

# Pathological fractures

## Definition

A fracture through abnormal bone.

## Aetiology

Can be divided into:

1. Systemic diseases e.g. osteoporosis, osteopetrosis, osteogenesis imperfecta
2. Primary benign disease e.g. giant cell tumour of bone
3. Primary malignant bone tumour e.g. osteosarcoma
4. Metastatic malignancy

The commonest cause is osteoporosis followed by metastatic malignancy.

## History

A pathological fracture should be considered in the following circumstances:

1. Spontaneously occurring fractures or fractures occurring after minimal trauma
2. Unusual fracture patterns
3. Several recent fractures
4. Specific fracture sites such as the subtrochanteric region of the femur
5. Patients with known malignancy

The sites most commonly affected by metastatic malignancy are the spine, the ribs, the pelvis, the femur and the humerus. The distal limbs are rarely affected.

More than half of pathological fractures occur in the proximal part of the femur due to the high forces this area is subjected to.

## Investigations

### Radiology

There are several radiological features of malignancy on plain XR

1. The lesions are usually eccentric within the bone
2. They commonly occur at the metaphyseal/diaphyseal junction
3. A permeative or moth eaten pattern of cortical destruction is suggestive.

### Further imaging

If a primary malignant bone tumour is suspected then a CT scan and MRI are indicated. Bone scan is required.

### Searching for the primary

|                              |          |
|------------------------------|----------|
| CXR                          | Lung     |
| Breast exam and mammogram/US | Breast   |
| Abdo CT                      | Kidney   |
| Thyroid exam                 | Thyroid  |
| PSA and digital exam         | Prostate |
| Serum and urine IEPG and EPG | Myeloma  |

## Biopsies

There are several important observations to be made on performing biopsies:

1. The biopsy should ideally be done at the institution where the patient will be treated
2. Biopsy related complications are five times as common in referring hospitals
3. The biopsy tract will need to be included in the eventual area of resection
4. A biopsy should be taken away from the fracture because the reaction of the bone to the fracture can cause problems in interpretation
5. If a patient has a known primary then another biopsy is unnecessary
6. The options for biopsy include FNAB, core biopsy and open incisional biopsy

## **Treatment**

The aim of treatment is to achieve pain free maintenance of daily function for the remainder of the patient's life.

### **Principles of treatment**

1. The impending fracture should be internally fixed if the patient is expected to live more than 6 weeks. Recovery from an uncomplicated ORIF usually takes around 2 weeks.
2. Arbitrary guidelines for fixation of fractures include:
  - a. Pain on walking
  - b. More than 50% of the cortex on any view
  - c. A tumour more than 2.5cm in diameter
3. Actual fractures through tumours are fixed unless the patient is in extremis.
  - a. Healing is slower
  - b. Bone cement improves the quality of fixation and prevents hardware cutting out but it is no substitute for cortex and if substantial areas of cortex are lost then bone grafting may be required
  - c. There is an increased blood loss when operating on pathological fractures. In particular, renal cell carcinoma and thyroid cancer may bleed enormously and pre-operative embolisation may be required.
  - d. Intramedullary nails don't provide as rigid fixation as compression plates and are therefore not as effective in reducing pain. However, long bones are usually stabilised with intramedullary nails, e.g. femoral metastatic disease is stabilised with a reconstruction type nail.
4. With particular regard to fixing hip fractures
  - a. If the acetabulum is involved then a THR is indicated
  - b. Cement is always used for the femoral prosthesis

### **Radiotherapy**

90% of patients treated with radiotherapy have some pain relief, and 50% have complete pain relief. Pain relief is typically within 2 weeks.

The tumours that respond best to radiotherapy are myeloma and metastatic breast and prostate.

### **Bisphosphonates**

Pamidronate decreases skeletal pain in up to 50% of patients with skeletal mets from myeloma, breast and prostate cancer. It is given in a dose of 90mg IVI once monthly for 9 months. It has no effect on survival.