ORIGINAL ARTICLE J. Med. Sci. (Peshawar, Print) July 2010, Vol. 18, No. 3: 132-134

ROLE OF ULTRASOUND IN THE DIAGNOSIS OF HEPATIC HYDATID CYST

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ABSTRACT

Objectives: To study the accuracy of ultrasound in the diagnosis of hepatic hydatid cyst.

Material and Methods: A prospective study carried out in Radiology and Surgical Units of Hayatabad Medical Complex, Peshawar from July 2002 to January 2006. All the patients were scanned for hepatic hydatid cyst and classified on the basis of characteristic ultrasound features. Indirect haemagglutination test was performed in all cases and biopsy taken from the cases in whom surgery was performed.

Results: Total of 30 patients were included in the study. Age range was 5-75 yrs with a mean age of 40 years. The sensitivity of ultrasound in the diagnosis of hydatid cyst was 96% and specificity 80%. The number of ultrasound positive cases were 25 (83.3%). Histologically confirmed positive cases were 24 with positive accuracy of 96%, and the ultrasound negative cases were 5 with a negative accuracy of 80%. Majority of the patients presented with type II cyst 16 (53.3%).

Conclusion: Ultrasound can diagnose hepatic hydatid cyst with high accuracy.

Key Words: Ultrasound, hydatid cyst, accuracy, diagnosis.

INTRODUCTION

Hydatid cyst is a worldwide parasitic disease and is endemic in countries where sheep or cattle grazing is carried out with the help of dogs. The hydatid cyst is a larva of a small tapeworm echinococcus granulosus. The larva grows in the tissues of intermediate host like sheep, cattle, camel etc. The human is accidental intermediate host. Liver is involved in up to 75% cases but no part of the body is spared[1, 2].

Ultrasound being cheap, non-invasive and easily accessible imaging tool, can diagnose and classify hepatic Hydatid cyst with high sensitivity and specificity. This type of imaging diagnosis is more important in parts of the world where more sophisticated imaging tools like CT scan and MRI is expensive[3].

Revolutionary changes have taken place in the diagnosis of hydatid cyst since the introduction of ultrasound. Classification of the hydatid cyst became possible by ultrasound in addition to size measurement and number assessment. The ultrasound classification of hydatid cyst tell us about the activity of the cyst also, so that unnecessary intervention in case of inert cyst can be avoided[4].

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There are various classifications available in literatures based on the characteristics ultrasound features of the hydatid cyst. We used a modified classification system based on the classification devised by the WHO informal group and Gharbi and Colleagues[5,6]. The advantage of this classification is that it discuss both the morphology and activity of the cyst.

MATERIAL AND METHODS

This descriptive study was conducted in Radiology and Surgical departments of Hayatabad Medical Complex, Peshawar from July 2002 to January 2006. Convenient sampling was adapted for this study. The sample included a total of 30 patients between the age of 5 and 75 years and comprises 18 male and 12 female patients.

The liver of the patient was carefully and thoroughly examined using 3.5 MHZ convex probe. For proper scanning subcostal oblique, epigastric transverse and intercostals approaches were used. Right decubitus postures and breath holding techniques in cooperative patients were found very useful. Hydatid cyst was classified into five types on the basis of the ultrasound features (Table 1). Informed consent taken from all the patients, and were followed up for 6 months.

Specified proforma of the patients was filled in all aspects leaving the space for the result of indirect haemagglutination test and biopsy results. The inclusion criteria was patients of both sexes, Patient between 5-75 years of age. The exclusion criteria was patients presented with peritonitis due to rupture of cyst and patients scanned and operated elsewhere.

RESULTS

A total of 30 patients including 18 male and 12 female were included in the study. Relation of ultrasound findings of hydated cysts with histopathology results are shown in Table 2.

Sensitivity of the ultrasound was noted to be 96% and specificity 80%. 1 (4%) of cases having positive ultrasound diagnosis of hepatic hydatid cyst was confirmed negative on biopsy. No. of cases according to ultrasound classification is shown in Table 3. Right lobe of the liver was involved in 15 (50%) cases while in 5 (16.6%) both lobes of the liver were involved.

DISCUSSION

The diagnosis of hydatid cyst is based on cyst wall and its contents. Majority of the characteristic features of hydatid cyst wall are because of the endocyst or germinal membrane. Its absence and presence both have diagnostic importance. If it is not identified in univesicular hydatid cyst of more than 4 cm, the diagnosis is most probably cyst of non-hydatid origin, although potential risk of hydatid still persists. Its identification in univesicular cyst in the form of ultrasound double line wall sign is highly suggestive of hydatid cyst[7,8]. In this study the double line wall sign was present in 36.6% of the total cases and 68.5% of univesicular cyst. This sign is produced by echogenic pericyst and echogenic germinal layer separated by anechoic laminated membrane and it forms type II cyst in the modified classification.

The germinal layer on its infolding produces daughter cysts which are well known pathognomonic signs of hydatid cyst. This sign was positive in 16.6% of the total cases in the present study. The germinal layer may detach as a result of treatment or spontaneously giving an ultrasound water lily sign which is type III according to the modified classification. This sign was seen in 10% of the cases. Thus a total of 24 (80%) were diagnosed on the basis of absence or presence of the germinal membrane. Cyst fluid consistency and pericyst calcification constituted 20%. One of the five cysts without characteristic sign and negative indirect haemagglutination test proved to be hydatid on biopsy (type I cyst). The WHO informal group has not included these cysts in their standard classification while Caremani and colleagues have labeled them as type I cyst[9,10,11].

Clinical and practical classification is important to guide the clinician regarding management. In this study the active cysts have double line wall sign and daughter cysts have been grouped as ‘a” and “b” under type II. The type II is comparable with group I of WHO standard classification. This group for clinical or practical purposes represents the cysts which are growing in size and contain active scolices[12,13].

Type III in this classification is composed of cysts having change in germinal membrane, cyst fluid or both. All the three forms grouped under III represent those cysts which have started degeneration but may contain viable scolices. Group 2 of the WHO classification corresponds to type III of this classification. Group 3 of WHO classification and type IV and V of this study exactly represents the same type of cysts having solid look and calcification[14,15,16].

Table 1: Modified ultrasound classification of hydatid cyst (HC)

Types	Ultrasound features
I	Simple looking univesicular cyst(s) without characteristic ultrasound features of HC
IIa	Univesicular cyst with clearly visible two layers of the wall and anechoic cyst fluid
IIb	Cyst with daughter cyst giving the appearance of honeycomb or spoke wheel with anechoic cyst fluid
IIIa	Cyst with undulated membranes and anechoic fluid (water lily sign)
IIIb	Echogenic cyst fluid representing solidification of the cyst fluid in univesicular cyst
IIIc	Echogenic (solidified) cyst fluid with embedded membranes or daughter cysts
IV	Heterogenous and echogenic cyst contents giving solid look with only wall calcification
V	Solid looking mass with widespread calcification

Table 2: Study Results

Ultrasound feature	Number of cases	Histologically confirmed positive	Histologically confirmed negative	Sensitivity	Specificity
Ultrasound positive cases	25	24	01	96%	—
Ultrasound negative cases	05	01	04	—	80%
Total	30	25	05	96%	80%

(P Value = 0.021)

Table 3: Number of cases according to Ultrasound Classification

Type	Number of cases
I	5 (16.6%)
IIa	11 (36.6%)
IIb	5 (16.6%)
IIIa	3 (10.0%)
IIIb	2 (6.6%)
IIIc	2 (6.6%)
IV	1 (3.3%)
V	1 (3.3%)

As far as the sensitivity of the ultrasound is concerned, technical factors must be considered. The ultrasound is highly operator dependent. Moreover quality of the apparatus also plays a large role. Condition and physique of the patient are again contributing factors. Inspite of the above facts, the sensitivity of the ultrasound was 96% which is slightly higher than the study in which the sensitivity of ultrasound was 94%.[17,18,19,20]

Only one patient i.e. 3.33% showed false negative result. The patient was an adult male having echogenic hepatic parenchyma because of fatty infiltration. A unilocular cyst of 4.2 cm was detected in the left lobe (segment II). No double layer of the wall or other signs of hydatid cyst were visible. Ultrasound diagnosis was simple cyst. Biopsy of the aspirate was positive for hydatid cyst. The reason of the non-visualization of the double layer of the wall could be obscured echogenic pericyst by the echogenic hepatic parenchyma. False positive cases again constitute 3.33%. A septum in the cyst of 4.7% in segment VIII was mistaken for hydatid cyst with detached membrane in a male patient of 46 years. Biopsy of the cyst was negative for hydatid cyst.

CONCLUSION

Ultrasound is a cheap investigation in diagnosing and classifying hydatid cyst.

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