

## A Comparative Diagnostic Ability Between Ultrasound and Computed Tomography in Evaluation of Focal Liver Lesions

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### Abstract

**Background:** The term focal liver lesion refers to circumscribed and well-defined liver tumours, which can either be benign or malignant. These lesions can be benign or malignant. Benign lesions include haemangioma, the most common benign tumour of liver. **Objectives;** 1. To study the distributions of various focal liver lesions by ULTRASOUND and CECT. 2. To compare the findings of ULTRASOUND and CECT in focal liver lesions. 3. To assess the sensitivity and specificity of ULTRASOUND and CECT in various pathologies. 4. To assess which modality is more accurate in a particular pathology. **Methods:** Hospital based observational study was done in 65 patients having focal liver lesions. Clinically suspected, history or physical examination suggestive of a focal liver lesion which is confirmed by ULTRASOUND/CT at Maharajah Institute of Medical Sciences Vizianagaram, Andhra Pradesh. Imaging Centre over a period of one year. SPSS was used for analysis. **Results:** It was seen the lesions were male preponderance (54%) and the most common age group was 61-70 years in both the sex followed by 31-40 years. the most common lesion was metastasis seen in 36% of cases followed by Cysts in 18% of cases. Sensitivity of USG was almost 100% except in Hemangioma (88.8%). Sensitivity and Specificity of CECT was 100% in all lesions. **Conclusion:** 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. Hence CT is useful to determine the extent of the liver tumors or hydatid cysts prior to surgical resection.

**Keywords:** focal liver lesions, metastasis, hydatid cyst, ultrasound, CECT.

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### Introduction

The liver plays several complex but essential role in the metabolism of amino acids, carbohydrates, and lipids as well as synthesis of proteins. The basic pathophysiology of parenchymal disease usually represents a failure in one of these metabolic pathways[1]. Parenchymal lesions may be focal or diffuse, focal lesion may be native or metastasis from other part of the body. Liver is often studied for evaluation of many surgical or nonsurgical conditions[2]. The term focal liver lesion refers to circumscribed and well-defined liver tumours, which can either be benign or malignant. These lesions can be benign or malignant. Benign lesions include haemangioma, the most common benign tumour of liver[3]. USG is safe, simple, non invasive, Cost effective and free from radiation. Even though it is an effective method which can pick up several abnormalities of the liver, Bile ducts, gall bladder and other organs[4,5]. Due to its widespread use and availability, ultrasonography is frequently the first test used to assess patients with focal or diffuse hepatic disease [6]. With its Doppler and color flow capabilities, ultrasound imaging will remain an important modality for hepatic imaging, especially in the evaluation of portal vein patency and hepatic artery thrombosis. In last two decades

dynamic CT and grey scale ultrasound have been the main imaging modalities for focal lesion of liver. With both techniques many questions can be answered, if no conclusive diagnosis can be made with a single technique, a combination of both is often helpful[5-7]. Hence it was proposed to study the various imaging features of focal liver lesions among our own population and to assess the utility of ultrasound and contrast enhanced computed Tomography in the evaluation of status of various focal liver lesions and correlate them with FNAC/Biopsy/Surgical findings/ Follow-up.

#### Materials and Methods

The study was done in Department of Radio-diagnosis, Maharajah Institute of Medical Sciences Vizianagaram, Andhra Pradesh. From 1<sup>st</sup> November 2018 to 30<sup>th</sup> November 2019. It was a Hospital based cross sectional and observational study. Clinically suspected, history or physical examination suggestive of a focal liver lesion which is confirmed by Ultrasound/CT at Maharajah Institute of Medical Sciences Vizianagaram, Andhra Pradesh. Imaging Centre over a period of one year. Sixty-five (65) cases was studied during the study period.

#### Inclusion criteria

- 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

#### Exclusion criteria

- All patients having allergy to iodinated contrast.
- Patients with renal failure

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**Methodology**

All the scans were performed with GE 16 slice CT, Philips HD 11, Philips Affinity ultrasound machines. The transducer to be used is a 3.5 MHz convex array transducer.

Contrast material - nonionic iodinated contrast (IOHEXOL). Patients were first subjected to detailed ultrasound examination of liver including Doppler which was carried out on one of the three ultrasound machines in the department. The liver was examined in supine and right anterior oblique views. Examination was done in

**Results**

suspended respiration so that dome of the liver was adequately evaluated. The Second step in the study was to perform unenhanced CT examination in these patients followed by triple phase contrast CT.

**Statistical Analysis:**All the statistical analysis will be performed by using SPSS Software version and MS EXCEL 2017. Data analysis are done by using percentages, sensitivity and specificity which are computed and compiled.

**Table 1: Age and Sex Distribution of Focal Liver Lesions**

Age in Years	Male	Female
01-10	0	0
10-20	0	0
21-30	2	3
31-40	8	6
41-50	5	6
51-60	7	6
61-70	8	7
71-80	5	2
81-90	0	0
TOTAL	35	30

Table 1 shows age and sex wise distribution of patients with focal liver lesions. It was seen the lesions were male preponderance (54%) and the most common age group was 61-70 years in both the sex followed by 31-40 years. Also no lesions were seen in age group from 1-20 years and 81-90 years which shows that during these age group the focal liver lesions were uncommon.

**Table 2: Distribution of Focal Liver Lesions in Study participants**

Lesion	Number Of cases	Percentage
Metastasis	24	36
Abscess	10	16
Hemangioma	11	16
H C C	6	10
Cysts	12	18
Hydatid Cyst	2	4
Total	65	100

As per table 2 the most common lesion was metastasis seen in 36% of cases followed by Cysts in 18% of cases. Abscess and Haemangioma was seen 16% of cases equally.

**Table 3: Sensitivity and Specificity of USG in Focal Liver Lesions**

Liver disease	No of cases	Sensitivity	Specificity
Metastasis	24	100%	91.11%
Cysts	12	100%	100%
Hemangioma	11	88.80%	100%
Abscess	10	100%	100%
Hcc	6	100%	100%
Hydatid Cysts	2	100%	100%

Table 3 shows the diagnostic ability of USG in focal liver lesions. Sensitivity was almost 100% except in Hemangioma (88.8%). Similarly, specificity was almost 100% but it was 91.11% in the diagnosis of metastasis.

**Table 4: Sensitivity and Specificity of CECT in Focal Liver Lesions**

Liver Disease	No of Cases	Sensitivity	Specificity
Metastasis	24	100%	100%
Cysts	12	100%	100%
Hemangioma	11	100%	100%
Abscess	10	100%	100%
Hcc	6	100%	100%
Hydatid Cysts	2	100%	100%

Table 4 shows the diagnostic ability of CECT in focal liver lesions. Sensitivity and Specificity was 100% in all lesions. Which shows the diagnostic ability of CECT was better than USG in diagnosing focal liver lesions.

**Discussion**

In present study, various etiologies of liver lesions were seen. These included metastasis, simple cysts, liver abscess, hydatid cysts, hemangiomas, and HCC. The metastasis disease was found to be the

commonest group seen in 24 patients, followed by in simple cysts and hemangiomas. Total number of patients studied were 65. Out of 65 patients, 35 patients were males, and 30 patients were females. Age range was from 20 to 80 yrs. In metastasis the Sensitivity and

specificity of USG in our study were 100% , 91.11% and of CT were and 100% , 100% respectively.

Leslie DF et al concluded in their study that peripheral globular enhancement is highly sensitive (88%) and specific(84-100%) for differentiating hepatic hemangiomas from hypervascular metastases on single-pass, contrast- enhanced CT scans[8]. Withers C.E and Wilson S.R concluded in their study of sonographic patterns of metastatic liver disease that hypoechoic metastasis is generally hypovascular and is the typical pattern seen in metastatic breast or lung cancer[9].The bulls eye or target pattern is characterized by a peripheral hypoechoic zone. The findings in our study were comparable to this observation. Gaines et al in a study of 43 cases (100%) showed that all the simple cysts had no wall abnormalities, internal septation or echoes, no post contrast enhancement[10]. Our study also goes along with the above findings.S F Quinn, and G G Benjamin in a prospective study of evaluation was performed to diagnose hemangiomas during incremental dynamic bolus CT. This sign is the visualization of foci of globular enhancement within the hemangioma, analogous to areas of puddling of contrast material seen at angiography[11]. A total of 34 lesions in 21 patients demonstrated foci of globular enhancement. Of the 34 lesions, 32 (94%) proved to be hemangiomas. All 21 patients underwent confirmatory evaluation. Foci of globular enhancement seen during dynamic bolus CT are a strong indication that the lesion is a cavernous hemangioma. This diagnostic sign may obviate further, more expensive imaging studies. Pablo Bächler et al found that at US abscess appears as a hypoechoic and homogeneous round or oval mass, with low-level internal echoes, no noticeable wall echoes, and with distal through-transmission[12].According to Takayasu et al , 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[13]. Suwan Z in his study of sonographic findings of hydatid disease concluded that. Sonography, the investigation of choice, since it is cheap, non-invasive and accurate, is particularly useful during the active stage of cyst development, when plain X-rays appear normal or show non-specific hepatomegaly. Sonography is superior to CT in the investigation of the cyst wall, hydatid 'sand', daughter cysts, and the relationship of the cyst to the diaphragm[14]. However, CT was superior to sonography in detecting gas within the cysts and minute calcifications and in anatomical mapping.

#### Conclusion

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. Hence CT is useful to determine the extent of the liver tumors or hydatid cysts prior to surgical resection. 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. 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.

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