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Pathology Newsletter
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Multiple Myeloma

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Introduction

With World Cancer day on the 4th of February, the focus of this newsletter is on multiple myeloma, which accounts for as much as 10 - 15% of haematological malignancies and 1% of all malignancies.

Multiple myeloma is a haematological malignancy of the antibody-producing (post-germinal) B-cell line characterized in the majority of instances by the production of a monoclonal antibody-protein, referred to as the M-protein.

This may be of any immunoglobulin class (IgG, IgM, IgA, IgD or IgE) or may simply be of the light chain class of κ (kappa) or λ (lambda). These monoclonals are typically identified from serum or urine samples.

Clinical Presentation

Multiple myeloma occurs most frequently in older patients, with the incidence in patients younger than 40-years of age being rare (<2% of cases).

The most common clinical features include bone pain, fatigue and recurrent infections. Bone pain arises from lytic bone lesions, evident on X-ray examination.

The classical radiological picture described is that of a skull 'salt and pepper' appearance or clear lytic lesions (figure 1). In addition, the prevalence of pathological fractures is also common and always warrants further investigations (figure 2).

Figure 1. Skull showing classic 'salt and pepper' appearance.

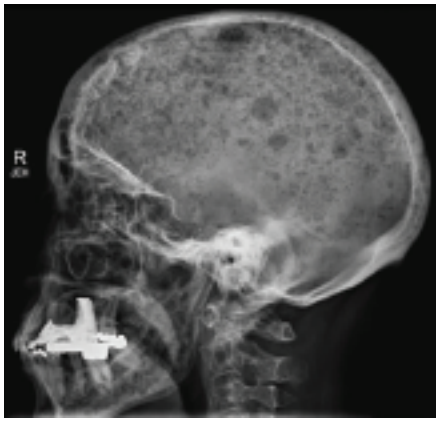
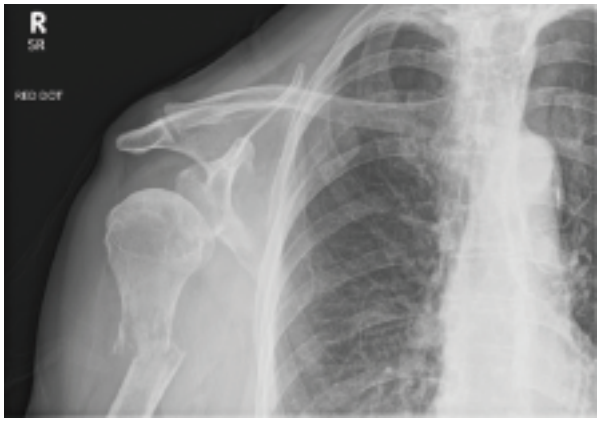


Figure 2. Pathological humerus fracture at lytic lesion site.



Recurrent infections occur due to the underlying immunoparesis associated with multiple myeloma. Although patients overproduce a specific antibody subset, the remainder of antibody production is severely suppressed, rendering patients more susceptible to infection.

Diagnosis

The World Health Organization (WHO) revised its diagnostic criteria in 2008, moving away from major and minor criteria. This simplified the diagnosis to essentially the demonstration of the presence of an M-protein with evidence of end-organ damage.

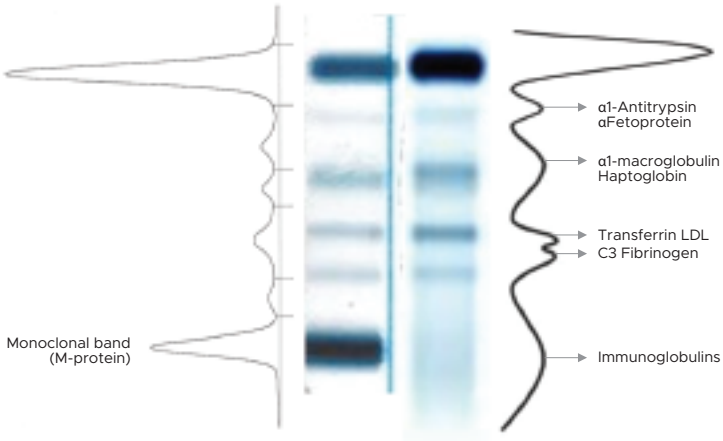
If end-organ damage is not present, the condition is classified as a Monoclonal Gammopathy of Unknown Significance (MGUS) and monitoring is required. The risk of progression from MGUS to multiple myeloma is increased in patient with large M-protein bands (>15g/L), IgA or IgM class or highly abnormal of κ:λ ratios.

The M-protein can be demonstrated using protein electrophoresis. This will show the normal subfractions of proteins found within serum. However, in the case of Multiple Myeloma, a marked expansion of a single (clonal) protein can be demonstrated by the presence of a spike (figure 3).

Table 1. Most recent diagnostic criteria in the diagnosis of Multiple Myeloma.

Diagnostic criteria for Multiple Myeloma (WHO)
1. M-protein in serum or urine
2. Bone marrow clonal plasma cells or plasmacytoma demonstrated
3. Related organ or tissue impairment C - Hypercalcaemia R - Renal impairment A - Anaemia B - Bone lesions on radiological examination

Figure 3. Electrophoresis of patient with multiple myeloma (left) compared to normal serum (right).



References

1. Figure 1. Case courtesy of Dr Jennie Roberts, Radiopaedia.org, rID: 17909.
2. Figure 2. Case courtesy of Dr Ian Bickle, Radiopaedia.org, rID: 83674.
3. WHO Classification of Tumours of Haemotopoietic and Lymphoid Tissues, 4th edition, 2008.

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