

ROLE OF TRI-PHASIC COMPUTED TOMOGRAPHY IN EVALUATION OF HEPATOCELLULAR CARCINOMA PATIENTS WITH LIVER CIRRHOSIS

Naila Tamkeen¹, Ghazala Wahid², Adnan Ahmad³, Mehreen Samad⁴, Mahnoor Rehman⁵, Khushbakht⁶, Maimoona Afsar⁷

ABSTRACT

OBJECTIVES:

To assess the usefulness of Tri-phasic computed tomography in the evaluation of hepatocellular carcinoma in cirrhotic patients.

METHODOLOGY:

This cross-sectional study was carried out in the Radiology and Imaging Department of Hayatabad Medical Complex Peshawar from October 2020 to September 2021 (01 year). Tri-phasic CT was done in all patients. Patients with suspected hepatocellular carcinoma diagnosed by clinical and ultrasonography and having high serum α -fetoprotein levels were enrolled in the study.

RESULTS

Malignant cases on tri-phasic CT were 120(82.8%) while benign cases were 25 (17.2%) Fig-1. In malignant tumor cases, 99(82.5%) patients had hepatocellular carcinoma (HCC), 13(10.8%) had metastases and 8(6.7%) had dysplastic nodule respectively. In benign tumour cases, 15(60%) had regenerative nodules, 6(24%) had hepatic adenoma and 4(16%) had haemangioma. Tri -phasic CT as a tool in the diagnosis of hepatocellular carcinoma in cirrhotic patients showed a sensitivity of 96.8%, specificity of 79.7%, the accuracy of 95%, positive predictive values of 96.2% and negative predictive values of 88.1%.

CONCLUSION

Tri-Phasic CT can be an ideal diagnostic tool for detecting as well as characterizing hepatocellular carcinoma in cirrhotic patients.

KEYWORDS: Cirrhosis, Hepatocellular Carcinoma (HCC), Tri-Phasic Computed Tomography

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Correspondence

²Ghazala Wahid, Assistant Professor, Department of Radiology, Hayatabad Medical Complex Peshawar
☎: +92-321-9861864

✉: ghazalawahid3@gmail.com

¹Assistant Professor, Department of Radiology, Hayatabad Medical Complex Peshawar

³Assistant Professor, Department of Radiology, Hayatabad Medical Complex Peshawar

⁴Associate Professor, Department of Radiology, Hayatabad Medical Complex Peshawar

⁵Assistant Professor, Department of Radiology, Hayatabad Medical Complex Peshawar

⁶Specialist Registrar, Department of Radiology, Hayatabad Medical Complex Peshawar

⁷Specialist Registrar, Department of Radiology, Hayatabad Medical Complex Peshawar

INTRODUCTION

Liver is the major visceral structure in the right hypochondriac region, getting 75-80 % of the total of its blood via the portal vein and 20-25 % from the hepatic artery.¹ Digestion, detoxification, and consequently maintaining physiological balance are the main roles. It can develop a variety of benign and malignant liver abnormalities. Hepatocellular carcinoma (HCC) is a type of liver cancer that occurs most commonly in people who have cirrhosis or chronic liver disease. Cirrhosis, alcohol, HBV, HCV, metabolic liver disorders, environmental toxins, hormone therapies, and smoking are all risk factors.² Cirrhotic livers

account for 90-95 % of hepatocellular carcinomas. Hepatocellular carcinoma is found in 20-40% of cirrhotic patients, according to several studies.^{3,4,5} Over the last 20 years, the global incidence of hepatocellular carcinoma has increased.⁶ Hepatocellular carcinoma is most common in Asia and Africa, where the endemic high incidence of hepatitis B and C significantly predisposes to the development of chronic liver disease and, ultimately, hepatocellular carcinoma.⁷ The hepatic artery supplies primary malignant and metastatic lesions in the liver, whereas the normal parenchyma is supplied mainly by portal blood.⁸ The tri-phasic CT scan of the liver is based on this differential blood supply.⁸ Due to a large number of benign and malignant liver lesions, as well as the predominance of benign lesions, it is critical to distinguish these lesions using non-invasive imaging in diagnosing, prognosticating, designing proper therapeutic strategies, avoiding unnecessary invasive biopsies, and finally in follow-up evaluation and palliative care.^{9,10} With the advancement of imaging technologies, tri-phasic computed tomography has recently emerged as a very sensitive non-invasive approach for diagnosing hepatocellular carcinoma in cirrhotic patients. It also aids in the definition of vascular invasion and capsular delineation, which aids in the classification of lesions.^{11,12} However, very few studies have been conducted in our country to observe the ability of this method to detect hepatocellular carcinoma despite the high prevalence of the malignancy.¹³ The current study was designed to look at the usefulness of tri-phasic CT scans in the evaluation of hepatocellular carcinoma in cirrhotic patients.

METHODOLOGY

This cross-sectional study was carried out in the Department of Radiology and Imaging, Hayatabad Medical Complex Peshawar during the period of October 2020 to September 2021. Ethical approval was obtained from the hospital's ethical committee. Total of 145 cirrhotic patients with suspected hepatocellular carcinoma who were referred to the Radiology department for tri-phasic computed tomography was enrolled. Cirrhotic patients with suspected hepatocellular carcinoma, diagnosed by clinical and ultrasonography and having high serum α -fetoprotein levels were included in the study. Patients having diffuse liver disease, cardiac disease and pregnant women with suspected liver disease, iodinated contrast administration in the previous 48 hours, lithotripsy

in the previous 72 hours and liver biopsy in the previous 24 hours; and with hypersensitivity to CT contrast agents and patients in whom CT is contraindicated due to any other reason were excluded from the study. Statistical analysis was done using SPSS 27.0 for windows. A p-value of ≤ 0.5 was considered statistically significant.

RESULTS

Total of 145 patients was included in the study. Age ranged between 20-75 years with a mean age of 47.5 years. 25 (17.2%) patients belong to the age group 20-30 years, 70 (48.3%) belong to the age group 31-50 year and 50 (34.5%) were in the age group of 51-70 years. 101 (69.7%) patients were male and 44(30.3%) were female. Malignant cases on tri-phasic CT were 120(82.8%) while benign cases were 25 (17.2%) Fig-I. In malignant tumor cases, 99(82.5%) patients had hepatocellular carcinoma (HCC), 13(10.8%) had metastases and 8(6.7%) had dysplastic nodule respectively. In benign tumour cases, 15(60%) had regenerative nodules, 6(24%) had hepatic adenoma and 4 (16%) had haemangioma (table 1). Tri-phasic CT as a tool in the diagnosis of hepatocellular carcinoma in cirrhotic patients showed a sensitivity of 96.8%, specificity of 79.7%, accuracy of 95%, positive predictive values of 96.2% and negative predictive values of 88.1% (figure 2).

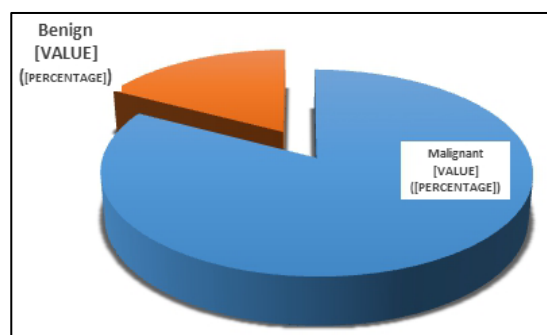


Figure 1: Malignancy & Benign Prediction

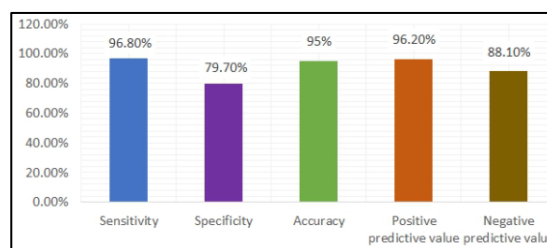


Figure 2: Sensitivity & Specificity of Tri-Phasic CT in Diagnosis of HCC

Table 1: Tumor findings on Tri-Phasic CT

Findings	f	%age
Malignant (n=120)		
Hepatocellular carcinoma (HCC)	99	82.5%
Metastasis	13	10.8%
Dysplastic nodule	08	6.7%
Benign (n=25)		
Regenerative nodule	15	60%
Hepatic adenoma	06	24%
Hemangioma	04	16%

DISCUSSION

The presentation of hepatocellular carcinoma has evolved significantly over the past few decades. Whereas in the past, patients with hepatocellular carcinoma generally presented at an advanced stage, with right-upper-quadrant pain, weight loss, and signs of decompensated liver disease, hepatocellular carcinoma is now increasingly recognized at a much earlier stage as a consequence of the routine screening of patients with known cirrhosis, using advance imaging like tri-phasic computed tomography & ultrasonography with or without serum alpha-fetoprotein (AFP) measurements.¹⁴ The diagnosis of hepatocellular carcinoma can often be established on the basis of noninvasive imaging, without biopsy confirmation. Even when biopsy is needed, imaging is usually required for guidance.¹⁵ It was observed in our study that most of the patient were in 31-50 years age group. The mean age was found 47.5 ± 15.3 years with ranged from 20 to 70 years. Similarly, Hafeez et al observed in a study that the mean was 46.5 ± 13.4 years and all patients of age over 18 years with suspected focal hepatic lesion.¹⁶ On the other hand, Laghi et al found the age range varied from 48-77 years with mean age 61 years.¹⁷ The higher mean age and age range maybe due to geographical variations, racial, ethnic differences, genetic causes, different lifestyle, and increased life expectancy may have significant influence on hepatocellular carcinoma in cirrhotic patients. Our results conclude that more than two third 101(69.7%) patients were male and 44(30.3%) were females. Male female ratio was 2.3:1. Similarly, Laghi et al and Zaky et al were also found male predominance in their respective studies.^{17,18} In the present study, it was observed that in case of detection of HCC in cirrhotic patients tri-phasic CT scan showed a sensitivity of 96.8%, specificity 79.7%, accuracy 95%, positive predictive values 96.2% and negative predictive values 88%. In evaluation of Metastasis, tri-phasic CT had sensitivity 100.0%, specificity 98.3%,

accuracy 98.4%, positive predictive values 75.0% and negative predictive values 100.0%. In evaluation of dysplastic nodule, tri-phasic CT had sensitivity 50.0%, specificity 100.0%, accuracy 98.4%, positive predictive values 100.0% and negative predictive values 98.4%. Li Cs et al evaluate the diagnostic value sensitivity 80.4% and specificity 97.9%, accuracy 88.4%.¹⁹ In another study by Yaqoob J et al sensitivity was 91.9%.²⁰ Caturelli et al also found CT sensitivity 96.0%, specificity 86.0%, and accuracy 91.0%.²¹ So the validity parameter of this study is more or less very close to that of previous studies.

LIMITATIONS

One of the limitations of our study is the limited study population carried out in a single hospital. The patients were not followed to assess the prognosis. Thus to confirm our results, a randomized control trial should be carried out on patients from different hospitals in future.

CONCLUSION

Tri-phasic computed tomography is a useful, reliable, efficient as well as handy and affordable diagnostic modality for patients which enables the characterization of a wide range of hepatocellular carcinomas in cirrhotic patients and can be used to plan the subsequent appropriate management in the majority of cases.

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CONTRIBUTORS	
1.	Naila Tamkeen - Concept & Design
2.	Ghazala Wahid - Drafting Manuscript
3.	Adnan Ahmad - Data Acquisition
4.	Mehreen Samad - Final Approval
5.	Mahnoor Rehman - Data Analysis/Interpretation
6.	Khushbakht - Data Analysis/Interpretation
7.	Maimoona Afsar - Final Approval

