



RESEARCH ARTICLE

Comprehensive Evaluation and Management of Liver Hydatid Cyst

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ABSTRACT

Hydatid cyst infection is a severe disorder caused by exposure to the infectious form of the *Echinococcus granulosus* parasite, which is widespread worldwide. This study examined a total of 125 patients who were diagnosed with hepatic hydatid cysts based on clinical and surgical evaluations. Patients with cysts larger than 5 cm displayed markedly elevated levels of alanine transaminase, aspartate transaminase, and alkaline phosphatase in comparison to those with smaller cysts. The heightened levels suggest a disturbance in liver functionality resulting from the infection. Furthermore, the patients exhibited elevated serum bilirubin levels. An evident differentiation was observed between patients with cysts over 5 cm in size and those with smaller cysts, indicating have a higher effect on liver function in individuals with bigger cysts. A total of 125 hepatic hydatid cysts were diagnosed using computed tomography (CT) scans. The predominant cyst phases seen were Stage I and II, accounting for 58% and 45% of cases, respectively. On diagnosis, 79% of the cysts range in size from 5 to 10 cm. CT imaging provides additional features that aid in the identification of Type I unilocular echinococcosis. However, it is important to note that no single imaging feature is clearly diagnostic of this type of cyst. Nevertheless, imaging techniques can assist in differentiating these cysts from non-parasitic liver cysts. On the other hand, Type II, III, and V hydatid cysts can be accurately identified by their distinct imaging characteristics.

Keywords: Hydatid cyst, echinococcosis, liver enzymes, bilirubin

INTRODUCTION

Cystic echinococcosis, also known as hydatid disease, is a common parasitic disease that is distributed worldwide.^[1] Echinococcosis is a human disease caused by the larval stages of *Echinococcus granulosus*, *Echinococcus multilocularis*, and *Echinococcus vogali*. *E. granulosus* is common in Iraq, with an annual report of approximately 500 cases of cystic echinococcosis.^[2] The liver is the most commonly compromised organ.

The commonly accepted radiographic classification of Gharbi *et al.*,^[3] is based on the ultrasonographic features of the disease, this classification differentiates five types of hepatic cystic echinococcosis. Type I involves the collection of pure fluid, which is simple and involves only one cyst. Type II is concerned with fluid collections that have a separate, floating internal chamber. Type III is characterized by smaller cysts and septa, and is primarily composed of fluid, as observed on ultrasound. Type IV cysts have a mostly complex pattern of solidity, including thick membranes and a few associated daughters. Type V is associated with calcified cysts that have a thick wall that reflects light. This kind of cyst is caused by damage.

Type II and III HECs have different radiographic properties due to their design, including fluid, sloughed

membranes, daughter cysts, and septa that are either calcified or not. As a result, their radiographic diagnosis is typically simple. However, the identification of Types I and IV HECs is difficult. Other lesions that are filled with fluid are classified as Type I HEC, these include: B. non-parasitic simple epithelial cysts, which are similar in appearance, this makes it difficult to differentiate between them.^[4] Similarly, the Type IV HEC is indistinguishable from other solid parts of the liver.^[5] As a result, it is now considered that hepatic cysts that contain only one compartment in common with other site specifically associated with the disease should be considered potential candidates for *E. granulosus* infection until proven otherwise.

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Common hepatic abnormalities are simple cysts that have a single layer of epithelial cells that line their walls. They may occur alone or in groups. Computed tomography (CT) images of simple liver cysts exhibit a well-defined, uniform mass that lacks a visible wall.^[6]

Liver damage is often accompanied by changes in the levels of certain serum enzymes, most notably aspartate transaminase (AST), alanine transaminase (ALT), alkaline phosphatase (ALP), and total serum bilirubin (TSB). These enzymes are relied on to assess damage or necrosis in liver cells. An increase in ALT and AST occurs with different types of liver damage; ALT is primarily found in the liver and is a more specific indicator of hepatitis compared to AST, which is also present in other organs such as the heart, muscles, brain, and pancreas.^[7] ALP is mainly found in the liver, bones, kidneys, intestines, and placenta. The level of this enzyme increases in cases of bile obstruction, hepatic cholestasis, which is a condition where bile flow from the liver is reduced or blocked, and infiltrative liver diseases.^[8]

The Aim of Study

The study aims to demonstrate the effect of hydatid cysts on liver enzymes levels and total bilirubin. The aim of the study was to diagnose patients more accurately by characterizing *E. granulosus* lesions.

MATERIALS AND METHODS

This study, covering during the (2022–2023), initially consisted of 125 patients with liver hydatid cysts (Seventy-two females, fifty-three males, range age 5–85 years, mean age 39.9 years), who visited and examined by CT in Smart hospital. Liver patients (125 patients) were divided according to the size of the cysts formed into patients with cysts larger than 5 cm and <5 cm (Cyst size significantly influences treatment decisions, risk of complications, and clinical management strategies), 110 and 15 respectively. CT scans were performed using a spiral scanner, and 10-mm-thick abdominal sections were examined. Non-enhanced and intravenous contrast studies were performed in each patient. Patients who were finally diagnosed with hepatic echinococcosis had a final diagnosis made by surgery or endoscopic retrograde cholangiopancreatography. The results of this study were statistically analyzed using SPSS Statistics 26.

RESULTS

Females (57.6%) were more likely to be affected than males (42.4%). Of the patients examined, 73 (58.4%) lived in rural areas and 52 (41.6%) lived in urban areas. The age of the patients ranged from 5 to 85 years, with the majority being in their forties (41–50 years). The distribution of cysts by age is shown [Table 1].

Of the total 125 patients, 79 had single cysts, 16 had double cysts, and 30 had multiple cysts. The diameter of the cysts ranged from 0 to 20 cm, and most of them were larger; 79 cysts were 5–10 cm, 29 cysts were 10–15 cm, 15 cysts were <5 cm, and 2 cysts were more than to 15 cm in diameter [Table 2].

Table 1: The frequency of cysts according to the gender, residence, and age of the patients

Gender	No.	%
Male	53	42.4
Female	72	57.6
Total	125	100
Residence		
Urban	52	41.6
Rural	73	58.4
Total	125	100
Age		
Age <10	13	10.4
Age 11–20	11	8.8
Age 21–30	17	13.6
Age 31–40	18	14.4
Age 41–50	26	20.8
Age 51–60	18	14.4
Age 61–70	18	14.4
Age 71–80	3	2.4
Age >80	1	0.8
Total	125	100

Table 2: Number and size of hydatid cysts in 125 patients

Number of cysts	No.	%
Solitary	79	63.2
Double	16	12.8
Multiple	30	24
Total	125	100
Size		
Size <5	15	12
Size 5–10	79	63.2
Size 10–15	29	23.2
Size >15	2	1.6
Total	125	100

CT staging showed that there were a large number of Stage 1 cases (46.4) in our patients, and 1 (0.8) Stage V cyst was observed in our study. Right abdominal pain was the most common symptom, followed by secondary symptoms and jaundice. Hepatic H.C. was found in the abdomen in two cases [Table 3].

The results shown in Table 4 indicate that there is a difference in ALT enzyme activity between patients with cysts smaller than 5 cm (2.4%) and patients with cysts larger than 5 cm (14.4%). The increase the ALP levels appeared more substantial in patients with cysts smaller than 5 cm (3.2%) compared to those with cysts larger than 5 cm (11.2%). Statistical analysis revealed differences in AST enzyme activity, with patients having cysts smaller than 5 cm (2.4%) and those with cysts larger than 5 cm (12%). The TSB level also showed

Table 3: The frequency distribution according to CT staging and presenting symptoms

CT staging	No.	%
Stage I	58	46.4
Stage II	45	36
Stage III	12	9.6
Stage IV	9	7.2
Stage V	1	0.8
Total	125	100
Presenting symptoms		
Pain	82	65.6
Incidental	37	29.6
Jaundice	4	3.2
Abdominal	2	1.6
Total	125	100

Table 4: The frequency of infection according to the several effective factors

Cyst size	ALT n (%)	ALP n (%)	AST n (%)	TSB n (%)
<5 cm	3 (2.4)	4 (3.2)	3 (2.4)	2 (1.6)
Higher than 5 cm	18 (14.4)	14 (11.2)	15 (12)	10 (8)

ALT: Alanine transaminase, ALP: Alkaline phosphatase, AST: Aspartate transaminase, TSB: Total serum bilirubin

differences, with patients having cysts smaller than 5 cm (1.6%) compared to those with cysts larger than 5 cm (8%).

DISCUSSION

The liver is regarded as a vital accessory organ to the digestive system. It performs a multitude of essential bodily functions. This study specifically examined a serious liver condition known as a hepatic hydatid cyst.^[9]

The most prevalent age group in this study was those in their fourth decade of life (ages 41–50).^[10] The impact was more common on females than on males.^[11] Cultural changes appear to influence the distribution of genders. Women in certain societies assume the responsibility of animal breeding and agriculture, which consequently exposes them to a higher risk of infection. Pain in the right upper quadrant was the most common symptom, followed by incidents and jaundice. Two cases, representing 1.6% of the total, revealed abdominal hepatic echinococcal cysts.^[12]

We found 79 (63.2%) of the hydatid cysts in our cases to be solitary. This finding is consistent with Morel *et al.*'s^[13] study, which found that two-thirds of the patients had solitary cysts. In our investigation, we observed several hepatic cysts in a sizable percentage of cases (24%). This is consistent with findings from other investigations.^[14] It is very uncommon to encounter multiple stages of hydatidosis in a single patient, particularly given the endemic nature of the disease in our country.

Initially, the majority of hydatid cysts were of considerable dimensions. The study found that 63.2% of the cysts had a

diameter between 5 and 10 cm, whereas 23.2% had a dimension between 10 and 15 cm. This is mostly due to the fact that hepatocellular carcinoma (HC) of the liver is asymptomatic in a clinical setting, resulting in a delayed diagnosis.^[15]

CT staging is crucial in determining the therapy approach, as it establishes the treatment pattern. At present, aspiration and medicinal intervention manage the majority of Stage I cases, while surgical means address Stage III and IV cases.^[16] Treatment options for Stage II can vary depending on the availability of drainable substances. In the mentioned order, the study classified 46.4% of the cysts as Stage I and 36% as Stage II.

CT scans can readily identify Stage II cysts due to their distinct appearance of a detachable membrane that resembles a serpentine shadow. This membrane is denser than the fluid inside the cysts. CT scans facilitated the identification of Stage III cysts due to the distinctive visual features of the daughter cysts. The cysts in Stage IV were characterized by an uneven mixture of soft-tissue density components.

It was harder to tell the difference between Type I unilocular hydatid cysts and simple hepatic cysts that are not caused by parasites. According to reports, unilocular Type I HC accounts for 23–46% of all HC cases.^[5,7] Out of the whole sample, 58 individuals (46%) belonged to this particular category. Individuals in their fourth decade of life observed the majority of these cysts, while older individuals predominantly detected Type II-V cysts. This occurrence is predictable when we consider the inherent progression of echinococcal cysts.^[17]

As a result, cyst size, shape, location, and CT attenuation values do not provide precise indications for diagnosing hepatic echinococcal cysts. This is due to the fact that non-parasitic simple hepatic cysts may exhibit identical CT characteristics.^[18] Out of the 125 cysts examined in this study, 15 of them exhibited peripheral ring enhancement following the administration of intravenous contrast. Prior research has discussed the ring enhancement pattern of HC and attributed it to either infection or compression of the hepatic tissue.^[19]

When investigating the effect of cyst infection on liver functions, the current study showed an increase in the level of liver enzymes ALT, AST, and ALP in patients. These levels were also elevated in patients with cysts larger than 5 cm. The increase may be due to the growth of the cyst in the liver tissue and the occurrence of pathological changes, such as necrosis in the liver cells, which causes an increase in the permeability of the cell membranes or their destruction, thus releasing these enzymes into the peripheral circulation.^[20] It may also be due to the expansion of the area of destruction occurring in the liver cells, as in the case of cysts larger than 5 cm. The study also included measuring the level of total bilirubin in the serum. The results showed a considerable rise in total bilirubin level in patients with hydatid cysts compared to patients with cysts larger than 5 cm. This increase may be due to liver cell damage or the large size of the cyst, which increases pressure on the liver cells.^[21]

CONCLUSION

The investigation discovered hydatid cyst infection in human patients from the Iraqi city of Sulaimani. Patients whose liver

cyst growth measured more than 5 cm had for higher enzyme levels than those whose cyst size was <5 cm, which indicated the disturbance of the liver functions in patients who revealed the growth of the cyst in the liver.

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