

Original article:

A study of role of ultrasonography in the diagnosis of various liver masses

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Abstract:

Introduction: Ultrasound is useful for the practitioner as a first imaging procedure in direct correlation to the clinical examination. The method has a very good cost/quality ratio, the image is very accurate and precise and the information has a dynamic character ("real time imaging").

Materials and methods: The present study consisted of 50 patients referred by physicians and surgeons from OPD and IPD for USG evaluation of the suspected liver pathology. Majority of the patients were referred to our Department with clinical suspicion of a liver mass lesion.

Results: In our study, we found POSTERIOR ACOUSTIC ENHANCEMENT in only 9 cases i.e 18% as PAE is only found in the cystic masses. Thus 41 cases did not show PAE. Our study included 34 cases of vascular lesions of which 15(30%) cases showed only peripheral vascularity, 8 (16%) cases showed only central vascularity and both (central+peripheral) vascularity was shown by 11(22%)cases. 16 cases (32%) did not show any vascularity of all the 50 cases.

Conclusion: The commonest clinical presentation was that of abdominal pain which was generally of a dull aching type.

Introduction:

Ultrasound is useful for the practitioner as a first imaging procedure in direct correlation to the clinical examination. The method has a very good cost/quality ratio, the image is very accurate and precise and the information has a dynamic character ("real time imaging"). It is important to note that ultrasound has its limitations which the examining physician must take into account. Thus, the ultrasound image contains a number of artifacts and is mainly limited by phenomena such as US attenuation related to distance and density.¹

Diagnosis and characterization of liver masses require a distinct approach for each group of conditions, using the available procedures discussed above for each of them. The correlation with the medical history, the patient's clinical and functional (biochemical and hematological) status are important elements that should also be considered. The limitless multiplanar scanning to delineate boundaries between contiguous viscera and the real time capabilities remain important advantages of Ultrasound. With this background, this study is being carried out to establish the efficacy of US in diagnosis and evaluation of liver masses with respect to cost, pick up rate, availability, sensitivity and specificity by comparing it with histopathological diagnosis.²

Materials and methods

The present study consisted of 50 patients referred by physicians and surgeons from OPD and IPD for USG evaluation of the suspected liver pathology. Majority of the patients were referred to our Department with clinical suspicion of a liver mass lesion. Though in some patients intrahepatic mass lesions which were found incidentally are also included in our study and then the findings were correlated with histo-pathology findings obtained from Biopsy/FNAC where ever possible.

Inclusion criteria:

- Clinical history/physical examination suggestive of a lump in right hypochondriac region/lump in abdomen.
- If a liver mass incidentally gets detected on routine abdominal USG.

Exclusion criteria:

- All patients who do not consent to be a part of the study.
- Postoperative patients.
- Patients with bleeding disorders.

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.in all patients. Various observations of the space occupying lesions were made. This included:

1. The number of lesions:

Solitary or Multiple.

2. Anatomical location of the lesion:

The lobe of the liver involved, the relation of lesion to the surfaces of liver, relation to the vessels (hepatic veins, portal veins and inferior venacava) etc. were studied.

3. Reflectivity:

The reflectivity of the lesions was compared with that of the normal liver parenchyma, i.e. whether the lesions were more reflective, less reflective, non- reflective, or mixed echogenic (hyperechoic/ hypoechoic/ anechoic/complex).

4. Size, shape and margins:

A note was made of the shape of the lesion i.e. round/oval/irregular/etc. and size measured. The margins of the lesion were studied i.e. whether well defined or poorly defined, regular or irregular. Apart from these observations related to the lesion, several other important observations were made.

5. Calcification:

6. Vascular involvement: Size of the vessels, color flow, velocity, invasion by the masses and thrombosis of the vessels.

7. Ascites: Present or Absent.

8. Lymphadenopathy: Pre and para aortic/retroperitoneal, mesenteric.

9. Biliary tree abnormality: Dilatation /compression.

Results:

Pain in the abdomen was the most common presenting feature and was present in 78 % of cases (38/50). Fever was present in only 20 cases(40%).On examination, presence of hepatomegaly was found in 35 cases (70 %).

The most common liver mass lesion found in our study was liver abscess in 15/50 cases i.e. 30% of which 14 cases were male and 1 case was female. It accounted for the maximum number of cases. Second most common mass lesions was of metastatic deposits in the liver and were found to be 12 cases i.e. 24% of which 7 cases were male and 5 were female. Followed by hepatocellular carcinoma which were found to be in 11/50 cases i.e. 22% of which 8 cases were male and 3 were female. 4 cases each of hemangioma (8%) and simple cyst (8%) of which 1 was male and 3 were female in hemangioma and 2 male and 2 female of simple cysts. 2 cases were found with hydatid cysts (4%) of which 1 was male and 1 was female. Whereas others constitute 2 cases of which one male was found with hepatic adenoma and 1 female was diagnosed with FNH.

Liver mass lesion such as abscess, Mets, and HCC showed male predominance where as female predominance was only seen haemangioma. Hydatid cyst, simple cyst and other mass lesions showed same incidence of lesions in both male and female.

1. Table showing Solitary V/S Multiple Lesions in total Liver mass Lesions

No.of Lesions	No.of Cases	Percentage
Solitary	34	68%
Multiple	16	32%
Total	50	100%

The above table indicates that most of the cases had solitary intrahepatic mass lesion (34/50 i.e. 68 %), while 16 cases (32 %) had more than one lesion.

2. Table Showing Lobe Involvement in Various total Liver mass Lesions

Sl. No.	Lobe	No. of Cases	Percentage
1.	Right only	32	64%
2.	Left only	6	12%
3.	Both	12	24%
	Total	50	100%

This table shows the lobe involvement in various liver mass lesions. 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 32 cases (64%). Followed by both lobe involvement i.e in 12 cases(24%) and then in left lobe i.e 6 cases (12%).

3. Table Showing Age Distribution of Liver Abscess:

Sl. No.	Age Group (Years)	Total	Percentage
1	0-10	0	-
2.	11-20	1	06%
3.	21-30	5	33%
4.	31-40	2	13.3%
5.	41-50	2	13.3%
6.	51-60	2	13.3%
7.	61-70	3	20%
	Total	15	100%

In our study out of 50 cases we found maximum no. of cases in the age group of 21-30 years i.e 5 cases (33%) followed by the age group 61-70 yrs i.e 3cases (20%) followed by 2 cases each (13.3%) in the age group of 31-40,41-50,51-60 years. The least no. of cases were found in the age group of 11-20 years i.e 1 case (6%).

The age incidence of cases with the liver abscess, shown in the above table indicates that a vast majority of patients were between 21-50 years of age (92.3%). 14/15 cases were males, indicating a high incidence of liver abscess in males.

The age and sex incidence in cases with metastasis shown in the above table. It shows that the majority of cases (3/4 i.e.75%) were between 21 and 40 years of age of which 2 were Female and 1 were male. Only 1 case(25%) in the age group of 41-50 years was found and was a male patient. In our study, we found 27 cases of solid lesions i.e. 54 %, 21 cases of cystic lesions i.e 42% and 2 cases of mixed lesions i.e 4% of all the cases ,

In our study, we found POSTERIOR ACOUSTIC ENHANCEMENT in only 9 cases i.e 18% as PAE is only found in the cystic masses. Thus 41 cases did not show PAE. Our study included 34 cases of vascular lesions of which 15(30%) cases showed only peripheral vascularity, 8 (16%) cases showed only central vascularity and both (central+peripheral) vascularity was shown by 11(22%)cases. 16 cases (32%) did not show any vascularity of all the 50 cases.

Discussion

Liver mass lesions are commonly encountered in clinical practice and are accountable for considerable morbidity and mortality.. Detection of these mass lesions is very crucial in arriving at a correct diagnosis and planning the management of patients. Ultrasound offers a safe and sensitive tool

for detection and follow-up of intrahepatic mass lesions.³

This study, carried over a period of two years, included 50 cases with various mass lesions of the liver. Most of the patients had clinical features suggestive of an intrahepatic mass lesion. However few cases had no clinical features related to the focal lesions and were detected incidentally. The age incidence indicates that maximum number of cases were between 41 to 50 years of age (14/50 i.e.28%). 50% of cases(25/50)were between 31 and 50 years of age which indicates that liver mass lesions are more common in middle age. Liver mass lesions appear to be rare in children as no case was found below 10 years of age.

The various lesions encountered in this study were liver abscess, hepatocellular carcinoma, metastasis, hydatid cyst, haemangioma, simple cyst and others(FNH and Hepatic adenoma). The incidence of these liver mass lesions is shown in Table No 5. In this study the most commonly encountered lesion was liver abscess (15/50 cases i.e. 30%). This correlates well with the study by Mukul P. Agarwal *et al.* In their study, 16 out of the 28 cases had liver abscess⁴. The next common intrahepatic mass lesion was metastasis which accounted for 12 cases i.e. (24%). The high incidence of metastasis in this study is probably due to the fact that our institute is a tertiary referral center. Hepatocellular carcinoma was found in 11 cases (i.e. 22%), 2 cases of hepatic hydatid disease (4%), 4 cases with haemangioma (8%), 4 cases of simple cyst (8%) and 2 of others were found.

In this study the commonest clinical presentation in cases with liver abscess was abdominal pain. Hepatomegaly was present in 12 cases and tenderness were present in all the cases. A history suggestive of amoebic dysentery was present in 9 cases. This correlates with other studies. 3 patients had multiple abscesses of 2 patients were affected in both the lobes.

9 cases of 15 liver abscess studied in this series were of amoebic abscess and 6 were pyogenic. This was confirmed either by aspiration of anchovy sauce pus, response to metronidazole treatment or both. This indicates the amoebic liver abscess is much more common than pyogenic liver abscess. 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 abscess⁵. The cause for the high incidence of amoebic liver abscess is probably poor sanitation and unhygienic habits and predominance of low socioeconomic group which is included in our study.

All the 9 cases of amoebic liver abscess (ALA) were males. Male predominance is known in amoebic liver abscess. C. Ramamohan *et al* .found a male to female ratio of 16:2 in their study⁵ In our study the right lobe alone was involved in 80% cases (12/15), the left lobe alone was only involved in 6.7% cases (1/15) and in 13.3% cases i.e. 2/15 both the lobes were involved. Philip W. Rall *et al*. found right lobe involvement in 73.4% of their cases⁶. C. Ramamohan *et al* .found right lobe involvement in 83% of their cases⁵. The right lobe predominance found in our study correlates well with these authors. The right lobe predominance is probably related to its larger size and flow pattern of the portal circulation. All the 2 cases with involvement of both the lobes had multiple abscesses.

The size of the liver abscess varies enormously. Laila Ahmed *et al*. encountered sizes ranging from 1-22cm⁷. 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 5-10cm in diameter.. In a study of 143 liver abscesses, Philip W. Ralls *et al.* found them ranging from 1.5-22 cm with an average of 7.5cm⁸. C.Ramamohan *et al.* found that 66% of their cases had abscesses between 6-10cm in size⁵. Our study correlates with above studies.

USG feature of pyogenic liver abscess are :- Frankly purulent abscesses appear cystic with the fluid ranging from echo – free to highly echogenic. Regions of early suppuration may appear solid with altered echogenicity usually hypoechoic related to the presence of necrotic hepatocytes. Occasionally gas producing organisms give rise to echogenic foci with posterior reverberation artifact Fluid – fluid interfaces, internal septations and debris have all been observed. The abscess wall can vary from well defined to irregular and thick⁹.

Conclusion:

In this study the third most commonly encountered liver mass lesion was hepatocellular carcinoma, accounting for 22% of cases (11/50). The commonest clinical presentation was that of abdominal pain which was generally of a dull aching type. Right upper quadrant lump was the second most common presenting feature. Hepatomegaly was present in 10 cases out of 11 with a firm to hard consistency.

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