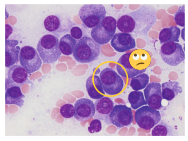
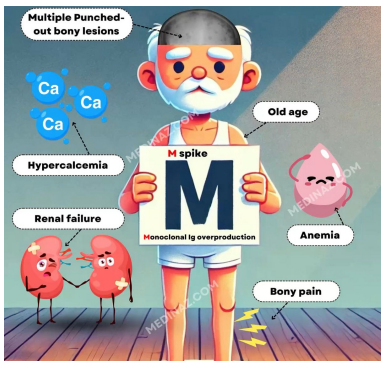
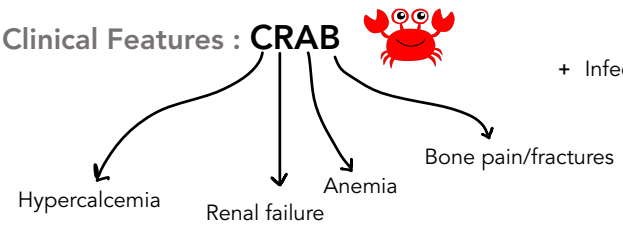
Multiple Myeloma



- Malignancy of **plasma cells** → excess production of **monoclonal immunoglobulin** .
  - **IgG** is the most common (~50%) , then **IgA** (~20%)
  - Excess light chains can occur in multiple myeloma **(Light chains only!!)**
- Dependent on **IL-6**
- Disorder of **older patients** (~ **66**)



- Clinical Features : **CRAB** + Infections



Bone pain/fractures

Hypercalcemia

- ↑ osteoclast activity
- **Lytic lesions** on x-ray (punched out)
- Pathologic fractures, especially **vertebral column**
- Elevated serum **calcium** **(Ca > 11 mg/dl))** (released from osteolytic bone lesions)
- Increased total serum protein.

Renal failure

- Elevated Createnine >1.96 mg/dL
- Caused by :

1. Light chains

- Normally : Small amount of light chains filtered/reabsorbed.
- **In MM** : proximal tubular capacity exceeded → Light chains reach distal tubule & combine with Tamm–Horsfall mucoprotein (THP) forming **obstructing casts** .
- **Light chains in urine = "Bence Jones" proteins**
- In addition to renal damage , over production of light chains also lead to primary **Amyloidosis.**

2. Hypercalcemia

Anemia

- Mostly , normocytic, normochromic
- Hb<10 g/dl
- **Multifactorial** :

1. Bone marrow replacement by plasma cells.
2. Renal failure (low EPO)

- Symptoms : Weakness, pallor often present at diagnosis.

Infections

- Decreased production of normal immunoglobulins.
- Depressed humoral immunity.
- Recurrent **bacterial** infections.
- **Infection is leading cause of death !!**

Extramedullary Plasmacytoma

- Plasma cell neoplasm of soft tissue without bone.
- EMP may develop as a complication of multiple myeloma and is associated with a poor prognosis.

Hyperviscosity

- especially, common in the rare **IgM** secreting myeloma

Labs / Imaging

CBC, KFT, LFT, , ↑ LDH, ↑ ESR, for bone **(skeletal survey, MRI, PET/CT scan)**

Blood film : rouleaux formation (due to ↑ protein levels in plasma → ↑ viscosity)

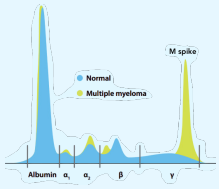
Bone marrow biopsy → **>10%** monoclonal plasma cells

SPEP → showing **M-spike**

UPEP → detects free light chains in urine **("Bence Jones" proteins)**

Immunofixation → helps in the identification of the type of secreted Igs

Serum free light chain essay



Urine dipstick → detect albumin, not light chains (**REMEMBER** to detect it we do **UPEP** !)

Prognostic Factors

International staging system

Stage I Serum β2 microglobulin < 3.5 mg/dl
Serum albumin > 3.5 g/dl

Stage II NOT I or III

Stage III Serum β2 microglobulin > 5.5 mg/dl

Treatment

- **Standard Chemotherapy**
  - Dexa and Thalidomide
  - Dexa and Bortezomib (Velcade) / Lenalidomide
  - Melphalan and prednisone
- **High Dose Chemotherapy with Bone marrow transplant**
- **For bone health :** Bisphosphonates, Vitamin D.

Differntial Diagnosis

MGUS (Monoclonal gammopathy of undetermined significance)
- Asymptomatic plasma cell disorder
- Serum monoclonal protein **<** 3 g/dl
- Clonal BM plasma cells **<**10%
- Abnormal SPEP (presence of M protein)
- **NO end organ damage**
- Can progress to multiple myeloma

SMM (Smoldering (asymptomatic) myeloma)
• both criteria must be met :
- Serum monoclonal protein **≥3 g/dL** and/or **≥10-60%** bone marrow clonal plasma cells
- **NO end organ damage related to plasma cell dyscrasia.**

Remember : **Multiple Myeloma (MM)**

Multiple myeloma (all 3 criteria must be met)
• Presence of a serum or urinary **monoclonal protein**
• Presence of **clonal plasma cells** in the bone marrow or a plasmacytoma
• Presence of end organ damage felt related to the plasma cell dyscrasia, such as:
- Increased calcium concentration
- Renal failure
- Anemia
- Lytic bone lesions

Done by : Rand Atiyat