemia: a systematic review and meta-analysis of observational, Canadian Data Year 2017/2018.

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Classification

Table 2. Clinical categories of acute limb ischaemia according to Rutherford²

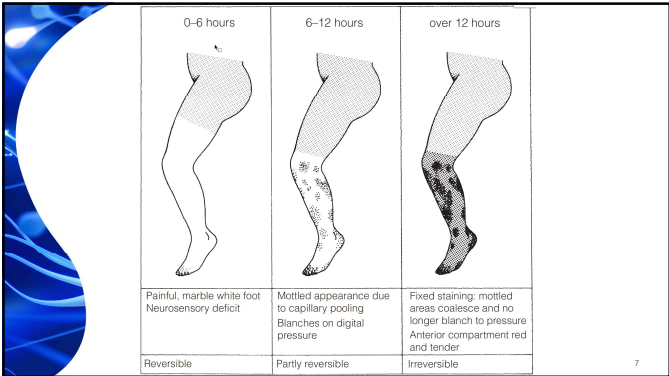
Grade	Category	Sensory loss	Motor deficit	Prognosis	Doppler signals	
					Arterial	Venous
I	Viable	None	None	No immediate threat	Audible	Audible
IIA	Marginally threatened	None or minimal (toes)	None	Salvageable if promptly treated	Inaudible ^a	Audible
IIB	Immediately threatened	More than toes	Mild/moderate	Salvageable if promptly revascularised	Inaudible	Audible
III	Irreversible	Profound, anaesthetic	Profound, paralysis (rigor ^a)	Major tissue loss amputation. Permanent nerve damage inevitable	Inaudible	Inaudible

^a This is an identical replica of the table in the 1997 publication by Rutherford *et al.*² with the exception of the asterisks (*).

^b In the original 1997 classification it was stated that arterial Doppler sounds are never present in Stage IIA, and that rigor (mortis) is always present in Stage III. However, it is the opinion of the Writing Committee that exceptions to these rules do exist, and a slight modification of the Rutherford classification from 1997 may be appropriate in the future.

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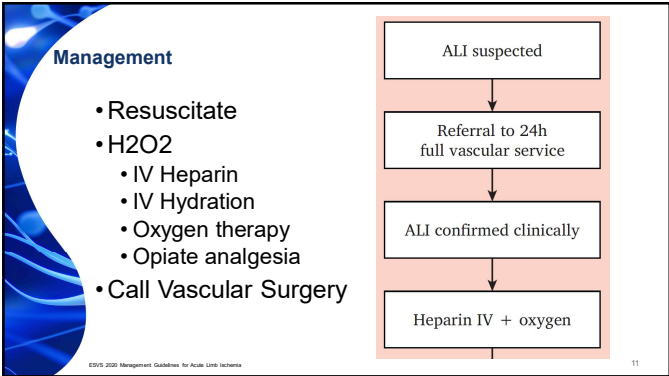
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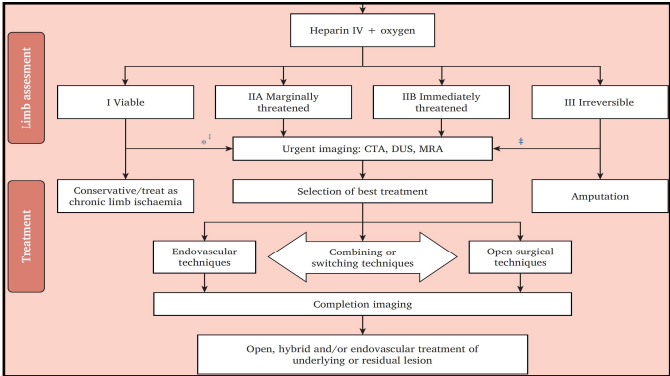
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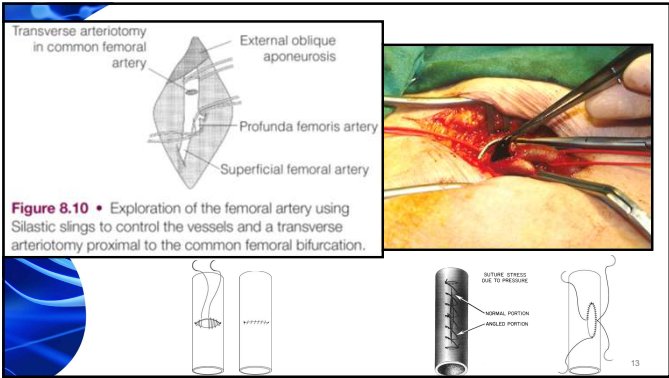
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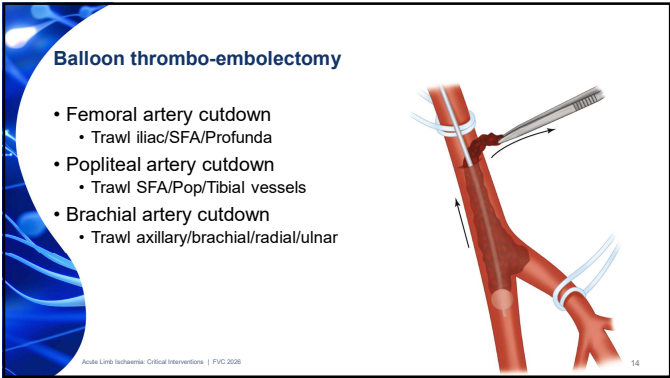
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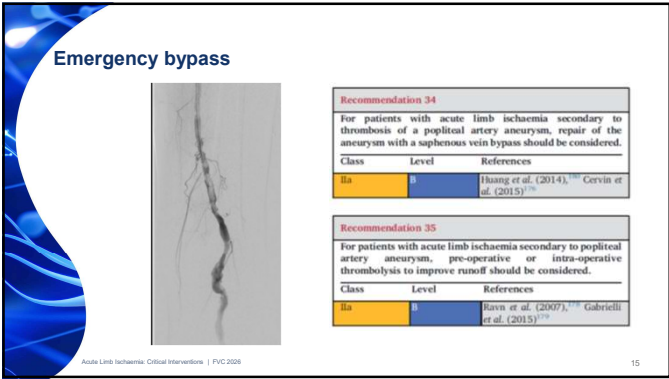
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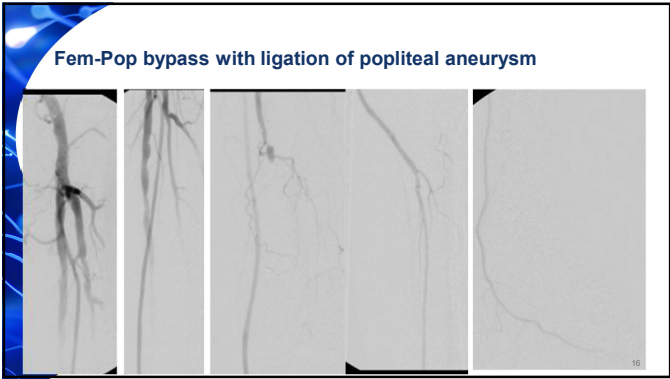
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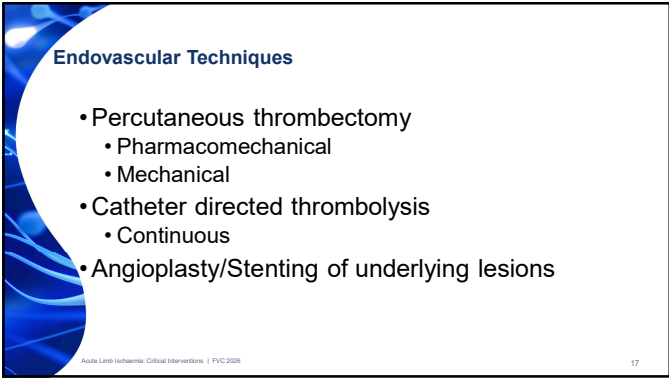
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Open or Endovascular?

- No RCTs comparing these 2 approaches, older studies in 1990s compared open surgery with CDT

Endovascular Versus Surgical Revascularization for Acute Limb Ischemia
A Propensity-Score Matched Analysis

Divyal Kotha, MD, PhD; Kevin F. Kennedy, MS; Mehdi H. Shahrbanoo, DO, MPH; PhD; Shafig T. Mandani, MD; Lars Stangenberg, MD; Omar N. Hyder, MD; Peter Soukas, MD; Herbert G. Aaronow, MD, MPH

RESULTS: Of 10,484 (weighted national estimate=51,914) hospitalizations for ALL, endovascular revascularization was performed in 5008 (47.8%) and surgical revascularization in 5476 (52.2%). In the propensity-score matched cohort (n=7746; 3873 per group), patients who underwent endovascular revascularization had significantly lower in-hospital mortality (2.8% versus 4.0%; $P=0.002$), myocardial infarction (1.9% versus 2.7%; $P=0.022$), composite of death/myocardial infarction/stroke (5.2% versus 7.5%; $P<0.001$), acute kidney injury (10.5% versus 11.9%; $P=0.043$), fasciotomy (1.9% versus 8.9%; $P<0.001$), major bleeding (16.7% versus 21.0%; $P<0.001$), and transfusion (10.3% versus 18.5%; $P<0.001$), but higher vascular complications (1.4% versus 0.7%; $P=0.002$), compared with those undergoing surgical revascularization. Rates of any amputation were similar between the 2 groups (4.7% versus 5.1%; $P=0.43$). Median length of stay was shorter and hospital costs higher with endovascular versus surgical revascularization.

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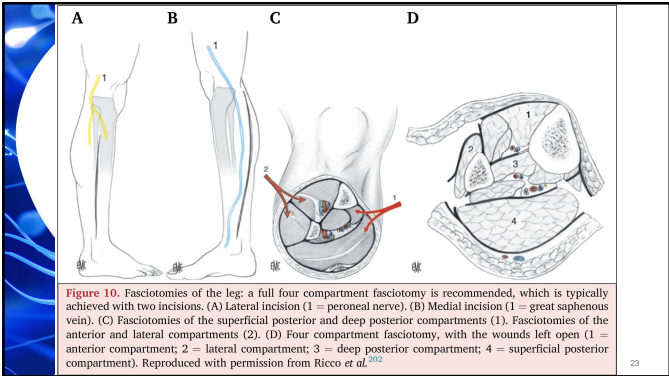
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Complications post revascularization

- Compartment syndrome
- Reperfusion injury
- Acute kidney injury
- Catastrophic bleeding – 8-10%
- AMI/CVA
- Limb loss – 6-16%
- Death – as high as up to 40%
- Reintervention rate 33%

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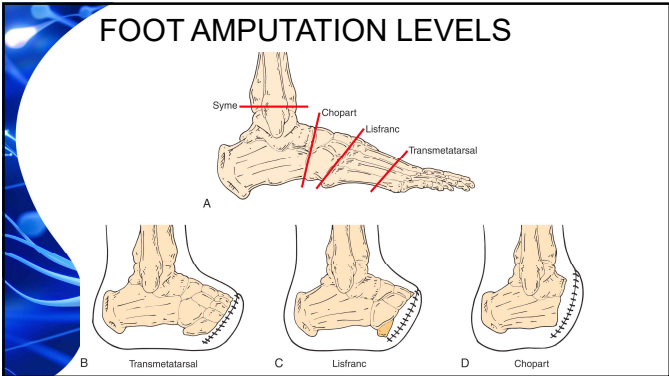


Post surgical management

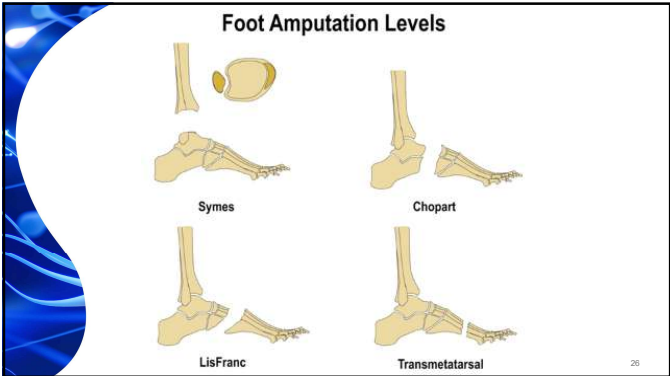
- Aggressive IV hydration
 - Urine may appear reddish brown due to haemolysis
- Analgesia
- Circulation charting
- Watch out for access site complications!
- Evaluate cause for acute limb ischemia
 - TTE/Holter
 - CT Aortogram
- Anticoagulation/Antiplatelet therapy

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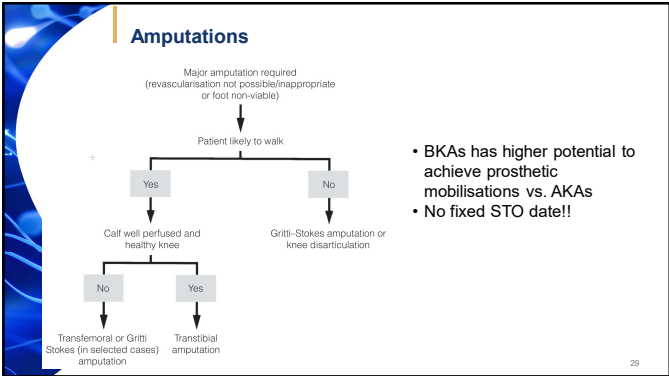
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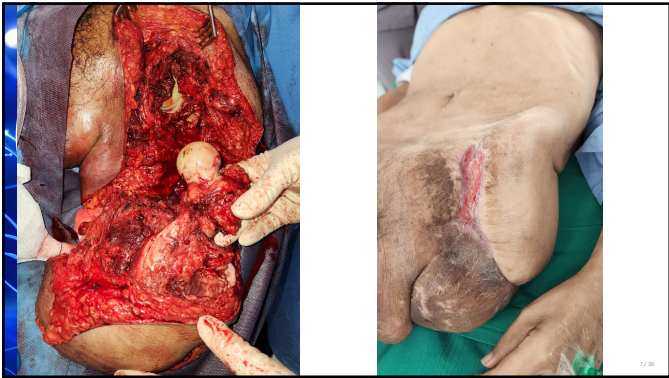
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