ORIGINAL RESEARCH PAPER
Volume - 13 | Issue - 02 | February - 2024 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ATYPICAL HYDATID CYST APPEARANCES IN IMAGING

Radio-Diagnosis

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ABSTRACT

In many regions of the world, hydatid illness remains a serious health issue. Although it can affect any region of the body, the liver is the most frequently affected area. For years, the disease could not show any symptoms. Compression of nearby structures or consequences such as rupture and infection cause symptoms. When the common sites of involvement have a characteristic radiological picture, the diagnosis is evident. It is complications that lead to abnormal looks. These together with peculiar localizations make diagnosis challenging. This pictorial essay aims to illustrate the uncommon forms of hydatid cysts, which may be a result of the odd placement or consequences.

KEYWORDS

INTRODUCTION

Echinococcus granulosus, a tapeworm larva, is the common cause of hydatid cysts. The worm has two hosts during its life cycle. Dogs are the undisputed hosts, and very seldom do other carnivores. The definitive host's proximal small bowel is home to the adult worm. Its eggs are transferred by the afflicted animal's excrement. Sheep are typically the intermediate host, ingesting the eggs through grazing on contaminated grass. Humans can contract the infection from the dog by touching them or by consuming tainted food or drink. [1] In the duodenum, the ovum releases the larva known as the oncosphere, which passes through the intestinal wall and enters the portal circulation. Consequently, it travels to the liver, where it develops into a cyst.

Three layers make up the hydatid cyst: (i) The middle laminated layer; (ii) the outer pericyst, which is made up of transformed host cells that create a thick, fibrous protective coating. which is acellular, nutrient-passing, and impermeable to microorganisms; and (iii) the inner germinal layer, which is where the laminated membrane and scolices are made [Figure 1]. Usually referred to as the endocyst, the middle laminated layer and the germinal layer together constitute the real wall of the cyst. [2] The tissue that contains the cyst determines how thick these layers are. The layers are typically absent from bone, less developed in muscle, and thicker in the liver. [3]

Approximately 75% of cases of hydatid disease involve the liver, 15% involve the lung, and 10% include other anatomic sites. [1] Considering the radiological based on their appearance, hydatid cysts are divided into four groups:

Type I: Simple Cyst With No Internal Architecture And Either Hydatid Sand Or Septae

Type II: Cysts with daughter cysts and matrix;

IIa: Round daughter cysts placed at the perimeter
Iib: a mother cyst filled with irregularly shaped daughter cysts; IIc: a high attenuation oval or circular mass with

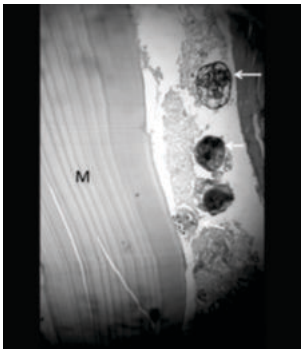

Fig:1 Hematoxylin and eosin stained section showing the wall of resected hepatic hydatid cyst. White arrows indicate daughter cysts with scolices. M = Middle laminated acellular layer

Type III: Dead cyst with complete calcification;

Type IV: Complicated cyst with rupture and superinfection; Dispersed calcification with sporadic daughter cysts. [4]

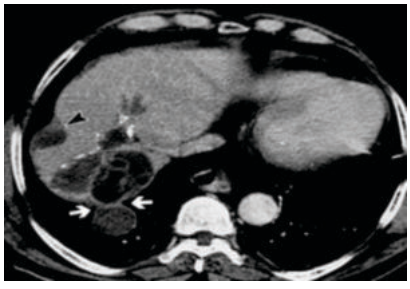

Fig:2 Type II hepatic hydatid cyst. CT scan shows a large fluid attenuation mass in the right and caudate lobe. Irregular shaped daughter cysts occupy almost the entire mother cyst

Sites of Involvement

Liver

The preferred screening technique for hepatic hydatid cysts is ultrasound. High sensitivity and specificity make computed tomography (CT) a valuable diagnostic tool. instrument for identifying issues. [3] Typically, a hydatid cyst is observed as an oval or circular lesion with a type I or type II look [Figure 2]. On unenhanced CT, it shows a strong attenuation wall and water density. After contrast injection, the septae or cyst wall may appear more prominent. The internal matrix or wall of the cyst may have partially calcified. This does not mean that the parasite has died. A cyst with thick total calcification may develop later and is thought to be dormant. [5] The most effective way to show the involvement of the biliary tree and the cystic component is by magnetic resonance imaging (MRI).

Complications of hepatic hydatid cyst are: (a) Infection, (b) rupture, (c) exophytic growth, and (d) portal vein involvement. (a) Infection manifests on CT as hypodense mass with typical enhancing rim like any other hepatic abscess. Gas or air-fluid level may also be seen. (b) Three types of cyst rupture have been described: Contained, communicating, or direct. [7] Contained- Endocyst ruptures, but the pericyst remains intact. Detached endocyst is seen as serpentine linear membranes within the cyst. When there is complete detachment, crumpled endocyst floats freely in the cyst fluid, giving rise to the "water lily sign."

Presence of fatty material, air-fluid level, and fat-fluid level in the hydatid cyst also suggests communication with biliary tree. [9] The fat is thought to arise from the lipid content of the bile.

Spleen

After liver and lungs, splenic hydatidosis is the third most frequent. [10] It typically results from intraperitoneal spread from the systemic diffusion or burst hydatid cyst in the liver. The imaging features [Figure 6] resemble those of hepatic cysts. Finding any daughter cysts and, if any detached floating membranes are present, identifying them

aids in the diagnosis. Pseudocyst, lymphangioma, and epidermoid cyst are among the differential diagnoses. [11] A thick calcified wall and a history of trauma point to post-traumatic pseudocyst syndrome. Lymphangioma typically manifests as a low attenuation without improvement. T1-weighted images may exhibit elevated signal intensity in the event of bleeding.

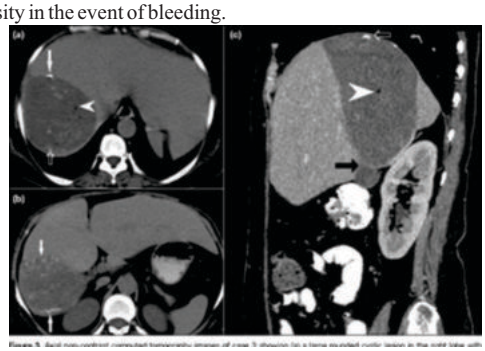

Fig-3 Lipid material in type II hepatic hydatid cyst. Axial contrast-enhanced CT image through the superior part of the liver shows well-defined cyst in the right lobe with fat attenuation areas within suggestive of biliary communication

Peritoneum

Hepatic hydatidosis is nearly invariably the underlying cause of peritoneal hydatid cysts. These can appear anywhere in the peritoneal cavity and are typically numerous. Existence of The diagnosis is made possible by several peritoneal lesions, hepatic hydatid, and the distinctive appearance of daughter cysts [Figure 7]. It is challenging to distinguish unilocular type I cysts from intestinal duplication cysts and mesenteric cysts, nevertheless. [3]

Retroperitoneum

Retroperitoneal hydatid is rare, usually secondary to involvement of other organs, especially liver. The infection reaches the retroperitoneum by spontaneous rupture or by inoculation during surgery. [3] Visualization of daughter cysts helps in the diagnosis. [3] However, other appearances like unilocular cyst, cyst with detached membranes, partially or totally calcified cyst may be seen [Figure 8]. This needs to be differentiated from lymphangioma which appears as a large, thin-walled cystic mass that may involve more than one compartment of retroperitoneum. Other entities like mucinous cystadenoma, cystic teratoma, and pseudocyst can be differentiated based on age and other findings in the abdomen.

Lung

Lung is the second most common site of involvement. Hydatid cyst can grow very large due to compressibility of lungs. It initially develops as type I cyst which may be round or oval. Daughter cysts are rarely seen. Erosion of the bronchiole included in the pericyst results in air between endocyst and pericyst, giving rise to the "crescent or meniscus sign." Presence of crescent-like rim of air in the posterior part of cyst is sometimes seen and is termed the "inverse crescent sign."[12] With continued leak, two layers may separate. The cyst shrinks and ruptures allowing the passage of air into the endocyst. An air-fluid level in the endocyst with air between the endocyst and pericyst constitute "the cumbo sign." Air-fluid level with collapsed floating membranes can be seen inside the cyst – "water lily sign" . All of the liquid content may be expelled to the bronchial tree – "dry cyst sign."[13]

Bone

Bone involvement is seen in 0.5-4% of cases.[14] Spine, pelvis, femur, tibia, humerus, skull, and ribs are the frequent sites involved.[14] Due to lack of pericyst formation, aggressive proliferation causes replacement of medulla, cortical destruction, and extension into soft tissues. Extraosseous cysts may calcify. The radiological appearance consists of areas of osteolysis with expansion, thinning, and destruction of cortex and extension into soft tissues.

Muscle

Skeletal muscle is a rare site as it does not favor the growth of hydatid cyst because of its contractility and high lactic acid level.[16] Muscles of the neck, trunk, thigh, or upper extremities and around the hip are generally involved, but any part can be involved.[15] Ultrasound done as part of initial workup of suspected soft tissue lesion may reveal findings typical of hydatid cyst. These vary from unilocular cyst to cyst with daughter vesicles, detached membranes, and water lily sign. Complicated cysts may simulate abscess, hematoma, metastases, or soft tissue tumors like myxoid liposarcoma. CT and MRI show rim enhancement in an abscess and variable enhancement in metastases and soft tissue tumors. Blood products are seen in hematoma on MRI.

Brain

Brain involvement is quite uncommon. Most hydatid cysts are found in the region of the middle cerebral arteries. [3] It appears as a unilocular cyst on a CT scan, with attenuation akin to that of CSF fluid [Figure 15]. One may notice fine peripheral enlargement. There is no edema. The nearby calvarium may be eroding. Unusual results Figure 10: A multiloculated, lytic lesion of the left hemipelvis is visible on the pelvic radiograph. A pathological fracture of the shaft also affects the proximal shaft and femoral head, resulting in calcification, numerous locules, heterogeneity of the cyst material, and edema in the cyst wall. [4]

Breast

Breast hydatid cyst is very rare. Diagnosis is difficult unless ultrasound reveals membranes or fluid level due to debris in the cyst [Figure 16]. Ring-shaped structures within a dense, well-circumscribed lesion on mammography are also suggestive of hydatid. [18] Presence of hydatid cysts in other organs adds to the diagnostic confidence. Hydatid cysts can also develop in other anatomical locations. These comprise the kidney, adrenal glands, orbit, mediastinum, heart, pericardium, and subcutaneous space. Participation of In roughly 3% of cases, the kidney is visible, and in less than 1% of cases, the orbit. [3] In some places, it is even more uncommon. The imaging appearances resemble those previously reported for other organs. Usually unilocular, the orbital hydatid can be extra- or intracellular. [19] Hydatid cysts, therefore, should be included in the differential diagnosis of cystic masses of a particular organ even in cases where the characteristic appearance of many daughter cysts is absent. This is especially crucial if the patient has lung or liver cystic lesions and lives in an endemic area.

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