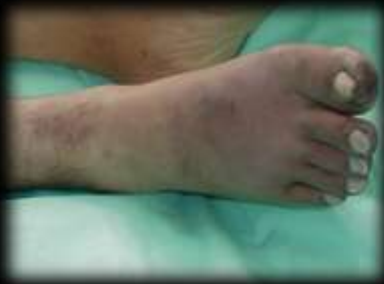

ACUTE LIMB ISCHAEMIA

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- *Sudden* interruption or cessation of blood flow in a major artery supplying a limb .

- Blood supply is inadequate to meet basal metabolic requirements.

ACUTE LIMB ISCHAEMIA

- Acute : varies but up to 2 weeks

- Chronic : > 2 weeks

- Acute on Chronic : Sudden and rapid deterioration in symptoms

ACUTE LIMB ISCHAEMIA

- Traumatic
  - Blunt
    - *± bone fracture*
  - Penetrating
    - *Stab wound*
    - *Gun Shot*

- Non-Traumatic
  - Embolism
  - Thrombosis
    - *Dissection of artery*
    - *Low flow states.*
    - *Thrombophilia*
  - *Bypass graft occlusion*

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ACUTE LIMB ISCHAEMIA

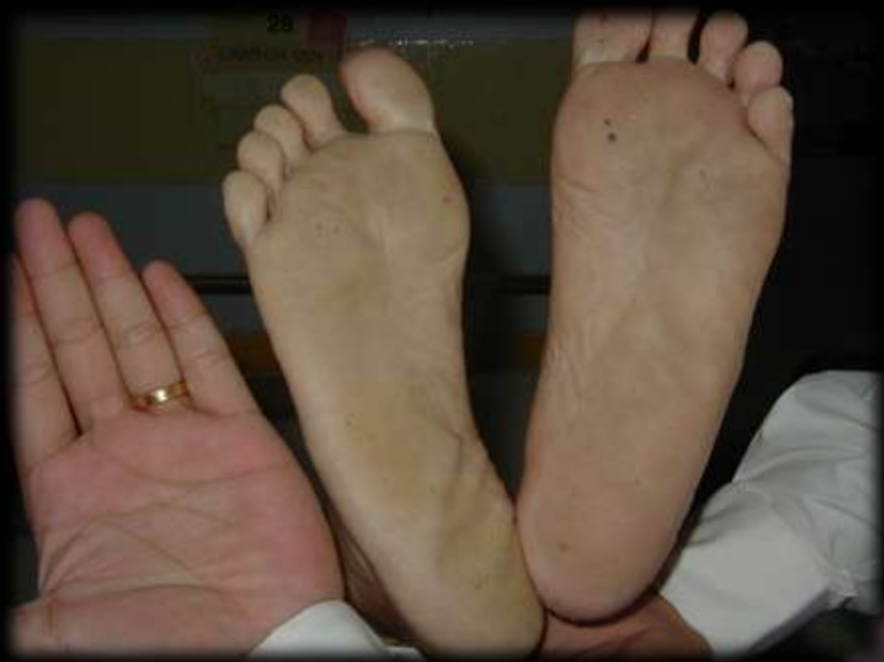
Management

- Diagnosis : History & Physical Examination
  - Is this ischaemia ?
  - Is this an embolism or thrombosis ?
  - Is this limb viable ?

ACUTE LIMB ISCHAEMIA

- Signs of Acute Ischaemia
  - Pulseless
  - Pallor
  - Decrease Temperature
  - Paresthesia
  - Pain
  - Paresis / Paralysis
  - Skin colour : mottled / cyanosis
  - Firm rigid musculature / woody

5 P's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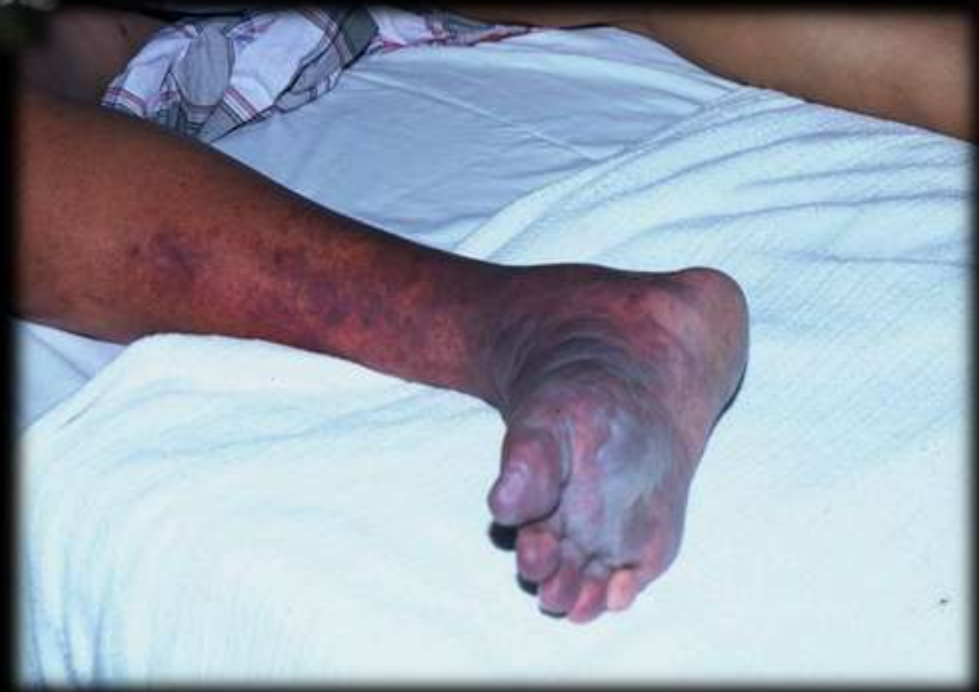

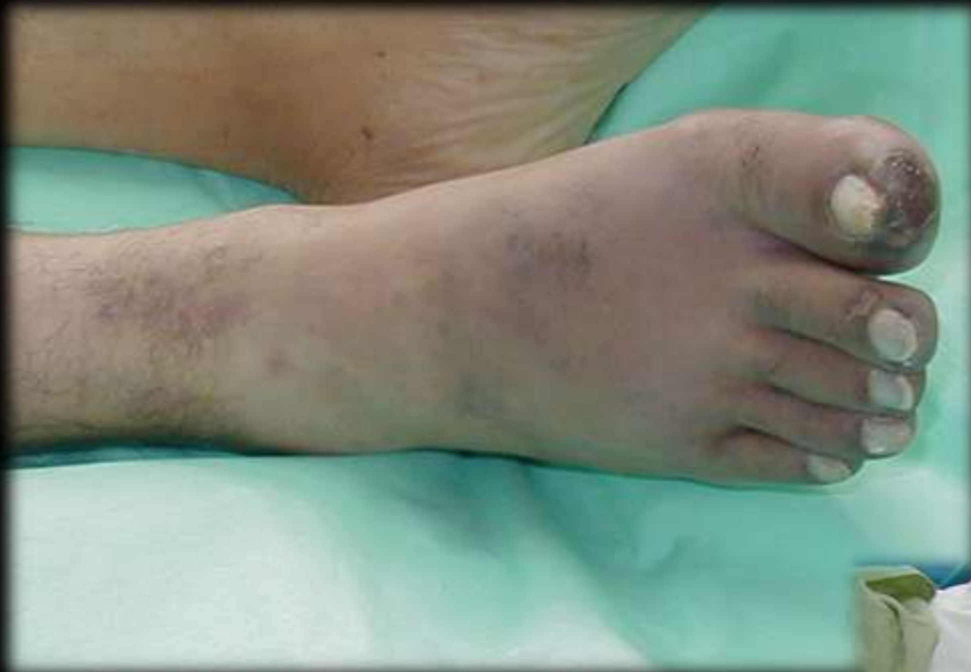

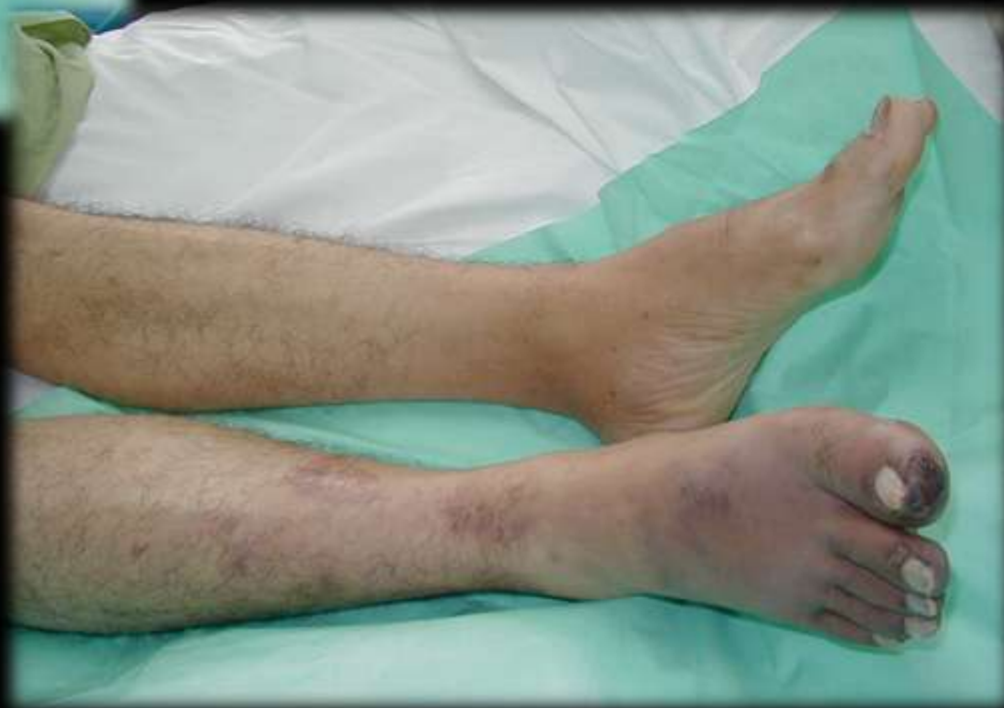

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ACUTE LIMB ISCHAEMIA

Management

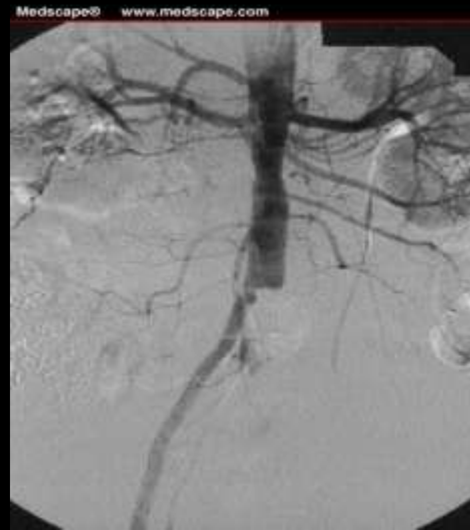
- Diagnosis : History & Physical Examination
  - Is this limb ischaemia ?
  - Is this an embolism or thrombosis ?
  - Is this limb viable ?

- **Embolus** : particulate matter circulating within the vascular system.
- **Thrombus** : mass derived from constituents of moving blood within the circulatory system.
- **Clot** : mass derived from constituents of stagnant blood / propagated thrombus.

ACUTE LIMB ISCHAEMIA

Embolus

- very sudden onset.
- identifiable source.
- less common to have claudication.
- few signs of PVD, contralateral pulses palpable.
- Arteriography: minimal atherosclerosis, sharp cutoff with minimal collaterals.



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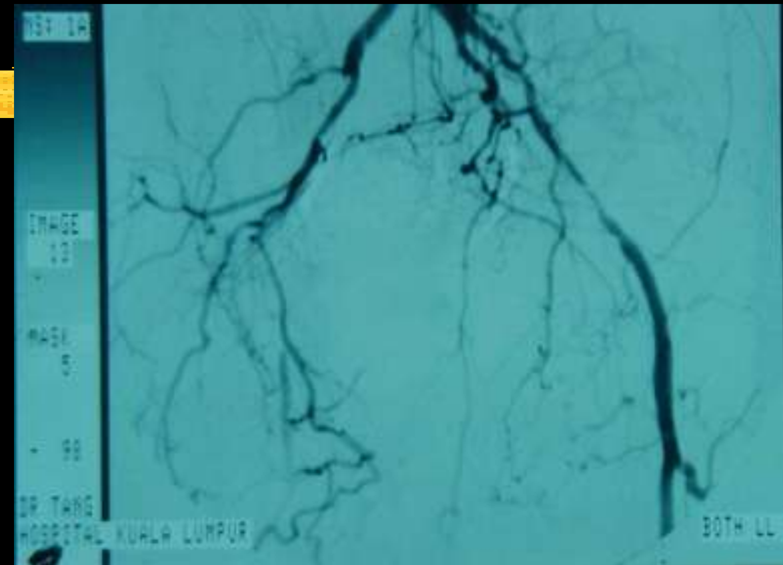
Sources of Emboli

- majority are from the heart ~ 80%
  - Atrial fibrillation
  - Myocardial infarction(usually 5 to 14 days later)
  - Valvular heart disease +/- infection
  - Ulcerated atheromatous plaques of aorta
  - Aneurysms
  - Unknown ~ 10%

Panetta T et al: Surg clinics of North America, 66:339-353,1986.

ACUTE LIMB ISCHAEMIA



Thrombosis

- no obvious source of embolus.
- less sudden onset.
- h/o claudication common.
- S/S of PVD and contralateral pulses are weak or not palpable.
- Arteriography: presence of atherosclerosis and collaterals.

ACUTE LIMB ISCHAEMIA

Initial Management

- Life threatening medical conditions
- Correct fluid & electrolyte imbalance
- Start anticoagulation (heparin)
  - Bolus intravenous unfractionated heparin and infusion
- Analgesia--- Opiods / Cox-2 inhib.(avoid I/M)
- ECG (AF , recent AMI)
- Blood biochemistry

ACUTE LIMB ISCHAEMIA

- Blood Biochemistry
  - FBC
  - Renal Profile
  - Glucose
  - ABG
  - CPK (muscle necrosis)
  - Urine myoglobin
  - PT / APTT
  - GXM

ACUTE LIMB ISCHAEMIA

- The Role of Heparin Anticoagulation
  - Unfractionated Heparin
  - Intravenous infusion
  - Dose adjusted to APTT(2-2.5X)
  - Important especially if delay in definative Mx.
  - Initial bolus dose
  - Standard Contraindications applies
  - Not necessary if intervention planned soon(<90min)
  - ?? LMWH??

Management

- Diagnosis : History & Physical Examination
  - Is this limb ischaemia ?
  - Is this an embolism or thrombosis ?
  - Is this limb viable/threatened/non-viable ?

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ACUTE LIMB ISCHAEMIA

- Grading of Ischaemia
  - Management tool
    - Conservative vs revascularization vs amputation
    - AVOID REPERFUSION INJURY
  - Documentation
    - Medico-legal
    - Audits, future research
  - Referrals

SVS/ISCVS Classification of Acute Extremity Ischemia[†]

	Viable	Threatened	Nonviable
Pain	Mild	Severe	Variable
Capillary refill	Intact	Delayed	Absent
Motor deficit	None	Partial	Complete
Sensory deficit	None	Partial	Complete
Arterial Doppler	Audible	Inaudible	Inaudible
Venous Doppler	Audible	Audible	Inaudible
Treatment	Urgent work-up	Emergency surgery	Amputation

[†]From Rutherford, RB, Semin Vasc Surg 1992; 5:4.

ACUTE LIMB ISCHAEMIA

Severity of Ischaemia

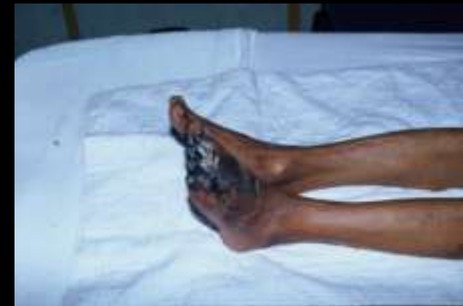
- Grade 1 (Viable)
  - cooler and paler
  - sensation intact
  - motor intact
  - No rest pain/ mild to moderate discomfort.
  - Doppler signal from pedal arteries
  - ABSI > or = 0.3

Severity of Ischaemia

- Grade II (Threatened)
  - Cold and pale
  - Decreased sensation
  - Decreased motor function
  - ABSI < 0.3
  - No pulsatile arterial Doppler signals but venous signals present
  - Skin colour changes

ACUTE LIMB ISCHAEMIA

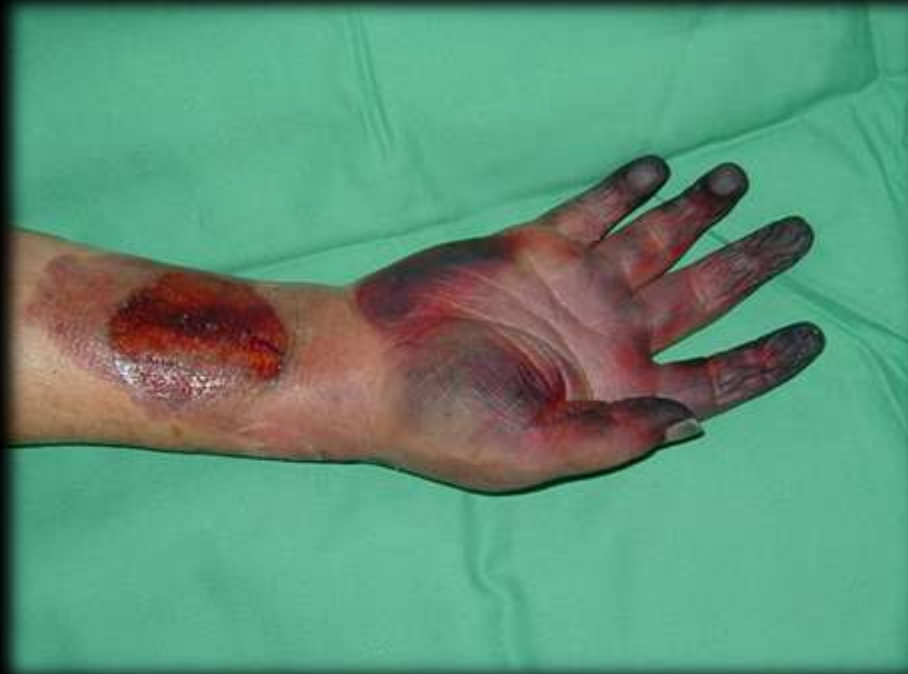
Severity of Ischaemia



- Grade III (Irreversible)
  - severe rest pain
  - anaesthesia
  - paralysis
  - No pedal Doppler signals (arterial / venous)
  - Muscle rigor
  - Muscle necrosis (biochemistry)
  - skin mottled. No blanching on pressure

ACUTE LIMB ISCHAEMIA

Remember, Gangrene Is Irreversible.



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Is There a Definite Cut-off Time to Determine Viability ?

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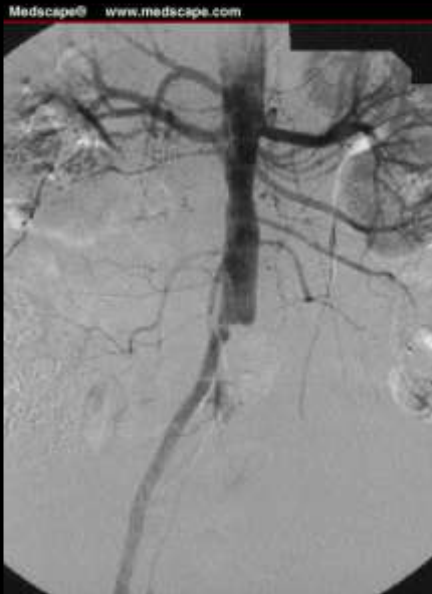
ACUTE LIMB ISCHAEMIA

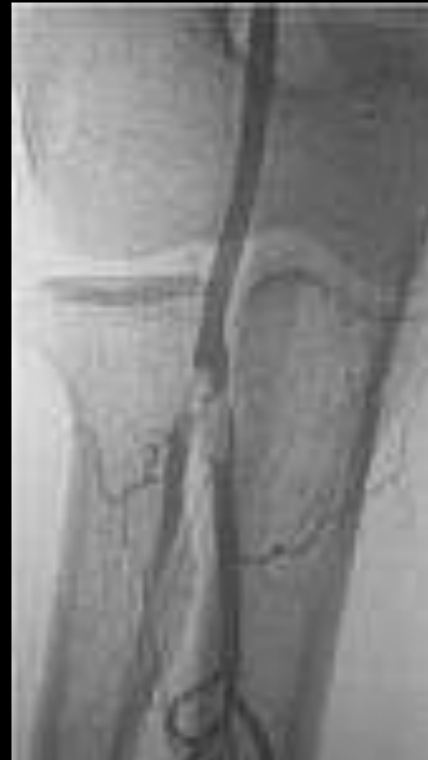
Extent of Ischaemic Necrosis

- Collateral circulation
- Level of Occlusion
- Propagation of Clot
- Timing & Effectiveness of Treatment
- CVS status of patient
- Viscosity of Blood
- Oxygen Carrying Capacity of Blood

ACUTE LIMB ISCHAEMIA

Is Arteriography Always Necessary ?





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ACUTE LIMB ISCHAEMIA

- In most obvious cases of embolus, not necessary unless early ischaemia and/or suspect underlying PAD.

- Useful in cases of thrombosis, but if ischaemia is advance or rapidly progressing then no.

- What about other Imaging modalities?

- Should Not Delay Management

ACUTE LIMB ISCHAEMIA

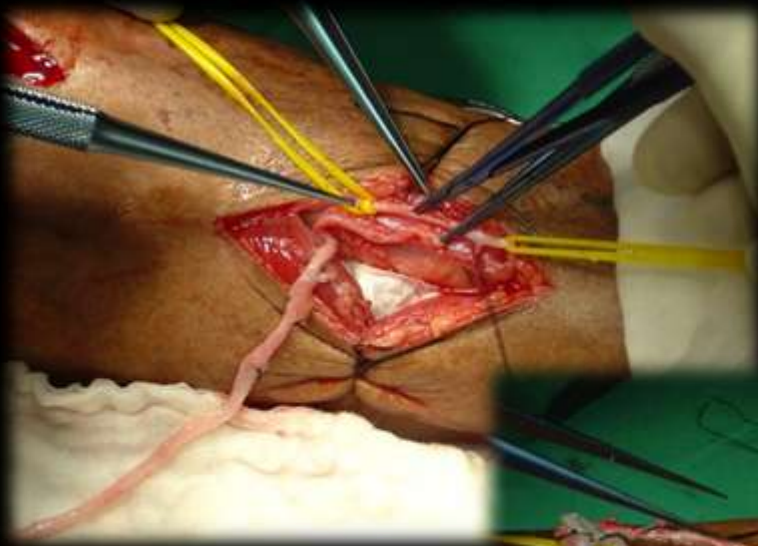
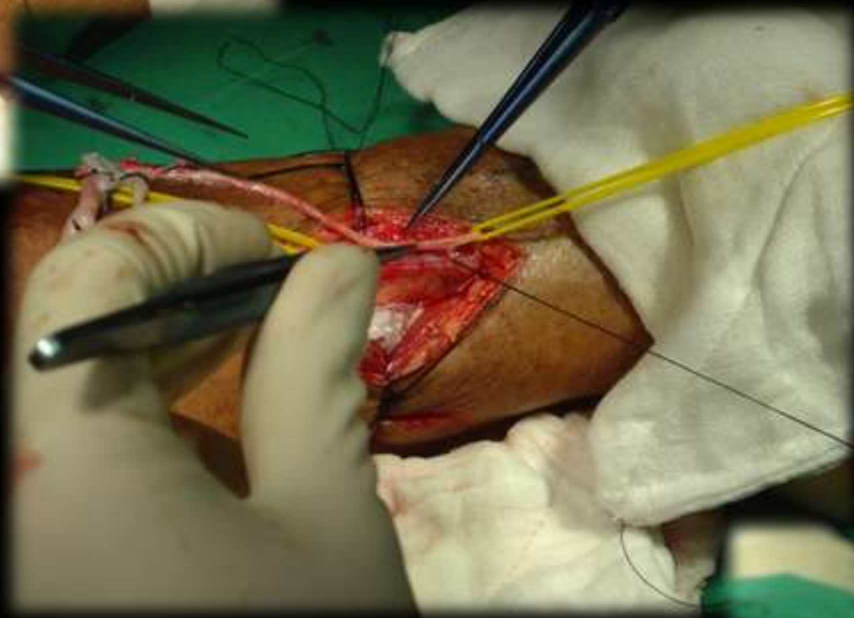
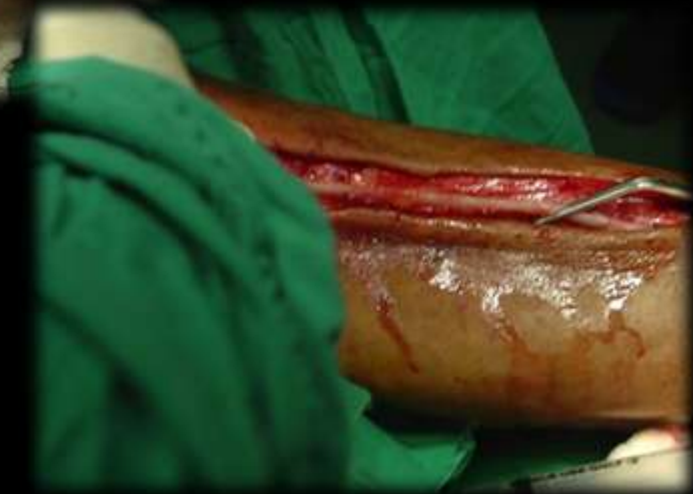
Definitive Management (Embolus)

- Conservative : anticoagulation only
- Balloon catheter embolectomy (Fogarty)
- Endovascular procedures
- Arterial Bypass / Reconstruction
- + / - Fasciotomy
- Amputation : minor / major

ACUTE LIMB ISCHAEMIA

Definitive Management (Thrombosis)

- Conservative : anticoagulation only
- Thrombolytic therapy- *streptokinase, urokinase, rTPA*
- Arterial Reconstruction- *Bypass*
- Endovascular- *angioplasty, stents, aspiration devices*
- Combination of the above
- + / - Fasciotomy
- Amputation : minor / major
- Catheter thrombectomy

Conclusion

- ALI is a vascular emergency requiring early diagnosis and prompt management
- Grading of limb ischaemia is essential
- Deciding between embolus and thrombosis
- Early vascular referral when indicated
- Early anticoagulation with heparin
- Recognise and stabilise co-medical conditions
- Remember reperfusion injury
- Life before Limb

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Thank You

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