CT EVALUATION OF THE HEPATIC MASS LESIONS

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ABSTRACT

Hepatic mass lesions represent a spectrum of disorders congenital, infective, neoplastic, and otherwise. The use of non-contrast and contrast enhanced CT enables to detect the liver lesions more adequately and detects other associated effects if any. CT delineates affected segments in the disease process and the extent of involvement.

AIMS

To study of effectiveness of CT in studying the CT patterns of different hepatic mass lesions and to correlate CT findings in hepatic mass lesions in various patients with FNAC and HPE findings.

MATERIALS AND METHODS

50 cases of clinically suspected hepatic mass lesions were scanned by Philips 16 slice CT MX-16 EVO within the period of July 2015 - 1st week of July 2016 in JMCH, Jorhat. All OPD and indoor patients of both sexes and patients in whom hepatic mass lesions were detected with other modalities of imaging were included. Hydatid cyst and haemangioma cases were excluded due to risk of anaphylaxis and haemorrhage during FNAC. All the patients were scanned pre and post IV contrast administration and data was recorded FNAC of the lesions were done by 20 G Chiba or 18 G Tru-Cut needle. The scans were viewed by two senior radiologists to minimise interpretative errors.

RESULTS AND OBSERVATIONS

In the 50 cases studied, 25 patients (50%) had metastatic lesions, 10 patients (20%) had hepatocellular carcinoma, 3 patients (6%) had hepatoblastoma, 11 patients (22%) had liver abscesses, 1 patient (2%) had polycystic liver disease. These correlated well with CT-guided FNAC findings where FNAC was positive in cases as follows: Metastatic lesions 23 patients (46%), hepatocellular carcinoma 8 patients (16%), hepatoblastoma 3 patients (6%), liver abscesses 9 patients (18%), 1 patient (2%) polycystic liver disease.

CONCLUSION

In this study, CT proved to be the diagnostic tool of choice for hepatic mass lesions. CT-guided FNAC and HPE findings correlated well with the CT diagnosis of hepatic masses. CT proved to be a fast imaging method, easily available modality, excellent in detecting lesions, calcifications. Drawbacks of CT-included radiation to patient and contrast reactions, the latter not encountered in this study.

KEYWORDS

CT, Hepatic Mass Lesions.

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INTRODUCTION: Hepatic mass lesions represent a spectrum of disorders congenital, infective, neoplastic, and otherwise. Newer imaging modalities have contributed towards hepatic imaging to a great extent. USG, CT, and MRI are now the primary imaging modalities for hepatic imaging and they have their own merits and demerits. Delineating the segments affected and the extent of disease, CT (Non-contrast and contrast) has thus revolutionised hepatic imaging.

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AIMS AND OBJECTIVES:

AIMS: To study effectiveness of CT in studying the CT patterns of different hepatic mass lesions and to correlate CT findings in hepatic mass lesions in various patients with FNAC and HPE findings.

MATERIAL AND METHODS: 50 cases of clinically suspected hepatic mass lesions referred to the Department of Radiodiagnosis, JMCH, Jorhat, from various clinical departments within the period of July 2015 - 1st week of July 2016. All OPD and indoor patients of both sexes and patients in whom hepatic mass lesions were detected with other modalities of imaging. Hydatid cyst and haemangioma where there is a risk of anaphylaxis and haemorrhage during FNAC. All the patients fulfilling the mentioned criteria were

evaluated clinically and data was recorded in a pre-devised proforma.

Then, these patients were subjected to abdominal CT scanning to evaluate the liver for mass lesions.

CT Machine: Philips 16 slice CT MX-16 EVO.
FNAC Needle: 20 G Chiba needle and 18 G Tru-Cut needle.
IV Contrast Agent: 64.6% W/V non-ionic iodinated IV contrast media (Lohexol).

SCAN Techniques:
NECT Scans: After oral administration of water soluble iodinated contrast media, abdomen was scanned from the highest point of the diaphragm to the pubic symphysis by taking 10 and 5 mm slices where necessary with adequate breath hold techniques. Rectal lumen was opacified by instilling water soluble contrast enema.

CECT Scan: Post NECT scans 100-150 mL of non-ionic iodinated contrast media was injected IV as bolus at a rate of 2-3 mL/sec. Scan protocol being same as NECT scans.

CT-Guided FNAC: After localisation of the mass lesions by NECT and CECT, the patients were subjected to CT-guided FNAC.

CT Findings:
Lobar Pattern of Mass Lesions – Incidence:

RESULTS AND OBSERVATIONS: In the fifty cases studied, the following results and observations were made.

Age: Lowest age of an individual case was 2 years and the oldest was 70 years with the mean age being 52 years.

Age Groups	No. of Cases	Percentage
0-10	3	6
11-20	0	0
21-30	1	2
31-40	5	10
41-50	7	14
51-60	17	34
61-70	17	34
Total	**50**	**100**

Table Showing Age Incidence of Hepatic Masses

Highest number of cases were seen in the age group 51 to 60 years and 61 to 70 years.

Sex: Males comprised of 36 cases (72%), females comprised of 14 cases (28%) with male:female=5:2.

Lobe	No. of cases	%	HCC	Met.	ALA	PLA	Hepatoblastoma	P.L.D.
RLL	27	54	7	8	6	4	3	-
LLL	6	12	2	4	-	-	-	-
RLL + LLL	17	34	1	13	1	1	0	1

RLL: Right lobe of the Liver; LLL: Left lobe of the liver.
Right lobe accounted for 27 (54%) cases of hepatic mass lesions followed by mass lesions affecting both the lobes-17 (34%) cases, 6 (12%) cases were seen to affect the left lobe only.

Number of Lesions: Single lesions-27 cases (54%), multiple lesions-23 cases (46%).

Lesion Type	Single	Multiple
HCC	9	1
Metastasis	6	19
ALA	6	0
PLA	3	2
Hepatoblastoma	3	0
Polycystic Liver Diseases	0	1

HCC: Hepatocellular Carcinoma; ALA: Amoebic Liver Abscess; PLA: Pyogenic Liver Abscess.
PLD: Polycystic Liver Disease.
Highest number of single lesions in an individual lesion entity was seen in HCC (9 cases).

Among multiple lesions, hepatic metastasis had 19 individual cases. 1 case of HCC had multiple lesions.

Size of Lesions: The largest lesion size among the fifty cases studied was 6.0 x 4.4 cm (ALA) and smallest was 2.0 x 1.2 cm (Metastasis). Average lesion size being 4.0 x 2.6 cm.

Lesion Type	Greatest (cm)	Smallest (cm)	Mean (cm)
HCC	5.2 x 3.6	3.0 x 2.1	4.1 x 2.9
Metastasis	Range between 3.4 to 1.2 cm		
ALA	6.0 x 4.4	3.6 x 2.8	4.8 x 3.6
PLA	4.0 x 3.6	3.2 x 3.0	3.6 x 3.3
Hepatoblastoma	5.1 x 3.8	4.0 x 3.4	4.6 x 3.6
Polycystic Liver Disease	Range between 2.0 to 1.3 cm		

Margin: In the fifty cases studied, the margins were either ill defined, irregular, ill-defined and irregular, regular sharp, and sharp.

Margin Type	HCC	Metastasis	ALA	PLA	Hepatoblastoma	Polycystic Liver Diseases
Irreg.	6	15	5	4	0	0
Ill def. and irreg.	4	9	0	0	0	0
Reg. and Sh.	0	0	1	0	0	0
Sh.	0	1	0	1	3	1

Irregular lesions accounted for in 30 cases (60%) followed by ill-defined and irregular margin lesions in 13 cases (26%). Regular and sharp margin was found in 1 case (2%). Lesion with sharp margin found in 6 cases (12%).

Calcification: In the total fifty cases of hepatic mass lesion studied, only three cases showed calcification and all the cases were of hepatoblastoma.

Septation: Septation was not a feature in any of the fifty cases studied.

Lesion Density and Enhancement Patterns:

NECT: In the fifty cases studied, 36 cases (72%) had hypodense lesions, 14 cases (28%) had mixed density lesions, hyperdense and isodense lesions were not a feature in any case among the 50 cases studied.

CECT: In the post IV contrast phase, homogenous enhancement pattern was seen in only one case. Inhomogeneous enhancement pattern was seen in 38 cases (76%). Marginal enhancement was seen in 31 cases (62%). Number of patients showing hyperdense lesions in CECT were 7(14%), hypodense lesions on CECT were 13 cases (26%), and mixed density lesions were seen in 30 cases (60%).

Target and Cluster Signs: Target sign was noted in 9 (18%) cases of the total 50 cases studied $\rightarrow$ 3 cases of ALA, 2 cases of PLA, and 4 cases of metastasis. Cluster sign was noted in 2 cases of PLA.

Associated CT Findings: Various associated CT findings were seen during the study of the 50 cases of hepatic mass lesions. Primary tumour was detected in 16 patients having liver metastasis (32%) followed by abdominal lymphadenopathy seen in 6 cases (12%). Ascites and gallbladder wall thickening with calculi were seen in 4 cases each (8%). Basal lung atelectasis and pleural effusion was seen in 3 cases each. Metastatic lesions in liver were associated with a detected primary tumour in a few cases.

Primary Tumour	No. of Cases
Ca. colon	4
Ca. pancreas	3
Ca. kidney	3
Ca. oesophagus	3
Ca. breast	2
Ca. thyroid	1

Comparison of CT scan and FNAC/HPE diagnosis of hepatic mass lesions.

Disease	CT Diagnosis	FNAC/HPE Diagnosis
HCC	10	8
Metastasis	25	23
ALA	6	5
PLA	5	4
Hepatoblastoma	3	3
P.L.D.	1	1

- Considering FNAC/HPE as gold standard, the sensitivity and positive predictive value of CT scan for diagnosis of hepatic metastasis were 95.83% and 95.83% respectively.
- In case of hepatocellular carcinoma, both sensitivity and positive predictive value of CT scan were 88.88%.
- In case pyogenic liver abscess, the sensitivity and positive predictive value of CT scan were 66.66% and 80% respectively.
- In case of amoebic liver abscess, the sensitivity of CT scan were 100%.

CT Findings of Hepatic Mass Lesions:

a) Metastasis: Out of total 50 patients studied 25(50%) patients had hepatic metastasis, age range was from 21-70 years, mean age being 58.2 years and maximum cases were seen in the age group of 61-70, 12 cases (48%) followed by 51-60 age group, 9 cases (36%). 31-40 age group showed no cases. Among the 25 cases of metastasis, 20 cases were males and 5 were females.

CT Features:

- In metastasis, single lesions were 6 in number, multiple lesions being 19 in number.
- The size ranged from 3.4 to 1.2 cm.
- 14 of the metastatic lesions were round and 11 were oval.
- Margins of metastatic lesions were irregular (15 cases), ill-defined and irregular (9 cases) and sharp (1 case).
- Calcification and septation were not seen.
- NECT showed (out of 25 cases) hypodense lesions in 15 cases, 10 cases showed mixed density.
- CECT showed inhomogeneous enhancement in all 25 cases. 21 cases showed mixed density followed by hyperdensity in 4 cases, 'Target Appearance' in 4 cases inhomogeneous enhancement and hypodense lesions were not a feature in these metastatic lesions.

b) Hepatocellular Carcinoma: Out of total 50 patients, 10 cases were of HCC, age range being 40-70 years, mean age was 58.5 years. Out of these 10 cases, 4 were males and 6 were females (1:1.5). The commonest age group of incidence of HCC was 61-70 age group (5 cases) followed by 51-60 age group (4 cases). 31-40 age group showed incidence of a single case whereas 21-30 and 41-50 age groups showed no incidence of cases of HCC.

CT Features:

- Among the 10 cases of HCC, 9 were single lesions, multiple lesions was seen in 1 case.
- Size of lesions-lesion size ranged between 5.2x3.6 cm to 3.0x2.1 cm, average size being 4.1x2.9 cm.
- Margins of hepatocellular carcinoma lesions were irregular in 6 cases, irregular, and ill-defined in 4 cases.
- Calcification and septation were not seen in these lesions.
- Out of 10 lesions of HCC, 7 were round and 3 were oval.
- NECT showed hypodense lesions in all 10 cases, hyperdense, isodense, and mixed density lesions were not seen.
- CECT showed inhomogeneous enhancement in all the 10 cases with mixed density on CECT. Homogenous enhancement, hyperdensity, and hypodensity were not a feature of any of the 10 cases of hepatocellular carcinoma. Vascular involvement was not seen in any cases of HCC.

c) Amoebic Liver Abscess (ALA): Out of the total 50 cases studied, ALA accounted for 6 number of cases, age range being 38-58 years, mean age being 48.7 years. All 6 cases were males. Highest number of cases were seen in the age group 51-60 years (3 cases) followed by 31-50 age group (2 cases). 41-50 age group showed an incidence of 1 case. The age group of 21-30 and 61-70 showed no incidence of cases.

CT Features:

- Number of lesions: Single lesions (6 cases).
- Multiple lesion (0 cases).
- Site of lesions: All of the 6 cases of ALA were situated in the right lobe.
- Size of lesions: Ranged from 6.0x4.4 cm-3.6x2.8 cm, average size being 4.8x3.6 cm.
- Configuration: Round 5 cases, Oval 1 case.
- Margin: Irregular 5 cases, Regular and sharp 1 case.
- Calcification and septation: Were not seen in any of the 6 cases of ALA.
- NECT: All the 6 cases of ALA were hypodense in NECT.
- CECT: All the 6 cases of ALA showed no post IV contrast enhancement and were hypodense. Wall enhancement was seen in all 6 cases. Target sign was positive in 3 cases out of the total 6 cases of ALA.
- Associated CT Findings: Right-sided pleural effusion-2 out of 6 cases.
- Basal lung Atelectasis - 2 out of 6 cases.

d) Pyogenic Liver Abscess (PLA): Out of the 50 cases of hepatic mass lesions studied, PLA accounted for 5 cases, age range being 35-52 years. Mean age being 45.4 years. All of the 5 cases of PLA were females. Highest numbers of cases were seen in the age group 41-50 (3 cases) followed by 31-40 and 51-60 age group (1 case each).

CT Features:

- Number of lesions: Single lesions (3 out of total 5 cases)
- Multiple lesion (2 out of total 5 cases)
- Site of lesions: Right lobe (4 cases), right+left lobe (1 case), left lobe (0 case).
- Size of lesions: Ranged from 4.0 x 3.6 cm - 3.2 x 3.0 cm, average size being 4.8 x 3.6 cm.
- Configuration: Round 4 cases, Oval 1 case.
- Margin: Irregular 4 cases, Sharp 1 case.
- Calcification and septation: Were not seen in any of the 5 cases of PLA.
- NECT: All the 5 cases of PLA were hypodense in NECT.
- CECT: All the 5 cases of PLA showed no post IV contrast enhancement and were hypodense. Wall enhancement was seen in all 5 cases. Target sign was positive in 2 cases out of the total 5 cases of PLA. Cluster sign was positive in 2 cases out of total 5 cases of PLA. Presence of gas bubble was seen in 2 cases of PLA.
- Associated CT findings: Basal lung atelectasis was present in 1 case out of the total 5 cases of PLA.

e) Hepatoblastoma: Out of the 50 cases of hepatic mass lesions studied hepatoblastoma accounted for 3 cases, age range being 2-3 years. Mean age being 2.6 years. Of all the 3 cases of hepatoblastoma 2 were males and 1 was female. Highest number of cases was seen in the 3-year age group.

CT Features:

- Number of lesions: Single lesions (3 out of total 3 cases).
- Multiple lesion (0 out of total 3 cases).
- Site of lesions: Right lobe (3 cases), right + left lobe (0 case), left lobe (0 case).
- Size of lesions: Ranged from 5.1x3.8 cm-4.0x3.4 cm, average size being 4.6x3.6 cm.
- Configuration: Round 3 cases, Oval 0 case.
- Margin: All the 3 cases showed well-defined margin.
- Calcification and septation: All the 3 cases showed irregular specs of calcification; however, no septation were found in any case of hepatoblastoma.
- NECT: All the 3 cases of hepatoblastoma were hypodense in NECT.

- CECT: All the 3 cases of hepatoblastoma showed inhomogeneous pattern of enhancement on post IV contrast enhancement. These lesions were predominantly hyperdense on CECT studies.

f) Polycystic Liver Disease: Out of the 50 cases of hepatic mass lesions, a single case of polycystic liver disease was found. The patient was 32 years old male.

CT Features:

- Number of lesions: Multiple lesion (more than 8 lesions seen).
- Site of lesions: All the lesions were scattered in the right and left lobe.
- Size of lesions: Ranged from 2.0 cm-1.3 cm.
- Configuration: All the lesions were round in configuration.
- Margin: All the lesions were regular and sharp margined.
- Calcification and Septation: Were not found in these lesions.
- NECT: All the lesions were hypodense in NECT.
- CECT: All the lesions were homogeneous and were hypodense on post IV contrast studies without any enhancement.
- Associated CT findings: Multiple cystic lesions, which were round in configuration and sharp margined were found in pancreas and both the kidneys.

Fig. 1: CECT Liver Abscess

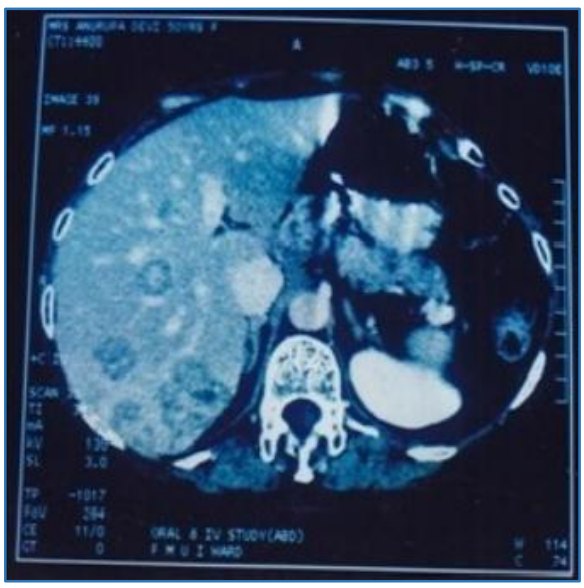

Fig. 2: CECT Liver Secondaries

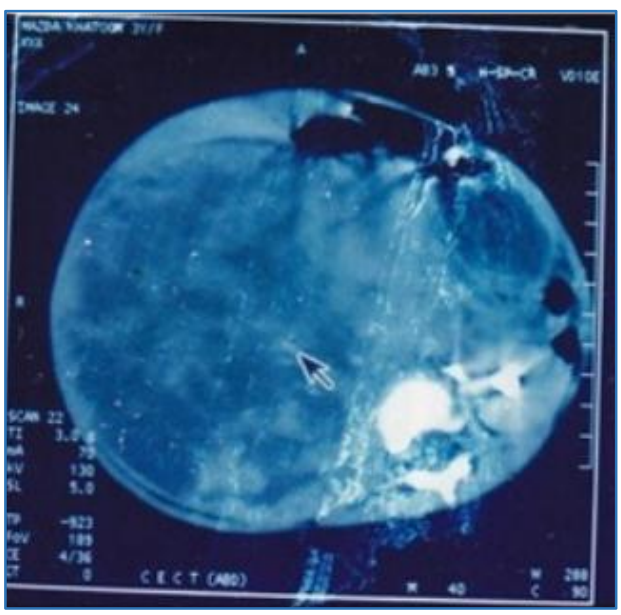

Fig. 3: CECT Hepatoblastoma

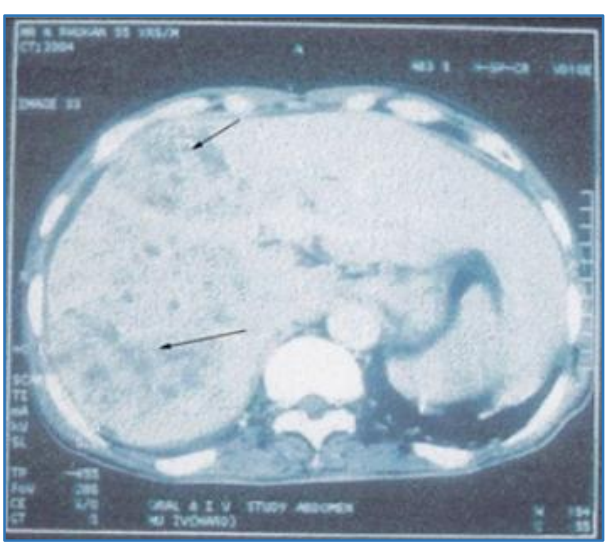

Fig 4: Hepatocellular Carcinoma in Right Lobe

Fig. 5: FNAC Needle in Right Liver Lobe

DISCUSSION: Hepatic masses are a common clinical presentation. Their differentiation and accurate diagnosis is very important in the perspective of treatment planning and patients management. In the present study, CT has proved its excellence is diagnosing these masses and also enabling us to obtain tissue for pathological correlation. In this present study period of one year, 50 cases of hepatic masses were evaluated with CT. In our study of 50 cases of hepatic mass lesion, 36(72.0%) were males and 14(28.0%) were females.

AGE INCIDENCE:

Metastatic Disease: In a study made by Muller et al in 1998, the age incidence ranged from 26 to 86 years with an average of 57 years. Present study showed the age incidence to be from 21-70 years with an average of 58.2 years.

Hepatocellular Carcinoma (HCC): Mathieu et al (1984) reported the patients' age to range from 16 to 75 years with a mean of 51 years. In the present study, the incidence ranged from 40-70 with a mean 58.5 years.[1]

Amoebic Liver Abscess (ALA): In a study by Gupta in 1984, age of patient varied from 11 years to 70 years with a mean of 40.5 years. In the present study, the age ranged from 38-58 years with an average of 48.7 years.[2]

Pyogenic Liver Abscess (PLA): Mathieu et al (1985) reported the age of PLA to be from 19 to 84 years of age with a mean of 51 years. In the present study, the age of PLA varied from 35-52 years with mean age of 45.4 years.[3]

Hepatoblastoma: Miller et al (1996) studied 12 cases of hepatoblastoma and found the age incidence below 3 years. In our study, all the cases were below 3 years age.

Hydatid Cyst: Age incidence have been cited from 22 to 77 years with a median of 46 years by Didier et al (1985). In the present study, 1 case of hydatid cyst was detected. The age incidence of the case was in the 31-40 years age group. Age of the patient being 38 years.[4]

Polycystic Liver Disease: Age incidence of polycystic liver disease as per Nelson et al (1989) was 36-58 years. In our study, one such case was found with age of 32 years.[5]

Haemangioma: Itai et al (1980) reported haemangioma that was found in the age range from 38 to 77 years. In our study, one patient of 45 years of age was found to have haemangioma.[6]

SEX INCIDENCE:

Hepatoblastoma: Miller et al (1996) studied 12 cases of hepatoblastoma; among them, 8 were males and 4 females. In our study, 3 cases of hepatoblastoma were found, 2 were males and 1 female.

Amoebic Liver Abscess: Gupta (1984) found incidence of ALA in male-88% and female-12%. The male-female ratio was 7:1 (approx.). Our study showed all the patients were males.

Pyogenic Liver Abscess: Rubinson et al (1980) in his study of pyogenic liver abscess found a male preponderance with a male to female ratio of 1.7:1. Present study showed the incidence of all cases in the male sex.[7]

Metastasis: Miller et al, 1987 studied a total of 15 patients of hepatic metastasis. In his study, 10 were males and 15 females with ratio of 2:3. In the present study of 50 cases of hepatic mass lesions, 20 cases were males and 5 females with a ratio of 4:1.

Hepatocellular Carcinoma: Mathieu et al (1984) in his study found 47 males and 15 females with a ratio of 3:1 in his study. Present study showed among 10 cases of hepatocellular carcinoma, 6 were females and 4 males with ratio of 3:2.

Hydatid Cyst: Study of Acunus et al (1992) showed 9 males and 6 females of total 35 cases with a ratio of 3:2. The present study showed that sex of the single case found to be male.[8]

Polycystic Liver Disease: Jeffrey et al (1986) noted a strong male preponderance in his study of polycystic liver disease with a male female ratio 3:1. The present study showed the single case of polycystic liver disease to be male.[9]

Incidence of Disease Profile: The different CT diagnosis in our present study were-Metastatic nodule (25 cases), Hepatocellular carcinoma (10 cases), Amoebic liver abscess

(6 cases), Pyogenic liver abscess (5 cases), Hepatoblastoma (3 cases), and Polycystic liver disease (1 case). The common differential CT diagnosis of hepatic masses found by some other authors are shown below:

Hepatic Masses	Tiderbrant et al, 1988	Present Study
Metastases	32.5%	50%
Hepatocellular carcinoma (HCC)	12.5%	20%
Abscess	7.5%	22%
Hepatoblastoma	-	6%
Polycystic Disease	5%	2%

In the present study, metastatic lesions were the predominant finding as because there is increased number of individuals who are into smoking and alcoholism giving rise to primary cancers of the lung and GIT in a larger population group. Hepatocellular carcinoma also showed a considerable increase in incidence in comparison to other study because of increased incidence of HBV infections and cirrhotic changes in the liver due to rampant alcohol addiction. Detection of cases of abscess were considerably more in the present study in comparison to other studies as because India being a tropical country, incidence of intestinal amoebiasis is more in this region.

Computed Tomographic Findings of Various Hepatic Mass Lesion: Hepatic Metastasis: Density: In the study of Honda et al (1992),[10] out of 28 cases of metastasis, pre-contrast study showed total hypodensity in all the cases. Following IV contrast, 17(61%) cases showed hypodensity, peripheral hyperdensity in 8(29%), total hyperdensity in 1(4%), mixed density in 1(4%), and total isodensity in 1(4%).

In the present study, hypodense lesions were seen in 15 cases out of total 25 metastatic lesions (60%), rest of the 10 cases showed mixed density on NECT scans (40%). In the present study of total 25 metastatic lesions, margins were irregular in 15 cases (60%), ill-defined and irregular in 9 cases (36%), and sharp in 1 case (4%). Levitt et al (1978) metastatic lesions showed irregular margin in 70% cases, ill-defined and irregular in 23% cases, and ill-defined margin in 7% cases.[11]

Hepatocellular Carcinoma (HCC): CT evaluation by Freeny et al (1994)[12] of 93 patients of hepatocellular carcinoma revealed 49% were unifocal with size range of 3.5 to 23 cm in diameter. Contrast enhancement was present in 95% of cases. On the other hand, multilocular tumours were present in 51% of patients, size varied from 1 cm to 16 cm. Post contrast homogeneous enhancement seen in 27% and heterogeneous in 73% of tumours. In the present study, out of total 50 cases studied, 10 cases were of HCC, age group ranging from 40-70 years with a male-female ratio 1:1.5. Single lesions were seen in 9 cases (90%) → unifocal HCC, multiple lesions were seen in 1 case (10%) → multifocal HCC lesion size varied between 5.2 to 2.1 cm. Margins of the lesions were mostly irregular (6 cases=60%) and irregular and ill-defined in (4 cases=40%). In the present study, all the 10 cases of HCC were hypodense on NECT scans. Post IV contrast studies showed inhomogeneous enhancement pattern in all the 10 cases and all the 10 cases of HCC detected by CT were of mixed density. Vascular involvement was not seen in any of the cases in this study.

Amoebic Liver Abscess (ALA): Our study showed hypodensity in all the lesions in pre-contrast phase with 10-24 H.U. attenuation values. Post contrast marginal enhancement was seen in all lesions. Radin et al (1988) found 90% of lesions were hypodense with 10-20 H.U. in pre-contrast phase. Post contrast marginal enhancement was found in 83.3% of the cases. In the present study, solitary lesions were seen in all the 6 cases (100%). Radin et al, (1988) found solitary abscess in 73.9% of cases, 2-5 lesions in 21.7% cases, and more than 15 abscesses in 43% cases.[13] All lesions were located in right lobe of liver in the present study (100%). Radin et al (1988) found 74% of the lesions in RLL, 20% in left lobe, and 7% in caudate lobe. In the present study, size of the lesion varied from 6.0x4.4-3.6x2.8. Lesions were round in 5 cases and oval in 1 case. No internal septations were seen in our study. "Double target sign" or "Hallo Sign" were found in 3 cases (50%). Radin et al (1988) found internal septation in 30% of cases. Double target sign were found in 65% of the cases.

Pyogenic Liver Abscess (PLA): Our study in pre-contrast phase 5 out of total 5 cases of PLA were hypodense lesions and density ranged between 15-25 H.U. Post contrast wall enhancement were seen in all cases and lesions were homogeneously hypodense. "Double target sign" was found in 2 out of the total 5 cases (40%). Cluster sign was seen in 2 out of total 5 cases (40%). Presence of gas bubbles within the lesions were seen in 2 out of total 5 cases.

Mathieu et al (1985) found hypodense lesions (15-30 H.U.) in 66.7% of cases and "double target sign" in 33.3% of cases. No intralesional gas bubbles were noted in his study. The present study showed multiple lesions in 2 case (40%) and solitary lesions in 3 cases (60%). Mathieu et al, (1985) found solitary abscess in 85% of cases and multiple in 10% of cases. Lobar involvement in our study-right lobe of liver was involved in 4 (80%) cases, left lobe no cases (0%), and both the lobes in 1 case (20%) cases. Mathieu et al (1985) found right lobe abscess in 87.5% of cases and left lobe in 20% of cases. Present study revealed various sizes of lesion from 4.0x3.6 cm to 3.2x3.0 cm. Irregular margin was seen 4 out of total 5 cases (80%), well defined and sharp margin in 1 case (20%). No internal septation was present. Mathieu et al (1985) found average diameter of lesions to be 4.5 cm.

Hydatid Cysts: Didier et al, 1984 found heterogeneous hypodense lesion with a density of 30-40 H.U. in 91.7% cases. No significant enhancement was observed after bolus dose of IV contrast. Our study revealed a single case of hydatid cyst, size of the lesion being 4.5 x 4.2 cm. The lesion

was hypodense 5 to 25 H.U. on NECT scans and showed no post contrast enhancement. Absence of internal septations and presence of daughter cysts were noted in that very case. The single case of hydatid cyst was excluded from the study as per the exclusion criteria. Hydatid cyst was diagnosed by the configuration and attenuation values of near water density and visualization of daughter cysts.

Haemangioma: Itai et al 1980 studied 12 cases of haemangioma by CT of them 9 females and 3 males ranging between 38-77 years of age. Pre- and post-contrast images were studied. Lesion size ranging from 1.2-16 cm, calcifications seen in 2 cases. The characteristic feature of centripetal filling in of IV contrast was seen. In our study, 1 case of haemangioma was detected. Size of the lesion was 4.2x4.0 cm. The patient was of the female sex. The case was excluded from the study taking into account the diagnostic features like centripetal filling-in of the iodinated contrast material and persistence of the contrast material on delayed scans.

Hepatoblastoma: In the present study, 3 cases of hepatoblastoma was detected. The study showed a male preponderance (2 males and 1 female) size ranged from 5.1 to 3.4 cm in diameter with evidence of calcification in all the 3 cases. No septation were seen in these 3 cases which correlated with Haas J.E. et al, (1989)

In our study, NECT scans, all the 3 lesions showed hypodensity and on post IV contrast studies the lesions showed inhomogeneous tumour enhancement without vascular involvement by the tumour mass.

Polycystic Liver Disease: Levine et al (1985) studied 15 cases of polycystic liver disease and found multiple cysts (>9) in both lobes of the liver. Size ranging from 2.5 to 1.0 cm lesions were round with regular and sharp margins.

On NECT scans, all the lesions were hypodense (0-15 HU) without any post contrast enhancement. In the present study, multiple lesions were seen in both the lobes of the liver. Sizes of the lesions were between 2.0-1.3 cm. Lesions had regular and sharp margins. NECT scans showed multiple cysts as hypodense lesions (0-12 HU) without any post IV contrast enhancement of the cysts.[14]

Richard et al 1996 [15]showed the sensitivity of CT scan for diagnosis of hepatocellular carcinoma was close to 80%. In the present study, both the sensitivity and positive predictive value of CT scan in the diagnosis hepatocellular carcinoma were 88.88%. U. Scherer et al 1978[16] found sensitivity of CT scan in diagnosing metastatic lesions to be 89%. Carlos et al 1998[17] studied metastatic lesions with CT scan and found a sensitivity of 76% and positive predictive value of 90%. In the present study, sensitivity and positive predictive value of CT scan in diagnosing metastatic lesions were both 95.83% and 95.83% respectively. Balthazar E.J. et al 1994 reported a sensitivity of 97% in case of CT scan in diagnosing amoebic abscesses. Power C. and Ros P.et al 1998 [18]found the sensitivity of CT scan in diagnosing hepatic amoebic abscesses to be more than 90%. In the present study, the sensitivity was 100%. David and Daniel et al 1994 showed diagnostic sensitivity and positive predictive value of CT scan in context to pyogenic liver abscesses to be greater than 90% and 87% respectively. In the present study, the sensitivity and positive predictive value of diagnosing pyogenic liver abscesses by CT scan to be 66.66% and 80% respectively.

Thus, in the present study, the diagnostic sensitivity and positive predictive value of CT scan in different hepatic mass lesions were in conformity with international study values. The aberration of sensitivity values of CT scan in regard to diagnosing pyogenic liver abscesses was probably due to the small study group of the present study and late presentation of cases in the referral hospitals.

SUMMARY: 50 prospective cases of hepatic lesions were studied for one year period from 2015-2016. After brief history taking and clinical examination, the patients were subjected to CT scan. CT-guided FNAC of all the hepatic mass lesions were made and CT diagnosis was correlated with FNAC/HPE diagnosis.

The results of the present study were as follows:

- Age range of the patients was 2-70 (years). Mean age being 52 years.
- 36(72%) patients were male and 14(28%) were females with a male-female ratio of 5:2.
- Increased incidence hepatic mass lesions were seen in the age group 51-60 and 61-70 (34% in each group). No case was found in the 11-20 years age group.
- Hepatomegaly was the commonest presenting feature (74%). Irregular bowel habit was the least common feature (24%).
- Relevant past history (history of jaundice) were positive in 14% cases.
- 42% of patients had a relevant personal history i.e. long continued alcohol/tobacco abuse.
- Lesion location: Right lobe (54%), both lobes (34%), and left lobe (12%).
- Number of lesions: Single lesions in 54% of cases, 46% had multiple lesions.
- Size range of lesions ranged from 2.0 to 12.0 cm.
- Shape of lesions: Round lesions 62% and 38% oval lesions.
- Margins of lesions: Irregular 58%, 30% ill-defined, and 12% of cases had sharp margin.
- Calcification: seen in 6% of cases.
- 72% of cases were hypodense on NECT and was the predominant type of lesion.
- On CECT, inhomogeneous enhancement was seen with 76% cases, marginal enhancement in 62% cases.
- Target and Cluster sign was seen in 9 cases (18%) and 2 cases (4%) of total cases studied.
- Various associated CT findings were seen-Detection of primary tumours 32% cases followed by abdominal lymphadenopathy (12%) cases. Multiple cyst detection in other organ besides liver was the least common finding.

CONCLUSION: The variety of lifestyles viz. alcohol drinking, smoking from an early age, and the tropical climate of eastern India makes the liver susceptible for both benign and malignant diseases. CT being easily available and a fast imaging modality has now made possible diagnosis of hepatic mass lesions with great accuracy, thus ensuring correct patient management. CT also improved tissue harvesting during FNAC from lesions thus improving the accuracy of guided FNAC.

In this study, CT-guided FNAC and HPE findings correlated well with the CT diagnosis of hepatic masses and were in conformity with other available and relevant international studies. This helped in proper diagnosis of these mass lesions and in further management of the patients thereafter.

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