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Case Report

Hydatid cyst presenting as a right frontal swelling: A rare case report

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Abstract

Hydatid disease is a parasitic infection caused by the larval stage of the cestode *Echinococcus granulosus.* In India, hydatid disease is predominant in certain states like Andhra Pradesh and Tamil Nadu. The most common site for hydatid disease is the Liver (75%), followed by Lungs (15%), Muscles (5%), Bones (3%), Kidneys (2%), Spleen (1%), and other sites. This case report highlights the rare presentation of hydatid cyst as right-sided frontal swelling in 26-year-old female patient. CT scan showed a well-circumscribed hypodense cystic lesion on the right-sided frontal region with osteolysis of the adjacent frontal bone. In endemic areas, we must consider hydatid cyst as the differential diagnosis, as it may mimic other soft tissue swelling.

Keywords: Hydatid cyst, *Echinococcus granulosus*, right frontal swelling

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1. Introduction

Hydatid disease is a parasitic infection caused by the larval stage of the cestode *Echinococcus granulosus.*[1,2] Genus *Echinococcus* has four main species that cause human disease, which are *E. granulosus*, *E. multilocularis*, *E. vogeri* and *E. oligarthus*. The highest incidence of *Echinococcus granulosus* has been reported among all the species.[3,4] Humans are the accidental host and do not play any role in the biological cycle of the parasite. The mode of transmission is through ingestion of food contaminated with faecal matter of a dog or exposure to domestic animals.[5-7]

The disease is more prevalent in endemic areas that include Central Asia, South America, Northern China, Eastern Europe, and the Middle East Africa.[8,9] The disease burden is higher in rural areas of developing countries. In India, hydatid disease is predominant in certain states like Andhra Pradesh and Tamil Nadu.[4,10,11]

The most common site for hydatid disease is the Liver (75%), followed by Lungs (15%), Muscles (5%), Bones (3%), Kidneys (2%), Spleen (1%), and other sites.[7,13] The egg containing enclosed embryos enters through the feco-oral route, then is transported to the liver through portal circulation, where it develops into larvae. The larvae may escape the capillary filter of the liver and enter into circulation and travel to distant sites. Most of the patients are asymptomatic or may develop symptoms after 5-to 20-year of incubation period.[4,6,12]

The provisional diagnosis of hydatid disease can be made on the basis of the epidemiological background of the patient, clinical history, and a non-invasive screening test.[4,5] Various imaging tests, such as ultrasonography, X-ray, and CT scan, can be used to detect the exact location and extent of hydatid cyst. Serological tests such as latex agglutination tests, ELISA, and immunoblot tests can be done to validate

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radiological findings. Surgical excision of cyst remains the gold standard in the management of hydatid disease.[7,8,10]

2. Case Presentation

A 26-year-old female presented to our surgery department with complaints of scalp swelling in the right-sided frontal region for 1 month. There was no history of fever, chest pain, vomiting or abdominal pain. The patient was a farmer by occupation, living in close contact with domestic animals. The patient noticed that the swelling was gradually increasing in size. The patient has no significant past history, family history, or underlying co-morbidities.

On physical examination, the soft tissue mass was painless and measured approximately 4cm x 5 cm in size. All other neurological examinations were normal. On peripheral blood smear examination, eosinophilia was noticed. A CT scan showed a well-circumscribed hypodense cystic lesion on the right-sided frontal region with osteolysis of the adjacent frontal bone. The rest of the cerebral parenchyma, cerebellum, and brainstem appeared normal.

The surgical excision of the mass was done and sent to the laboratory for further confirmation. The wet mount preparation revealed the protoscolex of *Echinococcus granulosus* along with hooklets. (**Figure 1,2**)

The post-operative CT scan was also done to find any residual cysts. Radiological investigations such as Chest X-ray and abdominal sonography were also performed, but were inconclusive. The patient was prescribed tablet Albendazole 400mg twice a day for 2 months. The patient was discharged after a week and advised to have regular follow-ups.

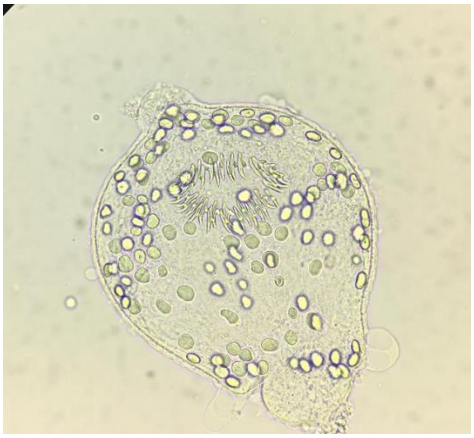

Figure 1: Hydatid sand containing the protoscolex of *Echinococcus granulosus*

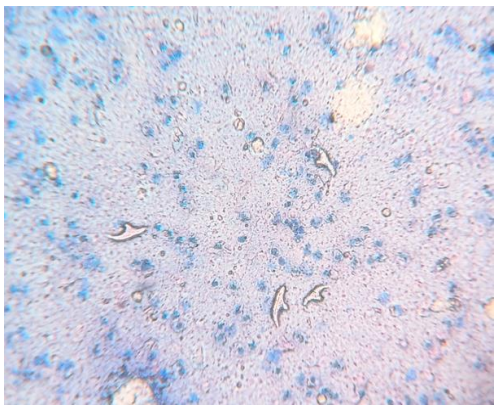

Figure 2: ZN-stained smear showing hooklets of *Echinococcus granulosus*

Table 1: Comparison between various studies

Author	Age and Gender of the patient	Site of Infection	Clinical symptoms	Laboratory Diagnosis
Present study	26-year Female	Scalp (Right side frontal region)	Painless swelling in the right-sided frontal region for 1 month	CT scan showed a well-circumscribed hypodense cystic lesion on the right-sided frontal region
V Abhishek et al.[5]	60-year Female	Abdominal wall	15x10 cm painless swelling in the right paraumbilical region of one year's duration.	Histopathological examination revealed multiple daughter cysts
Priya Datta et al.[4]	7-year Male	Bilateral Lungs	Localized throbbing pain on the left side of the chest for 1 month	The chest X-ray findings revealed multiple homogenous round masses with smooth borders, indicative of pulmonary hydatid disease.
Faten Limaiem et al.[7]	22-year Female	Cranial vault	Headache, vomiting. 6 cm X 4cm painless mass in the forehead	CT scan showed a well-circumscribed hypodense and multiloculated cystic lesion
Vinod Kumar et al.[8]	13-year Female	Parotid gland	Slowly enlarging hard mass in the left parotid	FNAC revealed a hydatid cyst

3. Discussion

Hydatid disease is more prevalent in Mediterranean countries, Northern China, South America, India, and other sheep-raising countries.[4,8] In India, the majority of cases are reported from southern and western states such as Andhra Pradesh, Gujarat, and Tamil Nadu, with a prevalence rate of 10 to 15%. The number of cases is increasing in developed countries due to the increase in travel and tourism worldwide.[9,11]

The most common site for hydatid disease is the Liver (75%), followed by Lungs (15%), Muscles (5%), Bones (3%), Kidneys (2%), Spleen (1%), and other sites. The involvement of central nervous system (CNS) is rare, with a prevalence rate of 0.5-4%.[7,8] The present case report highlights the rare presentation of hydatid cyst as right-sided frontal scalp swelling. Similar study was carried out by Faten Limaiem et al.[7] who reported Hydatid cyst of the cranial vault in 22-year female patient. Nasir Ud Din et al[13] reported 33 cases of hydatid disease of CNS from rural areas. The comparison between various studies is shown in **Table 1**.

Radiodiagnosis, microscopic examination, and serological tests remain a mainstay in the diagnosis of hydatid cyst. The “snowflake sign” is a key finding of hydatid cyst in ultrasonography due to the appearance of multiple, small foci that move within cystic fluid when the patient changes position. The “Honeycomb sign” (due to the presence of multiple daughter cysts) and “Water Lily sign” (due to detachment of endocyst from pericyst) are radiological findings associated with hydatid cyst.[12,13]

Routine blood tests are inconclusive, and only 15% of patients exhibit eosinophilia due to the release of antigenic material. Serological tests such as latex agglutination, immunoblot assay, and enzyme-linked immunosorbent assay are routinely used for the diagnosis of hydatid cyst.[4,5] These serological tests show 85-98% sensitivity for hepatic hydatid cyst, 50-60% sensitivity for pulmonary disease and lower sensitivity of 25-26% for other organ involvement. The Casoni’s skin test is a hypersensitivity-based test used in the detection of hydatid disease. The Casoni skin test showed false positivity (40%) in other helminthic infections due to cross-reactivity. Ugur et al. reported that Casoni’s skin test has higher sensitivity as compared to the indirect hemagglutination test with a P value <0.01.[7,12]

The management of hydatid cyst depends upon location, size of the cyst, and clinical signs and symptoms of the patient. Surgical excision remains the gold standard for the treatment of hydatid cysts.[7] PAIR (percutaneous aspiration, infusion of scolicidal agents, and re-aspiration) is a minimally invasive technique that is used in certain circumstances only. An antiparasitic drug such as Albendazole can be used as primary treatment as well as prophylaxis before surgery to reduce the risk of complications.[6,12,13]

4. Limitations

1. Lack of molecular testing method: It is important to identify the correct species of Echinococcus, which will help to understand its pathogenicity, epidemiology, and effective measures for its control. Effective typing methods using qPCR techniques are available, which differentiate different species by targeting polymorphic regions in the mitochondrial genome of Echinococcus species.
2. Lack of serological testing: Rapid serological testing will help in early diagnosis and prompt treatment. Serological tests, such as immunoblot and ELISA, are available, which detect antibodies against different Echinococcus species. The major drawback is the high rate of false positivity due to cross-reactivity.
3. Screening of contacts was not performed: Proper surveillance was not carried out among close contacts of the patient, which may continue the chain of transmission.

5. Conclusion

This case report highlights the rare presentation of hydatid cyst as right-sided frontal swelling. In endemic areas, neurosurgeons must consider hydatid cyst as the differential diagnosis, as cystic masses of the CNS may mimic cerebral abscess or arachnoid cyst. Early diagnosis is crucial as it results in a good prognosis. The surgical excision is curative, but care must be taken to avoid spillage as it may result in anaphylactic shock. Thus, pre-operative diagnosis is of utmost importance.

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7. Conflict of Interest

None.

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