ORIGINAL RESEARCH PAPER

Medical Science

MALIGNANT PLEURAL MESOTHELIOMA PRESENTING WITH RECURRENT HYDROPNEUMOTHORAX AND AN ABDOMINAL MASS

KEY WORDS: mesothelioma; hydropneumothorax; pneumothorax

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ABSTRACT

Although malignant pleural mesothelioma is only a rare cause of recurrent spontaneous hydropneumothorax, this underlying pathology needs to be considered especially in older patients with histories relevant to occupational exposure to asbestos. An 80-year-old retired mechanic presented with recurrent left hydropneumothorax and a superficial mass in the left flank. A CT scan demonstrated a large mass in the left loin, extending from the 10th rib to the iliac crest. Histopathologic examination, which required the use of confirmatory electron microscopy, resulted in a diagnosis of epithelioid malignant mesothelioma. Persistent (hydro)pneumothoraces need to be thoroughly investigated and occupational history taking is essential to raise the index of suspicion of MPM and ensure a timely diagnosis.

LEARNING OBJECTIVES

- Recognize that persistent (hydro)pneumothoraces may be secondary to serious underlying pathology and need to be thoroughly investigated to explain the failure of lung re-expansion.
- Recognize the importance of occupational history, especially remote exposures that might contribute to the pathogenesis of MPM.

PRE-TEST

- What are the causes of (hydro)pneumothorax?
- What is the epidemiology and etiology of malignant pleural mesothelioma and why is this important?

Case Presentation

An 80-year-old male retired mechanic presented with recurrent large left hydropneumothorax and a firm, superficial mass in the left flank. He had recently had cholecystectomy for cholecystitis, which was complicated by post-operative abscess formation; a CT at this time showed left pleural thickening.

A chest radiograph on presentation showed hydropneu mothorax (Figure 1), and although three repeat pleural aspirates were exudative, they were negative for malignancy and contained reactive mesothelial cells only.

A CT scan revealed a large discoid mass in the left flank that involved the overlying superficial muscles, extending from the lower ribs to the iliac crest (Figure 2). It was most prominent in the 10th and 11th rib interspaces, where it protruded into the overlying muscles. A core biopsy was taken at this site, and pathologic examination revealed morphologic and immunophenotypic features most in keeping with epithelioid malignant mesothelioma (Figure 3 A-C). Since there was aberrant expression of MOC31 and Ber-EP4 in the tumor (Figure 3 D, E), the diagnosis was corroborated by electron microscopy, which showed surface microvilli on malignant cells (Figure 3F).

DISCUSSION

Malignant pleural mesothelioma (MPM) is a highly aggressive malignancy that most commonly arises from pleural mesothelial cells. MPM is occurring with increasing frequency and has an incidence of 18-28/100,000 in men (1). Almost all cases are associated with exposure to asbestos fibers in the workplace; in this case, the patient's profession as a mechanic is likely to have exposed him to the asbestos that was commonly used in the brake pads and clutches during the 1980s. Other groups at risk of previous asbestos exposure include insulation manufacturers, ship builders, factory workers, some miners, and construction workers. Family members are also at risk due to fibers being transferred home on clothes. Due to the fact that there is a long latent period (20-50 years) between exposure and development of the disease, the incidence is expected to peak in in 2020 (1). The development of MPM is dependent on the dose and duration of exposure to asbestos, with earlier and longer exposures at higher levels increasing risk. Although there are other putative risk factors, such as radiation exposure, exposure to thorium dioxide (Thorotrast), and SV40 virus exposure, these are likely to account for a tiny proportion of cases (1).

Spontaneous pneumothoraces are divided into primary or secondary, depending on whether they are associated with underlying pathology. Secondary pneumothoraces are more commonly associated with chronic diseases such as emphysema, asthma, cystic fibrosis, or tuberculosis, and only rarely due to malignancy (1). Pneumothoraces are very common and usually resolve spontaneously, and only are only rarely associated with underlying malignancy, which is present in about 0.02% of cases (2). Hydropneumothorax is not an uncommon consequence of persistent pneumothorax and is known to be associated with primary lung malignancy, trauma, bronchopleural fistula, infections, infarction, radiotherapy, and rheumatoid lung disease. However, MPM has only rarely been described in association with recurrent hydropneumothorax; the first case was in a 69-year-old man with no occupational history given (3) and the second in a 73-year-old man with a history of asbestos exposure (4). Reported cases of MPM presenting with spontaneous pneumothorax are also rare; in one series, 11% of patients over 40 undergoing pleurectomy for pneumothorax had underlying MPM (5), while Alkhuja et al. reported four cases of MPM presenting with spontaneous pneumothorax where the youngest patient was 56 (6). It is therefore necessary to actively exclude underlying pathology in these patients, especially when the pneumothorax is persistent or recurrent, and when hydropneumothorax is present, since this in itself is associated with additional pathology. In addition, in this case, the patient was an older man with a relevant occupational history for asbestos exposure, further raising the index of suspicion.

MPM usually presents with insidious onset of chest pain and shortness of breath due to the presence of diffuse or multiple pleural nodules, pleural thickening, and effusion, and has only rarely been described presenting as an abdominal wall mass (7). In this case, although it appears from the preceding CT scan performed five months previously that the lesion was primary pleural in origin, the extensive downward extension into the flank and clinically palpable mass were unusual features, further complicating the diagnosis.

Finally, MPM are characteristically Ber-EP4 and MOC31 negative, in contrast to primary lung carcinomas, and are part of a typical panel of antibodies used for pathological confirmation of the diagnosis. However, Ber-EP4 is positive in about 4% MPM (8), and MOC-31 in 35% of cases (9), and the

tumor in this case demonstrated positivity for both. Electron microscopy was used to support the diagnosis, demonstrating that this often forgotten technology still has a use in securing the diagnosis where IHC is equivocal.

This case serves to highlight that the presenting clinical signs and symptoms, the location of the lesion, and the histop athologic features, can be unusual in MPM. Although MPM is rare underlying cause of spontaneous (hydro) pneumothorax, the possibility should be considered and actively investigated when the pneumothorax is associated with effusion, in an older patient, and where these is relevant occupational history.

Post-test

- What are the causes of (hydro)pneumothorax?

Pneumothoraces can be primary or secondary depending on whether they are associated with underlying pathology. Most are primary and spontaneous, occurring in younger men, and secondary causes include emphysema, asthma, cystic fibrosis, or tuberculosis, and malignancy. Hydropneu mothorax is associated with primary lung malignancy, trauma, bronchopleural fistula, infections, infarction, radiotherapy, and rheumatoid lung disease, but is only rarely described in association with MPM.

- What is the epidemiology and etiology of malignant pleural mesothelioma and why is this important?

MPM is primarily caused by occupational exposure to asbestos and most commonly arises after a long latency period from pleural mesothelial cells, although it can arise from other mesothelial surfaces such as the peritoneum. This is important since the incidence is still rising from remote exposures from before young doctors were born, and therefore vigilance and good occupational history taking is required in order to raise the index of suspicion and ensure a timely diagnosis.

Figure legends

Figure 1. Upright frontal chest radiograph demonstrating hydropneumothorax. Pleural edge (arrow A), air-fluid level (arrow B).

Figure 2. Axial contrast-enhanced CT of the upper abdomen demonstrating the large left chest flank mass (M).

Figure 3. Photomicrographs of: (A) H&E (x400) showing characteristic nests of malignant epithelioid cells with a hobnail pattern of growth; (B) calretinin positivity (x200); (C) WT1 positivity (x200); (D) patchy MOC31 positivity (x200); (E) patchy BerEP4 positivity (x200); (F) electron micrograph showing long slender microvilli on the surface of epithelial cells.

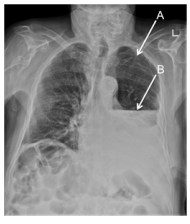

Figure 1

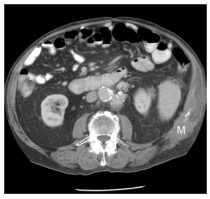

Figure 2

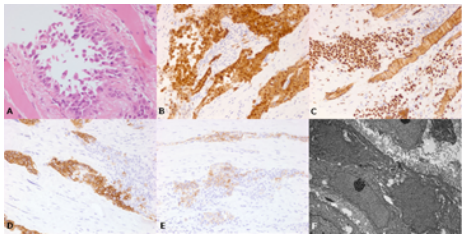

Figure 3

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