

## Pyopneumothorax revealing a complicated hydatid cyst of the lung

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### Abstract

Pulmonary hydatidosis remains asymptomatic for a long time, and may be revealed following a complication such as intrapleural rupture. This entity, known as pyopneumothorax, poses a diagnostic problem even in countries with high hydatid endemicity. The aim of this study was to investigate the clinical, radiological and therapeutic aspects of pulmonary hydatid cysts revealed by spontaneous pyopneumothorax. This is a retrospective descriptive study of 5 patients with spontaneous pyopneumothorax revealing complicated pulmonary hydatidosis collected over 8 years at the Pneumology Department, CHU Mohamed VI, Marrakech, Morocco. Patients were younger and male. Clinical signs were dominated by cough and fever. Chest X-ray showed a hydroaeric image. Pleural puncture revealed a purulent fluid. Direct examination and culture of this fluid did not isolate any germs. All patients were drained and put on initial probabilistic antibiotic therapy. In view of the lack of clinical, biological and radiological improvement and the clinical presentation, we suspected complicated pulmonary hydatidosis. CT scan and thoracic ultrasound confirmed the diagnosis of ruptured KHP.

**Keywords:** Hydatid Cyst; Pyopneumothorax; Pulmonary Hydatidosis; *Echinococcus granulosus*; Anthroponosis

### 1. Introduction

Hydatidosis is a public health problem in many countries, and is currently considered an emerging and re-emerging disease [1-2]. The highest prevalences are found in temperate zone countries, including the Mediterranean region, central and southern Eastern Europe, central Asia, China, Australia, and some countries in sub-Saharan Africa and South America [1]. In Morocco, hydatidosis is found throughout the country, with an uneven distribution from one region to another. It is rife in rural livestock-raising areas, mainly Meknes-Tafilalt, Chaouia-Ouardigha, and Doukala-Abda [3]. Hydatidosis is the most common human cestodosis [4-5]. It is still endemic in Morocco and constitutes a public health problem. Hepatic localization is the most frequent compared with pulmonary localization, and its evolution can be marked by complications such as rupture, infection, or compressive phenomena.

The diagnosis and management of uncomplicated pulmonary hydatidosis (PH) are generally straightforward. However, complicated pulmonary hydatidosis (CPH) often poses a diagnostic problem, due to its radioclinic polymorphism. HPC is defined as "any cyst ruptured in the bronchi or pleural cavity, infected, and/or with multiple localizations" [6].

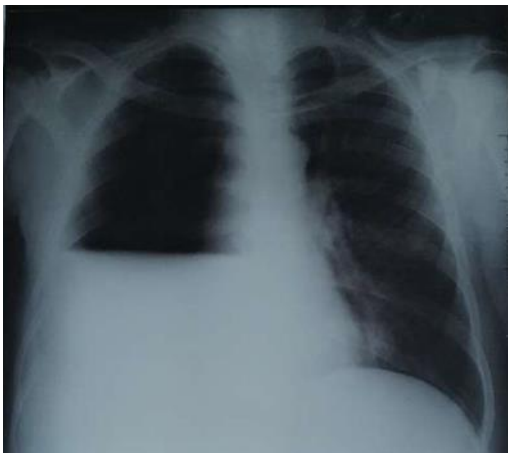
### 2. Patients and methods

This is a retrospective descriptive study of patients with spontaneous hydropneumothorax revealing pulmonary hydatidosis collated over 8 years at the Pneumology Department, CHU Mohamed VI, and Marrakech, Morocco.

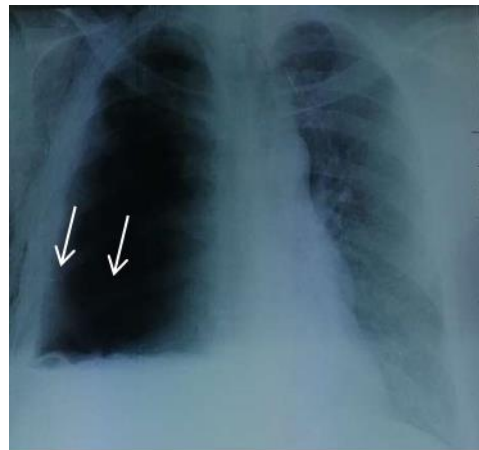
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### 3. Results

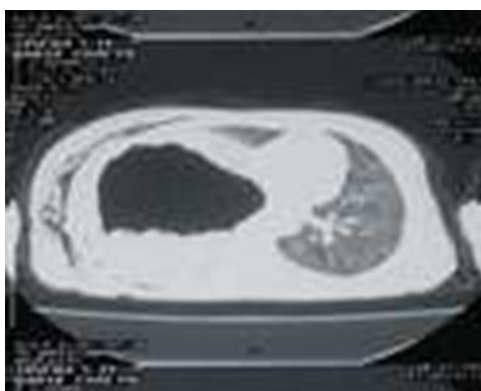
Among the 5 patients, age ranged from 23 to 34 years, with a mean age of 26.6 years. The majority of our patients were young. All were male. No patient was found to have had a hydatid infection. The majority of patients (97%) lived in average or poor socio-economic conditions. Spontaneous hydropneumothorax was indicative of pulmonary hydatidosis in all cases. The circumstances of discovery were related to respiratory signs in the majority of cases, essentially cough (100%), chest pain (66.7%), and dyspnea (33.3%). Hydatid vomiting was not found in any patient. General signs were dominated by fever (100%). Chest X-rays were taken on admission for all patients, revealing a hydroaerobic image. Intrapleural rupture occurred on the left side in 1 case and on the right side in 4 others. A pleural puncture revealed purulent fluid. Direct examination and culture of this fluid did not isolate any germs. All patients were put on initial probabilistic antibiotic therapy with thoracic drainage. The clinical, radiological, and biological presentation and non-improvement under antibiotic treatment were not in favor of a bacterial origin. The diagnosis of hydatid pyopneumothorax was made in the first case on thoracic ultrasonography, which revealed a voluminous, thick, clean-walled pulmonary cystic formation measuring 8mm in long axis, associated with a hydro-aeric pleural effusion. In the other four cases, thoracic CT showed a voluminous right basal pleural hydroaerobic collection. Abdominal ultrasound was routinely performed on all patients. It revealed associated hepatic hydatidosis in only one patient. All patients tested positive for scolex in the pleural fluid and for hydatid serology. Treatment consisted of pleural decortication in four cases and right lower lobectomy in one. Progression was good in four patients.



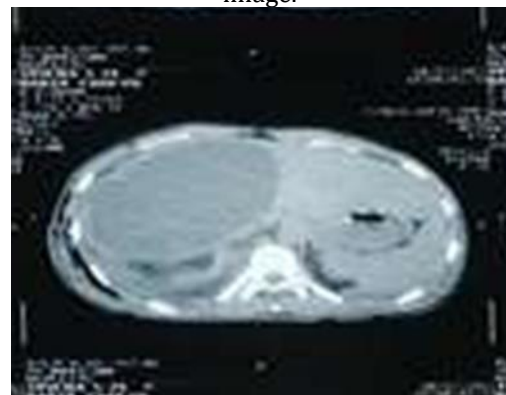
**Figure 1** Front thoracic X-ray: left hydropneumothorax



**Figure 2** Front chest X-ray after drainage: right hydropneumothorax with floating membrane image.



**Figure 3** Thoracic CT scan: voluminous right pulmonary kH with floating membranes giving the appearance of a water lily ruptured in the pleura and fistulized in the bronchi.



**Figure 4** Chest CT scan: large intrahepatic kH classified as GHARBI type II.



**Figure 5** Chest x-ray of same patient 2 months after pericystectomy, showing reduction of the right pulmonary hemichamber and ascension of the right diaphragmatic dome.

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#### 4. Discussion

The hydatid cyst is an encysted vesicular formation representing the larval form of a cestode, a parasite of the intestines of dogs and other carnivores: the taenia *Echinococcus*, of the *Granulosus* species. This larval stage develops in various herbivores, notably sheep and omnivores. Man is only an accidental host, constituting a parasitic dead end.

Hepatic localization is the most common (50-70%), followed by pulmonary localization (25-40%), but any organ can be affected.

Complicated pulmonary hydatidosis (CPH) poses a diagnostic and therapeutic problem in the majority of cases, due to its clinical and radiological polymorphism.

KHP rupture into the bronchial tubes is mainly associated with central cysts, whereas intrapleural KHP rupture occurs in peripheral cysts whose volume increase, favored by the elasticity of the lung in young subjects, only leads to intrapleural rupture.

KHP rupture is an important event in its natural evolution. It most often occurs in the bronchi, as a result of the pressure exerted by the cyst's growth on adjacent bronchial structures, leading to detachment of the adventitia and thus altering the nutrient supply to the cyst, which withers and cracks, then ruptures in the bronchi [7]. More rarely, rupture may occur in the pleural cavity, with a frequency varying from 2.4 to 13.4% [8-9].

Intrapleural rupture of KH may be acute, manifesting clinically as respiratory distress, pneumothorax, or pyopneumothorax, or it may be associated with a state of anaphylactic shock. When insidious, it can progress to secondary pleural hydatidosis [10-11].

Superinfection of KH results in bronchopulmonary suppuration, with fever, purulent cough, altered general condition, and neutrophil hyperleukocytosis.

All our patients were symptomatic but had non-specific functional signs. Hydatid vomiting, the only specific sign, was not found in any patient, hence the importance of suspecting HP before any respiratory symptoms in patients from endemic regions. Imaging plays an important role in diagnosis and extension [12]. It provides information on the number, location, appearance, and size of KHP. Radiological aspects are variable and depend on the stage of evolution of the cysts and the type of complications [13, 14]. Ruptured KHPs are characterized radiologically by hydro-aerosic images resulting from communication of the cyst with the bronchial tree, the most common of which is a water lily or floating membrane appearance. It was found in one case in our study (Figures 2 and 3).

Hydatid serology is an important element in the diagnosis of pyopneumothorax, particularly in patients from endemic regions. In our series, 100% of patients who underwent serological testing were found to have a positive hydatid serology.

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#### 5. Conclusion

KHP is a benign pathology, but rupture is a rare but potentially serious complication. Given its clinical and radiological polymorphism, ruptured KHP continues to pose diagnostic problems. This underscores the importance of considering the hydatid origin of any hydropneumothorax or pyopneumothorax, particularly in patients from endemic regions.

Improved prognosis will come from earlier diagnosis, thanks to advances in imaging. Hydatidosis remains a health, economic, and social scourge, posing a real health problem in Morocco, and the best treatment is undoubtedly preventive.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study

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