

## Acute Right Atrial Collapse During Childbirth Due to Enormous *Echinococcus* Cyst of the Lungs

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### Abstract

**Introduction:** Hydatid disease usually affects the liver and lungs. Pulmonary disease is usually asymptomatic until the cyst enlarges sufficiently to compress other organs or erupts releasing a large amount of antigenic material.

**Case report:** An 18-year-old female patient was submitted to the emergency department fifteen days postpartum presenting fatigue, breathlessness and non-productive coughing. According to the patient's description, symptoms first appeared two months ago displaying great aggravation for the past two weeks, along with episodes of conscious loss and eyesight loss during the last 24 hours. Imaging findings revealed a large cystic mass, 15 × 11 × 13 cm in size, occupying the right middle and lower chest cavity. The mass seemed to be in contact with the pericardium pressing onto the right atrium's wall, the diaphragm and the right lung. A right thoracotomy was performed which revealed a big *Echinococcus* cyst full of serous fluid that occupied half of the right chest cavity's volume.

**Discussion:** The extrinsic compression of the right atrium by an extracardiac mass has been very rarely reported in literature. In our case, the mass compressing the right atrium of the heart was an undiagnosed pulmonary hydatid cyst. Systematic realignments during natural childbirth, the size of the uterus, the widely used Valsalva pushing technique decrease venous return to the heart, diastolic filling and stroke volume. These changes deteriorate the operation of an already strained right atrium leading to a collapse of peripheral arterial pressure. The patient experienced symptoms of low blood pressure and lung compression, demanding urgent surgical operation for the removal of the cyst.

**Conclusion:** This is a rare case of a patient with pulmonary hydatid disease where the *Echinococcus* cyst compressed the right atrium's wall. The heart's strain deteriorated due to the patient's pregnancy and childbirth, a clinical course leading to the need of urgent and immediate action.

**Keywords:** Acute atrial collapse; Childbirth; Pulmonary echinococcosis

### Introduction

Hydatid disease is a zoonosis caused by tapeworms of the genus *Echinococcus* [1]. The infection occurs by the ingestion of echinococcal eggs. Humans are accidental intermediates, who become infected by consuming contaminated food [2]. The presentation of human echinococcosis is variable and may be due to the mechanical effect of a large cyst on organ function or the sudden rupture of a cyst and the subsequent acute hypersensitivity reactions. Sometimes, echinococcosis is revealed accidentally during routine examination. The organs that are most usually infected are the liver and the lungs. Pulmonary disease appears to be more common in younger patients. Most patients are asymptomatic until the cyst enlarges sufficiently enough to compress other organs or erupts releasing a large amount of antigenic material and causing a great immunologic reaction [3,4].

### Case Presentation

An 18-year-old female patient was submitted to the emergency department fifteen days postpartum presenting fatigue, breathlessness and non-productive coughing. According to the patient's description, symptoms first appeared two months ago displaying great aggravation for the past two weeks, along with episodes of conscious loss and eyesight loss during the last 24 hours. Her medical history was unremarkable, and she was a non-smoker. She was a refugee from a rural town of Syria and had been living in Greece for the past one year.

Patient underwent routine blood tests which came out without significant deviations. Diagnostic imaging first included chest X-rays, which revealed consolidation of more than half of the right hemithorax

[5] (Figure 1). Cardiac imaging via triplex ultrasound outlined a big mass in contact with and applying pressure to the right atrium's wall preventing its repletion (Figure 2). A thoracic surgery consultation was requested considering the probability of a cardiac tamponade.

Imaging findings were unspecified and, since the patient was still hemodynamically stable, a chest CT scan was scheduled [6]. Results delineated a large cystic mass, 15 × 11 × 13 cm in size, occupying the right middle and lower chest cavity. The mass seemed to be in contact with the pericardium pressing onto the heart's muscle wall, the diaphragm and the right lung (Figure 3). With a high suspicion of hydatid disease that causes cardiac compression symptoms the patient was immediately led to the operation room.

A right thoracotomy was performed which revealed a big *Echinococcus* cyst full of serous fluid that occupied half of the right chest cavity's volume. The surgeon incised the fibrous casing of the cyst and drained its fluid, sealing all communications between the cyst and the bronchi. The patient had a smooth recovery without important postoperative events.

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Figure 1: Chest X-ray showing consolidation of right hemithorax.



Figure 2: Echocardiographic evaluation of right atrial compression.

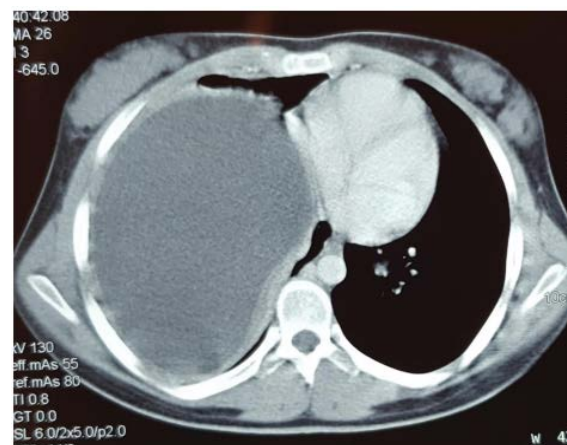


Figure 3: Cystic mass compressing the right atrium's wall.

## Discussion

The extrinsic compression of the right atrium by an extracardiac mass has been very rarely reported in literature [7]. Right atrial compression can be caused by many different etiologies [8], such as benign or malignant masses, aorta or coronary aneurysms, tortuous aorta, augmented abdominal structures, diaphragmatic elevation and diaphragmatic hernia with protruding intra-abdominal organs.

In our case, the mass compressing the right atrium of the heart was an undiagnosed pulmonary hydatid cyst. Although the patient's symptoms had started two months before her submission to our emergency department, there was a rapid worsening after her labor. This can be explained by the systematic realignments during natural childbirth. During the last semester, the size of the uterus increases the pressure inside the abdomen and subsequently increases the pressure inside the thoracic cavity. Additionally, at the time of labor, the widely used Valsalva pushing technique [9] decreases venous return to the heart, diastolic filling and stroke volume [10]. These changes deteriorated the operation of an already strained right atrium leading to a collapse of peripheral arterial pressure.

The patient experienced symptoms of low blood pressure such as fatigue, episodes of conscious loss and eyesight loss as well as symptoms from the compression of the lungs such as breathlessness and non-productive coughing. Due to her clinical worsening she was rushed to the operating room where a right thoracotomy took place followed by the complete excision of the hydatid cyst. Without the pressure of the large mass, the patient was relieved from her agonizing symptoms and recovered very quickly.

This is a rare presentation of pulmonary hydatid disease. Hydatid disease involves the lungs by different processes [11]. Human acquires the infection by the ingestion of eggs mixed with uncooked vegetables, fruits and drinking water. Digestion of eggs facilitates the release of embryos, which then attach to the duodenal or jejunal wall and penetrate the intestinal wall, reaching the liver via the portal circulation. Most often embryos are stuck in the liver sinusoids, but small diameter embryos may pass through the hepatic sinusoids and enter the right heart through the hepatic vein and the inferior vena cava settling in the lungs [12]. Embryos can also reach the lungs via lymphatics of the small intestine that enter the thoracic duct [13]. Direct pulmonary exposure through the inhalation of air contaminated with *Echinococcus* eggs is also possible [14].

Uncomplicated small peripheral cysts often remain asymptomatic and are discovered incidentally during routine examination. However, cysts larger than 5 cm in diameter may cause bronchial compression and symptoms such as chest pain, breathlessness, expectoration, hemoptysis as well as anaphylactic phenomena [15]. Possible complications of pulmonary hydatid cysts include rupture, secondary infection, pneumothorax and suppuration. After a cyst ruptures patient may develop sudden onset of chest pain, cough, fever, hemoptysis and hypersensitivity reactions ranging from urticaria and wheezing to anaphylaxis [16]. Compression of the heart by pulmonary hydatid cyst has very rarely been report and usually includes cardiac hydatid disease [17].

## Conclusion

This is a rare case of a patient with pulmonary hydatid disease where the *Echinococcus* cyst compressed the right atrium's wall, causing symptoms from low stroke volume and low blood pressure. The heart's strain deteriorated due to the patient's pregnancy and childbirth, a clinical course leading to the need of urgent and immediate action. We should always have a high degree of clinical suspicion for hydatid disease whenever a patient comes from an endemic area. Concluding we highly recommend that any patient with a chronic cough should have a screening chest X-ray and possibly an abdominal ultrasound.

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