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Megakaryocytes in bronchoalveolar fluid (BALF) samples

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To the Editor,

The presence of megakaryocytes in the lungs was first described and discussed by Aschoff in 1893 (1), suggesting that these cells are migrants from the bone marrow or from the spleen in the newborn or young animals. Thus, megakaryocytes are known to regularly inhabit human lung capillaries (2). In pulmonary capillaries, megakaryocytes usually appear as dark hyperchromatic barrel-shaped cells with prominently folded nuclear membranes that are squeezed tightly into the capillary lumens. Occasionally, multilobulation or branching may be seen.

This would explain why these cells may be observed in cytological samples that were obtained using different procedures from the respiratory system (3).

BALF is a procedure that is indicated mainly in the following clinical situations such as: diagnosis of lower respiratory tract infections, diagnosis of chronic interstitial lung disease, characterizing alveolitis, suspected lung cancer, and diagnosis of pulmonary aspiration.

Among the cells that are recovered from the lungs using BALF, it is possible to find megakaryocytes, although they are found much less frequently than other major cell types such as macrophages (the main cell type), neutrophils, lymphocytes, and eosinophils.

Apart from its physiological role in platelet formation in the lungs, some studies have shown that megakaryocytes in the lungs are closely related to several respiratory diseases, including diffuse alveolar damage, extensive burn-induced lung injury, pulmonary fibrosis in systemic sclerosis, and patients with myeloproliferative disorders (4). In addition, platelets have been found extravascularly in the lungs of patients with asthma and in animal models of allergic lung inflammation, and direct interactions between platelets and bacteria have been associated with increased pulmonary platelet accumulation. Moreover, the accumulation of numerous megakaryocytes in pulmonary arterial blood suggest that the lung plays a physiological role in systemic thrombopoiesis in lung cancer patients.

Herein, cytospin smears from two BALFs containing megakaryocytes are reported. BALFs corresponded to two patients who had suspected lung carcinoma on a previous chest CT scan.

Cytospin slides of BALF cells were made using a Shandon Cytospin 2™ device (Marshall Scientific, Hampton, NH, USA). Smears were stained using the Papanicolaou method to observe and characterize malignant cells. For cell differentiation, slides were stained using the May–Grunwald Giemsa technique. Immunocytochemical (ICC) studies were performed on the same samples to corroborate the presence of megakaryocytes.

Figure 1A shows a large cell with an ovoid cytoplasm (about 60 × 25 μm in size) and an elongated multilobed nucleus with dense chromatin (nucleolus is not observed). Some red blood cells can also be observed. Using ICC, this megakaryocyte showed positivity for the CD61 marker (Figure 1B).

Figure 1C shows a large round cell (about 45–50 μm in diameter) with a central multilobed nucleus with compact chromatin. Three macrophages and a lymphocyte were also present in the smear.

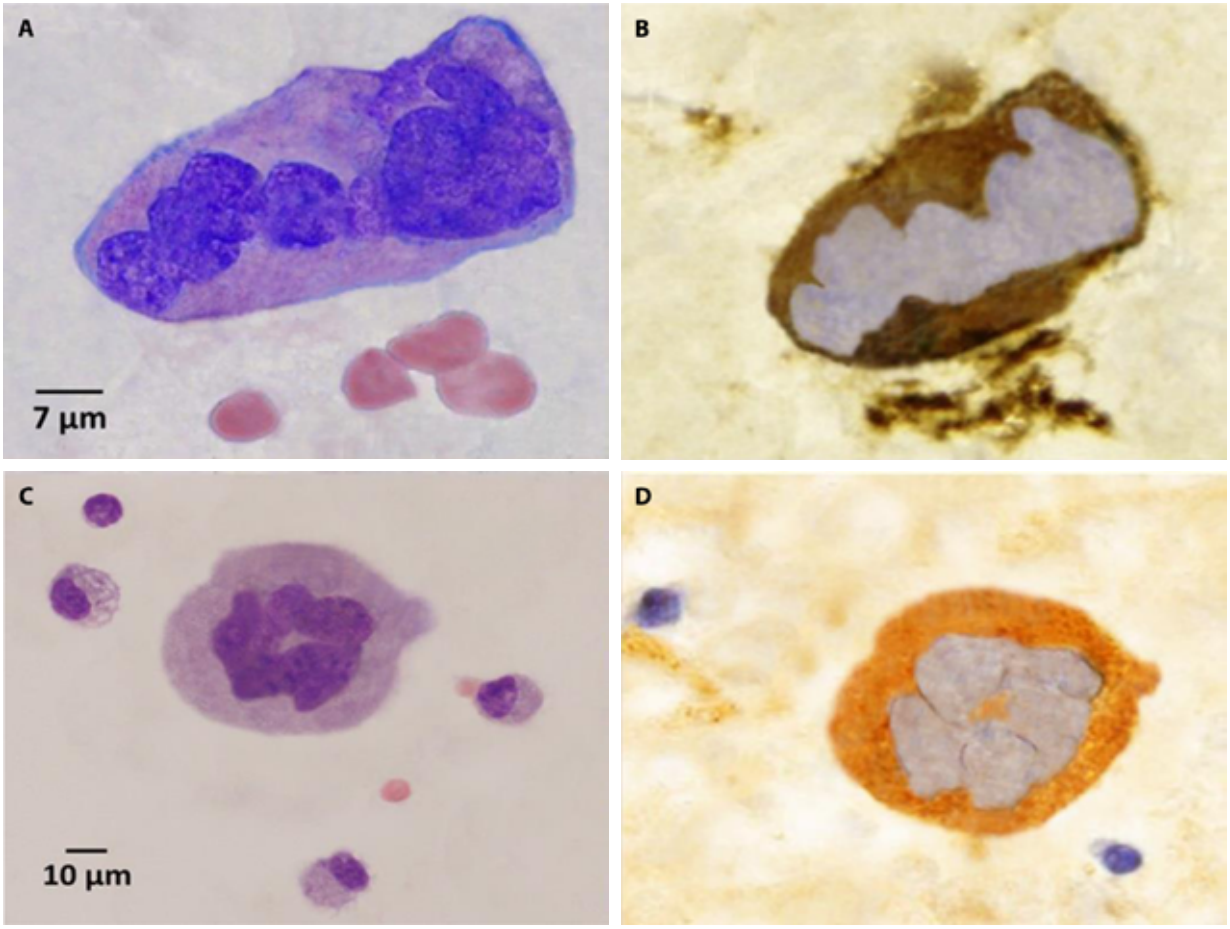

Figure 1. A: Megakaryocyte in a BALF smear. The nucleus is characteristically elongated and multilobed (MGG, x1000). B: The same cell showing positivity for CD61 (DAB, x1000). C: Megakaryocyte with multilobed nucleus in a BALF smear. Some macrophages and a lymphocyte are also observed (MGG, x400). D: The same cell showing positivity for CD41 (DAB, x1000).

This megakaryocyte showed positivity for the CD41 marker (Figure 1D).

Malignant cells, mainly in the lymphangitic carcinomatosis, may involve the lung microvasculature, so sophisticated techniques such as pulmonary microvascular cytology can collect cancer cells where megakaryocytes are also readily seen in wedged blood, confirming the microvascular origin of the sample (5). In addition, knowing how to recognize the morphological features that megakaryocytes present in cytological smears is essential to avoid mistakenly identifying them as malignant. Thus, in the work by Liu et al. (6), there are certain differences between megakaryocytes and tumor cells in cytological samples from effusions. These differences include the nucleolus, which is not observed in megakaryocytes, but it is large and prominent in malignant cells; nuclear morphology, which shows multilobed nuclei and condensed dark staining chromatin in megakaryocytes, and a large or ununiform size with loose chromatin in malignant cells; the appearance of the cytoplasm, which is abundant and has occasional platelet adhesions in megakaryocytes, but it is cloudy/foamy with an unclear boundary in malignant cells; and cellular distribution, which is single in megakaryocytes, but it is arranged in clumps and disorganized in malignant cells.

It is important to highlight that the most frequently diagnosed neoplasia with BALF is the

adenocarcinoma (both lepidic and well differentiated acinar patterns), reason why its cytological features will have to be taken into account, establishing also the differential diagnosis with large cell undifferentiated lung carcinoma, since these two histological types of lung cancer are the most likely to create confusion with the presence of megakaryocytes.

Conflict of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement, etc.) that might pose a conflict of interest in connection with the submitted article.

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