

International Journal of Radiology and Diagnostic Imaging



E-ISSN: 2664-4444
P-ISSN: 2664-4436
www.radiologypaper.com
IJRDI 2021; 4(4): 68-73
Received: 18-08-2021
Accepted: 23-09-2021

Dr. Mohammed Abdul Azhar
Associate Professor,
Department of Radiology,
Ayaan Institute of Medical
Sciences, Kanaka Mamidi,
Moinabad, Telangana, India

Ultrasonographic evaluation of hepatobiliary diseases

Dr. Mohammed Abdul Azhar

DOI: <http://dx.doi.org/10.33545/26644436.2021.v4.i4a.244>

Abstract

Background and Objectives: The science of Diagnostic ultrasound is perhaps the most promising of the imaging modalities currently available. The main objective of this study is to establish the efficacy of ultrasonography to detect various hepatobiliary lesions and provide necessary information, aiding in their appropriate management.

Methods: This study, carried over a period of two years, included 150 patients with various hepatobiliary lesions. There were patients of both sexes and their ages were above 5 years and below 85 years. After the routine blood and urine investigations and liver function tests, the patients were subjected to ultrasound examination.

Results: One fifty cases, aged between 5 and 85 years, with various hepatobiliary lesions were studied with real time ultrasonography. The most frequently encountered Gall bladder lesion was Gallstones (44) with associated chronic cholecystitis in 32 cases, acute cholecystitis in 10 cases, Gall bladder carcinoma in 2 cases. There were 3 cases of GB polyp, 2 case of chronic cholecystitis, 1 case of CA Gallbladder which were not associated with gall stones. Among the CBD lesions there were 2 cases of choledocholithiasis, 2 cases of cholangiocarcinoma and 1 case of choledochal cyst. The most frequently encountered focal liver lesion in this study was amoebic liver abscess which was found in 20 cases. The second most commonly encountered focal liver lesion was hepatocellular carcinoma which was found in 12 cases. 10 cases with hepatic metastasis were found. 4 cases with ultrasound features highly suggestive of haemangioma and 2 cases with hepatic hydatid disease were found. One case each of an intrahepatic haematoma and a simple liver cyst was found. Among the diffuse liver diseases, the most commonly encountered was fatty liver which was seen in 16 cases. The second most common diffuse liver disease was cirrhosis which was seen in 12 cases. 10 cases of acute hepatitis, 4 cases of chronic hepatitis and 3 cases of congestive liver was found.

Conclusion: Ultrasound proved to be a sensitive, easily available and safe imaging modality for the diagnosis and follow-up of various hepatobiliary lesions and should therefore be the first line of investigation in suspected cases.

Keywords: carcinoma, metastasis, amoebic, benign, cyst, diagnosis, focal liver lesions, haemangioma, hydatid, liver, malignant, patients, ultrasonography, ultrasound

Introduction

Although roentgenology has long been one of the cornerstones of diagnosis, it is now generally accepted that some hazards to the patient do exist. There has been a revolution in the field of diagnostic imaging following the advances in the techniques of ultrasonography, computed tomography and Magnetic resonance imaging.

The advent of diagnostic ultrasound is perhaps the most promising of the imaging modalities currently thought to be noninvasive. The ease and elegance with which ultrasound can detect and display intrahepatic lesions, the non-invasiveness, cost-effectiveness, portability, patient acceptability and radiation dosage (it does not employ any ionizing radiation) of the method are the other advantages.

Abdominal ultrasound provides the physician/surgeon the necessary information to plan out the right therapeutic approach required in the given situation. Hence, ultrasound has become a mandatory examination in the approach to the management of hepatobiliary lesions.

Gray scale ultrasonic imaging has been found to be most informative, quick and non invasive means for investigating hepatobiliary system. Its high resolution, flexibility and reliability make it almost ideal for the study of hepatobiliary diseases in general and focal lesions in particular. Other valuable information like the number of lesions, exact location, relation to the various vessels and surfaces of the liver, the nature of the lesions (i.e. solid, cystic or complex mass), etc. can be achieved.

Corresponding Author:
Dr. Mohammed Abdul Azhar
Associate Professor,
Department of Radiology,
Ayaan Institute of Medical
Sciences, Kanaka Mamidi,
Moinabad, Telangana, India

Starting from 1950, ultrasound has developed into the most indispensable diagnostic technique in the appropriate evaluation and management of all types of liver lesions. Ultrasound detects the abnormalities much before the disease becomes rampant and thus helps in decreasing the morbidity and mortality due to hepatobiliary lesions.

Materials and Methods

The present study consisted of 150 patients with various hepatobiliary lesions referred between 2017-2020 from various clinical departments of to the Department of Radiology. Majority of the patients were referred to our Department with clinical suspicion of a hepatobiliary lesion. In some patients intrahepatic lesions were found incidentally.

In the present study real time ultrasound examination was carried out using L and T SYMPHONY 3.5-5 MHZ mechanical sector transducer and PHILIPS ENVISOR 2-5 MHZ curvilinear transducer. Prior to the ultrasound examination a brief relevant history was taken and a quick

examination was performed as per the proforma given below. A provisional diagnosis was made as per the history and examination findings. Routine blood and urine investigations and liver function tests were also carried out. Patient were kept nil per oral for a few hours prior to the ultrasound examination wherever possible. In some cases, the clinical condition of the patient demanded an ultrasound examination without prior preparation. Patient were examined in the supine position, to begin with and then in the decubitus (right or left), sitting position etc. if required. A thorough ultrasound examination of the liver was carried out. The liver was scanned in various planes like the sagittal, parasagittal, transverse, oblique, subcostal, intercostals, coronal etc. Various observations of the hepatobiliary lesions were made. This included.

Results

Ultrasound scan was performed on 150 patients who presented with history, symptoms and signs of hepatobiliary lesions. The results are enumerated below.

Table 1: Incidence of Hepatobiliary lesions studied

Type of Hepatobiliary Lesion	Male	Female	Total
Gall Bladder Lesion	16	34	50
CBD Lesion	3	2	5
Focal Liver Lesion	34	16	50
Diffuse Liver Disease	27	18	45

Gall bladder lesions was found in 50 cases(33%).5 cases of CBD lesion(3%).50 cases of focal liver lesions (33%) and 45 cases of diffuse liver diseases(30%) were studied.

There were 16 males and 34 females in the present study of Gall bladder lesions with a M:F ratio of 1:2.8. Maximum no. of cases were in the age group of 31-50years (26/45 i.e. 60%), with a F:M ratio of 1:1.5.

Table 2: Age & Sex Incidence of Hepatobiliary Lesion

Age	Male	Female	Total
Gall bladder lesions			
> 19	1	0	2
20-29	0	1	2
30-39	0	4	8
40-49	7	9	32
50-59	6	8	28
60-69	2	7	18
70-79	0	4	8
< 80	0	1	2
CBD lesions			
10-20	1	0	2
21-30	0	0	0
31-40	0	0	0
41-50	0	2	4
51-60	2	0	4
>61	0	0	0
Focal Liver Lesions			
0-10	-	-	
11-20	-	-	
21-30	5	2	14
31-40	8	3	22
41-50	15	5	40
51-60	6	5	22
61 & above	0	1	2
Diffuse Liver Diseases			
0-10	5	3	16
11-30	2	0	4
31-50	13	14	57
<51	4	4	16

Table 3: Patients with different signs and symptoms of different disorders

Gall bladder lesions.	No. Cases	Percentage (%)
Pain	30	60
Mass in right hypochondrium	2	4
Jaundice	3	6
Fullness after eating	20	40
Fever	8	16
Focal liver lesions		
Pain	38	78%
Fever	16	32%
Hepatomegaly	35	70%
Jaundice	9	18%
Gall bladder carcinoma		
Pain	3	100
Vomiting	2	67
Jaundice	3	100
Mass in Right Hypochondrium	2	67

Pain in the abdomen was the most common presenting feature (30/50), Jaundice was present in 6% (3/50).Mass in right hypochondrium in 4% (2/50) of cases, fullness after eating was present in 40% of cases.

Pain in the abdomen was the most common presenting feature and was present in 78% of cases (38/50). Fever was present in only 16 cases (32%). On examination, presence of hepatomegaly was found in 35 cases (70%). Jaundice was present only in 9 cases (18%).

Table 4: Ultrasound findings of Acute Cholecystitis

Ultrasound Finding	Number of cases	Percentage (%)
Gall Bladder Wall Thickening	9	90
Echofree Layer within Gall Bladder Wall	6	60
Murphys Sign	8	80
Cholelithiasis	10	100

Gall bladder wall thickening was present in 90% cases(9/10), echo free layer within the gall bladder wall in(6/10) 60% cases, Murphys sign in 8/10(80%),associated cholelithiasis in 100% (10/10)cases.

Table 5: Incidence of Individual Lesions

Lesion	Male	Female	Total	Percentage
Liver Abscess	20	0	20	40%
Hepatocellular Carcinoma	9	3	12	24%
Metastatis	2	8	10	20%
Haemangioma	1	3	4	8%
Hydatid Cyst	1	1	2	4%
Haematoma	1	0	1	2%
Simple Cyst	0	1	1	2%
Total	34	16	50	100%

Liver abscess was found in 20/50 cases i.e. 40% and accounted for the maximum number of cases. Hepatocellular carcinoma was found in 12 cases i.e. 24%. 10 cases of metastatic deposits in the liver were found (20%). 4 cases of hemangioma (8%), 2 cases with hydatid cysts (4%), and one case each (2%) of haematoma and simple cyst were found.

Table 6: Showing Solitary V/S Multiple and lobe involved

No. of Lesions	No. of Cases	Percentage
Solitary	34	68%
Multiple	16	32%
Total	50	100%
Lobe		
Right only	32	64%
Left only	6	12%
Both	12	24%
Total	50	100%

Most of the cases had solitary intrahepatic focal lesion (34/50 i.e. 68%), while 16 cases (32%) had more than one lesion. The right lobe alone was involved in 32/50 cases (i.e. 64%). In 6/50 cases the left lobe alone was involved (12%), whereas in 12/50 cases (24%), both the lobes were involved. This indicates an overall predominance of right lobe involvement (88%).

Table 7: Site of primary in cases of metastatis

Site of Primary	No. of Cases	Percentage
Breast	5	50%
Colon	1	10%
Stomach	1	10%
Melanoma	1	10%
Ovary	1	10%
Undiff. Sarcoma	1	10%
Total	10	100%

The most common primary tumor was carcinoma of the breast and was present in 5/10 cases (50%). 1 case each (10%) of ovarian tumor, malignant melanoma, carcinoma of

the stomach, carcinoma of the colon and undifferentiated sarcoma (thigh) was found.

Discussion

Hepatobiliary lesions have been a leading cause of mortality and morbidity in the general population. Detection of these lesions is very essential in arriving at proper diagnosis and further management. Ultrasound is a sensitive tool for detecting and follow up of these lesions. The study carried over a period of two years, included 150 cases of hepatobiliary lesions. The study included 50 cases of gallbladder lesions, 5 cases of CBD lesions, 50 cases of focal liver lesions and 45 cases of diffuse liver lesions.

Shows the age and sex incidence of gall bladder lesions studied, 34 were females and 16 males indicating a F:M ratio of 2:1. Khalid Ahsan Malik. Found a F:M ratio of 4:1 in his study of 260 patients [1]. The age incidence indicates that maximum number of cases were between 40 to 69 years of age which indicates that gall bladder diseases are more common in middle age group.

Pain in the abdomen was most common presenting symptom (30/50 i.e 60%) and the type of pain varied from severe pain to vague abdominal pain. Right upper quadrant mass was present in 2 patients (4%), 20 patients had fullness after eating i.e 40%, jaundice was present in 3 cases (6%), fever was present in 8 cases (16%). In 50 cases of GB lesions, there were 44 cases of calculus disease and 6 noncalculus cases. Among the 6 noncalculus cases there were 3 cases of GB polyp, 1 case of Gall bladder carcinoma, 2 cases of chronic cholecystitis.

Majority of cases (32 out of 50) were seen between 40-69 years (64%) with a peak incidence in 4th and 5th decades. Gall stones were seen in 25% (11/14) men & 75% (33/44) women with a M:F ratio of M:F ratio of 1:3. Men were predominantly affected in 4th and 5th decades while women were affected predominantly in 4th, 5th and 6th decades. Khalid Ahsan Malik. In his study the maximum no. of patients were in the 4th decade of life [1]. In the study ultrasound diagnosed the presence of calculi in 44 cases and its absence in 6 cases. In one patient ultrasound missed a calculus that was subsequently found at surgery. The sensitivity of ultrasound in detecting gall stones was 97%, specificity of 100% in the present study. Mark S. Silidker *et al.* In their study the sensitivity of ultrasound in detecting gall stones was 91% and specificity of 100% [2].

There were 10 cases (10/50) of acute cholecystitis (22%). All the 10 cases were associated with gall stones. Acute cholecystitis was seen in nine cases in women and one case in a man. Among the 9 cases of acute cholecystitis seen in females, 6 cases were seen in 3rd and 4th decades (60%). Out of 10 cases of acute cholecystitis, ultrasound diagnosis was done correctly in 9 patients (90%), wall thickening was seen in 90% (9/10), echofree layer within the wall in 6 patients (60%), associated cholelithiasis was present in all 10 patients (100%), Murphys sign was present in 8 patients (80%). F Croce *et al.* In their study of 40 cases of acute cholecystitis, ultrasound diagnosis was done in 34 patients (85%), wall thickening (90%), echofree layer within the wall (67%), associated cholelithiasis was present in 28 patients (82%) [3]. The incidence of gall stones in acute cholecystitis was 100% in the study which is superior to that by Philips W. Ralls *et al.* (sensitivity of 99% in their study) [2]. Among the 50 patients of gallbladder lesions, 10 patients (20%) were diagnosed to have acute cholecystitis by

ultrasound. The diagnosis was correctly made in 9 patients (TP). One case (FP) which was diagnosed as acute cholecystitis turned out to be chronic cholecystitis by pathology. There was one case of false negative diagnosis.

There was a sensitivity of 90%, specificity of 50% and accuracy of 83.33%. Ralls P W *et al.* The sensitivity and specificity of ultrasound for acute cholecystitis is approximately 85% to 95% and 64% to 100% respectively.

In the study there were 34 cases of chronic cholecystitis, 22(68%) cases in women and 10 cases in men were associated with gall stones. 2 cases in women were not associated with gall stones. Majority of cases were in women in the 4th, 5th, and 6th decades. 80% of cases in men were encountered in 4th and 5th decade. The ultrasound features for chronic cholecystitis were absence of focal tenderness over gall bladder, contracted nature of GB, multiplicity of stones, wall thickening.

In the study 32 patients of chronic cholecystitis had associated gall stones (94%). Ultrasound correctly diagnosed gall stones in all 32 cases in whom they were present with a sensitivity of 100%. Faye C. Laing *et al.* In their study 94% of chronic cholecystitis were associated with gall stones. Wall thickening was seen in 20 out of 34 cases in our study with a sensitivity of 57%. Faye C. Laing *et al.* Their study had a sensitivity of 53% [4].

In the present study all cases of chronic calculus cholecystitis had small and multiple calculi and hence could not be enumerated. Ultrasonographically the diagnosis of chronic cholecystitis was correctly made in 27 cases. The 7 cases of errors that were made consisted of one case diagnosed pathologically as acute cholecystitis and 6 cases were diagnosed as just having gall stones. In the study there were 3 cases (6%) of gall bladder carcinoma with a M:F ratio of 1:2. The age group ranged from 40-60yrs. Ata Ur Rehman *et al.* In their study age group ranged from 34yrs to 73yrs with a M:F ratio of 1:2 [5]. The most common symptom was pain in right hypochondrium (3/3), mass in right hypochondrium in 2 patients (66%), jaundice in all 3 patients (100%).

The incidence of gall bladder carcinoma in the study was 6%. Shah *et al.* In the study the incidence of gall bladder carcinoma was 6.6% in the study.⁶ Among the 3 cases of gall bladder carcinoma, 2 cases were associated with gall stones (66%). Khalid Ahsan Malik. In his study all the cases of gall bladder carcinoma were associated with gall stones.¹ Ultrasound examination showed gall bladder mass in all 3 cases. Histopathological examination revealed adenocarcinoma in all 3 cases. Gall bladder polyps are quite common being present in 4-6% of population. There were 3 cases of gall bladder polyp in the study. The M:F ratio of 2:1 in the age group ranging from 27-49 years. All the 3 cases were not associated with gall stones. Collett j *et al.* are of the view that polyps <10mm are most likely benign incidental cholesterol polyps. Follow up is not warranted because the incidence of malignant transformation is extremely rare.⁷ Polyps more than 10mm are most likely to be benign cholesterol polyp, but probably should be followed for evidence of growth because some are adenomas that can be cancerous. In present study of 3 cases, polyps were small (<10mm), nonmobile, nonshadowing mass adherent to the wall. Ultrasound correctly diagnosed polyp in all 3 cases with a sensitivity of 100%. In the study there were 5 cases of CBD lesions, 2 cases of cholangiocarcinoma, 2 cases of choledocholithiasis and 1

case of choledochal cyst.

Maximum number of cases were seen in 4th and 5th decades with a M:F ratio of 3:2. The present study showed correct identification of level and cause of biliary obstruction by ultrasound in 100% and 80%. Our findings are similar to that of RN Gibson *et al.* In their series, they found that ultrasound correctly identified the level of obstruction in 95% of cases. The cause was correctly identified by ultrasound in 88% [8].

In the study there were 2 cases of cholangiocarcinoma in males, in the age group ranging from 51-60years. Common symptoms and signs were jaundice (2/2 i.e. 100%), pruritis (2/2 i.e. 100%) and anorexia (1/2 i.e. 50%). Elevated liver function tests were present in both cases.

There was one case of klatskin tumour in a male aged 54 years. Ultrasound showed hypoechoic mass lesion in porta hepatitis with dilatation of intrahepatic biliary radicles. It was confirmed by MRCP. The other case presented in a 56 year old man. Ultrasound showed dilatation of CBD and intrahepatic biliary radicles. The distal CBD was obscured by bowel gas. Pancreas was normal. A diagnosis of distal CBD lesion was made. Further evaluation with ERCP showed the level of obstruction in distal CBD which was subsequently proved by biopsy. Ultrasound is well suited to visualise common hepatic duct and proximal CBD, one of its major limitations is the assessment of distal CBD and pancreas which is often obscured by bowel gas in 30-50% patients [9].

There were 2 cases of choledocholithiasis in females, in the age group ranging 41-50years. The most common symptom was pain in right hypochondrium (2/2 i.e. 100%), jaundice (2/2 i.e. 100%) and vomiting (1/2 i.e. 50%). Ultrasound detected stone in both cases (100%). One case of CBD stone had associated cholelithiasis. In the present study the sensitivity of ultrasound in detecting CBD stone was 100% (2/2). Koenigsberg M *et al.* found a sensitivity of 82% (9/11 stones were diagnosed by ultrasound) [10].

There was one case of choledochal cyst in a male aged 27years who presented with mild pain in epigastrium, icterus, elevated liver profile. Ultrasound showed fusiform cystic dilatation of extrahepatic CBD with mild intrahepatic biliary radicle dilatation. The diagnosis of choledochal cyst was made based on Todanis classification [11]. Age & sex incidence and sex wise distribution of 50 cases of focal liver lesions studied, 34 were males and 16 were females indicating a M:F ratio of 2:1.

The age incidence indicates that maximum number of cases were between 41 to 50 years of age (20/50 i.e. 40%). 60% of cases (30/50) were between 30 and 50 years of age which indicates that focal liver lesions are more common in middle age. No case was found below 20 years of age. Pain in the abdomen was the most common presenting symptom (38/50 cases i.e. 78%) and the type of pain varied from severe pain to dull ache or vague abdominal pain. Hepatomegaly or right upper quadrant mass was present in 35 patients (i.e. 70%). The consistency of the liver varied from firm to hard in different cases. Tenderness was also noted in many cases. The various focal liver lesions observed in this study were liver abscess, hepatocellular carcinoma, metastasis, hydatid cyst, haemangioma, haematoma and calcified cyst. The most commonly encountered focal liver lesion was liver abscess (20/50 cases i.e. 40%). Mukul P. Agarwal *et al.* In their study, 16 out of the 28 cases had liver abscess [12]. The next common intrahepatic focal lesion was hepatocellular

carcinoma which accounted for 12 cases i.e. (24%). Metastasis was found in 10 cases (i.e. 20%), 3 cases of hepatic hydatid disease (6%), 3 cases with haemangioma (6%) and one case each of haematoma and calcified cyst were found. Multiple lesions were found in 16 cases (32%) while solitary lesions were found in 34 cases (68%). Therefore, a majority of the lesions were solitary. Right lobe alone was involved in 32/50 cases (64%), the left lobe alone was involved in 6/50 cases (12%). In 12/50 cases (24%), both the lobes were involved. This indicates that there is an overall tendency of right lobe involvement (88%). Age incidence in the cases of liver abscess. Majority of cases (17/20) were between 20-50 years of age (85%). Of these 17 cases, 5 to the age group 21-30 years, while 6 cases each belonged to the age group of 31-40 years and 41-50 years. C. Ramamohan *et al.* In their study of 22 cases of liver abscess, the most common age group was also between 31-50 years^[13].

All the 20 cases of amoebic liver abscess (ALA) were in males. C. Ramamohan *et al.* found a male to female ratio of 16:2 in their study. The common clinical presentation was abdominal pain. Hepatomegaly and tenderness were present in all the cases. All the cases of liver abscess studied in this series were of amoebic abscess. This was confirmed either by aspiration of anchovy sauce pus, response to metronidazole treatment or both. Out of the 22 cases of liver abscess studied by C. Ramamohan *et al.*, 18 cases had amoebic liver abscess while, 4 cases had pyogenic liver abscess^[13].

Number of abscesses in these 20 cases of amoebic liver abscess. Solitary abscess was present in 13 cases (65%), while 7 patients had multiple abscesses (35%). C. Ramamohan *et al.* found solitary abscess in 66.7% of cases and multiple abscesses in 33.3%.¹³ Present study correlates well with these figures. Philip W. Ralls *et al.* in a study of 106 cases of amoebic liver abscess found solitary abscess in 83% and multiple in 17%^[14].

The right lobe alone was involved in 65% cases (13/20), the left lobe alone was only involved in 10% cases (2/20) and in 25% cases i.e. 5/20 both the lobes were involved. Philip W. Ralls *et al.* found right lobe involvement in 73.4% of their cases. C. Ramamohan *et al.* found right lobe involvement in 83% of their cases. The right lobe predominance found in my study correlates well with these figures.

The size of the liver abscess varies enormously. Laila Ahmed *et al.* encountered sizes ranging from 1-22 cm^[15]. In the present study the smallest abscess was 3 cm in diameter, while the largest abscess was 13 cm in diameter. Majority of the abscesses were between 5-10 cm in diameter. This correlates with other studies. In a study of 143 liver abscesses, Philip W. Ralls *et al.* found them ranging from 1.5-22 cm with an average of 7.5 cm^[14].

Follow up of patients with amoebic liver abscess, after percutaneous aspiration and metronidazole treatment showed reduction in size, with a general only three patients. In these cases the echopattern was resorted to normal at the end of six months. Laila Ahmed *et al.* studied the resolution time for amoebic liver abscess in 25 patients with abscesses ranging from 1 to 22 cm in size. They found that resolution time was variable, ranging from two months for the smallest abscess to twenty months for the largest. Long term follow up was possible in all the abscesses in their study which resolved completely, leaving normal hepatic sonographic pattern.

The second most commonly encountered focal liver lesion was hepatocellular carcinoma, accounting for 24% of cases (12/50). Commonest clinical presentation was that of abdominal pain which was of a dull aching type. Right upper quadrant lump was the second most common presenting feature. Hepatomegaly was present in all the cases with a firm to hard consistency. Jaundice was present in 5 cases.

No case was found below 30 years of age. Maximum number of cases were found between 41 to 50 years (6/12 i.e. 50%). 3 cases were between 31-40 years (25%), while 3 cases (25%) were between 51 & 60 years. These findings indicate that hepatocellular carcinoma is common in middle age and older individuals. A male to female ratio of 3:1 (9:3) was found in this study indicating a male predominance. This correlates with other studies. P. A. Dubbins *et al.* In their study of 32 patients, 27 were males and 5 were females^[16]. In this study all the hepatocellular carcinomas were large at presentation, the smallest one being 5.4 cm in diameter. It indicates that in 9 cases (75%) the right lobe alone was involved; while in 3 cases (25%) both the lobes were involved. The echo pattern of the hepatocellular carcinomas encountered in this study was either that of a hyperechoic lesion or of a mixed echogenicity (hyper as well as hypoechoic lesion i.e. complex). The margins of the lesions were well defined in smaller tumors while they were poorly defined in larger lesions.

Other important findings on ultrasound included presence of ascites, indentation & compression of vessels (hepatic and portal veins) and thrombosis of portal vein (which was found in one case). A tendency of hepatocellular carcinoma to involve the portal vein is known. Bala R. Subramanyam *et al.* studied 15 cases of hepatocellular carcinomas with ultrasound and angiography and found vessel invasion (IVC / hepatic vein / portal vein) in 33% cases^[17]. In one case, enlarged lymph nodes were found in the porta hepatis.

In my study not a single case of hepatocellular carcinoma with cirrhosis was found. Mario Cottone *et al.* diagnosed hepatocellular carcinoma in 30 cases, in a study of 100 cases of histologically proved cirrhosis^[18]. In this study, 10 cases with metastasis in the liver were found. Majority of the patients were between 41-60 years (90%). The male to female ratio was 1:4 (2:8). Female predominance in this study is due to the fact that 50% of the cases were of Ca Breast. Carcinoma of the breast was present in 5/10 cases (50%), while one case each (10%) of carcinoma of the stomach, carcinoma of the colon, malignant melanoma, ovarian tumor and undifferentiated sarcoma (thigh) was found.

Anil K Jain *et al.* studied the sonographic spectrum of metastatic disease in 75 cases. In their study 85% cases had focal lesions while 15% had diffuse involvement^[19]. They categorized focal lesions into 7 types: echo-poor, bull's eye, echogenic, necrotic, cystic, calcific and mixed. They found that echo-poor lesions were more common (34.6%) followed by bull's eye (14.6%), echogenic (13.3%), necrotic (10.6%), cystic (4%), mixed (4%) and calcific (2.6%). In this study, out of 10 cases, 5 had bull's eye lesion (50%). 3 cases had hypoechoic lesions (30%), while 2 cases had hyperechoic lesion without a surrounding hypoechoic halo (20%).

In asymptomatic patients with no known history of malignancy, it is safe to consider these classical appearances

as diagnostic of haemangioma. With increasing size, degeneration and fibrous replacement, the reflectivity becomes heterogenous and makes distinction from other focal hepatic lesions difficult or impossible.

Conclusion

Ultrasound is a useful but imperfect tool in evaluating diffuse liver disease. Sonographic detection and evaluation of diffuse liver disease may be difficult, because diffuse liver disease does not always cause distortion of the liver parenchymal texture or shape of the liver. This is especially true in patients with acute hepatitis. Sonography can show hepatomegaly, fatty infiltration of the liver, and cirrhosis, all with good but imperfect sensitivity and specificity.

The overall good sensitivity, specificity and accuracy of ultrasound diagnosis in gall bladder diseases in our study has lent support once again to the proposition that ultrasound is the diagnostic technique of choice in the evaluation of gall bladder diseases. Disadvantages of ultrasound are its operator dependency (experience of the examiner is crucial) and to a lesser degree on patient cooperation. Large air containing collections may make ultrasonography difficult. Lesions which are isoechoic to the liver parenchyma, may be missed.

Thus ultrasound offers a safe, sensitive and easily available imaging modality for the diagnosis and follow-up of various hepatobiliary lesions and should be the first line of investigation in suspected cases.

References

1. Malik Ahsan Khalid. Pattern of Gall bladder disease at Nawabshah: An analysis of 260 patients. *Pakistan Journal of Surgery*, 2006, 22(4).
2. Silidker Mark S, Cronan John J, Scola Francis H, Moore Marlan M, Dorfan Gary S. Ultrasound evaluation of cholelithiasis in morbidly obese. *Gastrointestinal Radiology* 1988;13:345-346.
3. Croce F, Montali G, Solbiati L, Marinomi G. Ultrasonography in acute cholecystitis. *British Journal of Radiology* 1981;54:927-931.
4. Laing FC, Federle MP, Jeffrey RB, Brown TW. Ultrasonic evaluation of patients with Right upper quadrant pain. *Radiology*, 1981, 449-455.
5. Rahman Ur Ata, Shah Ali Murad Syed Khan Nadeem, Arif Ataulah, Assadullah, Sadiq Uddin, Muzaffar. Frequency of carcinoma gall bladder in patients undergoing surgery for chronic cholecystitis with cholelithiasis. *Journal of Medical Sciences*, 2006, 14(1).
6. Shah SA, Nadler LH, Mc Sherry CK. Gall stone disease in Pakistan. *The Journal of Surgery* 1990;1:30-33.
7. Collett J, Allan R, Chisholm R *et al*. Gall bladder poyps: Prospective study. *J Ultrasound Medicine* 1998;17:207-211.
8. Gibson RN, Yeung E, Thompson *et al*. Bile duct obstruction: Radiologic evaluation of the level, cause and tumour resectability. *Radiology* 1986;160:43-47.
9. Ferruci JT. *Journal of body ultrasonography*. *N Eng J Med* 1979;300:590-602.
10. Koenigsberg M, Wiener SN, Walzer A. The accuracy of sonography in the differential diagnosis of obstructive jaundice: A comparison with cholangiography. *Radiology* 1979;133:157-165.
11. Todani T, Watanabe Hue, Narusue M, Tabuchi K, Okajimok. Congenital bile duct cysts. Classification, operative procedure and review of thirty seven cases including cancer arising from choledochal cyst. *Am J Surg* 1977;134:263-9.
12. Agarwal MP, Kapoor R, Saha MM. Ultrasonography and scintiscanning in the diagnosis of intrahepatic space occupying lesions. *Indian J Radiol Imaging* 1991;44(1):33-7.
13. Ramamohan C, Reddy PK, Manohar K. Sonographic evaluation of liver abscess. *Indian J Radiol Imaging* 1989;43(3):312-5.
14. Ralls PW, Colletti PM, Quinn MF, Halls J. Sonographic findings in hepatic amoebic abscess. *Radiology* 1982;145:123-6.
15. Ahmed L. Salama ZA, el Rooby A, Strickland GT. Ultrasonographic Resolution Time for Amebic Liver Abscess. *Am J Trop Med Hyg*. 1989 Oct;41(4):406-10.
16. Dubbins PA, O'Riordan D, Melia WM. Ultrasound in hepatoma-can specific diagnosis be made? *Br J Radiol* 1981;54(640):307-11.
17. Subramanyam BR, Balthazar EJ, Hilton S, Lefleur RS, Horii SC, Raghavendra BN. Hepatocellular carcinoma with venous invasion. Sonographic-angiographic correlation. *Radiology* 1984;150(3):793-6.
18. Cottone M, Marcenò MP, Maringhini A, Rinaldi F, Russo G, Sciarrino E *et al*. Ultrasound in the diagnosis of hepatocellular carcinoma associated with cirrhosis. *Radiology* 1983;147(2):517-9.
19. Jain AK, Gupta NC, Kapoor R, Saha MM. Sonographic spectrum of hepatic metastatic disease. *Indian J Radiol Imaging* 1990;44:156-61.