Plasma cells in bone marrow – an artifactual change mimicking metastasis

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Sir,

Plasma cells are known to have a varied morphology especially in plasma cell tumors [1]. They may be flame cells with deep magenta to pink cytoplasm at the periphery, or Mott cells with multiple small globular cytoplasmic inclusions or thesaurocytes which have reticulated cytoplasm [2, 3]. We present a case in which plasma cells showed a unusual morphology in trephine bone biopsy. A 40-year-old male presented with bony pain for two months, reduced appetite with fever of and on for a month. He had taken treatment for pulmonary tuberculosis one year back. On examination, he had pallor and a subcutaneous swelling on the anterior chest wall. There was no lymphadenopathy or hepatosplenomegaly. FNAC of the subcutaneous nodule revealed numerous plasma cells, suggestive of a plasmacytoma. Further investigations were done to rule out multiple myeloma. Hemogram revealed: hemoglobin – 10.3 g/dl, red blood cell count – $2.73 \times 10^{12}/l$, total leucocyte count – $7.4 \times 10^9/l$, platelet count – $1.08 \times 10^9/l$ and erythrocyte sedimentation rate (ESR) – 140 mm/1st hour. Peripheral smear showed normocytic normochromic anemia with marked rouleaux formation with mild degree of thrombocytopenia. Serum protein electrophoresis showed a prominent band in the γ -globulin region. On quantization γ -globulin was 15.43% of the total proteins. Urine was negative for Bence Jones protein. Bone marrow imprint smears showed increase in

plasma cells (33%). Most of the plasma cells had abundant homogenous cytoplasm and large slightly eccentric nuclei with opened up chromatin and conspicuous nucleoli. Others were smaller had moderate amount of cytoplasm with some cytoplasmic globules, eccentric nuclei, coarse chromatin and inconspicuous nucleoli. Binucleate and multinucleate plasma cells were also seen.

Bone marrow biopsy was put in 5% EDTA for decalcification [4]. After decalcification, the biopsy was processed for paraffin embedding and stained with haematoxylin and eosin. The bone marrow biopsy was cellular. Erythroid cell islands were seen along with myeloid series. Occasional megakaryocytes were also seen. Amongst the hematopoietic cells there were large number of cells with abundant vacuolated cytoplasm and round to oval nuclei with clumped chromatin, prominent nucleoli. Some of them had moderate amount of cytoplasm (Fig. 1). Along with these cells there were some mature plasma cell clusters also identified

Fig. 1 Groups of vacuolated plasma cells in the bone marrow biopsy (hematoxylin and eosin, X400)

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in the biopsy. Due to the abundant vacuolated and foamy cytoplasm possibility of a metastasis in the bone marrow was considered. PAS and mucicarmine stain were negative and possibility of a metastatic adenocarcinoma was ruled out. The tumor was positive for CD38 and negative for pancytokeratin, thus establishing the nature of these vacuolated cells as plasma cells. Ultrasound abdomen revealed bilateral renal parenchymal disease but no primary tumor was identified.

Bone marrow imprint slides were reviewed and vacuolated cells were not found. Meticulous investigation to find the origin of these vacuolated cells was made. It was found out later that bone marrow biopsy was improperly fixed (kept for less than half an hour in 10% buffered formalin) before it was put for decalcification. We postulate that these vacuolated cells were probably a result of improper fixation before decalcification. The gases like carbondioxide released in the process of decalcification can sometime damage the tissue and produce vacuolation if the tissue is not fixed properly. This argument is also supported by the fact similar changes were not observed in the imprint smears of the same bone marrow biopsy. Hence, after meticulous examination of all the clinical, radiological and pathological material submitted to laboratory at various period of time a diagnosis of multiple myeloma was suggested.

This case has been presented to impress the fact that cytoplasmic vacuolations and clearing in plasma cells are a

known fact although rare. It was first described by Chen et al. in 1985. It may hence mimic a metastatic germ cell tumor or a clear cell carcinoma [5]. Signet ring change is also known to occur in plasma cells in multiple myeloma and could be confused with metastatic carcinoma or a lymphoma [6]. In this myriad of differential diagnoses which may confuse the histopathologists and invite an extensive work up, an awareness of artifactual changes (as highlighted by this case) occurring in plasma cells may be of importance and should be considered.

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