Plasma Cell Neoplasm with Clear Cell Morphology—A Diagnostic Dilemma

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Apart from their usual morphology (eccentrically placed round to ovoid nuclei with cart-wheel-like chromatin, perinuclear halo and deep basophilic cytoplasm), very rarely plasma cells show varied appearances—signet-ring, pleomorphic, blastic, vacuolated, spindle cell, and clear cell.[1] Here, we present a case of plasmacytoma involving the right pleural cavity with unusual morphology and masquerading as a nonhematolymphoid neoplasm.

A 75-year-old woman presented with complaints of weakness, shoulder, and back pain with breathlessness. Magnetic resonance imaging (MRI) of the thoracic spine (►**Fig. 1A**) showed a heterogeneous lesion measuring $11.3 \times 2.5 \times 3.9$ cm in the right pleural cavity with involvement of the adjacent ribs, costovertebral joints, and infiltration of the right neural foramina in the T3 to T4 and T4 to T5 regions. The lesion showed low fluorodeoxyglucose (FDG) uptake on positron emission tomography-computed tomography (PET-CT) scan with standardized uptake value (SUV) max of 3.3.

Needle core biopsy of the lesion under ultrasound guidance was done. Histopathological examination revealed fibrocollagenous tissue and skeletal muscle bundles with neoplastic cells arranged in cords and sheets (►**Fig. 1B**). The

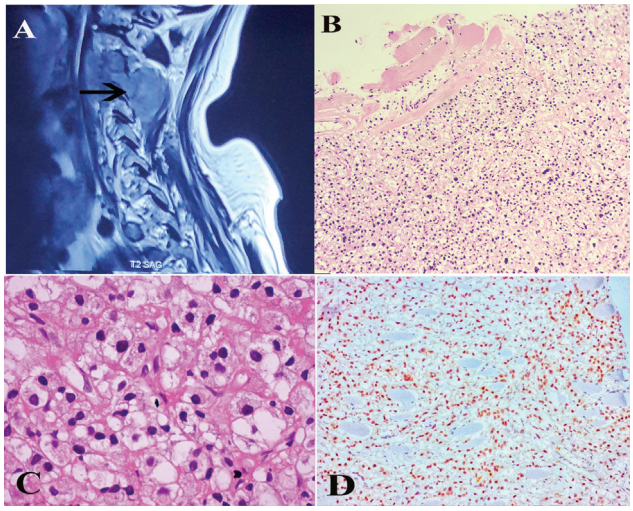

Fig. 1 (**A**) Magnetic resonance imaging of thoracic spine showing a large heterogeneous lesion involving the pleural cavity. (**B**) Hematoxylin and eosin (H&E) section shows skeletal muscle bundles with neoplastic cells arranged in cords and sheets, 200x magnification. (**C**) Individual cells showing ovoid nuclei with clumped chromatin and moderate amounts of vacuolated to clear cytoplasm, H&E 400x magnification. (**D**) Strong and diffuse nuclear staining for MUM1 immunostain, 200x magnification.

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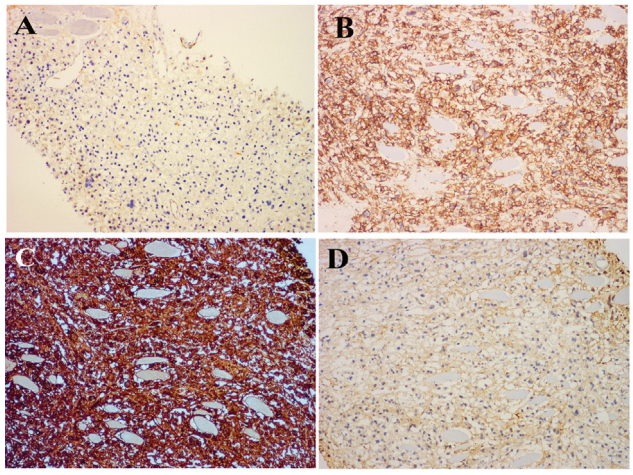

Fig. 2 (**A**) Pancytokeratin immunohistochemistry exhibiting no staining of the neoplastic cells, 100x magnification. (**B**) Strong and diffuse membranous staining for CD138 immunostain, 200x magnification. (**C**) Strong and diffuse cytoplasmic staining for lambda light chain immunohistochemistry (IHC); 200x magnification. (**D**) Kappa light chain IHC: No staining of the neoplastic cells, 200x magnification.

individual cells exhibited moderately pleomorphic ovoid nuclei with clumped chromatin and moderate amounts of vacuolated to clear cytoplasm (►**Fig. 1C**). A diagnosis of malignant neoplasm was rendered with differentials of mesothelioma, PEComa, clear cell renal cell carcinoma, and poorly differentiated carcinoma. Immunohistochemistry (IHC) with a panel of markers was performed.

The neoplastic cells were negative for pancytokeratin (►**Fig. 2A**), WT1, TTF1, PAX8, HMB45, S100, CD34, MelanA, desmin, caldesmon, SMA, SOX10, and TFE3. They showed strong and diffuse membranous staining for CD138 (►**Fig. 2B**), moderate and diffuse nuclear staining with MUM1 (►**Fig. 1D**), strong and diffuse cytoplasmic staining for lambda light chain (►**Fig. 2C**), and no cytoplasmic staining for kappa (►**Fig. 2D**); the cells also exhibited weak nuclear staining for estrogen receptor. A final diagnosis of plasmacytoma was made. Further workup for multiple myeloma was advised but the patient succumbed soon after.

Clear to vacuolated cytoplasm, centrally placed nuclei with clumped chromatin and no perinuclear hof are extremely unusual in neoplastic plasma cells. To our knowledge, this is the first case with this morphology involving soft tissue. It has previously been hypothesized to be artifactual, pertaining to decalcification of bone marrow samples.[2,3] However, our case involved biopsy of soft tissue that did not undergo decalcification. Švec et al hypothesized that accumulation of misfolded proteins and formation of autophagic vacuoles in neoplastic plasma cells can account for clear cell change.[4]

We, thus, recommend that this entity be kept in mind during the workup of a neoplasm with clear cell morphology in soft tissue and include study of light-chain restriction when other immunohistochemical markers are overlapping or noncontributory.

Conflict of Interest
None declared.

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