

Case Report

Isolated Pulmonary Hydatid Cyst Must Not Be Missed on Fine Needle Aspiration Cytology: A Case Report with Review of Literature

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Abstract

Hydatid cyst is an infectious disease caused by the parasite *Echinococcus*. Humans are accidentally infected. Mostly, the cyst remains dormant without causing any symptoms. The cyst can cause complications after rupture or due to mass effect. Imaging studies such as X-ray, CT, and MRI can be indicative of a hydatid cyst, but they are not reliable. Carefully performed fine needle aspiration cytology has gained importance in the definitive diagnosis of hydatid cyst because of its advantages, such as minimal invasiveness, rapidness, and simplicity of the procedure. We present a case of an isolated pulmonary hydatid cyst where Fine Needle Aspiration Cytology (FNAC) was effectively utilized for diagnosis.

Keywords: Hydatid Cyst; *Echinococcus*; Fine Needle Aspiration Cytology; Fiberoptic Bronchoscopy; Lamellated Membrane; Pneumonitis.

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Introduction

A hydatid cyst is a sac-like cavity formed after parasitic infection by *Echinococcus*. The incidence of hydatid cysts is high in developing countries like India. *Echinococcus* larvae enter the human body after being infected by dogs, sheep, or food and water contamination. Humans are accidental hosts, as the parasite cannot continue its lifecycle further and remains contained in the form of a fluid-filled hydatid cyst. It usually involves the liver (75%) and lungs (15%), with only 10% occurring in other parts of the body [1]. Imaging studies such as X-ray, CT, and MRI can be indicative of a hydatid cyst, but they are not reliable because a hydatid cyst can resemble a benign cystic lesion. Fine needle aspiration cytology is preferred by many clinicians despite its controversial role due to the risk of cyst rupture or anaphylaxis. Carefully performed fine needle aspiration cytology has an enormous role in the definitive diagnosis of a hydatid cyst because it is a minimally invasive, rapid, and simple procedure. We present a case where Fine Needle Aspiration Cytology (FNAC) was effectively utilized to diagnose a pulmonary hydatid cyst. It is rare to find an isolated pulmonary hydatid cyst in an adult.

Case Report

A 30-year-old male farmer presented with complaints of cough with expectoration, a moderate amount of hemoptysis, and bad breath from the mouth for 2 months. A provisional diagnosis of pneumonitis in the right lung was made, and a course of clindamycin and cefpodoxime was given for one week. The symptoms of the patient did not improve despite taking antibiotic treatment.

Laboratory Workup: On further investigating the patient, Serum Immunoglobulin E (IgE) levels were markedly raised to 4169 kUA/L, which raised a suspicion of parasitic etiology. An allergy test specific for *Aspergillus fumigatus* was negative. Other CBC parameters, Liver Function Tests, and Renal Function Tests were within normal limits.

Radiological Investigations: A chest X-ray showed an area of consolidation in the right lower lobe of the lung. Similarly, CECT chest examination revealed a large area of consolidation with surrounding ground glass and central necrosis along with cavitary changes (Figure 1). A final impression of infective etiology was made. The patient was advised Fiberoptic Bronchoscopy (FOB) to send a bronchoalveolar lavage sample to the laboratory for CBNAAT and culture examination to rule out fungus and bacteria. On Fiberoptic Bronchoscopy, it was observed that bronchi were filled with purulent secretions, which interpreted an infective cause. Negative results of CBNAAT and culture ruled out tuberculosis or other bacterial and fungal infections.

Fine Needle Aspiration Cytology: FNAC under ultrasound guidance was performed from the right lung consolidation. The material was aspirated, conventional smears were prepared and sent to the Department of Pathology, Pt B D Sharma, PGIMS, Rohtak. Residual material was also sent for cell block preparation. Conventional smears were stained with Giemsa stain. On examination, smears showed fragments of the wall of the hydatid cyst along with inflammatory cells comprising of macrophages, lymphocytes, and neutrophils (Figure 2). The cell block material was processed, and paraffin sections were stained with Hematoxylin & Eosin. Similarly, fragments of the wall of the hydatid cyst were identified in cell block sections (Figure 3). A diagnosis of an inflamed hydatid cyst was made on cytology.



Figure 1: Right lung revealing a cavitary lesion on Computer Tomography (CT)-Chest.

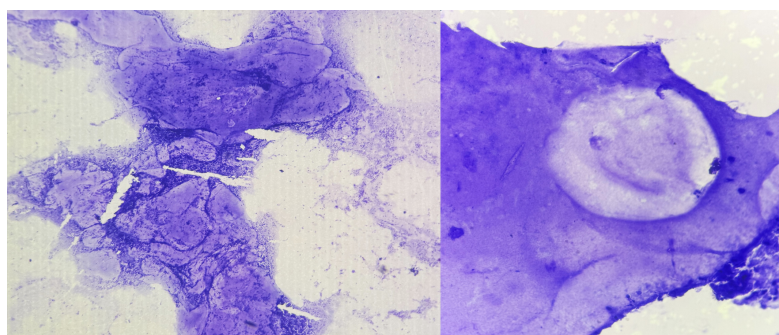


Figure 2: Fine needle aspirate showing fragments of the wall of the hydatid cyst. (Giemsa stain; 100x).

Discussion

Four pathogenic species of *Echinococcus* have been identified. The most common being *Echinococcus granulosus*, which causes cystic echinococcosis, followed by *Echinococcus multilocularis*, which is responsible for alveolar echinococcosis. Rarely, *Echinococcus shiquicus* is found in Tibet and *Echinococcus felidis* in African lions; these species have no zoonotic transmission potential [2, 3]. Humans are infected accidentally after contamination by dogs and sheep. In the life cycle of

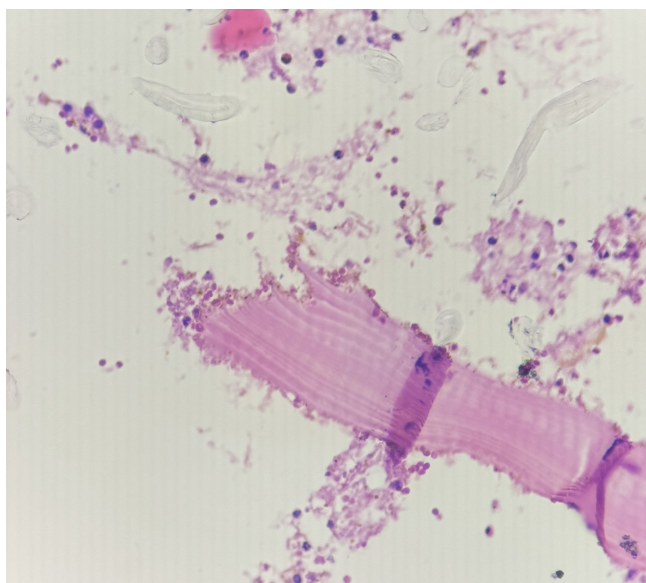


Figure 3: Lamellated membranes of the hydatid cyst identified on cell block. (Hematoxylin and Eosin stain; 400x).

this tapeworm, dogs are definitive hosts, whereas sheep or cattle are intermediate hosts. Human beings accidentally become intermediate hosts after intake of tapeworm ova. After the hexacanth larva hatch in the gastrointestinal tract, the hooklets of the larva help in the penetration of the intestinal wall. Subsequently, they enter several viscera and produce hydatid cysts. The cyst comprises an outer acellular laminated membrane called the ectocyst, whereas the endocyst is the inner germinal layer. The endocyst gives rise to small brood capsules incorporating about 10 to 30 protoscolices.

Diagnosing a hydatid cyst typically involves a combination of clinical evaluation, imaging studies, and laboratory tests. Most hydatid cysts remain asymptomatic and are diagnosed incidentally. However, a hydatid cyst can rupture and cause complications such as anaphylaxis, infections, or organ damage. Non-specific symptoms in liver and pulmonary cysts, such as bronchial obstruction, obstructive jaundice, and cirrhosis, are also evident due to mass effect. Such cases usually show a prominence of eosinophils or a raised Erythrocyte Sedimentation Rate (ESR). Serological testing is a rapid, non-invasive method in the primary screening of hydatid cysts. The enzyme-linked immunosorbent assay (ELISA), the indirect hemagglutination antibody assay (IHT), the latex agglutination test, and the immunoblot test (IB) are commonly used techniques. However, these tests have certain disadvantages. In a study by Rickard et al. [4], significantly evident false-negative results of serological tests were due to a senescent or deceased cyst. False-positive results can also occur after infection with other parasites such as cysticercosis.

Chest X-ray, CT, and MRI are commonly employed radiological techniques for the diagnosis of hydatid cyst. These methods have gained popularity as they are painless, non-invasive, and done on an outpatient basis. However, they detect a hydatid cyst as a benign cystic lesion, which can be misdiagnosed as an abscess or consolidation. Sometimes, cyst rupture can cause complications such as pleural effusion or fluid spillage in the peritoneal cavity, which are also evident in radiological investigations. Fibreoptic Bronchoscopy is not necessary where typical features of pulmonary hydatid cysts are present. However, fiberoptic bronchoscopy (FOB) is indicated where a pulmonary hydatid cyst is considered as a differential diagnosis. It can also be used to take a biopsy sample or for bronchoalveolar lavage. However, caution is necessary while doing bronchoscopy as it may rupture the cyst.

The role of Fine Needle Aspiration Cytology is debatable as a first diagnostic approach due to the potential risks it presents. However, in certain cases where imaging or clinical presentation raises suspicion for a hydatid cyst, FNAC can be performed under strict medical supervision. Material from the cyst is aspirated and smears are prepared. On cytology smears, degenerated scolices, fragmented parts of the membrane, hooklets, and granular debris can be detected. A lamellated membrane is the most commonly identified finding on FNAC. In a retrospective study by Kapatia et al. [5], it was observed that a lamellated membrane was identified in 20 (83.3%) cases out of 24 cases observed. Identification of lamellated membranes can be enhanced using Periodic Acid Schiff (PAS) stain. Hooklets are refractile bodies that are better identified using Ziehl-Neelsen stain.

The liver is the most common site for echinococcal cyst (>65%), followed by the lungs (25%). The spleen, kidneys, heart, bone, and central nervous system are rarely involved [6]. These findings were in contrast to a retrospective study by Kapadia et al. [5], where the most common organ involved was the lung (54.1% of cases), followed by the liver (25% of cases). Biswas et al. [7] reported a case of an isolated pulmonary hydatid cyst. Similar to our case, the patient was misdiagnosed as having pneumonitis, but the symptoms persisted even after an antibiotics course. Finally, the diagnosis was confirmed by an

unintentional fine needle aspiration of the mass lesion, which demonstrated scolices, indicating an active hydatid cyst. Few cases of hydatid cyst have been rarely reported as an isolated breast lesion. A case was reported by Cancelo et al. [8] where a hydatid cyst was reported in the breast. It was observed that the findings can be missed on mammography as it can mimic a benign breast lesion. Finally, the diagnosis was made on fine needle aspiration cytology. Sometimes, a hydatid cyst can mimic a neoplastic lesion clinically and radiologically. Amita K et al. [9] reported a case of a hydatid cyst occurring in an unusual location (thigh) and masquerading as a soft tissue tumour. On ultrasound, a diagnosis of a soft tissue tumor was made. FNAC of the thigh lesion was performed, and fluid was aspirated. Smears showed granulomas along with multiple hyaline acellular membrane-like fragments, a few of them showing vague laminations. A definitive diagnosis of hydatid cyst was made on FNAC, which was supported by a histopathology report.

Pulmonary Hydatid Cysts are treated pharmacologically and/or surgically. Surgical excision is the treatment of choice. Pulmonary Hydatid Cysts are sometimes treated by oral administration of drugs like mebendazole or albendazole in patients who are a contraindication for surgery, have disseminated hydatid cyst involving multiple organs, recurrent cysts, and patients with intraoperative spillage of hydatid fluid.

As Hydatid cyst has an unpredictable course, it must be diagnosed at the earliest. The burden of diagnosis lies both on the clinician and pathologists. Whenever there is any benign cystic lesion, the possibility of a hydatid cyst should be considered, especially if the lesion involves the liver and lungs. In view of its diagnostic importance in pathology, a hydatid cyst must not be missed on FNAC or cell blocks, as they can present as non-specific inflammatory lesions, as in our case. Smears must be scanned properly for lamellated membranes or scoleces. A prompt diagnosis of hydatid cyst becomes the most integral part in its course of management.

Conclusion

Hydatid cyst is a common infectious disease in developing countries like India. It becomes necessary to diagnose a hydatid cyst at the earliest before it gets disseminated in various organs. Specifically, pulmonary Hydatid cysts need immediate attention and early management due to the risk of rupture. Fine needle aspiration cytology is being preferred for diagnosing pulmonary hydatid cyst as its advantages take over the risks it can impose.

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Conflicts of Interest None declared.

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