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Unusual cause of recurrent Pneumothorax caused by Pulmonary Meningothelial-Like Nodule: Peer review

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Abstract

Recurrent pneumothorax, which frequently results from underlying bullous disease, infections, or other lung pathology, can present serious diagnostic and treatment issues. We report the case of a 38-year-old woman with recurrent right-sided pneumothorax. Following VATS bullectomy a pulmonary meningothelial-like nodule (PMLN) was discovered in the resected specimen. Progesterone receptor (PR) positivity and patchy CD56 staining were among the immunohistochemistry (IHC) results; HMB45, MNF, and oestrogen receptor (ER) were negative. Our case emphasises the value of thorough pathological examination in determining uncommon reasons for recurrent pneumothorax and the therapeutic ramifications of such.

Keywords: Immunohistochemistry, Progesterone receptor, CD56, VATS, Bullectomy, Pulmonary meningothelial-like nodule, and Recurrent pneumothorax.

Introduction

Bullous emphysema is a connective tissue abnormalities and spontaneous causes are frequently responsible for recurrent pneumothorax, especially in younger people. Although uncommon, pulmonary meningothelial-like nodules (PMLNs) are benign pulmonary lesions that are seen in 0.3% to 1.2% of lung specimens [1–3]. Due to their asymptomatic nature and incidental finding after autopsy or lung resections, their true incidence may be under reported despite their relative infrequency in literature [4, 5]. In clinical practice, identifying PMLNs is essential, especially when differentiating them from more sinister illnesses like primary or metastatic lung cancers, which frequently require radical treatment strategies.

Case presentation

A 38-year-old non-smoker presented with acute onset of chest pain and shortness of breath. Chest film revealed a moderate right sided pneumothorax which was treated with tube thoracostomy with good effect. She represented with recurrence 2 months later. High-resolution computed tomography (HRCT) exhibited apical right bullous disease. She underwent successfully a VATS bullectomy and pleurodesis.

Pathological Findings

Histopathology revealed patches of fibrosis and dilated airspaces. A PMLN was identified with focal aggregation of bland epithelioid to spindle cells around broncho vascular structures. In addition to confirming that the lesion was benign, these results highlighted the significance of a thorough histological examination of all resected specimens in determining possible atypical origins in all cases of recurrent pneumothorax.

Discussion

Although PMLN usually discovered accidentally, in few cases they may present with clinical signs, such as pneumothorax [4, 5]. Thirumala et al. described a case in which

a subpleural PMLN caused recurrent pneumothorax in a young girl [6]. Marchiori et al. also referenced cases in which PMLNs are linked with diffuse pulmonary fibrosis [8]. Autopsy examinations have traditionally detected benign proliferative lesions known as pulmonary meningothelial-like nodules [8]. Their clinical importance is becoming more well acknowledged, especially when they are a contributing factor to recurrent pneumothorax. This scenario highlights several important PMLN features, in regards of (1) **Pathogenesis and Hormonal Influence,** this case's PR positive confirms earlier research that suggested hormones have a role in PMLN development, especially in women [1, 4, 9]. The increased incidence of PMLNs in women and their possible connection to cyclical hormonal fluctuations can be explained by hormonal variables, which makes them important. This suggests that progesterone may play a part in encouraging the growth or survival of meningothelial-like cells, which calls for more research on the hormonal pathophysiology of PMLNs. (2) **Neuroectodermal Features:** Theories suggesting that these nodules have a meningothelial or mesenchymal origin are supported by the uneven expression of CD56 [10, 11]. PMLN was distinguished from melanoma, neuroendocrine tumours, and oestrogen-driven lesions, respectively, by negative staining for HMB45, MNF, and ER [3, 12]. The unusual combination of PR positivity with CD56 expression in this case makes it noteworthy and emphasises the need for more investigation into the hormonal and molecular processes that underlie PMLNs. (3) **Compared to other cases reported in literature,** this case study shows parallels to PMLN aspects that have been previously recorded, but it also has unique features: Histological Features, in line with earlier PMLN descriptions, there is a focal aggregation of bland epithelioid to spindle cells with eosinophilic cytoplasm. IHC Profile, Patchy CD56 expression and PR positivity are common results. In respect of Pneumothorax this has been reported instances of subpleural PMLNs resulting in pneumothorax [6, 13]. Uniquely in our case Pathological, Dilated airspaces and subpleural fibrosis add a unique pathological finding that isn't always explained. In addition to PR positivity and suggests hormonal contributions, which

are not always highlighted in reports. This case adds important information on the clinical and pathological subtleties of PMLNs to the expanding body of knowledge on the subject.

Review of literature PMLN complications

Pneumothorax: When combined with bullous illness, subpleural PMLNs may weaken alveolar integrity and raise the risk of spontaneous pneumothorax [6, 13]. Diagnostic Risks, If PMLNs are misdiagnosed as malignant or metastatic lesions, this could result in anxiety or needless therapies [7, 14]. Association with Other Pulmonary Conditions, Co-occurring emphysema or interstitial fibrosis may make identification more difficult or worsen symptoms [5, 15]. Systemic Association, New research indicates a connection between PMLNs and systemic diseases including connective tissue disorders or autoimmune diseases, which calls for more research [16].

In summary, this example emphasises how important a thorough histological and immunohistochemical analysis is for identifying uncommon reasons for recurrent pneumothorax. Accurate diagnosis and treatment of PMLNs depend on their detection, especially in female patients with PR-positive lesions. Both clinical alleviation and diagnostic clarity are provided by surgical surgery. The hormonal and molecular causes of PMLNs as well as their clinical ramifications require more research.

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