Sensitivity of ultrasound in differentiation between complicated and uncomplicated hepatic hydatid cyst

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حساسية الفحص بالأمواج فوق الصوتية في تحديد مضاعفات الأكياس المائية ألكبديه

الخلاصه

المقدمه:الكبد هو أكثر عضو يصاب بالأكياس المائية والفحص بالأمواج فوق الصوتية هو أهم الفحوصات المستخدمة لهذا الغرض تختلف الأكياس التي فيها مضاعفات عن الأكياس بدون مضاعفات في التشخيص والعلاج لذا يجب أن تكتشف مبكرا.

هدف الدراسة :تحديد حساسية الفحص بالأمواج فوق الصوتية في اكتشاف مضاعفات الأكياس المائية في الكبد اعتمادا على النتائج الجراحية.

طريقة البحث : أجريت هذه الدراسة في مستشفى الديوانية التعليمي في الفترة من الأول من حزيران إلى الثلاثون من كانون الثاني تضمن البحث ٥٤مريض فحصوا جميعهم بواسطة الامواج فوق الصوتية أجريت العملية لجميع المرضى المشمولين بالدراسة حيث كان لديهم أكياس مائية كبديه غير متكلسة اكبر من أربع سنتيمتر.

النتائج: الأمواج فوق الصوتيه شخصت سبعه وعشرون كيس كبدي بدون مضاعفات في حين نتيجة الجراحة أثبتت وجود المضاعفات في ١١ كيس.كما أظهرا لفحص بالأمواج فوق البنفسجية وجود المضاعفات في سبع وعشرون كيس وأثبتت نتائج الجراحة وجود المضاعفات في خمس وعشرون كيس .

الاستنتاج: حساسية الأمواج فوق الصوتية في اكتشاف مضاعفات أكياس الكبد المائية ٧٠% .

Abstract

Background

Liver is the most common site of hydatid cyst and ultrasound (US) is the most commonly implied investigation ,complicated and uncomplicated hydatid cysts are considered different forms of the disease and evaluated differently.

Aim of study:

To determine the sensitivity of US in detecting liver hydatid cyst complications.

Patients and method:

This study conducted in AL-Diawanyia teaching hospital through the period from June 2007 to February 2010. A total of 54 patients(20 males and 34female) with a solitary hepatic hydatid cyst more than 4cm were included in this study . Patients who have hydatid cyst less than 4cm or have calcified hydatid cyst and patient who refused the

operation were excluded from this study . Hepatic hydatid cysts were classified according to the US findings to complicated and uncomplicated hydatid cyst and these findings were compared with surgical findings .

Results:
Twenty seven cysts diagnosed as uncomplicated hydatid cyst according to US features, during surgery only 16 cyst found to be uncomplicated hydatid , most cases that diagnosed as complicated hydatid cyst were multilocular gravid hydatid cyst . Twenty seven cysts were diagnosed as complicated hydatid cyst by US & during surgery 25 cysts found to be complicated hydatid.
Sensitivity of US in detection hydatid complication 69.4%, specificity 88%.

Conclusion :
US is a sensitive tool for diagnosing complicated hepatic hydatid cyst .

Introduction :
Hydatid cyst is a parasitic infection caused by several species the most common form is Echinococcus granuloses, which give rise to cystic echinococcosis that can affect any organ but the commonest site of infection is the liver with a rate of 50-70 % , followed by the lungs[1,2].
Hydatid cyst is relatively common in Asia, Europe, Spain, South America and Australia. It is still an important & challenging problem &endemic in Iraq & other countries[1,2,3,4].
In general hepatic cysts are single ,uncomplicated & located in the Rt. lobe of the liver[1,2,5]. The treatment of H.cyst of the liver has remained primarily surgical with medical or percutaneous management assuming an adjuvant role especially for uncomplicated one[6,7].
In human hepatic cyst presents either as uncomplicated cyst which has lower postoperative complication rates and short hospitalization or presents as complicated hepatic cyst which has higher postoperative complication rates and longer hospitalization. Therefore complicated and uncomplicated hydatid cyst are considered different forms of disease and evaluated differently[8].
Cysts containing bile and or pus are considered complicated cysts therefore cyst content determine post operative cavity related complications. As mortality and morbidity increase in complicated hydatid cyst, so early diagnosis and proper management are mandatory in these cases and some of these complicated cases may need urgent surgery[4,9,10].
Ultrasound (US) is the most commonly employed investigation in diagnosis hydatid cysts and their complications [9,10].

Aim of study:
This study is designed to evaluate the sensitivity of US in differentiation between complicated and non complicated hepatic hydatid cyst.

Patient and method:
This is a prospective study conducted through the period from June 2007 to February 2010 on 54 patients (34females & 20 males who were 15-62 years old , mean age =38 year) were referred from surgical or medical wards to ultrasound unit at AL-Diawanyia teaching hospital because of abdominal pain or other nonspecific clinical features .

Abdominal Ultrasonic examination was performed with 3.5MHz curved transducer on a real time B-mode scanner Siemens (VersaPro) & Philips .
US criteria of hepatic hydatid cyst were carefully noted as regularity of the wall, size, site, echogensity of content, presence of the daughter cysts inside and if there is an associated biliary tree dilatation .Uncomplicated H.cysts are unilocular (or multilocular), thin wall with echofree content[10]. Complicated H.cyst was diagnosed by ultrasound as complicated ruptured or complicated infected hydatid. Ruptured hydatid which is either contained rupture (when the endocyst is torn but the cyst content is confined within the pericyst), communicated rupture (when the endocyst is torn with loss of cyst content via small biliary ducts) or direct rupture (there is a torn in both endocyst and pericyst) [11]. Complicated infected H.cysts are poorly delineated with mixed internal echoes & some time appear as complex mass abscess like appearance [10,11]. According to these US features hydatid cysts were classified into two types complicated and uncomplicated hydatid cyst and the ultrasonic findings were correlated with the surgical findings.
The reliability took from the pilot study in equal observers to five patients the personal correlation coefficient was 0.8.
We exclude patients with small H.cyst < 4cm & calcified hydatid who were treated medically. All the study sample have a solitary hepatic H.cyst & were treated surgically.
During surgery, if the cyst was communicated with the biliary tree, contained pus or if associated with dilatation of the biliary tree (obstruction) it was classified as a complicated one.

Results:

Only 4 from those 54 patients have left lobe hydatid cyst and other patient have right lobe hydatid cyst.
The diameter of the cyst range from 5-14cm.
Twenty seven cysts were diagnosed as uncomplicated cyst by ultrasound .
Twelve of them were unilocular, thin wall, echo free cyst within homogenous texture of the liver and regarded as uncomplicated hydatid cyst, during surgery only (10) patients from those 12 patients found to be uncomplicated hydatid cyst & 2 cases had bile containing cysts .
The other 15 cysts were multilocular, thin wall, multivesicular, multiseptated echo free hydatid cyst, when the mother cyst appear gravid with daughters those regarded as uncomplicated cyst, during surgery only (6) patients found to be uncomplicated and the other 9 patients had complicated hydatid containing either pus or bile& one case was associated with dilated biliary tree.
Complicated H.cyst was diagnosed by ultrasound as complicated ruptured or complicated infected hydatid. All ruptured H.cysts were diagnosed by ultrasound & confirmed by surgery as complicated ruptured hydatid (contained rupture 5 patients ,communicating rupture 8 patients & direct rupture - was intrapleural - 1 patient).
Nine patients had ultrasonic features of complicated infected H.cyst but only seven of them were found to be infected hydatid during surgery.

While in cases of H.cyst with obstructive jaundice, four hydatid cysts were found to have biliary tree dilatation by US study and during surgery all of them found to have obstructive jaundice with either localized or generalized biliary tree dilatation (table 1).

Table 1: Distribution of the study sample according to ultrasound & surgical findings .

Findings	Patients no. (%) according to US findings		Patients. no.(%) according to Surgical findings			
	No.	%	Compatible with US findings.		Not compatible with US findings.	
			No.	%	No	%
Uncomplicated cyst Unilocular ,echo free.	12	22.2	10	18.5	2	3.7
Uncomplicated cyst Multilocular,echofree	15	27.8	6	11.1	9	16.6
Complicated rupture *Contained type* *Communicating type* *Direct rupture*	 5 8 1	 9 14.8 1.8	 5 8 1	9 14.8 1.8	0	0
Complicated Infected hydatid cyst	9	16.7	7	12.9	2	3.7
Hydatid cyst with obstructive jaundice	4	7.4	4	2.1	0	0
Total	54	100	41	76	13	24

Table 2: Validity, positive and negative predictive value for diagnosing complicated hepatic hydatid .

	Complicated hydatid	**Uncomplicated Hydatid**	**Total**
US Positive	TP 25	FP 2	27
US negative	FN 11	TN 16	27
Total	36	18	54

*****TP: true positive ,TN: true negative, FP: false positive, FN:false negative.
Sensitivity = 69.4% , specificity = 88.8%
Positive predictive value = 92.5%
Negative predictive value = 59.2%**.**
Accuracy = 75.9%

Discussion :

Hydatid cyst should be suspected in patients who reside in rural areas & present with abdominal pain & hepatomeglly or palpable hepatic mass[2,4]. Asymptomatic cysts may persist for years, however they can cause life threatening complications such as anaphylactic shock ,rupture into the biliary tree & abdominal cavity, cyst infection & eventually replacement of liver parenchyma. Considering the possibility of such risks, the disease must be diagnosed & treated efficiently [1,2,5].

US plays a pivotal role in diagnosis and classifying hydatid cyst as it is fast, available, noninvasive, cost effective & has a high diagnostic accuracy [2,5,12].

US has the ability to identify certain characteristic features of hydatid cyst including wall thickness, daughter cysts and hydatid sands which are not always diagnosed by other modalities [3,13].

In this study the sensitivity of US for differentiation complicated form uncomplicated hydatid cyst is 69.4% , this is comparable to a study done by Atli et al who reported a sensitivity of 66.7%[14].

In this study we found that hepatic cyst were more prevalent in female patients 34(63%) compared to 20 (37%) males which is similar to the result of many studies & may be related to females handling with the vegetable more than males[15,16,17].

The current study showed that US is unable to detect complications in gravid hydatid as 9 patients out of 15 patients with gravid hydatid were diagnosed sonographically as uncomplicated & proved to be complicated surgically. This observation is consistent with Ali Hadidi[18] study who reported that many liver gravid H.cyst have complications that could not be detected by ultrasound, however this may be related to the complex appearance of the gravid hydatid cyst as the daughter cysts may organize in different shapes where there are double layers of internal septation and triple layers borders of the cyst ,this complex appearance give difficulty in classifying hydatid cyst [9].

Sixteen patients with cysts diagnosed as uncomplicated hydatid by US and during surgery were either bile or pus containing, and only one case was associated with biliary tree obstruction. Early infection and early obstruction are the possible explanation as intrahepatic biliary tree not dilated at all within the first 48 hour of acute obstruction[19].

Zeno et al explained bile containing cyst which is not diagnosed by US as non ruptured hydatid cyst surrounding by pericyst and biliary duct usually cross this layer but it is very rarely seen in US [11].

EI fortia et al reported that numerous signs of H.cyst infection including poor delineation, mixed internal echoes can also be found in intact cyst [9]. In our study 2 patients with sonographic signs of infected cyst (increased wall thickness & the cyst contained multiple different intensity echoes) found to be not infected during surgery. Gharbi et al explained this complex appearance in US as a degenerative process of liver hydatid rather than an infected hydatid [10] .

Obstructive jaundice is one of the most important complication that need urgent surgery. US has a high sensitivity in detecting non acute biliary obstruction[19]. In this study four patients had biliary tree dilatation by US & are surgically confirmed; two with biliary obstruction that caused by ruptured hydatid into the biliary tree, the other two cases were due to pressure effect of huge hydatid cyst located in the inferior surface of the liver pressing on the gall bladder and common bile duct.

Conclusions :

US demonstrates complications of hepatic hydatid cyst with relatively high sensitivity & accuracy rates.

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