Acute limb ischaemia

Acute limb ischaemia

ALI is an emergency that requires rapid, accurate clinical assessment and emergency surgical treatment. ALI typically - occurs as a result of embolic arterial occlusion or trauma, but less common causes, including thrombosed popliteal artery aneurysm and popliteal artery entrapment, should be kept in mind during patient assessment. Clinicians reviewing a patient with sudden onset leg pain should have a high index of suspicion for ALI as an incorrect diagnosis can be catastrophic for the patient; ischaemia beyond 6 hours is usually irreversible and results in limb loss. Clinical features Patients presenting with ALI secondary to embolism typically give no history of prior claudication and complain of the sudden development of severe pain or numbness of the limb. Bedside clinical assessment should be aimed at (i) confirming the diagnosis of ALI, (ii) assessing the severity of the limb ischaemia, and (iii) identifying the underlying cause, including an embolic source. The skin is initially cold and pale, but as time progresses it slowly becomes mottled; first, non-fixed (blanching to pressure) and then fixed (non-blanching), indicating skin death. Neu - rological function deteriorates with time, prog ressing from paraesthesia to eventual complete loss of sensory and motor function, causing an insensate and paralysed limb (a poor prog - nostic sign). Muscle groups are weakened and painful; manual compression of a ff ected muscle groups may cause pain owing to ischaemia-induced injury – rhabdomyolysis.

Figure 61.31 Aortic bifurcation thrombosis: claudication is worse but there is no dramatic event owing to the network of collaterals formed as a result of the insidious nature of the stenosis; acute on chronic disease.

Pulses are absent distally but the femoral pulse may be palpable, even thrusting, as distal occlusion results in forceful expansion of the artery with each pressure wave despite the lack of flow . Insonation of the pedal vessels with a hand-held Doppler may elicit faint monophasic signals or no signals at all. Assessment of flow in the limb veins, including the GSV and popliteal vein, can be useful as concurrent venous thrombosis is a very poor prognostic indicator. Following thorough clinical examination, the limb should be classified according to the Rutherford categories of ALI: class I, viable; class IIa, marginally threatened; class IIb, immediately threatened; and class III, irrever sible. The management options and urgency of treatment depend on the appropriate categorisation of the limb (Table 61.2). Investigations should be undertaken as clinically indicated and may include: /uni25CF ECG to assess for myocardial infarction and/or atrial fibrillation; /uni25CF creatinine kinase to assess for rhabdomyolysis; /uni25CF renal function as rhabdomyolysis may lead to myoglobin uria and acute kidney injury; /uni25CF imaging assessment of the a ff ected limb’s arterial tree, e.g. DUS or CTA, if readily available and not likely to unnec essarily delay emergency treatment when indicated, e.g. Rutherford class IIb A similar picture will occur in the arm with a brachial embolus. Treatment Because of the ensuing stasis, a thrombus can extend distally and proximally to the embolus. The immediate administration of 5000 /uni00A0 U of heparin intravenously can reduce this extension and maintain patency of the surrounding

(particularly the distal) vessels until the embolus can be treated. The relief of pain is essential because it is severe and constant. Embolectomy and thrombolysis are the treatments available for patients with limb emboli. Embolectomy Local or general anaesthesia may be used. The artery (usually the femoral), bulging with clot, is exposed and held in silastic vessel loops. Through a transverse incision the clot Robert Rutherford , 1931–2013, Professor of Surgery , Colorado, USA. Thomas J Fogarty , b. 1934, surgeon, University of Oregon Medical School, Portland, OR, USA. begins to extrude and is removed, together with the embolus (Figure 61.32), with the help of a Fogarty balloon catheter. The catheter, with its balloon tip, is introduced both proximally and distally until it is deemed to have passed the limit of the clot. The balloon is inflated and the catheter withdrawn slowly , together with any obstructing material (Figure 61.33). The procedure is repeated until bleeding occurs. An angiogram (a) (b) - -

Grade Category Sensory loss Motor de /f_i cit Doppler signals Prognosis I Viable None IIA Marginally threatened None or minimal None (toes) IIB Immediately threatened More than toes Mild/moderate Inaudible Audible Salvageable with immediate III Irreversible Profound or Paralysed Inaudible Inaudible Limb irreversibly damaged, major insensate Arterial Venous None Audible Audible No immediate threat Inaudible Audible Salvageable if promptly treated revascularisation tissue loss, amputation Figure 61.32 Embolic material removed from the common femoral artery, along with a long distal extension thrombus. Figure 61.33 (a) A Fogarty catheter is inserted through an arteriotomy in the common femoral artery and fed distally down the super /f_i cial femoral artery and through the embolus. (b) The balloon is in /f_l ated and the catheter withdrawn, removing the embolus; the deep femoral and iliac arteries are similarly treated.

may be performed in the operating theatre at the end of the procedure to ensure that flow to the distal leg has been restored. Postoperatively , heparin therapy is continued until long-term anticoagulation with warfarin is established to reduce the chance of further embolism. Thrombolysis If ischaemia is not so severe that immediate operation is essen tial, it may be possible to treat either embolus or thrombosis by intra-arterial thrombolysis (Figure 61.34). At arteriography of the ischaemic limb (usually via the CFA) a narrow catheter is passed into the occluded vessel and left embedded within the clot. Tissue plasminogen activator is infused thr ough the catheter and regular arteriograms are carried out to check on the extent of lysis, which, in successful cases, is achieved within 24 hours. The method should be abandoned if there is no progression of dissolution of clot with time. There are several contraindications to thrombolysis, the most important of which are recent stroke, bleeding diathesis and pregnancy , and results in those over 80 years old are poor. Compartment syndrome In limbs that have been subject to sudden ischaemia followed by revascularisation, oedema is likely . Muscles swell within confined fascial compartments and this can itself be a cause of tissue ischaemia, with both local muscle necrosis and nerve damage due to pressure and systemic e ff ects such as renal failure secondary to the liberation of muscle breakdown products. The classical clinical picture is that of severe pain out of proportion with clinical findings that worsens with time despite appropriate analgesia. The patient often complains of numbness/paraesthesia in the distribution of nerv es running within the compartment (non-myelinated type C sensory fibres are most sensitive to hypoxia). Examination of the limb reveals a tense compartment with passive flexion and extension of - muscles causing pain. The presence of palpable pulses does not rule out compartment syndrome. The treatment is urgent compartment fasciotomy to release the compression. The usual site for fasciotomy is the calf (espe - cially the anterior tibial compartment), but compartment syn - drome may occasionally a ff ect

the thigh, arm and foot. Liberal concomitant usage of calf with/without thigh fasciotomies following r evascularisation of a prolonged ischaemic limb is advisable (Figure 61.35).

Figure 61.34 Angiogram of an occluded popliteal artery before thrombolysis (a) , during successful lysis (b) and after completion of lysis (c) . (b) Figure 61.35 (a) Foot and calf fasciotomies; (b) thigh fasciotomy: the medial compartment rarely requires decompression

---

Revision #1
Created 2025-12-31 15:23:03 UTC by Omar Ayman
Updated 2025-12-31 15:23:04 UTC by Omar Ayman