The Role Of The Site Of Liver Hydatid Cyst(s) On Intra-biliary Rupture Of Liver Hydatid Cysts

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ABSTRACT

Background
Hydatid cysts of the liver are caused by *Echinococcus granulosus* and have a worldwide distribution. The liver is the most commonly affected by ***Echinococcus*** (50-70 per cent of cases)

Patients And Methods
Four hundred patient were presented to the Gastroenterology and Hepatology Teaching Hospital, from January 2000 to December 2008 with liver hydatid cysts. The diagnostic work up was directed for establishing the site, size, number, biliary communication and intra-biliary rupture of liver hydatid cysts . These works up include abdominal ultrasound for all patients, CT ,MRI,MRCP and ERCP.

Results:
There were 280 patient females and 120 patient males, female to male ratio 2.3 : 1. The ages of the patients ranged from 6 years to 75 year , (mean = 37 year) . The main presenting symptom was RUQ pain 75%, jaundice 25%, fever 20%, weight loss 15%, cholangitis 12.5% ,pruritus 7.5% and vomiting cysts 2.5% .

Conclusion:
The incidence of biliary communication and intrabiliary rupture more in the left lobe hydatid cysts than the right lobe hydatid cysts

.**Keywords:**
liver hydatid cysts, US,CT, MRI, MRCP, ERCP(Endoscopic Retrograde Cholangio-Pancreatography)

Introduction

Hydatid cysts of the liver are caused by Echinococcus granulosus and have a worldwide distribution. They are a common health problem in sheep and cattle-raising areas such as Turkey and other Mediterranean countries, the Middle East, South America, New Zealand, and Australia (1). Hydatid disease is a parasitic infection caused by Echinococcus grunulosus. Human being is an intermediate host who acquires the disease by ingesting the parasite eggs. Cysts which are larval forms of the parasite, subsequently develop. The liver is the most commonly affected by Echinococcus (50-70 per cent of cases) (2,3,4). Most patients with a hydatid cyst in the liver have no symptoms, and its presence becomes evident when the liver is found to be enlarged or a cystic lesion is noted when the liver is imaged for other reasons. Large cysts may be painful, but otherwise symptoms may be the result of a number of complications(5, 6, 7) . They may rupture into the biliary system and then the patient presents with cholangitis. Cysts may also become infected or obstruct major intrahepatic bile ducts . Rupture of a hepatic hydatid cyst is a serious complication which occurs in 5% to 15% of patients with hepatic involvement and produces a clinical picture of biliary obstruction (8,9,10,11,12). The communication with the bile duct can be tangential (side to side) or terminal (end to side). Depending on the site of the cyst, a cystobiliary communication can engage a peripheral, small-caliber bile duct

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(usually end to side) communication or a major segmental duct including the right or left hepatic ducts (usually side to side tangential communication). Rupture into a large channel may allow more or less complete emptying of the fluid and laminated membranes, and lead to spontaneous cure or cholestatic jaundice with recurrent cholangitis. Incomplete emptying and a persisting communication usually result in secondary infection(13,14,15,16). The rapid discharge of the cyst contents into a major bile duct or body cavity can lead to the sudden absorption of the hydatid antigen in a sensitized patient resulting in anaphylaxis. More frequently, pruritus or urticarial rash are the major external ma
nifestation. Episodes of asthma have been reported.Ultrasonographic examination and CT are very useful in diagnosis and also for the classification of cysts (17,18,19). Accurate, non-invasive, repeatable organ imaging has added a new dimension to the diagnosis of hydatid disease. Ultrasonography is more readily available worldwide, much less expensive than computed tomography (CT) and can be repeated when needed. Ultrasound can demonstrate the cystic nature of the lesion and will sometimes show the presence of unmistakable daughter cysts within the main cyst cavity, providing a definitive diagnosis . Ultrasound is particularly useful in the work-up of patients presenting with jaundice (hydatid cyst rupture into the biliary tree) as it is possible to differentiate daughter cysts from gallstones in many of these patients . In the hands of skilled, experienced staff, the precision of ultrasound diagnosis is high (20,21,22,23).CT, however, probably yields the most information regarding the position and the extent of intra-abdominal hydatid disease. Daughter cysts are clearly seen and CT will demonstrate exogenous daughter cysts as well .This may be of the utmost importance in planning surgery. CT will also demonstrate cysts in other parts of the peritoneal cavity, and there are no problems caused by the bowel containing gas, as there may be with ultrasound.Manzullo reports that 25% of ultrasound-diagnosed patients need a CT scan preoperatively, which is an exaggeration and probably reflects the quality of the ultrasound examination(24).

Magnetic resonance imaging (MRI) provides good images of liver hydatidosis, but it is too complex and expensive for routine use. The real value of MRI in hydatid disease is in monitoring skeletal and vertebral hydatidosis and in cardiac hydatidosis (25). Intrabiliary rupture is the most common complication of hepatic hydatid cyst, occurring in only 317% of cases. The diagnosis is rarely difficult on ultrasound and CT when typical radiological features are present. In rare cases of complete evacuation, when characteristic findings of hydatid cyst are absent or when there is no evidence of the previous existence of liver hydatid cyst, the diagnosis may be difficult. In difficult cases, MRI, MRCP, ERCP are employed (30). Endoscopic retrograde cholangiopancreatography (ERCP) is of particular use when obstructive jaundice is caused by hydatid membranes , when cholangitis has been a feature of the clinical presentation and when previous surgery has distorted anatomy. Communication between the bile ducts and the cyst can be demonstrated by ERCP. ERCP should be done after ultrasound examination in jaundiced patients . The importance of ERCP in asymptomatic patients has been overemphasized . Correct indications for endoscopic papillotomy are of paramount importance in managing complicated cysts. Papillotomy should be performed for the pre- and postsurgical removal of fragmented intrabiliary hydatid membranes and in the management of postoperative external biliary fistulae. Preoperative endoscopic papillotomy facilitates flushing of the bile ducts but renders intraoperative cholangiography even less informative (26,27,28,29,30).

Aims Of The Study:

The aim of this study is to summarized the gender distribution ,age ,main presentation ,organ imaging and incidence of biliary communication and intra-biliary rupture of liver hydatid cysts.

Patients And Methods:

Four hundred patient were presented to the Gastroenterology and Hepatology Teaching Hospital, from January 2000 to December 2008 with liver hydatid cysts. There were 280 patient females and 120 patient males, female to male ratio 2.3 : 1. The ages of the patients ranged from 6 years to 75 year , (mean = 37 year) .

All patients were evaluated by clinical assessment, hematological profile and biochemical profile. Then the diagnostic work up was directed for establishing the site, size, number, biliary communication and intra-biliary rupture of liver hydatid cysts . These works up include abdominal ultrasound for all patients. CT of the liver, MRI of the upper abdomen and MRCP for some patients. ERCP was done preoperatively for treatment cholangitis due to intra-biliary rupture of hydatid cyst and diagnosis of biliary communication, post-operatively for treatment of external biliary fistulae

Results

Table 1 : Distribution of patients according to their gender

Gender	N	%
Female	280	70%
Male	120	30%
Total	400	100%

Table 2 : Age distribution of the studied patients

Age groups (years)	N	%
Less than 10	6	1.5%
10-19	32	8%
20-29	80	20%
30-39	130	32.5%
40-49	96	24%
50-59	36	9%
60 & above	20	5%
Total	400	100%

Table 3 : The dominant symptoms of liver hydatid cyst

Symptom	No.	%
Symptomless	20	5%
RUQ pain	300	75%
Fever	80	20%
Jaundice	100	25%
Cholangitis	50	12.5%
Pruritus	30	7.5%
Vomiting cyst(s)	10	2.5%
Weight loss	60	15%
Others	10	2.5%

Many patients had more than one symptom

Table 4: Organ Imaging and Intervention and detection of biliary communication and Intrabiliary rupture

Type of Imaging	No.	Biliary communication	Intrabiliary rupture
Ultrasonography	400	20	30
CT Scan	80	25	11
MRI & MRCP	80	70	50
ERCP	120	90	50

Table 5 : Distribution of single cyst, size, site and complication

	Right lobe			Left lobe		
size	No.&%	Biliary communication	Intrabiliary rupture	No.&%	Biliary communication	Intrabiliary rupture
3-5cm	10 (9.09%)	0(0%)	0(0%)	16 (26.7%)	2 (3.3%)	2 (3.3%)
6-8cm	24 (21.81%)	2 (1.8%)	2(1.8%)	24 (40%)	10 (16.7%)	4 (6.7%)
9-10cm	36 (32.72%)	6 (5.45%)	2(1.8%)	12 (20%)	6 (10%)	4 (6.7%)
>10cm	40 (36.36%)	16 (14.55%)	6(5.4%)	8 (13.3%)	6 (10%)	2 (3.3%)
Total	110 (100%)	24 (21.8%)	10(9%)	60 (100%)	24 (40%)	12 (20%)

Table 6 : Distribution of multiple cysts, size, site and complication

Multiple Right lobe cysts				Multiple Left lobe cysts		
Size	No.&%	Biliary communication	Intrabiliary rupture	No.&%	Biliary communication	Intrabiliary rupture
Large cysts	44(29.3%)	12(8%)	8(5.3%)	6(30%)	3(15%)	2(10%)
Large cyst and small cysts	56(37.3%)	12(8%)	6(4%)	8(40%)	3(15%)	2(10%)
small cysts	50(33.3%)	8(5.3%)	2(1.3%)	6(30%)	2(10%)	2(10%)
Total	150(100%)	32(21.3%)	16(10.6%)	20(100%)	8(40%)	6(30%)

Small cyst =5cm, large cyst

Table 7 : Distribution of bilobar liver cysts, , number and complication

Site	N0.&%	R.Biliary communication	R.Intrabiliary rupture	L.Biliary communication	L.Intrabiliary rupture
One cyst in both lobes	20(33.3%)	4(6.7%)	1(1.7%)	4(6.6%)	2(3.3%)
Two cysts in R.lobe & one cyst in L.lobe	16(26.7%)	4(6.7%)	1(1.7%)	2(3.3%)	2(3.3%)
Two cysts in L.lobe &one cyst in R.lobe	12(20%)	0(0%)	0(0%)	4(6.7%)	2(3.3%)
More than two cysts in both lobes	12(20%)	1(1.6%)	1(1.6%)	4(6.7%)	2(3.3%)
Total	60(100%)	9(15%)	3(5%)	14(23.3%)	8(13.2%)

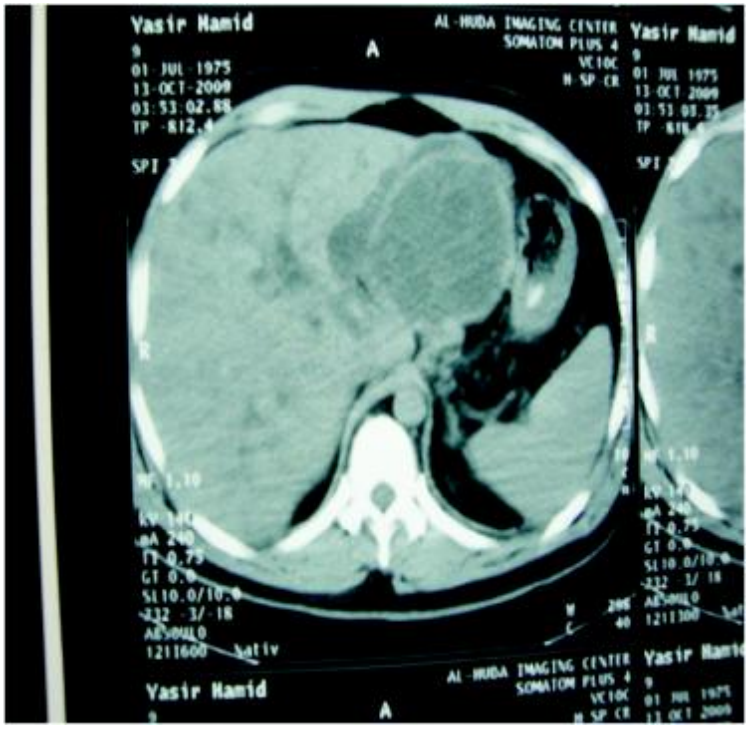

Figure 1:CT of liver with Left lobe hydatid cyst and left biliary

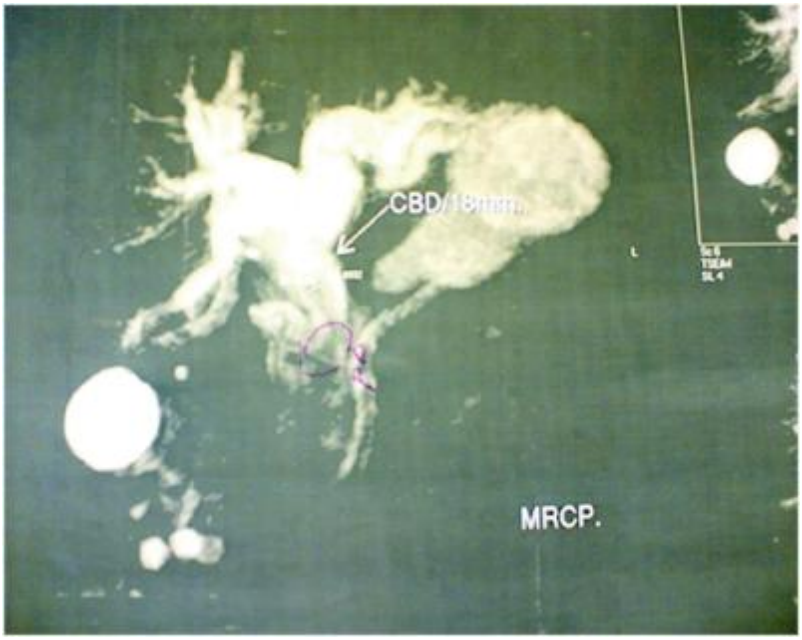

Figure 2 :MRI of liver&MRCP with Left lobe hydatid cyst and left Intrabiliary rupture

Figure 3: MRCP with Right lobe hydatid cyst and biliary communication

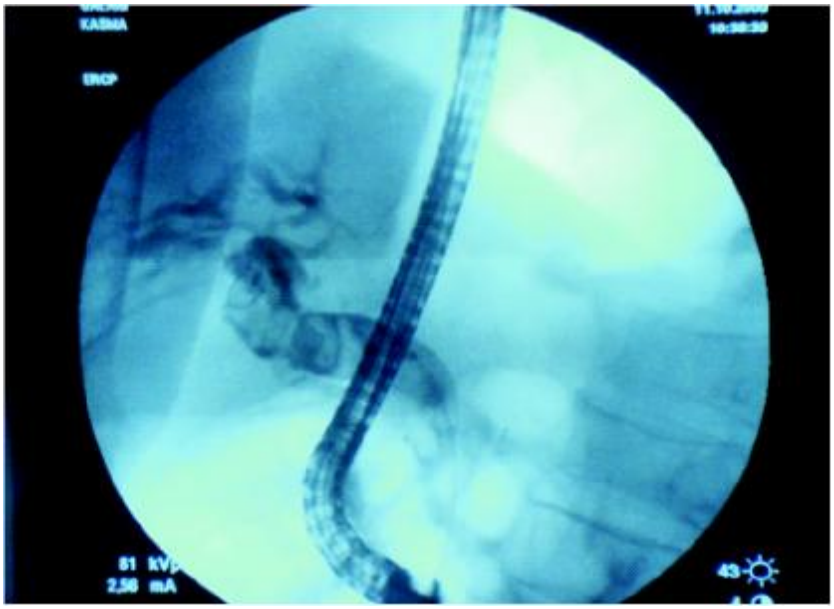

Figure 4: ERCP for Intrabiliary rupture of hydatid cyst and biliary

Table 1 was showing that 70% of infected group were females and 30% were males. The most common age group infected with hydatid cysts between 20-49 years about 76% (Table 2) . The main presenting symptom was RUQ pain 75%, jaundice 25%, fever 20%, weight loss 15%, cholangitis 12.5% ,pruritus 7.5% and vomiting cysts 2.5% (Table 3).Table 4 was showing that US study was done for all the patients who were referred to our hospital as a case of hydatid liver cyst(s).Twenty patient was had a biliary communication and thirty patient had intrabiliary rupture. CT of abdomen and liver was done for 80 patient which detected a biliary communication in 25 patient and intrabiliary rupture in 11 patient. MRI of the liver and MRCP was done for 80 patient ,70 patient had biliary communication and 50 patient had intrabiliary rupture. ERCP was done as therapeutic procedure with sphincterotmy for patients presented with jaundice or vomiting cysts or post operative biliary fistuala. One hundred twenty patient was shifted for ERCP as their general condition were allowed, 90 patient had biliary communication and 50 patient had intrabiliary rupture.Table 5 was showing single hydatid liver cyst and number and percentage of biliary communication and intrabiliary rupture. There were 110 (100%) patient had single hydatid liver cyst of R.lobe, 10 patients 9.09% the size of the cyst 3-5 cm with 0% biliary communication and intrabiliary rupture. While patients with single hydatid liver cyst of R.lobe between 6-8cm 24(21.81%) patient only 2(1.8%) patients developed biliary communication and intrabiliary rupture. Patients with single hydatid liver cyst of R.lobe between 9-10cm 36(32.72%) patient 6(5.45%) patients developed biliary communication and 2(1.8%) intrabiliary rupture. Forty (36.36%) patient had single hydatid liver cyst of R.lobe more than 10cm, 16(14.55%) patient developed biliary communication and 6(5.4%) intrabiliary rupture . There were 60 (100%) patient had single hydatid liver cyst of L.lobe, 16 patients (26.7%) the size of the cyst 3-5 cm with 2 patients (3.3%) biliary communication and intrabiliary rupture. While patients with single hydatid liver cyst of L.lobe between 6-8cm 24(40%) patient, 10(16.7%) patients developed biliary communication and 4 (6.7%) intrabiliary rupture. Patients with single hydatid liver cyst of L.lobe between 9-10cm 12(20%) patient, 6(10%) patients developed biliary communication and 4(6.7%) patients developed intrabiliary rupture. Eight (13.3%) patients had single hydatid liver cyst of L.lobe more than 10cm, 6(10%) patients developed biliary communication and 2(3.3%) intrabiliary rupture .The percentage of biliary communication and intrabiliary rupture of variable size of single hydatid liver cyst of R.lobe was 21.8% and 9% respectively, while the percentage of biliary communication and intrabiliary rupture of variable size of single hydatid liver cyst of L.lobe was 40% and 20% respectively.Table 6 was showing multiple hydatid liver cysts and number and percentage of biliary communication and intrabiliary rupture. There were 150 (100%) patient had multiple hydatid liver cysts of R.lobe, 44 (29.3%) patient had multiple large hydatid cysts, 12(8%) patient had biliary communication and 8(5.3%) patients developed intrabiliary rupture. There were 56(37.3%) patient had large hydatid cyst and multiple small hydatid cysts, 12(8%) patient had biliary communication and 6(4%) patients developed intrabiliary rupture. Fifty patient with multiple small hydatid liver cysts of R.lobe, 8(5.3%) patients had biliary communication and 2(1.3%) patients developed intrabiliary rupture.

There were 20 (100%) patient had multiple hydatid liver cysts of L.lobe, 6 (30%) patients had multiple large hydatid cysts, 3(15%) patients had biliary communication and 2(10%) patients developed intrabiliary rupture. There were 8(40%) patients had large hydatid cyst and multiple small hydatid cysts, 3(15%) patients had biliary communication and 2(10%) patients developed intrabiliary rupture.

There were 20 (100%) patient had multiple hydatid liver cysts of L.lobe, 6 (30%) patients had multiple large hydatid cysts, 3(15%) patients had biliary communication and 2(10%) patients developed intrabiliary rupture. There were 8(40%) patients had large hydatid cyst and multiple small hydatid cysts, 3(15%) patients had biliary communication and 2(10%) patients developed intrabiliary rupture. Six patients with multiple small hydatid liver cysts of L.lobe, 2(10%) patients had biliary communication and 2(10%)
patients developed intrabiliary rupture. The percentage of biliary communication and intrabiliary rupture of variable size of multiple hydatid liver cyst of R.lobe was 21.3% and 10.6% respectively, while the percentage of biliary communication and intrabiliary rupture of variable size of multip
le hydatid liver cyst of L.lobe was 40% and 30% respectively.Table 7 was showing bilobar hydatid liver cysts and number and percentage of biliary communication and intrabiliary rupture. There were 60 (100%) patient had multiple bilobar hydatid liver cysts , 20(33.3%) patient had one hydatid cyst in the right lobe and one cyst in the left lobe of variable size. Four (6.7%) patients had biliary communication and 1(1.7%) patient developed intrabiliary rupture from R. lobe cyst, while the L.lobe cyst 4 (6.7%) patients had biliary communication and 2(3.3%) patients developed intrabiliary rupture. Sixteen patient had two hydatid cysts in the right lobe and one cyst in the left lobe of variable size, 4(6.7%) patients had biliary communication and 1(1.7%) patient developed intrabiliary rupture from R. lobe cysts, while the L.lobe cyst 2(3.3%) patients had biliary communication and 2(3.3%) patients developed intrabiliary rupture. Twelve patient had one hydatid cyst in the right lobe and two cysts in the left lobe of variable size, no biliary communication or intrabiliary rupture from R. lobe cyst, while the L.lobe cysts 4(6.7%) patients had biliary communication and 2(3.3%) patients developed intrabiliary rupture.

Twelve patient had one hydatid cyst in the right lobe and two cysts in the left lobe of variable size, no biliary communication or intrabiliary rupture from R. lobe cyst, while the L.lobe cysts 4(6.7%) patients had biliary communication and 2(3.3%) patients developed intrabiliary rupture. Twelve patient had more than two hydatid cysts in the right lobe and left lobe of variable size,1(1.6%) patient had biliary communication and 1(1.6%) patient developed intrabiliary rupture from R. lobe cysts, while the L.l
obe cysts 4(6.7%) patients had biliary communication and 2(3.3%) patients developed intrabiliary rupture. The percentage of biliary communication and intrabiliary rupture of variable size of multiple bilobar hydatid liver cysts that arise from R.lobe cysts were 15% and 5% respectively, while the percentage of biliary communication and intrabiliary rupture of variable size of multiple bilobar hydatid liver cysts that arise from L. lobe cysts were 23.3% and 13.2% respectively.

Discussion:

Hydatid cysts of the liver are caused by *Echinococcus granulosus* and have a worldwide distribution. They are a common health problem in sheep and cattle-raising areas such as Turkey and other Mediterranean countries, the Middle East, South America, New Zealand, and Australia (1). The liver is the most commonly affected by ***Echinococcus*** (50-70 per cent of cases) (2,3,4). Hydatid cysts of the liver are common in Iraq ,in our study found that 70% of infected group were females and 30% were males. The most common age group infected with hydatid cysts between 20-49 years about 76% (mean = 37 year).In a series of 70 patients with liver hydatidosis reported by Little et al, 60% complained of right upper-quadrant abdominal pain or lower chest pain at some time in the illness. About 25% of patients had no complaints and were unaware of any abnormality at all. Amongst the symptomatic patients,four (5%) reported

generalized pruritus, while three (4%) noted skin rashes and two patients (3%) suffered anaphylactic attacks. One patient suffered episodes of asthma which were relieved by surgery. Five (7%) reported as emergencies and 11 (15%) reported that they had been jaundiced at some time in the past or were jaundiced on admission to the hospital (5,6,7) .Our study found that the main presenting symptom was RUQ pain 75%, jaundice 25%, fever 20%, weight loss 15%, cholangitis 12.5% ,pruritus 7.5% and vomiting cysts 2.5% .Ultrasonographic examination and CT are very useful in diagnosis and also for the classification of cysts (17,18,19). Accurate, non-invasive, repeatable organ imaging has added a new dimension to the diagnosis of hydatid disease. Ultrasonography is more readily available worldwide, much less expensive than computed tomography (CT) and can be repeated when needed. Ultrasound can demonstrate the cystic nature of the lesion and will sometimes show the presence of unmistakable daughter cysts within the main cyst cavity, providing a definitive diagnosis . Ultrasound is particularly useful in the work-up of patients presenting with jaundice (hydatid cyst rupture into the biliary tree) as it is possible to differentiate daughter cysts from gallstones in many of these patients . In the hands of skilled, experienced staff, the precision of ultrasound diagnosis is high (20,21,22,23). CT, however, probably yields the most information regarding the position and the extent of intra-abdominal hydatid disease. Daughter cysts are clearly seen and CT will demonstrate exogenous daughter cysts as well (**Figure 1**). This may be of the utmost importance in planning surgery. CT will also demonstrate cysts in other parts of the peritoneal cavity, and there are no problems caused by the bowel containing gas, as there may be with ultrasound. CT may also be able to provide an estimate of the density of the cyst contents, thus suggesting the vitality of the cyst. Manzullo reports that 25% of ultrasound-diagnosed patients need a CT scan preoperatively, which is an exaggeration and probably reflects the quality of the ultrasound Examination(24) .In our study was showing that US study was done for all the patients who were referred to our hospital as a case of hydatid liver cyst(s).Twenty patient was had a biliary communication and
thirty patient had intrabiliary rupture. CT of abdomen and liver was done for 80 patient which detected a biliary communication in 25 patient and intrabiliary rupture in 11 patient.Magnetic resonance imaging (MRI) provides good images of liver hydatidosis, but it is too complex and expensive for routine use. The real value of MRI in hydatid disease is in monitoring skeletal and vertebral hydatidosis and in cardiac hydatidosis (25). Intrabiliary rupture is the most common complication of hepatic hydatid cyst, occurring in only 317% of cases. The diagnosis is rarely difficult on ultrasound and CT when typical radiological features are present. In rare cases of complete evacuation, when characteristic findings of hydatid cyst are absent or when there is no evidence of the previous existence of liver hydatid cyst, the diagnosis may be difficult. In difficult cases, MRI, MRCP, ERCP are employed (30). Endoscopic retrograde cholangiopancreatography (ERCP) is of particular use when obstructive jaundice is caused by hydatid membranes , when cholangitis has been a feature of the clinical presentation and when previous surgery has distorted anatomy. Communication between the bile ducts and the cyst can be demonstrated by ERCP. ERCP should be done after ultrasound examination in jaundiced patients . Correct indications for endoscopic papillotomy are of paramount importance in managing complicated cysts. Papillotomy should be performed for the pre- and postsurgical removal of fragmented intrabiliary hydatid membranes and in the management of postoperative external biliary fistulae. Preoperative endoscopic papillotomy facilitates flushing of the bile ducts but renders intraoperative cholangiography even less informative (26,27,28,29,30).

In our study,MRI of the liver and MRCP was done for 80 patient. The main indications for MRI and MRCP were cholangitis , jaundice ,vomiting cysts and pruritus to excludes other causes.Seventy patient had biliary communication and 50 patient had intrabiliary rupture(**Figure 2,3**). ERCP was done as therapeutic procedure with sphincterotmy for patients were presented with cholangitis, jaundice or vomiting cysts or post operative biliary fistuala. One hundred twenty patient was shifted for ERCP as their general condition were allowed, 90 patient had biliary communication and 50 patient had intrabiliary rupture(**Figure 4).**.Ttere are 110 patients with single hydatid cyst in the right lobe of different sizes and 150 patient with multiple hydatid cysts in the right lobe of different sizes.The biliary communication and intrabiliary rupture was 21.5% , 10% respectively. While in the left lobe ,there are 60 patient with single hydatid cyst of different sizes and 20 patient with multiple hydatid cysts of different sizes.The biliary communication and intrabiliary rupture was 40% , 22.5% respectively. Sixty patient had bilobar hydatid cysts of different numbers and sizes. The biliary communication and intrabiliary rupture of the right lobe cysts was 15% , 5% respectively.

While the biliary communication and intrabiliary rupture of the left lobe cysts was 23.3% , 13.2% respectively. Size and complicated hydatid cyst are a well known variants that influence the incidence of biliary communication and intrabiliary rupture. In this study we found that the site of liver hydatid cysts have a role on biliary communication and intrabiliary rupture.We found that the incidence of biliary communication and intrabiliary rupture more in the left lobe hydatid cysts than the right lobe hydatid cysts. Small size left lobe, long coarse left hepatic bile duct and repeated trauma facilitate erosion of the cyst to the biliary ducts.

Conclusion:

1.Hepatic hydatid cysts more common in females than males.

2. The most common age group infected with hydatid cysts between 20-49 years about 76%.

3.The main presenting symptom was RUQ pain , jaundice and cholangitis .

4. The incidence of biliary communication and intrabiliary rupture more in the left lobe hydatid cysts than the right lobe hydatid cysts.

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