



## ORIGINAL RESEARCH PAPER

### EFFICACY OF MULTIDETECTOR COMPUTED TOMOGRAPHY IN EVALUATION OF FOCAL LIVER LESIONS.

## Radiology

**KEY WORDS:** Liver, Multi Detector Computed Tomography, Metastasis, Hepatocellular Carcinoma, Liver Abscess.

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#### ABSTRACT

Multi Detector Computed Tomography is widely accepted as the state-of-the-art technology for the evaluation of focal liver lesions. The relatively recent introduction of helical CT scanners with heat capacity enables multiple-phase helical examinations of about 20 seconds each with a short time interval. This technology permits examinations of the abdomen in multiple phases with a single monophasic bolus of intravenous contrast material, thus improving lesion detection and characterization of liver tumors. Detection of hepatic lesions with CT is optimized by rapid delivery of iodinated contrast material and scanning during the phase of maximum difference in attenuation between the neoplasm and normal parenchyma. Detection and characterization of both focal and diffuse pathologic conditions in the liver require an understanding of the principles of hepatic perfusion. Normal liver parenchyma receives about 70% of its blood from the portal vein and 30% from the hepatic artery.

#### INTRODUCTION

Aim of the study the efficacy of multidetector ct scans in detection, diagnosis and differentiation of liver lesions .The objectives are to study the enhancement patterns of various liver lesions on triphase mdct scans. To correlate imaging findings with histopathological/surgical/usg/followup whenever possible. To study the prevalence of each of these specific liver masses.

#### Case Study

50 cases referred to the Department of Radio-Diagnosis, with clinically suspected focal liver lesions, or with suspected / proven focal liver lesions with Ultrasound modality. Prospective consecutive sampling of the patients referred for Liver Triphasic CTscan to the Department of Radiodiagnosis and followed by Cyto-histopathology. This prospective observational study was conducted in the Department of Radiodiagnosis in a tertiary care hospital for a period of 24 months.

Adult patients of age group 20-60 years presenting to the surgery department with right upper quadrant of abdomen symptomatology presenting with deranged liver functioner with focal hepatic lesions on abdominal imaging (USG) were included in the study and triphasic Contrast Enhanced Computed Tomography (CECT) scan was done for them followed by biopsy.

#### Inclusion Criteria

- Patients referred to radiology department for Triple phase CT evaluation of hepatic lesions falling under the age group 20-60 years old.
- Patients presenting with abdominal pain, discomfort and / or tenderness more so localized to the right upper quadrant.

#### Exclusion Criteria

- Patients with contraindications for contrast enhanced CT scan Triphasic Protocol (renal failure, bleeding diathesis, pregnancy & previous case of anaphylactic reaction to iodinated contrast)
- Those patients who have not undergone either CT Triphasic or Cyto-histopathology in this institution
- Already proven cases of hepatic tumors by CT scan sorhistopathology.

#### CONCLUSIONS

**Table1: Age Distribution of Subjects. (n=50)**

| Age group(years) | Number | %   |
|------------------|--------|-----|
| 20-40            | 10     | 20  |
| 40-60            | 40     | 80  |
| Total            | 50     | 100 |

**Table2: Gender Distribution of Subjects. (n=50)**

| Gender | Number | %   |
|--------|--------|-----|
| Male   | 34     | 64  |
| Female | 16     | 32  |
| Total  | 50     | 100 |

**Table3: Distribution of Patients According to Addiction. (n=50)**

| Nature of Addiction      | Number | %   |
|--------------------------|--------|-----|
| Smoking and alcohol      | 30     | 60  |
| Tobacco                  | 5      | 10  |
| Not reported addictions. | 15     | 30  |
| Total                    | 50     | 100 |

**Table4: Liver Size Among Participants (n=50)**

| Liver Size | Number | %   |
|------------|--------|-----|
| <15cm      | 10     | 20  |
| >15cm      | 40     | 80  |
| Total      | 50     | 100 |

**Table 5: Number of Lesions Among Study Participants with Focal Lesions(n=50)**

| Number of lesions | Number | %   |
|-------------------|--------|-----|
| One               | 40     | 80  |
| Two               | 7      | 14  |
| Three             | 3      | 6   |
| Total             | 50     | 100 |

**Table 6: Plain(CT)Distribution Among Study Participants with Focal Lesions(n=50)**

| Plain                                  | Number | %   |
|----------------------------------------|--------|-----|
| Heterogeneous                          | 12     | 24. |
| Hypodense with central necrotic areas  | 32     | 64  |
| Hypodense with internal calcifications | 06     | 12  |
| Total                                  | 50     | 100 |

**Table 7: Triple Phase Contrast Features Among Participants with Focal Lesions**

| CONTRAST ENHANCEMENT                           | NUMBER | %  |
|------------------------------------------------|--------|----|
| Arterial                                       |        |    |
| Enhancement Present                            | 37     | 74 |
| • Heterogenous enhancement                     | 12     | 24 |
| • Enhancing wall/capsule                       | 25     | 50 |
| Non-Enhancing                                  | 13     | 26 |
| Centripetal discontinues follows arterial pool | 05     | 10 |
| Venous                                         |        |    |
| • Heterogenous enhancement                     | 14     | 28 |
| • Enhancing wall/capsule                       | 25     | 50 |

|                          |    |    |
|--------------------------|----|----|
| • Target enhancement     | 2  | 4  |
| Delayed                  |    |    |
| • Enhancement Present    | 30 | 60 |
| • Enhancing Central Area | 5  | 10 |
| • Enhancing wall/capsule | 25 | 50 |

Table 8: CT Diagnosis Among Study Participants with Focal Lesions

| CT Diagnosis            | Number | %   |
|-------------------------|--------|-----|
| Abscess                 | 25     | 50  |
| Hemangioma              | 07     | 14  |
| Hepatocellularcarcinoma | 08     | 16  |
| Cholangiocarcinoma      | 04     | 08  |
| Metastasis              | 02     | 04  |
| Hydatidcyst             | 03     | 06  |
| Biliary cystadenoma     | 01     | 02  |
| Total                   | 50     | 100 |

Table 9: Nature of Lesions Among Study Participants with Focal Lesions Based on CT Diagnosis.

| Nature of lesion | Number | %   |
|------------------|--------|-----|
| Benign           | 36     | 72  |
| Malignant        | 14     | 28  |
| Total            | 50     | 100 |

Table10: Cyto-histopathological Diagnosis Among Study Participants with Focal Lesions(n=50)

| Histopathologicaldiagnosis | Number | %   |
|----------------------------|--------|-----|
| Abscess                    | 25     | 50  |
| Hemangioma                 | 07     | 14  |
| Hepatocellularcarcinoma    | 07     | 14  |
| Cholangiocarcinoma         | 03     | 06  |
| Metastasis                 | 04     | 08  |
| Hydatidcyst                | 02     | 04  |
| Biliary cystadenoma        | 02     | 04  |
| Total                      | 50     | 100 |

Table11: Nature of Lesions Among Study Participants with Focal Lesions on Histopathological Correlation. (n=50)

| Nature of lesion | Number | %   |
|------------------|--------|-----|
| Benign           | 36     | 72  |
| Malignant        | 14     | 28  |
| Total            | 50     | 100 |

Table12: CT Diagnosis vs Cyto-histopathology in Focal Liver Lesions(n=50)

| Gold standard           | True Posi-<br>tive | False Posi-<br>tive | False Nega-<br>tive | True Nega-<br>tive | Total |
|-------------------------|--------------------|---------------------|---------------------|--------------------|-------|
| Abscess                 | 25                 | 0                   | 0                   | 25                 | 50    |
| Hemangioma              | 07                 | 0                   | 0                   | 18                 | 50    |
| Hepatocellularcarcinoma | 06                 | 02                  | 01                  | 16                 | 50    |
| Cholangiocarcinoma      | 03                 | 0                   | 01                  | 21                 | 50    |
| Metastasis              | 02                 | 02                  | 0                   | 21                 | 50    |
| Hydatidcyst             | 02                 | 0                   | 01                  | 22                 | 50    |
| Biliary cystadenoma     | 01                 | 0                   | 01                  | 23                 | 50    |

Table 13: Diagnostic Accuracy of CT Diagnosis with Cyto Histopathology in Focal Liver Lesions(n=50)

|                             | Sensi-<br>tivity | Speci-<br>ficity | PPV        | NPV        | Accu-<br>racy | P<br>value |
|-----------------------------|------------------|------------------|------------|------------|---------------|------------|
| Abscess                     | 100%             | 100%             | 100<br>%   | 100<br>%   | 100%          | <0.<br>001 |
| Hemangioma                  | 100%             | 100%             | 100<br>%   | 100<br>%   | 100%          | <0.<br>001 |
| Hepatocellular<br>carcinoma | 85.71<br>%       | 88.89<br>%       | 75.0<br>0% | 94.1<br>2% | 88%           | <0.<br>001 |
| Cholangiocarcinoma          | 75%              | 100%             | 100<br>%   | 95.4<br>5% | 96%           | <0.<br>001 |
| Metastasis                  | 100%             | 91%              | 50%        | 100<br>%   | 92%           | <0.<br>001 |
| Hydatidcyst                 | 67%              | 100%             | 100<br>%   | 95.6<br>5% | 96%           | <0.<br>001 |

|                     |     |      |          |            |      |            |
|---------------------|-----|------|----------|------------|------|------------|
| Biliary cystadenoma | 50% | 100% | 100<br>% | 95.8<br>3% | 96 % | <0.<br>001 |
|---------------------|-----|------|----------|------------|------|------------|

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