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What is the impact of a large cyst size on the radiological diagnosis of pulmonary hydatid cyst in children?

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Informed Consent
The authors stated that the written consent was obtained from the parents of the patient presented with images in the study.

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Abstract

Anamnesis, physical examination, and laboratory investigation of patients admitted to the clinic provide non-specific findings for pulmonary hydatid cysts. Obtaining an accurate diagnosis of this cystic lesion is only possible by radiological examination. An uncomplicated intact simple cyst in an early phase could be easily and precisely diagnosed by chest roentgenogram and computed tomography scan of the thorax. Complicated late cases may have confusing and challenging atypical radiological signs. In this case report, we report a giant pulmonary hydatid cyst (13 x 8 x 12 cm) with atypical radiological findings in a 4-year-old girl who was hospitalized with fever and cough and was treated with oral antibiotics for pneumonia.

Keywords: Pulmonary hydatid cyst, Radiology, Children

Introduction

Echinococcus granulosis causes hydatid disease. The lungs are the most common sites of this parasitosis in children [1, 2]. A pulmonary hydatid cyst (PHC) with a diameter of more than 10 cm is called a giant cyst [3–5]. A well-circumscribed spherical or oval homogenous opacity in the pulmonary field is the typical radiological image determined in the most of the hydatid cysts even in the giant ones. Lung tissue elasticity allows the hydatid cyst to reach a very large size that may result in an atypical radiological presentation in delayed cases. We report an unusually large PHC in a 4-year-old girl.

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Case presentation

A 4-year-old girl had been admitted five months ago to an outside facility with fever and cough and was treated for pneumonia with an oral antibiotic. Her symptoms ceased after the treatment; however, progressive shortness of breath with fatigue, lethargy, anorexia, and weight loss developed, and she presented to our hospital with a 10-day history of cough, fever, diaphoresis, dyspnea, and left-sided chest pain. During physical examination, she was febrile, pale, cachectic, and in moderate respiratory distress with an oxygen saturation of 92%. She had decreased breath sounds on the left. She had significant iron deficiency anemia with a hemoglobin concentration of 7.2 g/dl. The white blood count was 15,500/mm^3, and eosinophilia was present. On chest roentgenogram, a homogenous opacification occupying the whole left lung field and shift of the mediastinum to the right were determined (Figure 1). A computerized tomography (CT) scan of the thorax showed a thick-walled intact giant cyst (13 x 8 x 12 cm) that completely filled the left hemithorax (Figure 2). The upper left lobe from which the cyst had originated was totally collapsed. The main body part of the cyst was located on the left upper hemithorax, and the basal part of the cyst settled on and squeezed the atelectatic lower lobe (Figure 3).

Figure 1: Homogenous opacification occupying the left hemithorax and shift of the mediastinum to the right caused by the giant hydatid cyst as viewed on chest roentgenogram

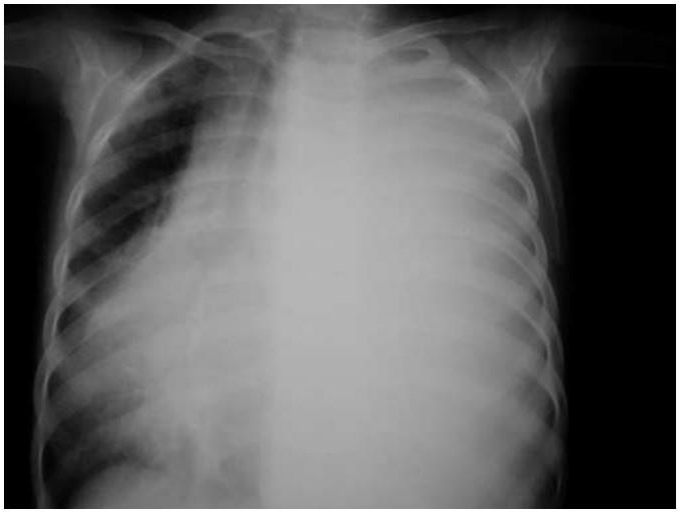


Figure 2: Computed tomography (CT) scan of the thorax showing a thick-walled intact giant hydatid cyst in the left hemithorax

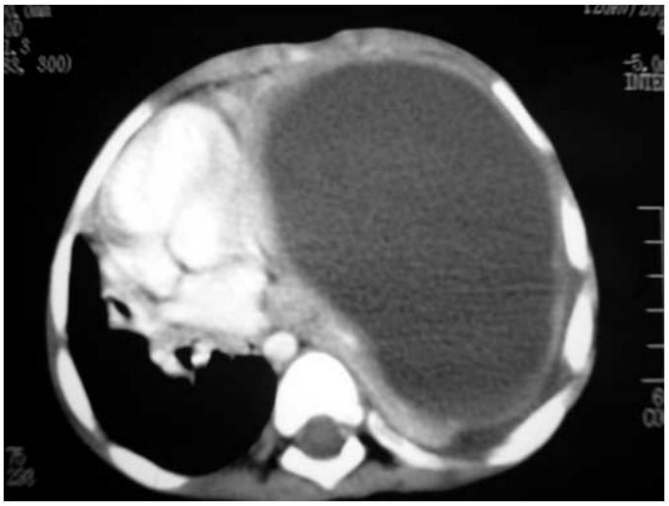
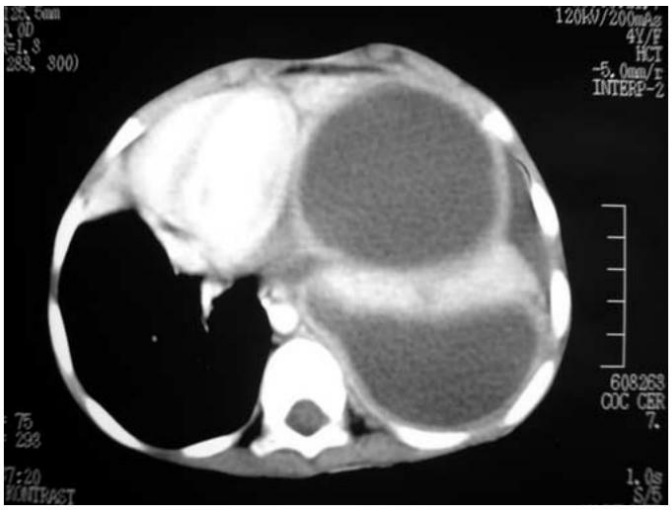
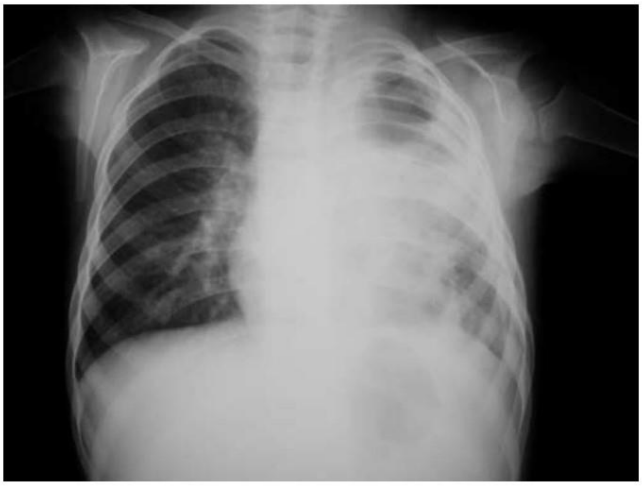


Figure 3: CT scan of the thorax showing the basal part of the cyst squeezing the atelectatic lower lobe



Indirect hemagglutination test for *Echinococcosis* was positive. Since the patient was living in a region endemic for hydatid disease, the clinical, laboratory, and radiological findings suggested the diagnosis of PHC. A classical posterolateral thoracotomy was performed. After the cyst was aspirated, it was irrigated with saline solution to prevent contamination after which cystectomy with left upper lobectomy was performed. The operative findings and histopathological examination confirmed the diagnosis. An early post-operative chest roentgenogram showed a fully expanded left lower lobe and post-lobectomy space at the upper hemithorax (Figure 4). The patient recovered uneventfully and was discharged with albendazole treatment on the 12th post-operative day. Written informed consent to use study information was obtained from the patient's family.

Figure 4: Post-operative chest roentgenogram showing the fully expanded left lower lobe and postlobectomy space at the left upper hemithorax



Discussion

In children, PHC may remain asymptomatic for a long time so that the elasticity of the lung tissue and the immune system allow the cyst to reach a very large size [3, 6, 7]. The findings in the history and the physical examination of the patient with PHC are often nonspecific. A chest roentgenogram is needed in suspected cases, especially in endemic regions. While chest roentgenogram of an early phase PHC showing a well-circumscribed spherical or oval cyst with homogenous opacity provides significant clues to make a plan for the further diagnostic work up, late presentation with atypical findings on

the chest roentgenogram may cause confusion in the differential diagnosis. In our case, the clinical findings most probably were overlooked, and a chest roentgenogram was not required at her first visit to the primary care physician. At her second visit, the delay in presentation caused enlargement of the cyst and atypical findings on the chest roentgenogram. In our patient, the combination of the history of previous pulmonary infection, current clinical presentation, and chest roentgenogram showing a homogenous density occupying the whole left lung field and shift of the mediastinum to the right strongly suggested a diagnosis of diffuse empyema secondary to underlying pneumonia. The attending clinician may decide to perform thoracentesis in such cases; however, this procedure can lead to an increase in PHC-associated morbidity and mortality. Thoracentesis may cause the cyst to rupture thus resulting in intense inflammation, pleural and bronchial seeding, acute anaphylaxis, and severe hypotensive shock [8–10]. Therefore, before any therapeutic intervention, a CT scan of the thorax should be considered to clarify this type of opacity based on the chest roentgenogram findings. CT can distinguish cystic from solid lesions and shows the morphological features of the hydatid cyst, including its size, location, and extension in the thoracic cavity and its relationship to the lung parenchyma and neighboring organs. CT examination also demonstrates multiple cysts, secondary bacterial infection, cyst wall calcification, and the state of the affected lobes [4, 11, 12]. It may identify the pathognomonic features in complicated or ruptured hydatid cysts. If communication develops between the cysts and the bronchial tree, air may enter between the pericyst and exocyst, producing crescent or inverse crescent signs. If communication occurs directly with the endocyst, the air–fluid level can be observed or a totally air-filled cyst termed as dry cyst sign can be identified [4, 8, 13]. CT also shows the daughter cysts and endocyst membranes and water lily sign caused by floating membrane on the fluid within the cyst after rupture. CT is especially crucial for making a correct diagnosis and for pre-operative evaluation of large and atypical cysts. In our case, although the cyst had an unusual size, shape, and location, the demonstration of a thick-walled intact cyst with the water density based on the CT examination provided an accurate pre-operative PHC diagnosis. The state of the affected pulmonary parenchyma and possibility of lobectomy of the left upper lobe were also determined by pre-operative CT examination.

Conclusion

In conclusion, it is recommended that patients with giant lung hydatid cysts be evaluated pre-operatively using CT both to determine the characteristics of the cyst, such as the size and location, and to allow the surgeon to decide more easily what kind of surgical procedure should be performed during the operation.

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