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Original Article

Role of Multi Detector Computed Tomography in the Evaluation of Hepatic Masses

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ABSTRACT

The liver is at risk of various diseases which include benign and malignant. The rich blood is supplied by hepatic artery and portal vein **Objective:** To find the role of multi detector computed tomography in the evaluation of hepatic masses **Methods:** It was a cross-sectional analytical study. It involves 162 patients suffering from liver masses visiting Shalamar hospital, Lahore. Consecutive sampling method was used. Analyses by using SPSS version 21.0. **Results:** In this study, 162 patients visited the Radiological Department because all the patients were suffering from different hepatic masses. Out of 162 patients, 116 patients were males and 46 patients were females. In these 162 patients, 112 patients (69.9%) were suffering from hepatocellular carcinoma (HCC), 55 patients (34%) were suffering from abscess, 42 patients (26.9%) were suffering from multiple cysts, 12 patients (8%) were suffering from Focal Nodular Hyperplasia (FNH), 9 patients (7.4%) were suffering from hemangioma, 4 (2.5%) patients were suffering from hydatid cyst and 2 patients (1.2%) were suffering from lymphoma **Conclusions:** Triple phase Computed Tomography (CT) helps in better diagnosis of different types of hepatic masses and our study concludes that the frequency of HCC is higher than other masses. It also provides information about enhancement of liver lesion with the help of images. CT also helps in diagnosis of different liver lesions in arterial, venous and delayed phase.

INTRODUCTION

Hepatocellular carcinoma (HCC) is the maximum not unusual cancer inside the liver [1]. HCC is more common in males than females. The occurrence of HCC is higher than other hepatic masses. The liver organ is the largest organ and the most important gland in the human body. Its function is to metabolize the nutrients and excrete the waste. It performs a role in metabolic detoxing's. Liver excrete the bile, stores vitamins, and metabolize bilirubin. It comprisies of 2% of overall weight in adults. Liver weight within the woman is about 1400g while in the male is 1800g [2]. The liver is scanned in the arterial phase at 35-40 sec after contrast injection. Hepatic veins are extra suited in this phase. Hepatic parenchyma is more desirable in portal phase. Hypo-vascular lesions are visible on these phases. Delayed or equilibrium phase is obtained 2-10 minutes after the contrast injection. Those tumors have become visible on delayed phases. After 10 minutes, the contrast is washed out swiftly [3]. These lesions may be benign or malignant. The prevalence of various liver lesions has different geographic areas throughout [4]. The focal liver lesion metastases is more prevalent in Europe and the United States. In Pakistan it's occurrence is 8-10% [5]. In an affected person without recognizing most cancers, those lesions generally may be evaluated with serial follow-up imaging. In sufferers with most cancers, however, the prompt dedication of the purpose of such lesions can be pivotal for defining diagnosis and therapy. Benign hepatic tumors prevalence 52% of the overall population [6]. It is critical to distinguish between

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benign and malignant. It is regularly hard to symbolize hepatic lesions with various imaging studies. Histopathology is the gold standard to dictate hepatic lesions. Histopathology is the gold standard, biopsy is always not possible as it is an invasive technique. The liver receives approximately 30% of its blood supply from the hepatic artery. Approximately, 70% of blood is delivered from the portal vein. The liver masses get 80-95% of their blood from the hepatic artery. The maximum common place benign focal liver lesions are cysts, hemangiomas, and focal nodular Hyperplasia. The characterization of these lesions is important [7]. The liver tumors receive their blood supply from the hepatic artery. Hyper vascular tumors like HCC are greater distinguished within the arterial segment. Hypo vascular tumors like most metastatic lesions can emerge as conspicuous within the later section known as Porto venous segment. Hence presently multiphasic comparison-stronger dynamic CT of the Whole liver has shown promise in the higher characterization of the morphology of hepatic tumors. CT is a super imaging approach. Recent research has moreover counseled and developed in lesion detection. Portal venous phases in particular inside the presence of hyper-vascular neoplasms, such as HCC. The motive in the back of the protocol is that the portal segment is the most sensitive segment for lesion detection, while the arterial land equilibrium levels can deliver extra records on the vascularity of the lesion which may also moreover help to find out the character of the lesion. Vascular hemodynamics is to characterization the hyper-vascular lesions. Triphasic CT is characterizing and differentiates benign and malignant lesions. The capability to scan the liver in the course of the arterial segment, portal venous phase of enhancement, and the capability introduced cost. Delayed section pix increase the lesion diagnostic self-belief. CT Scanning the liver allows the detection of each hyper vascular and hypo vascular tumor. The liver is the most important organ in the abdomen occupying a maximum of the upper right quadrant. Medially to the liver is the belly, duodenum, and transverse colon. Inferiorly to the hepatic flexure of the colon, kidney, and adrenal glands. The liver is attached to the diaphragm by the falciform ligament. The Liver has the main feature in the detoxing of blood. The liver is considered one of the most important organs inside the frame is a huge arrange of benign and malignant neoplasms. It is one of the commonest websites of metastatic neoplasm of primary tumors elsewhere. Complex diffuse illnesses like cirrhosis and chronic viral infections additionally affect it. The twin vascular delivery of the liver is essential for neoplasm selection. Before surgical remedy of liver tumors, it's miles critical to detect, symbolize, and localize them. The liver lesions as benign and malignant are vital to dictate for the sufferers who come for surgical or non-surgical therapies. During embryonic development, the liver primordium first seems as a thickening of the endodermal cells on the ventral surface of the maximum caudal part of the foregut, in which the foregut will become non-forestall with the stalk of the yolk sac. As the one's cells proliferate, they shape a hepatic diverticulum or liver bud, which extends into the septum transversum as strands of swiftly proliferating cells. Larger cranial liver primordium gives rise to the interlacing cords of hepatic cells and the intrahepatic portion of the biliary device[8,9]. Although modern literature shows that MRI has a comparable charge in detection and classification of focal liver lesions, but, speedy availability and short scanning time made CT a perfect imaging approach[10-12]. Recent studies have additionally improved lesion detection if arterial section imaging is executed further to portal venous imaging in the presence of hyper-vascular neoplasms, which includes Hepatocellular carcinoma [13-15]. We evaluated a triphasic spiral computed tomogram approach that allowed imaging of the entire liver in arterial, portal, and equilibrium levels. The cause in the back of the protocol is that the portal phase is the maximum touchy phase for lesion detection. The arterial and equilibrium stages deliver extra data of delivery to the lesion. Vascular hemodynamics is the key to detecting the characterization of hyper vascular lesions [16-18]. This study mainly aimed to assess the diagnostic performance of CT scans in the detection of hepatic masses. In our research, we have found the frequency of hepatic masses with the help of CT scan.

METHODS:

The cross-sectional study was conducted in radiological department of Shalimar hospital, in the period, (from 14th September 2021 to 22nd November 2021). Patients with hepatic masses visited the hospital and among these patients 162 patients were included in our study. Among these 162 patients, 116 patients were males and 46 were females. All the relevant features of the patients like age, sex and characterization of liver lesions were recorded. Contrast were given to the patients and images of masses were taken in arterial, venous and delayed phase. The diagnostic accuracy of CT to identify liver lesions and data analysis was calculated using SPSS Version 17.0.

RESULTS:

Most common clinical presentation was jaundice (73%) followed by pain (88.9%), Hematemesis is 32%,Abdominal Distension 84%, Vomiting 87%. The mean and standard deviation for age were 60.5 ± 13.06 years.

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Age Years	N (%)
30-40	12(26)
40-60	69(33)
>60	74(22)
Gender	
Male	116 (71.6)
Female	46 (28.4)

Table 1: demographic details of study participants

Complaints	N (%)
Abdominal Pain	144(88.9)
Abdominal Distension	136 (84.0)
Hematemesis	52(32)
Jaundice	119(73)
Renal Colic	45(27)
Vomiting	142(87)

Table 2: Distribution of subjects according to the complaints

Lesions	Lesion category	N (%)
HCC	Malignant	112(69.8)
Abscess	Benign	55(34)
Cyst	Benign	42(25.9)
FNH	Benign	12(7.4)
Hemangioma	Benign	9(5.6)
Hydatid cyst	Benign	4(2.5)
Lymphoma	Malignant	2(1.2)

Table 3: Distribution of hepatic masses

In this study, 162 patients were detected with hepatic masses. Most common clinical presentation was jaundice (73%) followed by pain (88.9%), hematemesis is 32%, abdominal Distension 84%, vomiting 87% (Table 2). The mean and standard deviation for age were 60.5 ± 13.06 years. Out of 162 patients, 116 patients were males and 46 patients were females (Table 1). Symptoms that appeared in the patients were abdominal pain, abdominal distension, hematemesis, jaundice, renal colic and vomiting. Out of these 162 patients, 112 (69.9%) patients were suffering from HCC (Table 3). Among these patients, 43(26.5%) patients were suffering from a cyst, abscess, and HCC, and 69(42.5%) patients were having only HCC in the liver. 55(34%) patients were suffering from abscesses (Table 3). Among these patients, 41(25.3%) patients were having abscess, cyst and HCC. 14(8.6%) patients were having only abscesses. 42(26.9%) patients were suffering from multiple cysts (Table 3). Among these patients, 27(16.6%) patients were having cysts, abscesses, and HCC. 15(9.2%) patients were having only cysts. 12(8%) patients were suffering from FNH, 9(7.4%) patients were suffering from hemangioma, 4(2.5%) patients were suffering from hydatid cyst and 2(1.2%) patients were suffering from lymphoma (Table 3). The data of patients shows that the percentage of HCC is more as compared to the other liver masses. In our study, out of 162 patients, 125(77.1%) patients were having single lesions in their liver and 37(22.8%) patients were detected with multiple lesions in the liver. The occurrence of male patients with hepatic masses was high as compared to female patients (Table 1).

DISCUSSION

Triphasic computed tomography is a standardized procedure for the detection of different types of hepatic masses in the liver. With the help of this technique, different types of hepatic masses can be treated and also provide information about a variety of hepatic masses. Spiral computed tomography is used for liver assessment as it provides a better image of the parenchyma of the liver. And fast data acquisition provides better images of liver masses at arterial, venous, and delayed phase [19]. HCC is the most common liver cancer and its prevalence is high in males as compared to females. On NCCT, eight lesions have been hypo dense (61.5 %). All lesions confirmed early enhancement (one hundred %) in the arterial section with fast washout in Porto venous segment. All lesions were hypo dense is not on time phase (a hundred %). Comparable findings have been defined with the aid of Lee et al. [20]. In our study, 112(69.8%) patients were detected with HCC, and they showed better enhancement during the arterial phase. Lesions are hypo dense during the delayed phase and showed capsular enhancement in the delayed phase. HCC is the most common hepatic mass but another metastatic lesion such as abscess also has a high prevalence in patients.It appears as dark fluid in the liver on CT. In our study 55(34%) patients were detected with abscesses. An abscess appears as hyper dense fluid in the arterial phase, venous and delayed phase. Hepatic cysts are with well-defined margins. They are anechoic structures and show posterior acoustic enhancement and they demonstrate homogenous hypo attenuation around 0-10HU. In our study, 42(25%) patients were having multiple benign cysts that appeared as anechoic structures on CT. And the cyst only shows enhancement when there is no administration of contrast. In our study. The lesion was misdiagnosed as other benign lesions, as the central scar was not well appreciated in very small-sized FNH [21]. In our study 12(7.4%) patients were detected with FNH, it is a benign-tumor-like mass in the liver which shows bright contrast enhancement in the arterial phase and shows mild enhancement in the delayed phase. In our study, 9(5.6%) patients were suffering from hemangioma, which is a benign lesion and appeared as

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discontinuous, peripheral enhancement on late arterial phase, peripheral enhancement on portal venous phase, and in the delayed phase, they were hypo attenuating to liver parenchyma [22]. Hydatid cysts are very rare in patients with hepatic masses. On CT it is detected as calcification of cystic walls with internal septa. It also demonstrates a high attenuation wall at unenhanced CT without calcification. In our study, only 4(2.5%) patients out of 162 patients were detected with hydatid cyst. And it is not like other cysts because they consist of separations or septa. And it appeared as a hypoechoic thin-walled structure in the arterial, venous, and delayed phase. Mostly the benign lesions in the liver do not cause any symptoms, and people find their benign lesions when they go for imaging tests such as CT. In our study, only 2 patients were detected with lymphoma. It was multiple or solitary, hypoechoic, or nearly anechoic mass. The nodules were of low attenuation on undeniable CT and can show minimal enhancement. Thus, triple-section CT has a high accuracy of diagnosing a hepatic mass by way of triphasic CT-96.5%, a cost corresponding with Chauhan U et al, study [23]. In our study, 37 patients were detected with multiple lesions of the liver. Some patients were having HCC and multiple cysts and some patients were having abscesses, cysts, and HCC. Out of 162 patients, 125 (77.1%) patients were having single lesions in their liver and 37(22.8%) patients were detected with multiple lesions in the liver.

CONCLUSION

Triple phases CT helps in better diagnosis of different types of hepatic masses and our study concludes that the prevalence of HCC is higher than other masses.

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