

Multiple myeloma

Definition

A primary malignant tumour caused by malignant proliferation of plasma cells. Also known as Kahler's disease.

Incidence

Most common primary malignant tumour of bone.

Makes up 27% of biopsied bone tumours in one series; in the Mayo series makes up 44%.

Makes up about 1% of all malignant disease.

Average age is 60. Rare in patients less than 40 years old.

M>F by 2:1

Localisation

Spine is commonest, particularly lower thoracic and lumbar areas

Marrow rich flat bones of the pelvis, skull, ribs, clavicle and scapula are frequently involved.

In long bones the femur and humerus are much more commonly affected than the distal appendicular skeleton.

Osseous pathology

Gross

Multiple permeative lesions which are filled by gelatinous, red, soft masses of neoplastic plasma cells, "current jelly" in appearance. The lesion is usually multicentric.

Microscopic

Sheets of closely packed cells with basophilic cytoplasm. The cells are usually uniform, and have few mitotic figures. The nuclei have a clock face appearance and the surrounding cytoplasm has a perinuclear clear zone or halo (which is taken up by the Golgi apparatus).

Occasionally only amyloid may be seen in specimens.

Immunohistochemistry

CD56, a natural killer antigen, is frequently seen on myeloma cells but not reactive plasma cells.

Signs and symptoms

Pain is the cardinal initial symptom

Initially intermittent and becomes continuous
An acute sudden exacerbation may represent a pathological fracture
Paraplegia may occur with vertebral collapse

Other presentations:

- Anaemia
- Infection
- Renal failure
- Hypercalcaemia
- Weight loss
- Amyloidosis
- Neurological findings
- Peripheral polyneuropathy

Lab findings

1. FBC
 - a. Anaemia – often normochromic normocytic
 - b. Thrombocytopenia
2. ESR – elevated
3. EUC
 - a. Hypercalcaemia in 20-50% of patients
 - b. Normal phosphate
 - c. Hyperuricaemia
4. Serum proteins
 - a. Hyperglobulinaemia with reversal of the albumin-globulin ratio
5. Beta –2 microglobulin – elevation is a poor prognostic finding
6. Urine – Bence Jones proteins
7. Bone marrow aspiration – is diagnostic

Radiology

1. Diffuse osteoporosis is the first sign of myeloma
 - a. Usually most evident within the spine
 - b. Goes on to result in pathologic vertebral collapse, which may cause a vertebra plana or so called wrinkled vertebra
2. Osteolytic defects
 - a. Punched out, sharply circumscribed. No surrounding sclerosis.
 - b. Most frequently seen in bones with haematopoietic potential i.e. skull, pelvis, long bones, clavicles and ribs

- i. In the long bones the diaphysis is most often involved
 - ii. In the vertebra the pedicles are often preserved
 - c. In the skull this is referred to as a raindrop skull. Myelomatous deposits in the skull are relatively uniform in size. If the lesions vary a lot in size they are more likely to be secondaries
 - d. The ribs may have a “ballooned out” appearance
- 3. Sclerotic lesions
 - a. Less than 3% of patients have sclerosis on their X-rays
 - b. Can have a solitary ivory vertebra
 - c. The sclerotic form of the disease is associated with peripheral demyelinating symmetrical polyneuropathy
 - d. With sclerotic lesions the differential diagnosis includes:
 - i. Osteoblastic metastasis
 - ii. Mastocytosis
 - iii. Lymphoma
 - iv. Myelosclerosis

Nuclear medicine

Bone scans are cold except at the site of pathological fractures

This is because of a deficiency of osteoblastic activity at the site of the lesion

Differential diagnosis

Metastatic carcinoma
Lymphoma
Hyperparathyroidism

Treatment

Supportive treatment including rehydration and management of hypercalcaemia may be necessary before definitive treatment
Radiotherapy – treatment of choice for localised disease, after excisional biopsy if possible
Chemotherapy
Prophylactic long bone fixation, or tumour prosthesis if required around joints.

Prognosis

90% dead within 3 years
Most deaths are due to renal failure

Plasmacytoma (solitary myeloma)

This is a forerunner of disseminated myeloma.

Commonest site is the vertebral column
In a series of 46 cases of plasmacytoma at the Mayo clinic, the overall survival rate was 74% at 5 years and 45% at 10 years.