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Radiologic-Pathologic Correlation

Atypical imaging feature of Non-secretory multiple myeloma☆

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Abstract Non-secretory multiple myeloma (NSMM) is a rare variant of the classic form of multiple myeloma in which no monoclonal gammopathy can be demonstrated in the serum or urine. We describe a rare case of non-secretory multiple myeloma in a 23 year old female presenting with bilateral limb weakness of two years duration. Clinically she was diagnosed to have Pott's spine and was treated with category 1 anti tubercular drugs. Hematological investigations showed plasmacytosis and radiography showed osteolytic lesions. No monoclonal gammopathy was found in the serum or urine. MRI showed multiple compressions with sclerosis within vertebral bodies suggestive of osteomalacia/ diffuse infiltrative disorder. The free light chain (FLC) assay revealed increment in the free kappa light chain and an abnormal κ/λ ratio. Free Light Chain assay (FLC) when used in complement with Protein Electrophoresis (PEP) and Immunofixation Electrophoresis (IFE) were pivotal in diagnosis of non secretory multiple myeloma or light chain myelomas. FLC is a useful monitoring tool because it reflects therapy results due to short serum half life.

Keywords: Non-secretory multiple myeloma (NSMM); Plasmacytosis; Osteolytic lesions; Free light chain(FLC)

1. Introduction

Non- secretory multiple myeloma (NSMM) is a rare variant of multiple myeloma that has no serum or urine monoclonal gammopathy on protein electrophoresis (PEP). Although a monoclonal gammopathy is absent, NSMM usually has the same clinical and radiological features as found in MM [1].

NSMM can be classified as non-producer or producer type by production of M-protein from plasma cells.

The possible mechanism of NSMM is considered as (i) an inability to excrete immunoglobulin (ii) low synthetic capacity for immunoglobulin (iii) increased intracellular degradation (iv) rapid extra cellular degradation of abnormal immunoglobulin. Immunoglobulin can be seen in the cytoplasm in producer type; such patients produce, but are unable to secrete. In the non- producer type, the disorder originates from reticular cells rather than the plasma cells and seems to block the protein production process from plasma cells [2].

The mechanism of the defect of immunoglobulin transport is still unclear and the differential diagnosis of pseudo-non-secretory type needs to be considered. In the pseudo-non-secretory type, the proteins are secreted, but dissolved quickly and deposited to the tissues, and are not found in serum or urine [3].

An atypical imaging feature, of NSMM, on contrast-enhanced MRI, has been reported previously by Hwa yeon Lee et al. Diffuse osteosclerosis associated with plasma cell dyscrasiasis is extremely rare and is apparent in less than 3% of cases. Osteosclerotic lesions are rare in malignant monoclonal gammopathies, and may present as diffuse bone sclerosis, mixed sclerotic and lytic lesions [4]. Multiple myeloma must be born in mind in the presence of diffuse bone sclerosis. Some disorders like osteoblastic metastasis, lymphoma, and osteosclerotic sarcoidosis may pose diagnostic difficulty.

It has been speculated that in common multiple myeloma the bone changes result from secretion of osteoclastic activating factor (OAF) released by neoplastic plasma cells

☆ Above listed authors have significant contributions in working up this case report.

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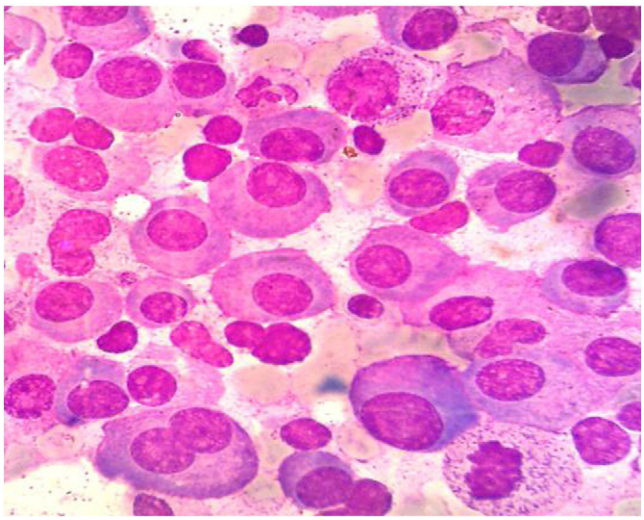

Fig. 1. Photomicrograph of bone marrow aspiration showing plasma cells, plasmablasts with nucleoli and binucleated plasma cell. Cytoplasm was deep blue with indistinct perinuclear halo×1000 (Giemsa stain).

with osteoclast stimulating activity. Recently identified as lymphotoxin, which stimulate a fibroblastic reaction with in the marrow resulting in osteosclerosis [5].

Free light chain assay is useful for diagnosis and monitoring of patients with NSMM.When FLC assay used in conjunction with protein electrophoresis (PEP) and immunofixation electrophoresis (IFE) has high sensitivity to detect monoclonal proteins in a proportion of patients with non- secretory multiple myeloma (NSMM) [6].

We here report a case of NSMM presenting with atypical imaging features, absence of monoclonal proteins in the serum and urine with increment in the kappa free light chains and abnormal k/λ ratio.

2. Case report

23 year old female presented with bilateral limb weakness over a period of 2 years on clinical examination she had high stepping gait, kyphosis present over thoracic region with restricted ankle dorsi flexion .clinical diagnosis of pott's spine was made. Haematological investigations revealed Hb-(10g/dl), total count –(4700/cumm) platelets –(90,000 cells/cumm) and increased ESR-101 mm/hr. Peripheral smear was consistent with normocytic normochromic anemia with increased rouleax formation. Bone marrow aspiration studies showed hypercelluar marrow with 40% plasma cells, mature and atypical plasma cells with eccentric hyperchromatic nuclei showing conspicuous nucleoli and indistinct peri-nuclear hoff, including binuclear form with marked suppression of erythroid, myeloid and megakaryocytic series (Fig. 1). Bone marrow biopsy performed but yield was unsatisfactory. Serum electrophoresis was normal. Biochemical investigations showed increased serum alkaline phosphatase (134 IU/L) (Table 1). Radiograph of the spine showed compression of D11,L1,L5 with severe osteoporosis (Fig. 2). X-ray of the.Skull showed multiple lytic lesions with involvement of mandible. CT scan showed multiple level compressions (Fig. 3).

MRI showed multiple compressions with sclerosis within vertebral bodies suggestive of osteomalacia/ diffuse infiltrative disorder (Fig. 4). Free light chain assay revealed increased kappa free light chain and abnormal k/λ ratio (Table 2). Bone scan revealed collapse/compression fracture of D7,D10,L1, L5vertebrae. Bone mineral densitometry showed severe osteoporosis and increased bone fragility (Table 3).

Endocrine profile were within normal limits (Table 4). The patient was treated with anti-tubercular drugs in view of probable diagnosis of pott's spine. A diagnosis of NSMM was made and the patient was referred to cancer institute for radiotherapy and chemotherapy.

Table 1
Biochemical investigations

Test name	Results	Reference range
Serum calcium (Arsenazo III method)	10.2 mg/dl	Adult :8.5-10.5 mg/dl
Serum inorganic phosphorous (UV end point method)	3.4 mg/dl	Adult: 1.5-6.8 mg/dl
Alkaline phophatase (IFCC mod.37C method)	134 I U/L	Adult:42-98 IU/L
Acid phosphatase (Total)	4.2 IU/L	Adult 0-4.7IU/L
Total Proteins (BIURET)	8.2g/dl	Adult 6.4-8.3 g/dl
Globulin	3.2g/dl	Adult 2-3g/dl
Albumin :Globluin Ratio	1.56 :1	Adults1.5:1-2.5:1

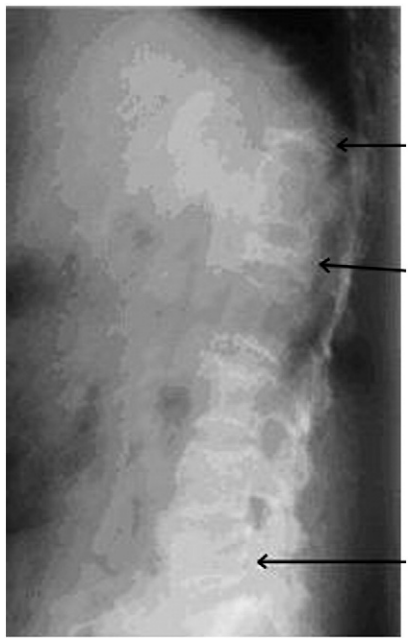

Fig. 2. Radiograph of the spine showed compression of D 11, L1 and L 5 with severe osteoporosis.