The Diabetic Foot

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Case

How might this 45 yr old man with Type 1 diabetes for 20 years and previous laser therapy for retinopathy, present?

45 year old male

- odour
- Pain and redness
- nausea and vomiting
- Flu like illness
- hyperglycaemia, ketonuria ++

Case

What are the risk factors for foot ulceration?

Risk factors

- Previous ulcer
- foot deformity
- PVD
- diabetic neuropathy
- diabetic nephropathy
- impaired vision
- ill-fitted foot wear

PVD

- Macrovascular disease:
  - affects mainly calf vessel with sparing of proximal and foot vessels
- microvascular disease:
  - structural: thickened basement membrane, wall fragility and thrombosis
  - functional: vasomotor neuropathy and abnormal endothelial function

Neuropathy

- Sensory:
  - loss of light touch and vibration leading to loss of protective sensation
- motor:
  - affecting small muscles leading to hyperextension of MTP joints and flexion of interphalangeal joints
    - loss of transverse and longitudinal arches
- autonomic:
  - loss of sweating and arteriovenous shunting leading to dry, fissured skin (- site of infection)

Infection

- Superficial and local
- soft tissue and spreading (cellulitis)
- Osteomyelitis

- **Gram-positive:**
- Staph. Aureus

Gram-negative:

E. coli; pseudomonas

- **Anaerobes:**
- Bacteroides

Case

How might you assess the foot?

Assessment of circulation

- palpation of foot-pulses
- capillary refill
- ABPI
- toe-pressure
- arterial doppler
- angiography

Result of assessment

- Neuroischaemic foot:
  - cool and pulseless,
  - colour can be pink or red
  - reduced callus formation
  - ulcer at the margin of the foot and back of the heel

Assessment for neuropathy

- history and inspection
- light touch
- pin-prick sensation /10 g monofilament
- vibration sense
- ankle reflexes
- (biothesiometry)

Result of assessment

- Neuropathic foot:
  - warm and well perfused
  - reduced sweating
  - dry skin and prone to fissuring
  - callus hard and dry
  - Charcot’s foot
  - ulceration typically at sole of foot

Signs of infection (1)

- Ulcer:
  - base changes from healthy pink granulation to yellowish or grey tissue
  - purulent discharge
  - smelly
  - sinuses within the ulcer
  - undermined edges
  - exposed tendon or bone

Sign of infection (2)

- Mild cellulitis (<3cm):
  - erythema, warmth and swelling

- Severe cellulitis:
  - spreading of erythema and swelling
  - lymphangitis and tender LN
  - systemic symptoms
  - bluish-purple discolouration indicates s.c necrosis

Severe infection

another severe infection!

Sign of infection (3)

- Osteomyelitis:
  - bone or tendon exposure
  - penetrating of a sterile probe to the bone
  - drainage of viscous, bubbly clear or yellowish fluid if joint is involved
  - sausage shaped toe in case of chronic osteomyelitis

Case

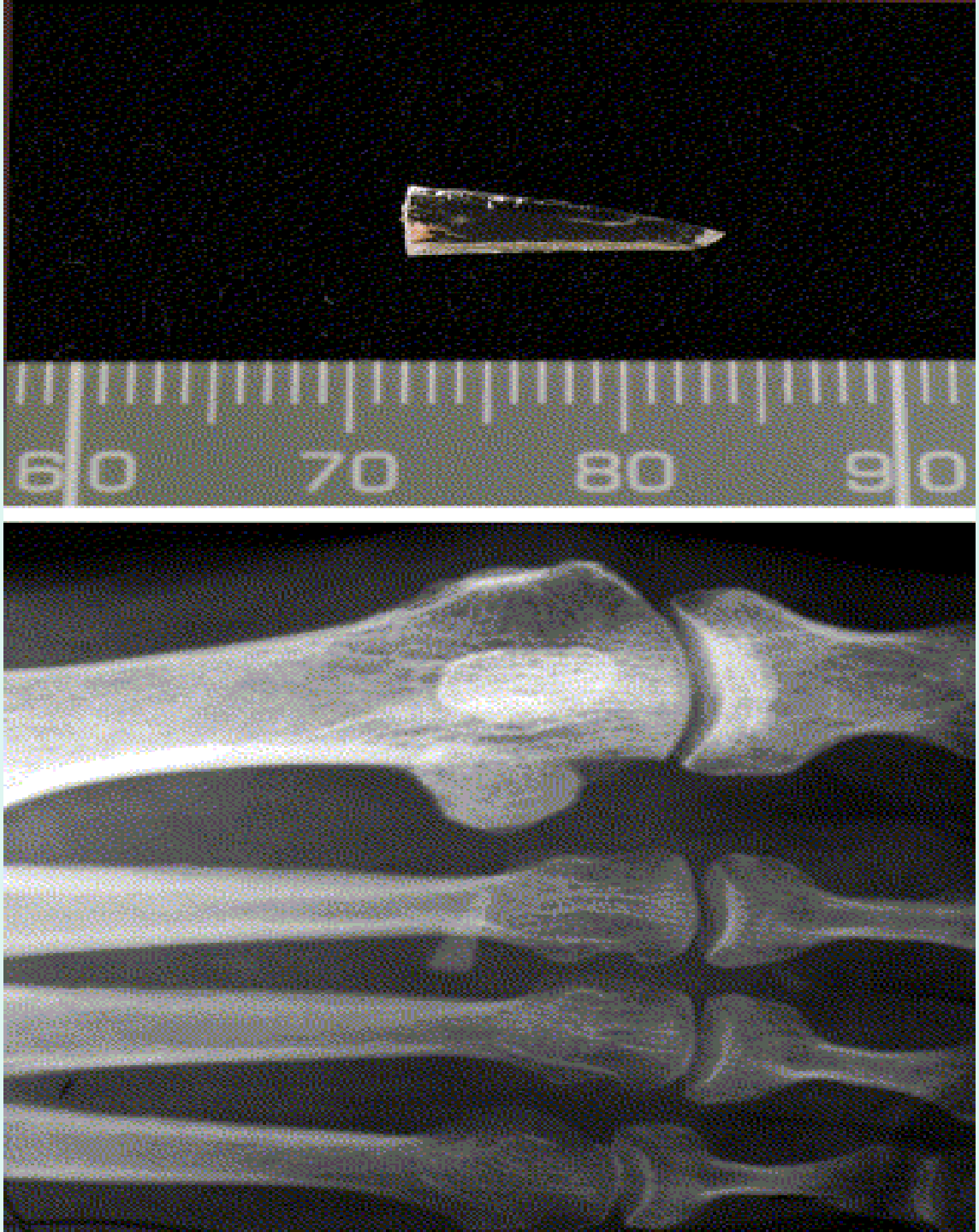
How might you manage this foot?

Management

- Assessment of the severity of infection
- Determination of the need for hospitalization
- Evaluation of the vascular supply
- Determination of the need for surgery (debridement, amputation and/or revascularization)
- Appropriate antimicrobial therapy
- Local wound care
- Relief of pressure on the ulcer (mechanical off-loading)
- Control of hyperglycemia
- Education

Management (2)

- Even if it's busy: Take the dressing off!!
- Inspect, feel and smell
- swabs from the base of the ulcer and blood-cultures
- X-Ray of foot:
  - ?osteomyelitis
  - ?gas in the tissue
  - ?foreign body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Management (3)

- Antibiotics: (local policies)
  - most of the time: intravenously
  - cellulitis: benzylpenicillin + flucloxacillin
  - severe cellulitis: levofloxacin and augmentin
  - add metronidazole if suspicion of anaerobes
  - use clindamycin if suspicion of osteomyelitis

- in severe infections: liaise with microbiologist!

Management (4)

- Wound-care:
  - debridement and cleaning
  - appropriate dressing
  - rest and avoidance of pressure on ulcer
    - aircast, scotchcast boot
    - total contact cast if no infection
  - surgical intervention

Management (5)

- Glycaemic control:
  - adequate glycaemic control is imperative to aid healing of the ulcer (poor glycaemia impedes neutrophil function):
  - almost all patients with more than mild infection will require intravenous insulin (“sliding scale”) to optimize glycaemia

Management (6)

- **Multidisciplinary approach:**

– physician, vascular surgeon, orthopaedic surgeon, interventional radiologist, tissue viability nurse, chiropodist, orthotist, DSN

cost of foot ulcers

- NHS cost £13m per year
- Peri-operative mortality: 10-15%
- 3-year survival rate: 50-59%
- 5 years post amputation: 39% to 68%

BUT

50% of foot ulcer are preventable!