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Case Report

Rexpansion Pulmonary Edema

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Abstract: Ex vacuo pulmonary edema is a rare but potentially severe event with a mortality of 15-20%. We report the case of a patient who presented with ex vacuo pulmonary edema after drainage of a right pneumothorax. The pathophysiology of ex vacuo pulmonary edema is not yet clearly established, with mechanical and inflammatory factors (production of interleukin 8 and leukotriene B4) being the most incriminating. Certain factors, such as the duration and extent of pulmonary collapse and the speed of lung re-expansion after drainage, appear to favour the onset of ex vacuo edema, justifying certain precautionary measures. Curative treatment relies essentially on oxygenation and reduction of pleural aspiration pressures, but the best treatment is prevention.

Keywords: ex vacuo pulmonary edema, pneumothorax, rexpansion.

INTRODUCTION

The development of homolateral pulmonary edema at the time of pulmonary rexpansion is a rare complication of pleural drainage, which is often trivial in course, but can also be serious, necessitating recourse to intensive care. Hence the need for a better understanding of this complication of thoracic drainage.

OBSERVATION

Mr R. M, aged 32, a non-smoker with no previous pathological history, presented with severe right chest pain of abrupt onset after physical exertion, with mild dyspnea and a dry cough. Clinical examination on admission revealed a characteristic right aeric effusion syndrome, confirmed by a standard frontal chest x-ray (fig.1), which showed a total right pneumothorax with a reduced, dense lung stump.

The patient was drained in the right 4th intercostal space on the mid-axillary line, and the drain siphoned. Two hours later, the patient presents with an incoercible cough associated with moderate dyspnea. Chest auscultation reveals crackling rales in the right lung field.

Chest X-ray (fig.2) confirms right unilateral pulmonary edema in the form of alveolar syndrome. The patient received 6l/min oxygen by nasal tube and the drain was clamped. The patient improved 4 hours later, with resolution of cough and dyspnea. Radiologically, the pulmonary edema had disappeared by day 4 (fig.3).

The patient left the ward after being weaned off oxygen.

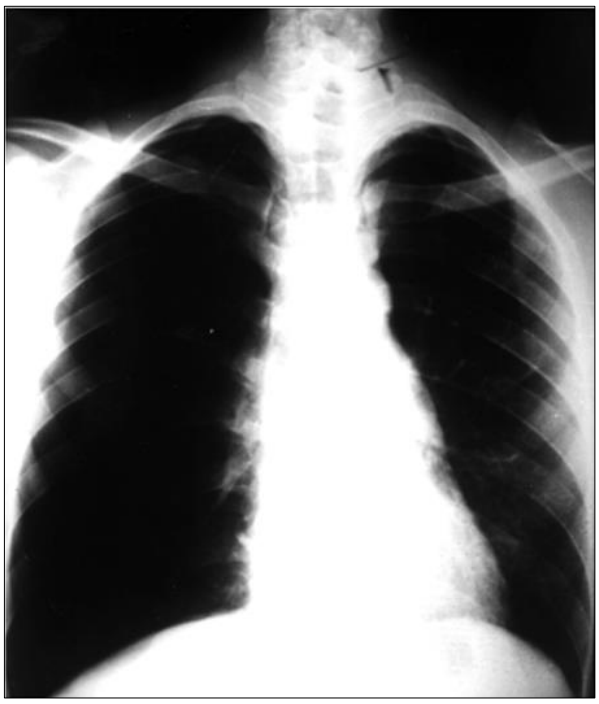

Figure 1: **Right Spontaneous Pneumothorax**

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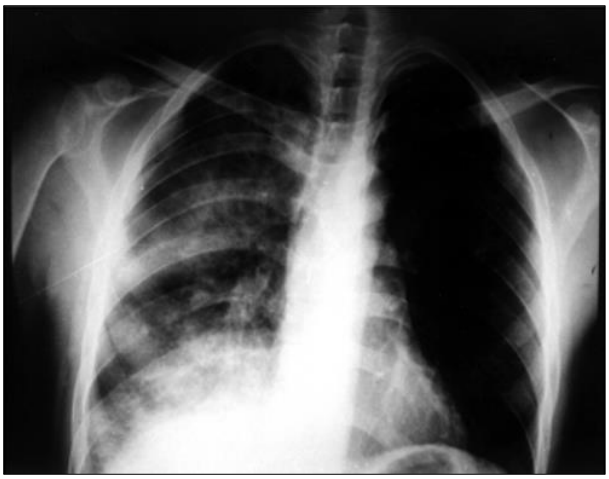

Figure 2: **Right alveolar lung diseases (pulmonary edema) Chest tube**

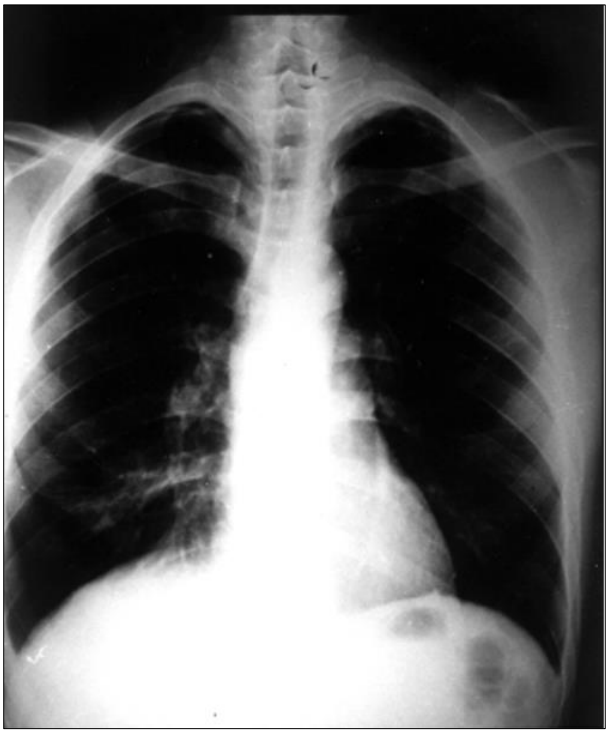

Figure 3: **Radiological Cleaning with Disappearance of Pulmonary Opacities**

DISCUSSION

The main etiology of unilateral pulmonary edema is re-expansion edema after evacuation of a gaseous or liquid pleural effusion [1].

A case of post-operative pulmonary rexpansion oedema after removal of a large intrathoracic tumour has been reported [2]. This is a rare and exceptionally serious complication. The true frequency of rexpansion pulmonary edema is not well known. In a large series of 3347 drained spontaneous pneumothoraxes, no cases of ex vacuo pulmonary edema were reported [3].

Clinically, ex vacuo pulmonary edema can take 3 forms: The asymptomatic form: purely radiological findings. The minor form (as in our patient): the clinical picture consists of a cough, mild dyspnea and sometimes minimal frothy sputum. The course is benign.

Severe form: intense dyspnea, incoercible cough, abundant, serous, frothy sputum, cyanosis and hypotension, sometimes severe, leading to cardiovascular collapse with oligo-anuria, with a potentially fatal outcome [4]. (15-20% mortality).

Diagnosis of pulmonary edema is radioclinical. Chest X-rays confirm the diagnosis, showing a unilateral alveolar syndrome. Biological tests may show hemoconcentration, especially hyperleukocytosis in major forms. Chemical analysis of sputum reveals a particularly high protein content, which some consider to be an additional argument in favor of pulmonary edema [5].

The pathophysiology of ex vacuo pulmonary edema remains imperfectly understood. However, altered permeability of the alveolar-capillary membrane is the element incriminated by all studies [1-6]. This alteration is secondary to a reduction in surfactant activity, mechanical distension of the endothelial pores when ventilation of the collapsed lung is restored, and excessive production of oxygen free radicals that are toxic to the alveolar-capillary membrane. Treatment of rexpansion pulmonary edema is essentially preventive.

All authors agree that suctioning should be avoided, and that simple siphoning into a jar with a water valve should be used (this measure was insufficient in our case). It would also be useful to control air outflow by intermittently clamping the drain. Symptomatic treatment is based on rest and monitoring in asymptomatic forms, combined with oxygen therapy in minor forms.

Severe forms also require hemodynamic rebalancing, and sometimes even assisted ventilation. There is no consensus on the use of diuretics, corticoids or colloid agents.

Competing Interests

The authors declare that they have no known competing interests or personal relationships that could have appeared to influence the work reported in this paper.

Authors' Contributions

Youssef Haouas, Tissir Abdelhak and Zakaria Allal: Drafting of manuscript

Sara Chabbar, FZ FAOUJI and Anas MOUNIR: Critical revision

Chafik Elkettani and Lahoucine Barou: Final approval

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