Solitary Pulmonary Benign Metastasizing Leiomyoma: A case study

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Background

Leiomyomas, or fibroids, are the most common uterine neoplasms seen in women. Typically, leiomyomas can be found anywhere from the subserosa to the submucosa of the uterus and range in size from microscopic to more than 10 cm in greatest dimension. Grossly, leiomyomas are well-defined, white-tan, rubbery nodules with a homogenous, whirled, trabeculated cut surface void of areas of hemorrhage and necrosis. Microscopically, leiomyomas exhibit smooth muscle bundles of elongated myocytes encompassed by vascularized connective tissue without the presence of atypia Depending on their size and location, leiomyomas may be asymptomatic or cause symptoms such as dysmenorrhea, menorrhagia, urinary frequency, abdominal pressure and even a palpable mass. If it is found that surgical intervention is needed, the traditional methods may include a myomectomy or hysterectomy which may come with risks such as blood loss and death, but a rarer risk is that of seeding. Seeding, defined as the dispersion of tumor cells from the primary site to a secondary site in the body, was a potential risk in the early nineties when the technique of morcellation was popular for treating symptomatic leiomyomas. This technique becomes problematic with improper retrieval of all tumor fragments which then have the potential for seeding. Leiomyomas may metastasize to several areas of the body including the lungs, the most common site, lymph nodes, the peritoneum, or retroperitoneal structures.

Case Information

A 75-year-old female presented to the hospital for a routine physical examination with complaints of new onset shortness of breath. The patient has a history of 'casual smoking'. Past medical history includes a breast mastectomy for unspecified breast cancer in the 1980s and a hysterectomy for a 'benign tumor' in the 1990s. The patient returns in the next couple of weeks for CT imaging. Imaging studies reveal a single, dense, spiculated nodule in the right lower lung measuring approximately 9.0 mm in greatest dimension. Within the next couple of months, the patient returns for a video-assisted thorascopic surgery where the right lower lobe was removed.

Gross:

A right lower lobectomy was performed. A discrete, white-tan rubbery nodule was identified secondary to the lesion noted on CT imaging (Figure 1). The secondary mass did not invade adjacent bronchioles, pleura or lung parenchyma. The lesion measured 2.0 x 2.0 x 2.0 mm, 3.0 cm from the inked resection margin, 1.8 cm from the pleural surface and 6.0 mm from the primary lesion. The specimen was then thoroughly palpated multiple times revealing no additional lesions.

Micro:

The mass was well-circumscribed, sharply demarcated from the surrounding lung parenchyma displaying low cellularity, no calcification, necrosis, hemorrhage or atypical cells. Immunohistochemical (IHC) stains were performed. Smooth muscle actin (SMA), estrogen receptor (ER) and B-cell lymphoma/leukemia 2 (BCL-2) exhibited varying degrees of positivity while KI-67 proliferative index was negative. Masson's trichrome stain showed the presence of a significant amount of fibrosis.

Images

Figure 1: Right lower lobectomy with 1° mass (circle) and 2° mass (square), gross

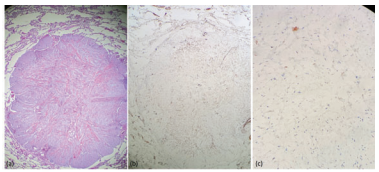

Figure 2: Micrographs; (a) H&E, (b) SMA, (c) ER

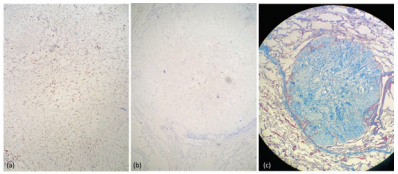

Figure 3: Micrographs; (a) BCL-2, (b) Ki-67, (c) Masson's trichrome

Discussion

Grossly, on palpation, the secondary nodule had a very similar morphology to that of a typical leiomyoma. Even still, the rarity of pulmonary BML puts it far from the list of differential diagnoses which might instead include things like a malignant bronchogenic carcinoma, benign pulmonary chondroma, inflammatory rheumatoid nodule or even a pulmonary infarct to name a few.[10,11] Keeping these possibilities in mind, the next crucial step is to take proper sections to ensure that histologic studies can be adequately performed. In this case, the lesion itself was so minute that it was entirely submitted alongside sections showing its relationship to the resection margin, pleural surface and to the primary lesion. Standard H&E staining gives a lot of information regarding the general characteristics of the lesion at hand. The lesion is well-circumscribed, sharply demarcated from the surrounding lung parenchyma and exhibits spindle cell proliferation, low cellularity while being void of malignant features such as necrosis, hemorrhage, atypical cells, and calcifications (Figure 1a). Even with this 'preliminary' microscopic view, this lesion displays characteristics that lean towards benignity rather than malignancy. Special IHC stains were then ordered to pinpoint further details. The IHC stain for SMA was positive demonstrating cytoplasmic positivity of smooth muscle differentiation (Figure 1b). ER stain was faintly positive (Figure 1c) as was BCL-2 (Figure 2a), the combination of which in the setting of smooth muscle proliferation further point in the direction of a uterine leiomyoma as a potential origination site. The Ki-67 proliferative index stain was negative (Figure 2b) with less than 1% of cells staining indicating low to no proliferation and the benign nature of the lesion. Finally, a Masson's trichrome stain displays a high degree of fibrosis/hyalinization (Figure 2c) in the lesion as is commonly seen in old uterine leiomyomas. When taken into consideration, the anecdote of the patient's clinical history, the specimen's gross examination and microscopic evaluation are indicative of a rare case of solitary pulmonary BML. This case study highlights the importance of being thorough when grossing. The simple step of palpating the specimen led to the discovery of a secondary lesion initially undocumented via imaging studies. The keen eye, and hands, of the grosser to spot things out of the ordinary are brought to light by this case of BML. Though IHC techniques provide the ultimate answer, finding a secondary, unexpected lesion can be accredited to the thorough nature of the Pathologists' Assistant's role.

References/Acknowledgements

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