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Case Report

A Comparative Study Of Ultrasound And Ct Findings In Focal Liver Lesions

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ABSTRACT

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FOCAL LIVER LESIONS

HISTOPATHOLOGY

This study assess the usefulness of USG and MDCT scan in depicting the status of various focal liver lesions and correlate them with FNAC/Biopsy/Surgical findings/ Follow-up.

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CASE REPORT

Liver is the largest organ in the abdomen, having a number of important functions. There is no single test by which liver can be stated to be normal. Hence laboratory tests and imaging modalities are necessary for complete evaluation of structure and function of the liver.

Ultrasound is a fundamental technique for imaging the liver, biliary tree, and gallbladder because it is inexpensive, easily available and widely accepted. Its advantages are speed and simplicity. Its disadvantages include some what limited resolution for small liver lesions and limitations of specificity.

MDCT scanning - with its speed and three-dimensional volume rendering that can provide detailed vascular anatomy - remains a dominant imaging modality not only for lesion detection and preoperative planning, but also for treatment monitoring and post treatment surveillance.

This study assess the usefulness of USG and MDCT scan in depicting the status of various focal liver lesions and correlate them with FNAC/Biopsy/Surgical findings/ Follow-up.

OBJECTIVES OF THE STUDY

- 1.To study and compare the ULTRASOUND and CT findings of various focal lesions in the liver.
- 2.To assess the sensitivity and specificity of ULTRASOUND and CT in various pathologies.

MATERIALS AND METHODS: Cases for the above-proposed study were collected from Sri R.L. Jalappa Hospital and Research Center attached to Sri Devaraj Urs Medical College, Kolar.

METHOD OF COLLECTION OF CASES:

Clinical history or physical examination suggestive of a focal liver lesion which is confirmed by ULTRASOUND/CT.

Focal liver lesion incidentally detected on abdominal ULTRASOUND or CT.

The investigation was performed with SIEMENS USG MACHINES ACUSON X 300 , SONOLINE G-50 and SONOLINE G-40 & SIEMENS SOMATOM 16 SLICE CT.

RESULTS

USG plays a very important role in distinguishing the solid and cystic mass.

The most common encountered focal liver lesion is METASTASIS which can be well diagnosed on USG showing 100% sensitivity.

After metastasis the commonly encountered lesions were abscess, hemangioma, HCC, hepatic and hydatid cysts.

Simple liver cysts and small hemangiomas can be identified on ultrasound with good accuracy with 100% sensitivity and specificity.

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In cases of large hemangiomas, HCC and Cholangio carcinoma MDCT plays a major role in diagnosing.

RESULTS AND OBSERVATIONS: The total number of patients included in our study were 50.

THE SPECTRUM OF LESIONS ENCOUNTERED IN STUDY (N = 50)

TABLE 1: Age distribution of breast lesions

LESION	NUMBER OF CASES	PERCENTAGE
METASTASIS	13	26
ABSCESS	11	22
HEMANGIOMA	10	20
H C C	6	12
CYSTS	5	10
HYDATID CYSTS	4	8
CHOLANGIO CA	1	2
TOTAL	50	100

Represents The Sex Distribution Of Lesions In Study

	ZMALE	FEMALE	M:F
METASTASIS	9	4	2.25 : 1
ABSCESS	10	1	10 : 1
HEMANGIOMA	5	5	1 : 1
HCC	5	1	5 : 1
CYSTS	2	3	1 : 1.5
HYDATID CYSTS	1	3	1 : 3
CHOLANGIO CA	1	0	1 : 0

Sensitivity And Specificity Of Usg In 50 Focal Liver Lesions

Liver disease	No of cases	Sensitivity	Specificity
METASTASIS	13	100%	97.29%
ABSCESS	11	100%	100%
HEMANGIOMA	10	90%	100%
HCC	6	83.33%	97.72%
CYSTS	5	80%	100%
HYDATID CYSTS	4	100%	97.28%

Sensitivity And Specificity Of Usg In 50 Focal Liver Lesions

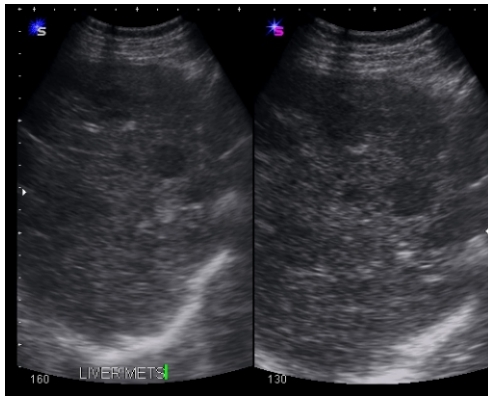
Liver disease	No of cases	Sensitivity	Specificity
METASTASIS	13	100%	100%
ABSCESS	11	100%	100%
HEMANGIOMA	10	100%	100%
HCC	6	100%	100%
CYSTS	5	80%	100%
HYDATID CYSTS	4	100%	97.82%

SONOGRAPHIC AND CT APPEARANCE OF VARIOUS LESIONS

METASTASIS

USG : The metastatic lesions from carcinoma rectum were hypoechoic with target pattern. The lesions from the prostate were hyperechoic in our study and the lesions from the stomach , breast and cervix were hypoechoic with few showing target pattern. Cystic matastasis was not seen in the study.

CT : 11 (84.6%) cases were hypoattenuating and the rest two were heterogeneous. All the lesions showed enhancement on CECT and the two (15.38%) cases of metastasis from breast were intensely enhancing suggesting their hypervascular nature.



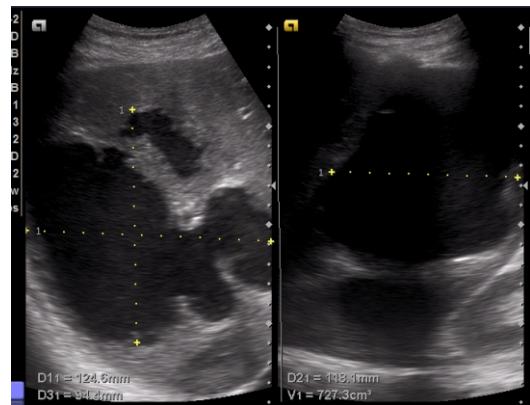
USG showing multiple round to oval hypoechoic CECT abdomen showing multiple Lesions involving both the lobes of the liver well defined variable sized mildly showing target appearance. enhancing hypodense lesions involving both the lobes of the liver.

L.Rubaltelli et al1 in their study concluded that hypervascular lesions corresponds to hyperechogenic patterns , while hypovascular lesions furnish hypoechoic images. Our study was also going along with that.

USG : The metastatic lesions from carcinoma rectum were hypoechoic with target pattern. The lesions from the prostate were hyperechoic in our study and the lesions from the stomach , breast and cervix were hypoechoic with few showing target pattern. Cystic matastasis was not seen in the study.

CT : 11 (84.6%) cases were hypoa

CT : All lesions were hypodense (CT VALUE 14 – 22HU) .100% of lesions had enhancing wall.



USG showing a large hypoechoic lesion CECT showing a large well defined with internal echos in the right lobe of liver. non enhancing hypodense mass lesion in the right lobe of the liver.

PYOGENIC ABSCESS

USG :100% pyogenic abscesses had round shape , and were hypoechoic. Distal sonic enhancement was seen in two cases. Two cases showed echogenic foci with posterior reverberation artifact suggestive of gas. The abscess wall was thick and irregular in one case.

CT : All lesions were hypoattenuating and showed peripheral thick enhancing wall.

TABLE 11: Distribution of cases diagnosed by diagnostic modalities compared with FNAC



USG showing a large well defined hypoechoic mass in the right lobe of liver with mixed echogenicity.



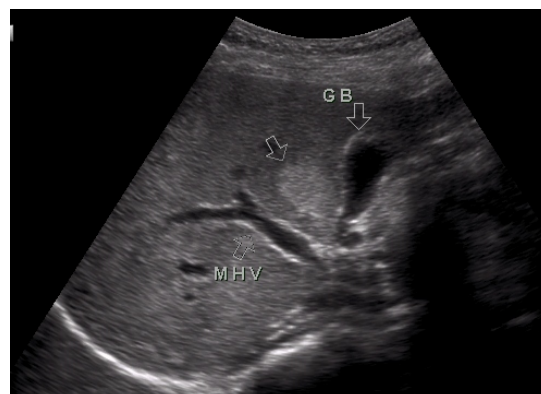
CECT abdomen showing multiple well defined hypodense lesions with peripheral enhancement.

Dewbury K.C et al 5 found that an isolated focal lesion in the right lobe of liver with a peripheral echo free halo , irregular central echo poor areas and with distal acoustic enhancement , is most likely to be an abscess in its early stage of formation . If repeat scan within a week shows progressive changes, it is almost certain to be a liver abscess.

HEMANGIOMA

USG :Sharply defined highly reflective round tumor with a homogeneous echopattern lesions larger than 2.5cms showing post acoustic enhancement.

CT : The lesion shows typical centripetal type of enhancement pattern on CECT study. Starts with peripheral nodular enhancement in the early phases and shows typical centripetal enhancement on delayed scan.



USG image showing well defined hyper echoic lesions in the segment IV of the liver.



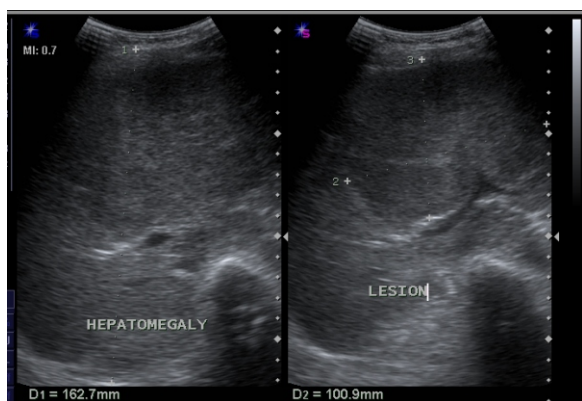
CECT abdomen images showing a well defined hypodense lesion in segment VII showing typical centripetal type of enhancing pattern.

Bruneton et al³ observed that lesions less than 3 cms are often hyperechoic and homogeneous. Gibney et al 23 in his study concluded that , once hemangiomas are identifiable , sonographically in adults , they do not continue to grow and they can be differentiated reliably from metastasis.

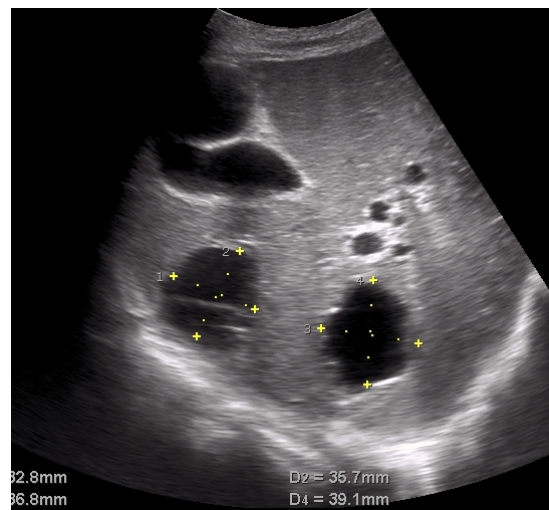
HEPATOCELLULAR CARCINOMA

USG :50% HCCs were hypoechoic and 50% were heterogeneous .Calcification was not seen in any case on US.

CT : 83 % HCCs were heterogeneous and 17% were hypodense. All the lesions showed early heterogeneous enhancement in early phases and showed early wash out in delayed phases.



USG showing a large well defined mixed Echoic mass in the left lobe of Liver.



USG showing multiple anechoic lesions the right lobe of Liver.



CECT showing early enhancement of the mass lesion.

According to Takayasu et al⁹ & David J Brandt et al¹⁰, in chronic liver disease, sonography has very high specificity in detection of lesions. Hence sonologically identified hemangioma like lesions in a cirrhotic liver should be considered malignant until proved otherwise.

HEPATIC CYSTS

USG :The typical appearance of simple cysts was seen in all cases i.e. anechoic, with a well-defined thin wall and posterior acoustic enhancement.

Complicated cysts were one in number and they appeared on USG as well-defined cystic lesion with thin internal septations and uniform low level internal echoes.

CT : They appeared as well-defined non-enhancing lesions with attenuation values of water density. On CT these lesions had attenuation values slightly more than water density and were well-defined with thick wall and internal septations which showed minimal enhancement on CECT.



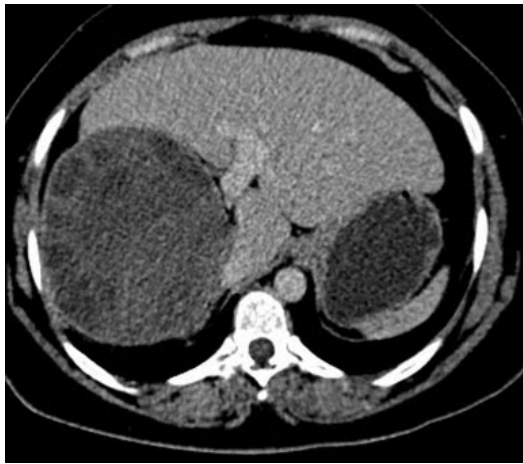
CECT showing multiple well defined non enhancing hypoattenuating lobulated cysts.

Spiegel et al¹² summarized the established ultrasonic criteria of a simple hepatic cyst: must be anechoic, must have smooth borders and strong posterior wall echoes, must be spherical or oval in shape. Our observation was also the same.

HYDATID CYST

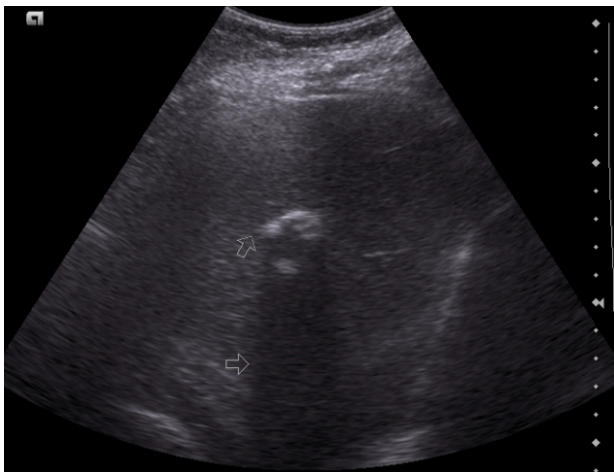
USG :All cysts had well-defined margins. On USG a multiseptated cyst with daughter cysts and echogenic material between the cysts (characteristic appearance) was seen in two (50%) cases. Cyst with internal septae was seen in one (25%) case. Wall calcification was seen in one (25%) case. **CT :** Well-defined hypoattenuating lesions with daughter cysts were seen in two cases (50%). In one case daughter cysts were not seen, only few septae were seen. Calcification was seen in one (25%) case.

In our study in one case the hydatids were also seen in pelvic cavity.



CECT showing a large exophytic dumbbell shaped cystic lesion arising from the right lobe of the liver inferiorly with multiple small daughter cysts.

CALCIFIED HYDATID CYST OF THE LIVER



USG showing hyper echoic lesion in the right lobe of the liver causing posterior acoustic shadowing.



CECT abdomen showing a well defined round mass lesion measuring 4.1 x 3.4 x 3.2cm in segment VIII of right hepatic lobe. Lesion demonstrates dense peripheral and internal calcification.

Alltree et al¹⁴ found that US and CT scan define equally well the daughter cysts and calcification. The appearances are characteristic and usually diagnostic but USG has the advantage of being able to scan in both longitudinal and transverse planes. The position of diaphragm and its relation to the cyst is better shown by it. Bagga et al found the diagnosis of hydatid is certain when one can image daughter cysts.

OTHER FOCAL LIVER LESIONS

Cholangio carcinoma was seen in only one case, 45 year old male. On USG there was mild hepatomegaly and mild intra hepatic biliary radicals dilatation confined to only left lobe of the liver. USG could not pick up the lesion in the case. On CECT abdomen there was a ill defined mass in the left lobe of the liver where it was showing delayed enhancement and delayed washout which is quite opposite to HCC. So the probability of Cholangio ca was given as probable diagnosis. CT guided FNAC was done and proved to be cholangio carcinoma.



CECT of the abdomen showing dilated mass.



biliary radicles and an ill defined mass in the left lobe of the liver.

HISTOPATHOLOGY FINDINGS

In our study histopathology findings played a supportive and confirmatory role in characterizing the lesions especially in patients with liver metastasis, HCC, Cholangio carcinoma, cysts and liver abscess.

FOLLOW UP STUDY

Follow up ULTRASOUND/CT was very important in obviously benign lesions in order to avoid unwanted surgeries and biopsies.

Follow up was done in most of the patients with benign lesions like simple liver cysts, hemangiomas and abscesses. The patients with neoplastic disease underwent definitive treatment.

CONCLUSION

Simple liver Cysts have typical appearances on USG as well as CT, having high specificity and sensitivity. Hence, if cysts are diagnosed by one modality further investigation may not be needed.

The sensitivity of USG in detecting liver metastases is comparable to CECT.

CT is superior to USG in showing exact extent of a focal lesion and in delineating adjacent organs.

Using CECT there is a high degree of sensitivity and specificity (up to 100%) in lesions such as hemangioma, which have specific enhancing pattern.

USG is non-specific in diagnosis of large hemangiomas.

Imaging features of amoebic versus pyogenic abscesses are non specific on either imaging modality, and require needle aspiration cytology. However, subsequent to treatment, follow-up is easier with ultrasound.

CECT is superior in diagnosing HCC and CC because of their typical enhancement patterns.

So in essence USG and CT are the modalities having comparable specificity and sensitivity, CT being slightly more accurate than USG in evaluation of focal hepatic lesions.

In spite of the various advantages of CT over USG, in a developing country like ours it may be judicious to use ultrasound first because it is widely available, cost effective, non invasive and free from radiation.

CT scan may be performed in

1) atypical cases where ultrasound is not confirmatory and

2) to know exact extent of the lesion prior to surgery.

As a follow up modality, in most situations USG may be adequate.

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