case report

Mimicry of sugar tumor and minute pulmonary meningothelial-like nodule to metastatic lung deposits in a patient with rectal adenocarcinoma

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Several reports have described different lung lesions mimicking primary or metastatic neoplasms. In this paper, we describe the different features of two uncommon and benign lung lesions mimicking metastasis from a primary large bowel adenocarcinoma. Our patient is a 75-year old female with a history of invasive rectal adenocarcinoma. One month after her surgery, she started complaining of coughing and shortness of breath. Clear cell sugar tumor and minute meningothelial-like nodules had been found incidentally and simultaneously during her chest x-ray. The diagnosis had been made based on morphology and was supported by a positive staining to a panel of immunohistochemical stains including CD34, vimentin, HMB45, melan A and S100. An ultra-structural examination was also performed and confirmed the presence of melanosomes in sugar tumor. The coexistence of lung sugar tumor and minute pulmonary meningothelial-like nodules has never been reported in the literature and an awareness of these lesions is essential to correctly diagnose and stage patients.

Since its description in 1963 by Liebow and Castleman, sugar tumor has been reported in pulmonary and several extra-pulmonary sites.[1,2] Its presentation as a lung nodule raises the possibility of pulmonary metastasis, especially in patients with known neoplastic diseases. Another interesting and uncommon lesion is the minute pulmonary meningothelial-like nodules, which were first described in 1960 by Korn et al.[3] It is essential to the pathologist dealing with a lung wedge biopsy to be aware of such entities and able to recognize them, as such diagnosis would have a tremendous impact on staging and treatment options. To our knowledge, this is the first case report describing the rare coexistence of both lesions in a patient with rectal adenocarcinoma.

CASE

A 75-year-old female was referred to King Khaled University Hospital, Riyadh, for evaluation, investigations and treatment. She had a history of progressive constipation and per rectal bleeding for a period of 5 months. A colonoscopy showed multiple polyps in the transverse and sigmoid colon and a circumferential ulcerating mass, 10 centimeters from the anal verge. Biopsies were taken from the rectosigmoid mass and a diagnosis of moderately differentiated adenocarcinoma of the large bowel was rendered.

The patient underwent a chest-abdomen-pelvis computed tomography and multi-planer multi-sequential MRI of the pelvis. The films showed a neoplastic mass involving the rectum with enlarged regional lymph nodes. Results of routine laboratory investigations were within normal limits.

A total proctocolectomy with end ileostomy procedure was performed followed by a total abdominal hysterectomy (TAH) and bilateral salpingo-oophorectomy (BSO). The pathological diagnosis was invasive, moderately differentiated, adenocarcinoma of the rec-

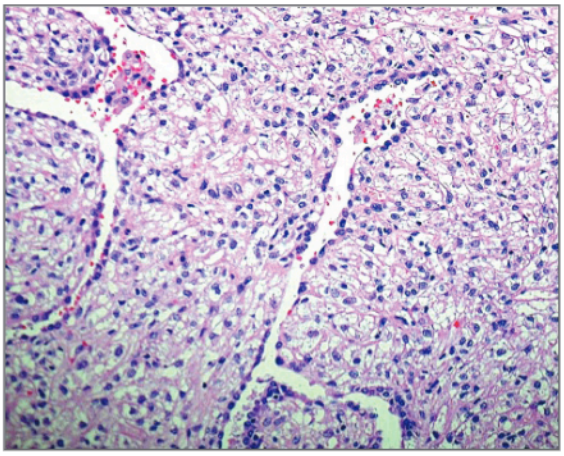

Figure 1. Sugar tumor comprising clear cells with distinct cellular borders and entrapped bronchi (hematoxylin and eosin ×200).

tum (pT3N2M0 according to the 7th AJCC staging system). The TAH and BSO specimen was negative for malignancy and showed only cystic atrophy of the endometrium and chronic cervicitis. The patient was discharged on the twelfth day postoperation with an uneventful hospital stay and well-functioning stoma. One month after discharge, the patient started complaining of coughing and shortness of breath. A chest x-ray and a high-resolution CT identified two suspicious small nodules in the upper and lower lobes of the right lung. The patient underwent thoracoscopy and CT-guided wedge resection of both lung nodules.

Pathologic Findings

Macroscopically, specimen 1 was from the right lower lobe and comprised a lung wedge biopsy with a well-cir-

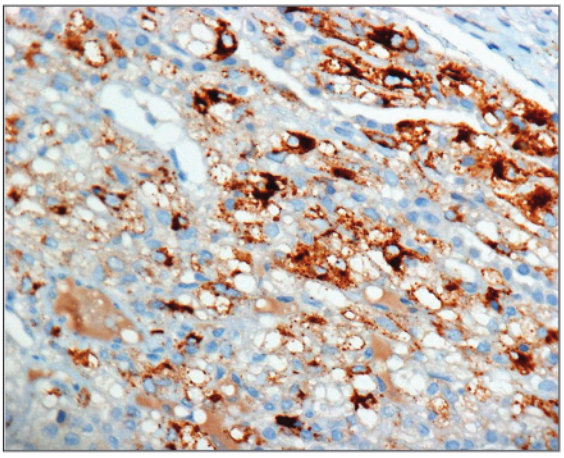

Figure 2A. Immunohistochemical stains showing cytoplasmic positivity to HMB-45 (2A ×400) and melan A (2B ×400).

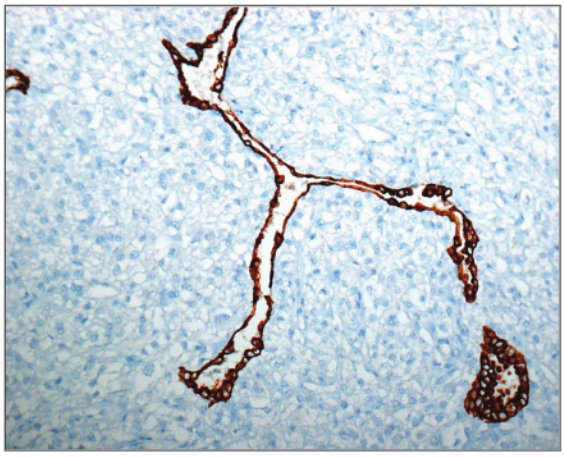

Figure 3. Cytokeratin cocktail immunohistochemical stain showing the contrast between the negative tumor cells and the entrapped bronchial epithelium.

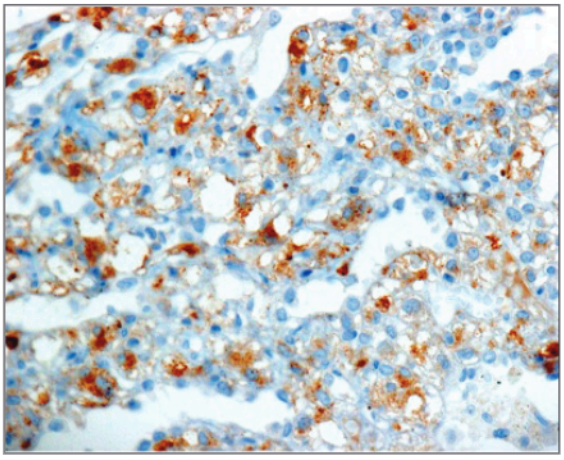

Figure 2B. Immunohistochemical stains showing cytoplasmic positivity to HMB-45 (2A x400) and melan A (2B ×400).

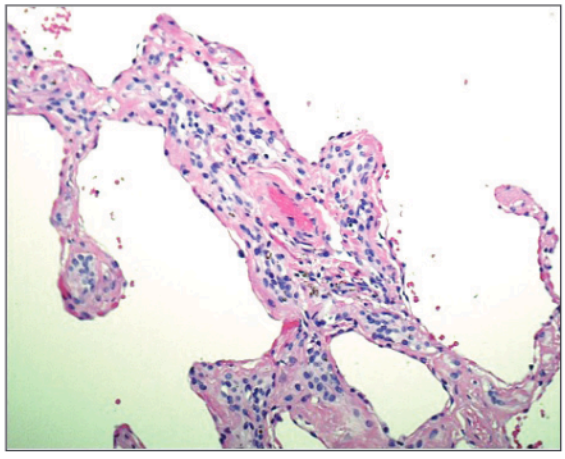

Figure 4. Perivascular nests of minute pulmonary meningothelial-like nodule (hematoxylin and eosin ×200).

cumscribed firm white nodule measuring 0.4×0.3×0.3 cm. Specimen 2 was from the right upper lobe and was grossly unremarkable. Microscopically, specimen 1 showed a well-circumscribed lesion consisting of solid sheets of polygonal to oval cells with distinct cellular borders. The cytoplasm was clear to pale eosinophilic. The nucleus was round to oval with fine chromatin and inconspicuous nucleolus. No mitotic figures were seen. The nodule was well-vascularized and showed entrapped bronchi with narrowed lumina (**Figure 1**).

In addition to the routine hematoxyline and eosin stain, the cells were positive to Periodic acid-Schiff (PAS) special stain. A panel of immunohistochemical stains was done using Benchmark, Ventana. The neoplastic cells showed membranous positivity to CD34 and vimentin (mouse monoclonal, ready to use, Novocastra), cytoplasmic positivity to HMB-45 (mouse monoclonal, 1:50, Novocastra) and melan A (mouse monoclonal, 1:25, Novocastra) in most of the cells (**Figures 2A, 2B**) and focal nuclear and cytoplasmic positivity to S100 (rabbit polyclonal, ready to use, Novocastra). They were negative to cytokeratin-cocktail (**Figure 3**), CK7, vimentin, SMA, NSE, synaptophysin and CD68. Tissue from the paraffin-embedded blocks was retrieved and reprocessed for electron microscopy. Ultrastructural features included clumped cytoplasmic glycogen granules and rare melanosomes. Most of the tumor cells were resting on well-recognized basal lamina.

Specimen 2 showed a minute pulmonary meningothelial-like nodule consisting of nests of oval to epithelioid cells with a pale eosinophilic cytoplasm and indistinct cellular borders. The nuclei were oval, centrally located with a fine granular chromatin and inconspicuous nucleoli (**Figure 4**). The cells were positive to EMA (mouse monoclonal, ready to use, Novocastra), Vimentin (mouse monoclonal, ready to use, Novocastra) and PR (mouse monoclonal, ready to use, Novocastra) immunostains confirming the above diagnosis. The patient was discharged on the second day of the procedure with no complications. She was still under careful follow-up in the outpatient clinic at the time of writing.

DISCUSSION

Perivascular epithelioid cell neoplasms are a family of tumors that share morphological features and show both melanocytic and muscular differentiation demonstrated by immunohistochemistry. This group includes renal angiomyolipoma, pulmonary clear cell sugar tumor (CCST), lymphangioleiomyomatosis and less common neoplasms of the soft tissue, female genital and gastrointestinal tracts.[2,4] In 1963, Liebow and Castleman reported the first 12 cases of CCST of the lung.[1] Although a number of cases have been recognized since then, it is still considered an extremely rare primary pulmonary neoplasm.[5] It shows equal gender distribution though a slight female predominance was noticed in some case series.[1,6-9] The age distribution is wide, starting from the 1st to the 6th decades. CCST is usually asymptomatic except for a few cases with symptoms such as hemoptysis.[1,8] It is usually recognized incidentally on chest x-ray, in any lobe, as a peripheral coin lesion ranging from 0.7 to 6.5 cm.[6,8] Although histology and confirming ancillary studies are the golden standard for the diagnosis, CCST was recognized in cytology specimens as a dual population of cohesive clusters of polygonal and spindle cells with fragile cytoplasm and frequent stripped nuclei. Delicate transgressing vessels can also be seen.[10] The course of this tumor is benign though there is a case report of a metastatic CCST to the liver and subsequent death of the patient.[11] Features that could point to a malignant potential are size >2.5 cm, necrosis, mitotic index of 1 per 50 high power fields, marked pleomorphism and nuclear atypia.[11,12] Due to its rarity, there are no well established guidelines to the treatment of CCST, however, surgical excision without adjuvant therapy is recommended.[9]

The differential diagnosis of CCST includes clear cell variant of lung adenocarcinoma, acinic cell carcinoma, chemoductoma as well as metastatic carcinoma including renal cell carcinoma, adrenal cortical carcinoma and clear cell carcinoma of the female genital tract. A simple panel of immunohistochemical stains can differentiate between those entities and confirm the diagnosis.

On the other hand, minute pulmonary meningothelial-like nodules (MPMNs) were first described by Korn et al in 1960.[3] These are not uncommon benign lesions with a detection rate ranging from 7% to 13.8% in surgical resection specimens.[13] Radiologically, they appear as small persistent attenuated ground-glass opacities.[14] Such findings are nonspecific and raise the probability of metastatic deposits especially in patients with previously diagnosed primary tumors. MPMNs are detected incidentally in and no treatment is required as they run a benign course.

In conclusion, we describe an unusual case of an elderly female patient presenting with two benign rare lung lesions mimicking metastatic deposits. An awareness of such entities is essential and pathological correlation is needed, particularly for patients with known malignancies, in order to stage the disease properly and provide the patients with the optimal treatment options.

REFERENCES

1. Liebow A, Castleman B. Benign clear cell ("sugar") tumors of the lung. Yale J Biol Med. 1971;43:213-222.
2. Prasad SR, Sahani DV, Mino-Kenudson M, Narra VR, Humphrey PA, Menias CO, Chintapalli KN. Neoplasms of the perivascular epithelioid cell involving the abdomen and the pelvis: cross-sectional imaging findings. J Comput Assist Tomo. 2007;31(5):688-96.
3. Korn D, Bensch K, Liebow AA, Castleman B. Multiple minute pulmonary tumors resembling chemodectomas. Am J Pathol. 1960;37:641-72.
4. Argani P, Aulmann S, Illei PB, Netto GJ, Ro J, Cho HY, Dogan S, Ladanyi M, Martignoni G, Goldblum JR, Weiss SW. A Distinctive Subset of PEComas Harbors TFE3 Gene Fusions. Am J Surg Pathol. 2010;34(10):1395-1406.
5. Govender D, Sabaratnam R, Essa A. Case Report Clear Cell " Sugar " Tumor of the Breast: Another Extrapulmonary Site and Review of the Literature. Am J Surg. 2002;26(5):670-675.
6. Flieder DB, Travis WD. Clear cell "sugar" tumor of the lung: association with lymphangioleiomyomatosis and multifocal micronodular pneumocyte hyperplasia in a patient with tuberous sclerosis. Am J Surg Pathol. 1997;21(10):1242-7.
7. Kim WJ, Kim SR, Choe YH, Lee KY, Park SJ, Lee HB, Chung MJ, Jin GY, Lee YC. Clear cell "sugar" tumor of the lung: a well-enhanced mass with an early washout pattern on dynamic contrast-enhanced computed tomography. J Korean Medl Sci. 2008;23(6):1121-4.
8. Santana ANC, Nunes FS, Ho N, Takagaki TY. A rare cause of hemoptysis: benign sugar (clear) cell tumor of the lung. Eur J Cardio-Thorac. 2004;25(4):652-4.
9. Nicholson AG. Clear cell tumor. In: Travis WD, Brambilla E, Muller-Hermelink HK, Curtis CH, eds. WHO classification of tumors, Pathology and genetics of tumors of the lung, pleura, thymus and heart. Lyon: IARC Press; 2004:118.
10. Idowu MO, Powers CN. Lung cancer cytology: potential pitfalls and mimics - a review. Int J Clin Exp Pathol. 2010;3(4):367-85. 11. Sale GF, Kulander BG. Benign clear cell tumor of lung with necrosis. Cancer. 1976;37(5):2355-8.
12. Gaffey MJ, Mills SE, Ritter JH. Clear cell tumors of the lower respiratory tract. Semin Diagn Pathol. 1997;14(4):222-32.
13. Mizutani E, Tsuta K, Maeshima AM, Asamura H, Matsuno Y. Minute pulmonary meningothelial-like nodules: clinicopathologic analysis of 121 patients. Hum Pathol. 2009;40(5):678-82.
14. Sellami D, Gotway MB, Hanks DK, Webb WR. Minute pulmonary meningothelial-like nodules: thin-section CT appearance. J Comput Assist Tomo. 2001;25(2):311-3.