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Clinical-Medical Image

Misleading Myeloma Morphology

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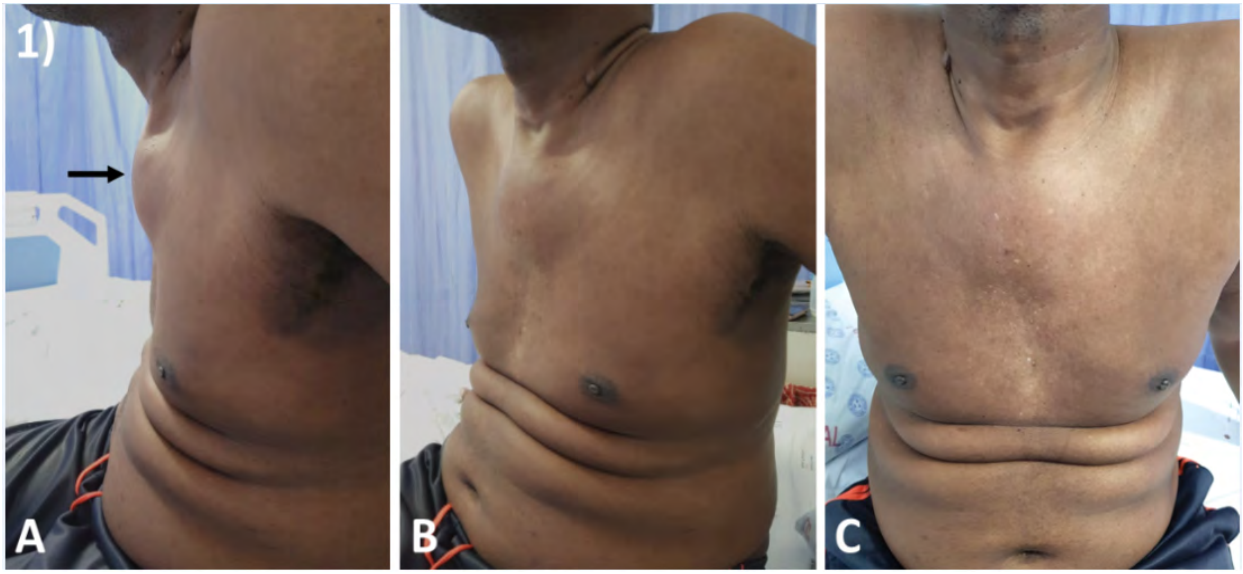

Figure 1: Anterior chest wall mass (A – C; arrow); 12 cm × 12 cm.

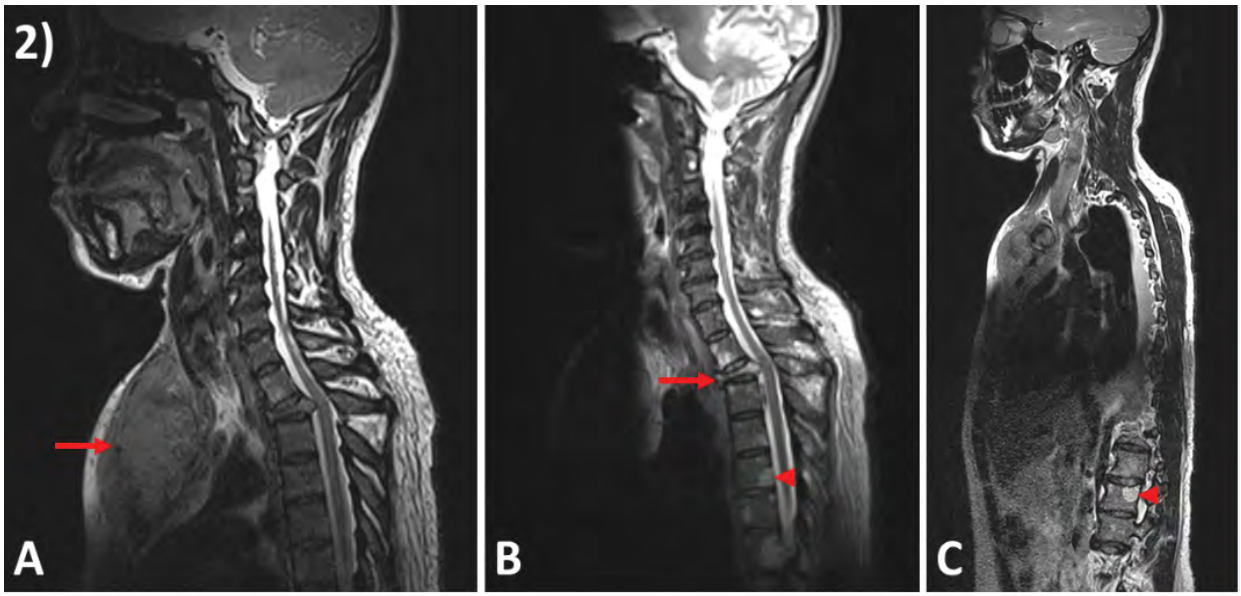

Figure 2: Magnetic resonance imaging (MRI) of the spinal cord. (A) Soft tissue mass in sternum with extension into manubrium (arrow); B) Pathobiological fracture involving the 4th thoracic vertebra (T4; arrow) with associated focal spinal stenosis; (B, C) Diffuse marrow infiltration of thoracic and lumbar vertebrae (arrowheads).

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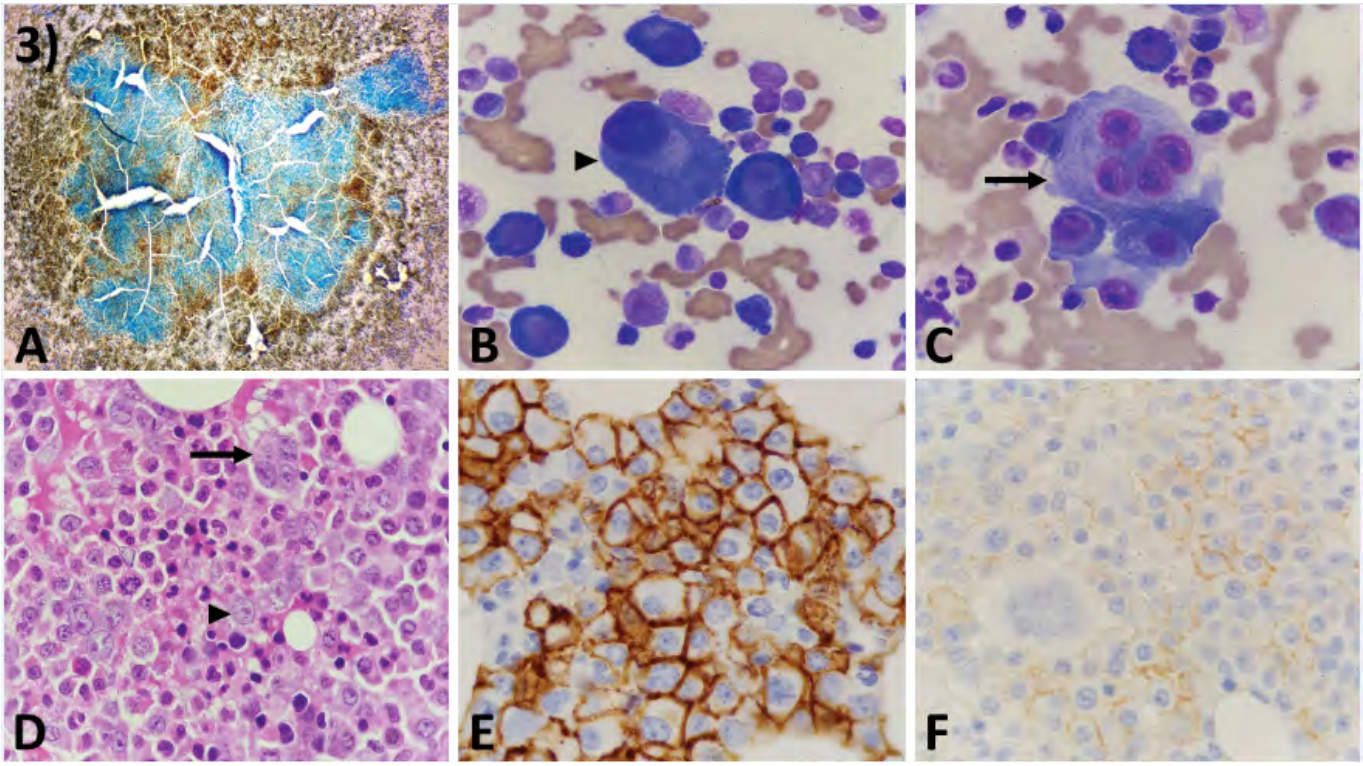

Figure 3: Morphology of the bone marrow (A – C): Aspirate – Giemsa stain; (D – F): Trephine. (A) Markedly hypercellular bone marrow particle (original magnification 100x); (B and D) Large and giant plasma cells (PC) with large eccentric nuclei comprising fine chromatin and prominent macronucleoli, in addition to voluminous deeply basophilic cytoplasm and a pronounced perinuclear hof (arrowhead; original magnification 1000x); D: haematoxylin and eosin stain); (C and D) Giant multinucleate PC with primitive nuclear features and abundant cytoplasm (arrow; original magnification 1000x); (E) CD138 immunohistochemical stain depicting intensely positive staining of PC present in a nodular pattern of infiltration (original magnification 1000x); (F) CD56 immunohistochemical stain highlighting variable staining of PC (original magnification 1000x).

Abstract

Most plasma cell neoplasms are comprised of recognisable tumour cells that can be readily identified morphologically and generally without any difficulty. However, infrequently these cells demonstrate atypical features and may possibly result in erroneous diagnosis. In such rare instances, a high index of suspicion together with extensive whole blood, serum and urine analyses, in conjunction with the additional methods of bone marrow assessment such as flow cytometry and immunohistochemistry, are generally required for definitive diagnosis, classification and prognostication.

Keywords: Plasma cell myeloma; Atypical plasma cells; Giant plasma cells; Multinucleate plasma cells

Case Presentation

A previously healthy 49-year old man presented with a 6-month history of progressively worsening effort tolerance, back pain and weight loss of 15kg; he denied any bleeding. Clinical examination revealed pallor and an anterior chest wall mass (Figure 1); neurological examination was unremarkable. Initial investigations demonstrated a profound isolated normocytic anaemia (haemoglobin 4.7 g/dL; MCV 90.4 fL; ferritin 637 µg/L; RPI 0.4). Peripheral blood morphology displayed increased background staining, occasional plasmacytoid lymphocytes and a single plasma cell. Biochemical tests showed elevated serum calcium (2.7 mmol/L) and β2-microglobulin (4.1 mg/L); renal function was preserved. Serum protein electrophoresis with immunofixation confirmed an IgG kappa monoclonal protein (39 g/L); with serum free light chain analysis the kappa to lambda ratio was 0.84, and urine protein electrophoresis was negative for Bence-Jones protein. Magnetic resonance imaging (MRI) highlighted extensive spinal cord pathology (Figure 2). A bone marrow biopsy revealed marked hypercellularity comprising 30% atypical plasma cells (Figure 3). Immunophenotyping by flow cytometry showed a distinct population of large-sized cells with low side scatter, dim-to-negative CD45 expression, negative CD19 expression, positive expression of CD38, CD138 and aberrant CD56 (confirmed on trephine biopsy with immunohistochemistry (IHC); Figure 3) and kappa light chain restriction. A final diagnosis of plasma cell myeloma (PCM), International Staging System stage II, was concluded. Concurrent with the bone marrow diagnosis, a biopsy of the sternal mass confirmed infiltration by PCM. The patient was subsequently referred to a tertiary adult oncology centre for definitive therapy.

Conclusion

The pleomorphic nature of plasma cells is well described and occasionally their atypical morphology may lead to misdiagnosis. In the present case, misinterpretation of the atypical plasma cells as other haematopoietic cells (neoplastic e.g. large cell/anaplastic lymphoma, dysplastic megakaryocytes; stromal e.g. osteoblasts, osteoclasts, Langhans/foreign body giant cells) or even a non-haematopoietic malignancy, is possible. A comprehensive/diversified approach for ensuring the correct diagnosis is emphasised.