A man with opaque left hemithorax due to hemorrhagic exudate

Homem com hemitórax opaco causado por exsudato hemorrágico

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Abstract

The authors briefly present a case study of opaque hemithorax due to voluminous hemorrhagic pleural effusion, and comment data of studies about malignant pleural effusions. This very ominous condition may be associated with diagnostic challenges, and must be treated as earliest as possible, to propitiate better quality of life to the affected patients. Authors emphasize the role of imaging studies to guide the pleural drainages and biopsies. The major primary and secondary causes of malignant pleural effusions are also commented.

Keywords: Malignant pleural effusion, metastatic adenocarcinoma, opaque hemithorax

Resumo

Os autores apresentam um breve estudo de caso de hemitórax opaco devido a derrame pleural hemorrágico volumoso e comentam dados de estudos sobre derrames pleurais malignos. Esta condição muito grave pode estar associada à desafios diagnósticos e deve ser tratada mais rapidamente possível, para propiciar uma melhor qualidade de vida aos pacientes afetados. Os autores enfatizam o papel dos estudos de imagem para orientar drenagens e biópsias pleurais. As principais causas primárias e secundárias de derrames pleurais malignos também são comentadas.

Palavras-chave: derrame pleural maligno, adenocarcinoma metastático, hemitórax opaco

This 58-year-old man had nonspecific moderate continuous pain, in epigastrium and left hypochondrium, worsening after food ingestion or cough, but not with local compression. He had no episode of fever; the cough was dry and associated with hoarseness and dysphagia. In addition, there was progressive dyspnea initially with physical efforts and later even at rest. During the last two months he presented with lack of appetite and loss of weight (4 kg). Medical antecedents were unremarkable. He denied alcoholism, smoking or illicit drugs use. The abnormalities found by physical examination were tachypnea; few elastic lymph nodes with less than 0.4cm on the left supraclavicular region;

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absence of respiratory sounds, associated with dullness to percussion and absence of tactile fremitus in the left hemithorax. Arterial blood gas values: pH 7.44, pCO_2 36 mmHg, pO_2 67 mmHg, $cHCO_3$ 40 and SO_2 92%. Routine blood tests were within the normal ranges; and the tumor markers (CEA, CA50, CA125, CA242, CA15-3, CA19-9, CYFRA 21-1, SCC-Ag, and mesothelin) unremarkable. The plain radiograph images showed complete opacity of the left hemithorax (Figure 1A).

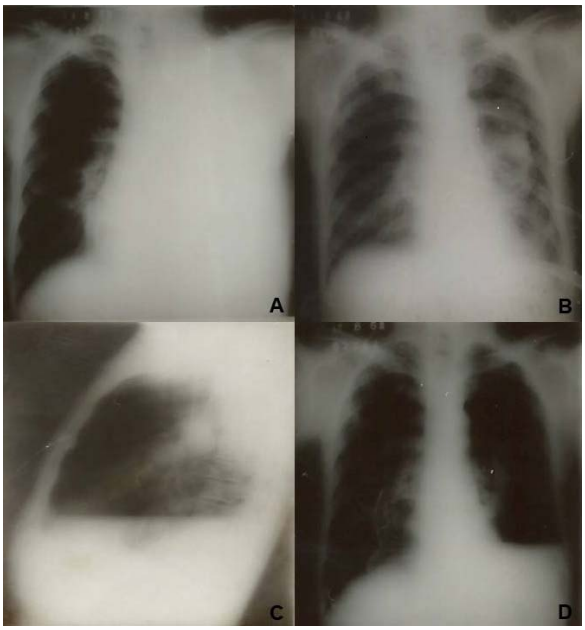

Figure 1. (Plain radiographs of the chest) **A**: Image of complete opaque hemithorax and trachea centrally positioned due to a large pleural effusion and total collapse of the left lung; **B** and **C**: Aspect of complete collapse of the left lung, pneumothorax, and residual effusion; and **D**: Image of the late control post thoracic drainage and the talc pleurodesis procedure.

Thoracic ultrasound evaluation (not shown) confirmed the compression of lung parenchyma by voluminous effusion; and a circumscribed pleural nodular thickening was also observed. Left thoracentesis removed 1.5 liters of hemorrhagic fluid, with symptomatic improvement. Fluid samples were sent to laboratory for chemical, microbiological, and cytological analysis. Pleural biopsy by thoracoscopy was performed after the drainage of the pleural effusion. Cytological and histopathological features of this case study are shown in Figures 2A to 2D. Because of recurrent dyspnea one week later, a radiograph of control revealed complete collapse of the left lung, pneumothorax, and residual pleural effusion (Figures 1B and 1C).

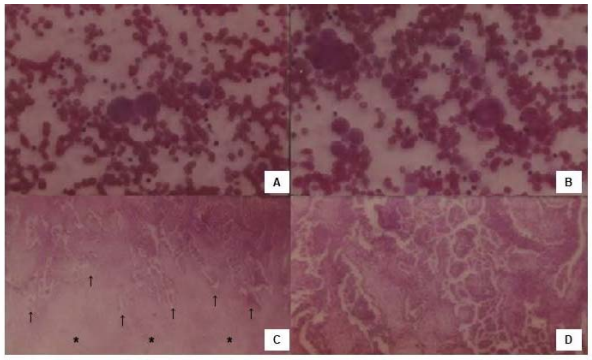

Figure 2. (Photomicrographs, H&E, high-power) **A** and **B**: Cytological analysis of pleural fluid revealing abundant number of erythrocytes surrounding binucleated malignant cells. The atypical cells appear isolated or in clusters, with large round to oval nuclei containing coarse chromatin and some of them with intracytoplasmic vacuoles; **C**: The connective tissue (asterisks) of the pleura presenting accentuated carcinomatous

infiltration (arrows); and **D**: The pleural implant of adenocarcinoma in more detail, displaying a papillary growth pattern.

After the intercostal drainage, with little residual pleural fluid, there was lung re-expansion (Figure 1D) and rapid clinical improvement. Furthermore, the talc pleurodesis was performed. In order to establish the diagnosis of the primary site of this metastatic pleural malignancy, the patient was soon referred to the specialized complementary evaluation and follow-up.

In the present case, the chest images showed complete left opaque hemithorax (OH) without mediastinal deviation, due to massive pleural effusion associated with lung collapse. Differential hypotheses for OH with centrally positioned trachea may be unilateral pulmonary edema or consolidation, massive pleural tumor (mesotelioma), or massive chest wall tumors. OH may develop with displacement or not of the mediastinal structures; and can cause the compensatory contralateral hyperinflation with herniation of the lung across the midline[1,2]. The most usual causes of OH include massive pleural effusion, pneumonectomy, atelectasis, malignant or benign consolidation, fibrothorax, and lung agenesis, aplasia or hypoplasia[1,2].

Malignant pleural effusion is an exudate containing malignant cells or tumor tissue[3,4]. The accumulated fluid may be associated with dyspnea, pain, physical limitations, poor quality of life, increased morbidity and mortality, in addition to elevated health care costs[4]. The growing in longevity of global population has raised concerns about a higher prevalence of malignancies, and the potential increase of metastases in organs and serosal membranes[4]. Mesothelioma, the main primary pleural tumor, is associated with malignant effusion in more than 90% of cases; but up to 65% of malignant effusions are due to lung or breast cancers[4]. Mechanisms for effusions development involves increased fluid production by extravasation from hyper-permeable pleural or tumor vessels, in addition to impaired lymphatic drainage[4]. As occurred in the case herein described, the findings obtained by thoracic radiograph and ultrasound are very useful tools to guide further necessary procedure to get pleural biopsies[4]. The investigation of suspected malignant effusions should include cytology (mean sensitivity of 60%) and histopathology of thoracoscopic biopsy specimens, with sensitivity over 90%[4].

Wu YB et al. reviewed thoracoscopic evaluations of malignant effusions done during nine years, and the diagnosis was confirmed by findings of fluid cytology and pleural biopsy[5]. The mean age of the patients was 62.8 ± 9.7 years, 53.5% were males, and 43.6 non-smokers; 70.4% of the effusions had a large size, 59.9% were hemorrhagic, and 38.9% were left sided[5]. The most frequent

malignancies were: 79.5% metastatic carcinomas (lungs: 85.2%, breast: 4.4%, ovaries: 2.2%, and pancreas: 1.8%), 10.2% mesotheliomas, and 2.9% lymphomas[5]. There was no definite etiology in 4.4% of cases after cytology and histopathological analysis[5]. They commented the ominous prognosis of malignant effusions, the low utility of tumor markers to establish the etiology, and the role of thoracoscopy to better diagnostic accuracy[5].

Johnston WW evaluated samples of 5888 pleural effusions in the period from 1970 to 1983; and in near 10% of the exams the fluid presented malignant features, due to carcinoma (75.7%), large cell undifferentiated cancer (14.3%), and leukemia or lymphoma (15%)[3]. Adenocarcinoma was the most frequent type of lung cancer (41.3%), followed by small cell undifferentiated (24.6%), squamous cell (20.3%), and large cell undifferentiated (9.6%)[j]. Both cytopathology and histopathology analysis were done in 406 cases, with total concordance[3]. The main primary sites of malignant pleural fluid in males were lung (49%), leukemia/ lymphoma (21%), gastrointestinal (7%), genitourinary (6%), and melanoma (1.4%)[3]. Among females, the main primary sites were breast, ovary, gastrointestinal, lung, and lymphoma[3]. Only three mesotheliomas occurred in 472 patients (0.6%) with known primary tumor type, whereas the primary site of malignancy could not be established in 10% of the individuals[3].

The conclusion is that at least 90% of malignant pleural effusion can be detected by study of fluid samples, and histopathology of pleural biopsy can enhance diagnostic accuracy.

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