

CASE REPORT/SURGICAL VIDEO

Cerebral multiple echinococcosis: management with dowling technique – illustrative video article

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Hydatid Cyst (HC) is a zoonotic disease caused by *Echinococcus granulosus*, which is more common in poverty-stricken regions, such as in African countries and Southeast Asia, and rarely in Western countries. Canine is the definitive host, humans are the incidental hosts, and domestic animals such as cows and goats are the intermittent hosts. The lungs, liver, and brain are common sites of cyst formation in this condition. Depending upon the locations, the HC manifestation includes constitutional symptoms, abdominal pain, jaundice, and CNS symptoms.

Case Report: A 60-year-old male patient came to the Government Vellore Medical College Department of Neurosurgery with chief complaints of headache, vomiting, seizure, and subtle focal neurological deficit. The CT brain plain contrast shows a Multiloculated cystic lesion in the right parieto-occipital region with a minimal contrast-enhancing lesion. An MRI of the brain showed multiple cystic lesions involving the right parieto-occipital region and midbrain level. The patient was taken for surgical intervention, and numerous cysts were excised using the Dowling Technique. Patient was managed post-operatively with antiepileptic, steroids, and anti-helminthic management. Patient discharged on POD3.

Discussion: Human echinococcosis, also known as hydatidosis or hydatid disease, is caused by the larval stages of cestodes of the genus *Echinococcus*, most commonly *Echinococcus granulosus*. This disease is endemic in countries with large animal husbandry sectors, such as India and the Middle East. The most common site of hydatidosis is the liver (50%–60%) followed by the lung (20%–30%). Cerebral hydatid disease is an extremely rare manifestation, documented as 2% of space-occupying lesions. Computer tomography, MRI, and immunological tests are modalities used to diagnose cerebral hydatid cyst disease. It is more common in the supratentorial region, most commonly the parietal and occipital lobes. Surgical excision is the treatment of choice for cerebral hydatid cystic disease, but needs to be tailored to each patient. During surgical excision, the cyst was removed using the Dowling technique, which avoids cyst rupture and spillage of cystic fluid into the brain parenchyma. The medical line of management is anti-helminthic medication, such as albendazole, for 28 days.

Keywords: hydatid cyst, cerebral echinococcosis, multiple intracranial cysts, dowling technique, albendazole therapy

Introduction

A 60-year-old male presented to the outpatient department with a history of headache and seizures for the last 6 months. The symptoms were gradually progressive in course. She developed gait imbalance 2 months after the onset of the first

symptoms. On examination, her GCS was 13/15 (E3V4M6). The patient underwent MRI, which revealed multiple cystic SOL in the subarachnoid space of the right temporo-parietal region and the mesencephalic cisterns. These cysts were hypointense on T1-weighted images and hyperintense on T2-weighted images, with no contrast enhancement and mass

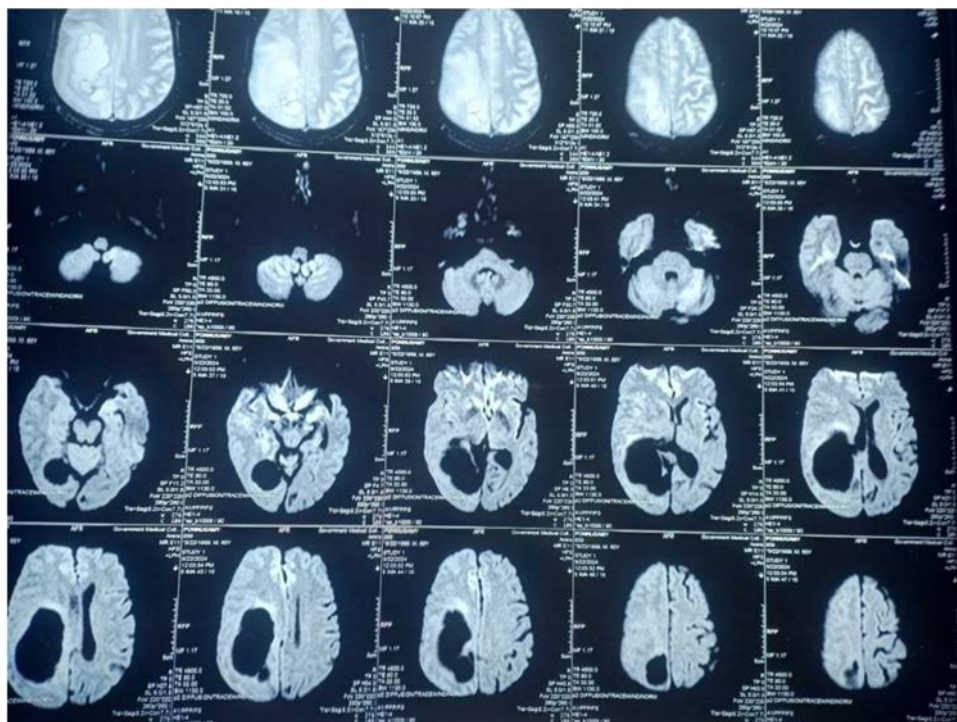


FIGURE 1 | MRI Brain T2W images show multiple cystic space-occupying lesions.

effect on the pons and medulla (**Figure 1**). The most probable differential diagnosis was cystic glioma, hydatid cyst, and

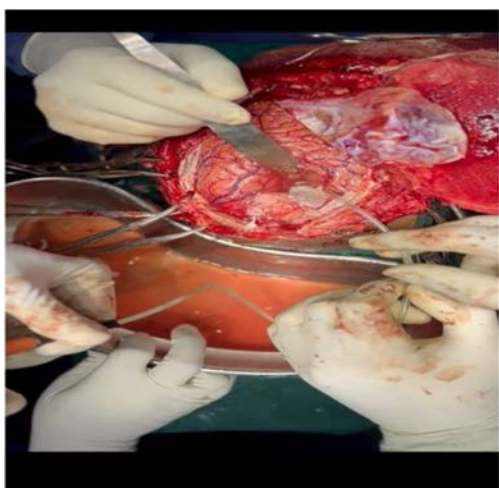


FIGURE 2 | Intra op picture of the evacuation of a hydatid cyst using the dowling technique.

VIDEO 1 | Application of the Dowling Technique. This video illustrates the careful preparation and application of the Dowling technique. The primary surgical goal is to deliver the cerebral hydatid cyst completely intact, as any rupture would cause harmful cystic fluid to spill into the brain parenchyma.

<https://youtube.com/shorts/K0Dr0hr1L28>

dermoid cyst of the right temporal-parietal region (1, 2). The patient was taken for surgery following consent in May, 2024. The intra-op picture (**Figure 2**) shows the cyst being excised using the Dowling technique. The cyst was glistening white and avascular. As expected, it was multicystic, with delicate walls. Therefore, careful dissection was made to remove these cystic structures (3) (**Video 1**). These cysts were compressing the right temporal-parietal region. One by one, the cysts were removed, and upon observation during removal, it was found that the cysts contained sand-like particles, scolices; therefore, extra care was taken to avoid dissemination of these particles into the right temporal-parietal region (2, 4). Using normal saline irrigation, the maximum number of approachable cysts was removed (**Figure 3**) (**Video 2**). Surgery was uneventful, except for minimal ooze from the surgical site, which was controlled with Surgicel and gentle pressure. After closure, the patient was intubated and shifted to the surgical ICU for postoperative monitoring. On the second post op day, a CT scan of the brain was done, revealing a minimal surgical site bleed. Ischemic changes in the region of the right temporal-parietal were also observed. Gentle extubation was successful, and patient has recovered slowly. The (**Figure 4**) report confirmed the presence of a Hydatid cyst (2). A CT abdomen and pelvis was performed to diagnose any other cysts, and a second cyst was found in the liver (4, 5). The infectious disease team was consulted, and the patient was started on the recommended 400 mg BD for 1 month (6). Follow-up in the clinic after 10 Days revealed good healing of the wound edges; GCS 15/15, but persistent gait imbalance. CT Brain showed subtle improvement in



FIGURE 3 | Multiple hydatid cysts, 20–25 in number.

VIDEO 2 | Critical Intact Extraction. This video captures the high-stakes final moments of the cyst's extraction.
<https://youtube.com/shorts/8R7fotwJfKA>

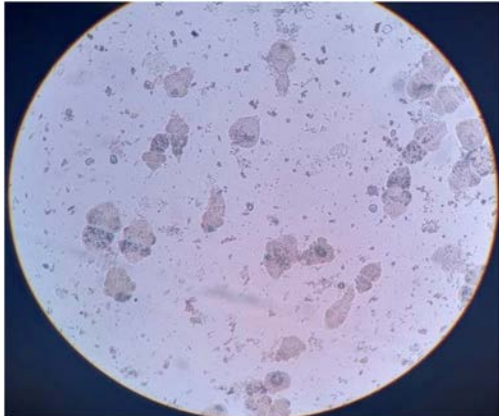


FIGURE 4 | Microscopic picture of a hydatid cyst.

mass effect, with persistence of gliotic changes within the right temporo-parietal region.

Discussion

Hydatid cyst is classified as a zoonosis caused by *Echinococcus granulosus* (2, 4). The dog is the definitive host, which harbors the disease by eating infected tissues from sheep, goats, and other animals (4). Contaminated food is accidentally consumed by humans, who serve as intermediate hosts. In humans, the larva enters the blood

and reaches different organs, especially those with a rich blood supply (1, 4). While CNS spread is considered rare, it is the third most common site of involvement (5). The following is a list of organs where hydatid cysts can spread: muscles, the orbit, the heart, the adrenal gland, the thyroid, the submandibular gland, the kidneys, the intestine, the internal acoustic canal, the jugular foramen, and the spine (4, 5). Radiologically, Hydatid cysts are best diagnosed on contrast-enhanced MRI (1). The cysts can be solitary or multiple. The clinical signs and symptoms depend on the area of brain involvement and range from Headache to focal neurological deficits in the affected area when the cyst is present (1, 2). Histopathological diagnosis of hydatid cyst is confirmatory by observing scolices (the sand) in the Cystic fluid (2). During surgery, Saline (Dowling technique) is used to dissect the hydatid cyst, and with this method, the cysts are usually delivered intact (3). Microscopic dissection is done with care to avoid the spillage of cyst contents in the surrounding areas (3). Once the diagnosis of hydatid disease is confirmed, anti-parasitic treatment Albendazole is given 400 mg orally BID for 1–3 months (6). Reviewing the literature from 2008 to 2018 using the PubMed search engine, we found that the disease is geographically concentrated in the Middle East and developing countries (5).

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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