ORIGINAL ARTICLE

CT-Scan Findings of Patients Presented with Hepatic Mass attended at Tertiary Care Hospital in Bangladesh

Wahida BEGUM[1], Khondker Shaheed HUSSAIN[2], Tariqul ISLAM[3], Sharmin Sultana RUPA[4]

[1]Assistant Professor, Department of Neuro-Radiology & Imaging, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; [2]Assistant Professor, Department of Cardiology, National Institute of Cardiovascular Diseases & Hospital, Dhaka, Bangladesh; [3]Junior Consultant, Department of Neuro-Radiology & Imaging, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; [4]Associate Professor, Department of Radiology & Imaging, Popular Medical College Hospital, Dhaka, Bangladesh

Abstract

Background: CT-scan findings give a well delineated impression on hepatic mass. **Objective:** The purpose of the present study was to observe the CT-scan findings of hepatic mass. **Methodology:** This cross sectional study was carried out in the department of Radiology and Imaging MMC in collaboration with the same department of BSMMU, DMC, Dhaka during the period of 1st January 2006 to 31st December 2007 to establish the usefulness of CT scan in the diagnosis of hepatic mass and its validity by determining sensitivity, specificity, PV, NPV, and accuracy. A total of 50 patients were admitted in the Department of Medicine and Department of Hepatobiliary of MMCH, BSMMU, and DMCH with the clinical diagnosis of fever, abdominal pain, anorexia, nausea/vomiting, loss of appetite, jaundice, weight loss and ascites. They were sent to the department of Radiology and Imaging and of respected hospitals for CT evaluation, confirmation and to see the extension for planning of proper management. **Result:** A total number of 50 hepatic mass patients were recruited in this study. CT findings of all patients showed 29 had lesions on right lobe, six patients had on left lobe and 15 patients had lesion on both lobe (p value <0.05). Among all patients 28 had multiple lesion, of them 71.4% was malignant and 28.6% was benign. On the other side 22 patients had solitary lesion, of them 36.4% was malignant and 63.6% was benign (p value <0.05). Among all malignant lesions 17 (60.7%) were hypodense, followed by 6 (21.4%) were isodense and 5 (17.9%) had mixed pattern of density. 12 (42.9%) patients of malignant diseases had ill-defined margin and 16 (57.1%) had well defined margin. 6 (27.3%) patients of benign lesions had ill-defined and 16 (72.7%) had well defined margin. No significant difference was observed. All malignant lesions (100%) and 77.3% benign lesions were enhanced after giving contrast. 16 (57.1%) malignant lesions were mildly enhanced, 10 (35.7%) were moderate and 2 (7.1%) were intensely enhanced. On the other side 8 (47.1%) benign lesions were mild, 35.5% were moderate and 3 (17.6%) were intensely enhanced. **Conclusion:** In conclusion hepatic mass is more common in right lobe of the liver of which multiple lesion is commonly found. [J Curr Adv Med Res 2015;2(1):7-11]

Keywords: Hepatic mass, CT-scan findings, metastasis

Introduction

Hepatic mass is very common findings of the sinologist[1]. Once a mass is found in liver the radiologist have to determine its nature solid or cystic, benign or malignant, single or multiple and its extension into the surrounding structure by using means that are both precise and economic[2]. Imaging procedures used to detect hepatic mass includes ultrasound (US), computed tomography (CT), magnetic resonance imaging (MRI), Hepatic artery angiography and radionuclide scan. Since the liver is a large solid organ of soft tissue composition it is uniquely suited to examine by computed tomography[3]. The combination of rapid bolus injections of urographic contrast medium and timed sequential computed tomography (CT) scans permits recognition of different patterns of enhancement[4]. Varying amounts of liver glycogen in fasting and recently fed patients may affect hepatic CT attenuation values and CT members vary with variations in fat contact[5]. Contrast enchantment pattern of hepatoma, hemangioma and metastases seen on two phase dynamic incremental CT scans are useful in the differential diagnosis of these tumours. Computed tomography has been highly useful in detecting liver tumours and in determining their extent. CT scan can show a well circumscribed and often encapsulated mass has a low density on non-contest phase, a marked centripetal pattern of enhancement on a phase and a central necrotic area or calcifications[6]. On non-constant enhanced CT, most lesions appear as either hypodense or insodense with adjacent parenchyma, unless fresh hemorrhage or calcification is present, which can increase the attenuation. Due to increased vascularity same metastasis may not be well demonstrated with contrast CT, as they rapidly become isodense with normal liver[7]. CT scanning before and after I/V administrative of contrast agent is an excellent method of evaluating hepatic lesion. Cystic lesions were readily identified and abscesses are usually distinguished from tumours. Hepatic mass lesion among the Bangladeshi population is reported; however, their CT-scan findings are very important. Therefore, this present study was undertaken to observe the CT-scan findings of hepatic masses.

Methodology

This cross sectional study was carried out in the Department of Radiology and Imaging of three tertiary care hospitals in Bangladesh named as Mymensingh Medical College Hospital, Mymensingh; Dhaka Medical College Hospital, Dhaka and Banghabandhu Sheikh Mujib Medical University (BSMMU), Dhaka in collaboration with the Department of Pathology of the same institute for histopathological diagnosis from 1st January 2006 to 31st December 2007 for a period of 2 years. All the clinically suspected patients having hepatic mass at any age with both sexes who were attended in three hospitals were taken as study population as per inclusion and exclusion criteria. Patients having hepatomegaly due to extra hepatic causes, patients who refused to undergo CT-scan, patients who refuse to do biopsy or whose biopsy result was not available and patients having known hypersensitivity reaction to contrast agent were excluded from this study. Purposive sampling technique was used to collect the patients. Prior to the commencement of this study, the research protocol was approved by the ethics review committee of the respective hospital. Each patient was undergone CT examination of hepatobiliary system (HBS) at the Department of Radiology and Imaging. All CT-scan were performed with a third generation CT-scan (Siemans). Somatom (2-5) mm thick contiguous slice were taken. These scan were obtained using 120 kv, 75 mm and 0.8 see scanning time for 2 slice. Both pre and post contrast were performed. Oral contrast medium was routinely administrated before the examination. Immediately after completion of bolus injection 8mm contiguous slice were obtained through the upper abdomen by CT-scan. All collected biopsy tissues were sent for histopathological examination in the histopathology department of respective hospital and collected reports were compared with CT-scan diagnosis. Percentages were calculated to find out the proportion of the findings. Further statistical analysis of the results was done by computer software devised as the statistical package for the social sciences (SPSS, win version 13). For significance of differences was done using Student's t test and Chi-square test where applicable. Statistical significance was set at p value less than 0.05 and confidence interval was set at 95% level. All probability values quoted were 2-tailed.

Result

A total number of 50 clinically diagnosed hepatomegaly patients those who attended Radiology and Imaging Department of Mymensingh Medical College Hospital (MMCH), Mymenshigh, Dhaka Medical College Hospital, BSMMU, Dhaka were enrolled in the study. The mean age of the respondents was 51.28 years. Males were more than females. The following observations were made. Statistical analysis of patients of both sex has revealed that they were within similar age distribution (p value= 0.617). Mean age of male was 50.78 years with a std. deviation of $\pm$ 13.68 whereas female was 53.3 years with std. deviation of $\pm$ 16.11 years.

Table 1: Age of the patients (n-50)

Age (year)	Mean ± SD	Range
Male (n=40)	50.78±13.68	22-78
Female (n=10)	53.30±16.11	17-75
Total	51.28 ±14	17-78
t value=-0.504, df=48, p value=0.617		

Age range of the total patients was 17 year to 78 years. Maximum patients were within 56 to 65 years age range. 15 (30%) patients were within 56 to 65 years age range followed by 13 (26%) were 46 to 55 years and 8 (16%) patients were 36 to 45 years age range (Table 1).

Table 2: Distribution of lesion on CT according to malignant and benign lesion

Site of lesion	Histopathological diagnosis		Total n (%)
	Malignant n (%)	Benign n (%)	
Right lobe	12 (41.4)	17 (58.6)	29 (100.0)
Left lobe	4 (66.7)	2 (33.3)	6 (100.0)
Both lobe	12 (80.0)	3 (20.0)	15 (100.0)
Total	28 (56.0)	22 (44.0)	50 (100.0)

*Chi square value=6.229, df=2, p value=0.043

CT findings of all patients showed 29 had lesions on right lobe, of them 12 (41.4%) were malignant and 17 (58.6%) were benign, six patients had lesion on left lobe (66.7% malignant and 33.3% benign), and 15 patients had lesion on both lobe, of them 12 (80%) were malignant and 3 (20%) were benign. Distribution was statistically significant (p<0.05) (Table 2).

Table 3: Number of lesion on CT according to malignant and benign lesion

Number of lesion	Histopathological diagnosis		Total n (%)
	Malignant n (%)	Benign n (%)	
Multiple	20 (71.4)	8 (28.6)	28(100.0)
Solitary	8 (36.4)	14 (63.6)	22 (100.0)
Total	28 (56.0)	22(44.0)	50(100.0)

*Chi square value=6.148, df=1, p value=0.013

Among all patients 28 had multiple lesion, of them 71.4% was malignant and 28.6% was benign. On the other side 22 patients had solitary lesion, of them 36.4% was malignant and 63.6% was benign. Statistically significant difference was observed in term of number of lesions (p<0.05) (Table 3).

Table 4: Density of lesion on CT according to malignant and benign lesion

Density	Histopathological diagnosis		Total n (%)
	Malignant n (%)	Benign n (%)	
Hypodensity	17 (60.7)	18 (81.8)	33 (70.0)
Isodense	6 (21.4)	0 (.0)	6 (12.0)
Hyperdensity	0 (.0)	1 (4.5)	1 (2.0)
Mixed	5 (17.9)	3 (13.6)	8 (16.0)
Total	28 (100.0)	22(100.0)	50(100.0)

*Chi square value=2.851, df=3, p value=0.425

Among all malignant lesions 17 (60.7%) were hypodense, followed by 6 (21.4%) were isodense and 5 (17.9%) had mixed pattern of density (Table 4). 12 (42.9%) patients of malignant diseases had ill defined margin and 16 (57.1%) had well defined margin. 6 (27.3%) patients of benign lesions had ill defined and 16 (72.7%) had well defined margin. No significant difference was observed (Table 5).

Table 5: Margin of the lesion on CT according to malignant and benign lesion

Margin of the lesion	Histopathological diagnosis		Total n (%)
	Malignant n (%)	Benign n (%)	
Ill defined	12 (42.9)	6 (27.3)	18 (36.0)
Well defined	16 (57.1)	16 (72.7)	32 (64.0)
Total	28 (100.0)	22 (100.0)	50 (100.0)

*Chi square value=1.299, df=1, p value=0.254

Discussion

Hepatic masses come to clinical attention when these are felt by the patient as well as discover on physical examination by the physician or most commonly detected on diagnostic radiological studies[8]. Technologic advances and the expanded use of imaging modalities have led to the increased documentation of hepatic masses[9]. This study was carried out to determine the accuracy of CT scan examination for the evaluation of hepatic masses and it's correlation with histopathological examinations. Subjects of this study were taken from Mymensingh Medical College Hospital, Mymensingh Dhaka Medical College Hospital, BSMMU, and BIRDEM, Dhaka. During the study period from 1st January 2006 to 31st December 2007, total 50 cases were studied

who had undergone CT examinations of hepatobiliary system.

Mean age of male of present study was 50.78 years with a std. deviation of ± 13.68 whereas female was 53.3 years with std. deviation of ± 16.11 years. Age range of the total patients was 17 year to 78 years. Maximum patients were within 56 to 65 years age range. 30% patients were within 56 to 65 years age range followed by 26% were 46 to 55 years and 16% patients were 36 to 45 years age range. Statistical analysis of patients of both sexes has revealed that they were within similar age distribution (p value 0.617). Liver mass can occur in a person of any age; however the incidence is more common in middle aged and elderly persons[10]. In their study age of the patients varied from 20-75 years. Most of the patients were found between 41-50 years. These results were nearly comparable with present study. In the USA and Western Europe[11], HCCs are seldom encountered before the age 60 with male and female ratio of about 6:1 to 8:1. In Africa and Asia[12] this form of cancer occurs in younger individuals often between 20 and 40 years age with a male: female ratio about 3:1 to 4:1. Out of 50 patients of present study 40 were male and 10 were female with a male and female ratio 4:1. This result was consistent with Saad et al[12]. They found males were affected more than females (3:1). In another study it has been reported that male and female ratio of hepatic masses was 6:1 in Bangladeshi people[13].

CT findings of all patients showed 29 had lesions on right lobe, of them 12 (41.4%) were malignant and 17 (58.6%) were benign, six patients had lesion on left lobe of which 66.7% malignant and 33.3% benign, and 15 patients had lesion on both lobe, of them 12 (80%) were malignant and 3 (20%) were benign. Distribution was statistically significant (p<0.05). These findings were consistent with Saad et al[12]. They also reported similar findings of more right lobe involvement. It has been found that 46% hepatic masses were unifocal and 54% were multifocal. Among all patients of present series 28 had multiple lesions, of them 71.4% was malignant and 28.6% was benign. On the other side 22 patients had solitary lesion, of them 36.4% was malignant and 63.6% was benign (p<0.05).

Among all malignant lesions 60.7% were hypodense, followed by 21.4% were isodense and 17.9% had mixed pattern of density. Saad et al[12] described 76% hepatic lesions were hypodense, 7.6% hyperdense and 15% isodense. CT finding of early HCC were usually isodense with respect to surrounding liver on unenhanced, early enhanced and late enhanced CT

scans. This pattern was seen in 46% of 37 lesions in a study conducted by Takayasu et al[14]. In malignant lesions ill-defined margin was observed in 12 (42.9%) patients and well defined margin was observed in 16 (57.1%) patients. 6 (27.3%) patients of benign lesions had ill defined and 16 (72.7%) had well defined margin (p value >0.05).

On CT, most lesions are visible on arterial phase imaging (80%), with washout of contrast in the portal venous phase. The appearance of the lesion on CT varies primarily with size; small lesions are more homogenous, while large lesions may exhibit mosaic pattern due to necrosis and fatty change[15]. Present study revealed that all malignant lesions (100%) and 77.3% benign lesions were enhanced after giving contrast. 57.1% malignant lesions were mildly enhanced, 35.7% were moderate and 7.1% were intensely enhanced. On the other side 47.1% benign lesions were mild, 35.5% moderate and 17.6% were intensely enhanced. Out of 28 patients of malignant diseases, maximum 46.4% patients had heterogeneous appearance followed by 42.9% had homogenous, 7.1% had rim and 3.6% had nodular pattern after enhancement. Among all benign lesions 58.8% had rim enhancement followed by 17.6% had homogenous, similar number had heterogeneous and 5.9% had nodular enhancement (p<0.01). 39.3% malignant lesions and 4.5% benign lesions has given pressure effect on biliary apparatus. Statistical significant difference was seen in term of pressure effect on biliary apparatus (p<0.05). 35.7% malignant lesions and 4.5% benign lesions had lymphadenopathy. Statistical significant difference was seen in term of lymphadenopathy (p<0.05). Tumour invasion of the portal vein, and less often the hepatic vein or Inferior vena cava, occur, and show as distension of the vein with a filling defect on contrast-enhanced CT[16]. 14.3%, 10.7%, and 7.1% patients of current series had portal vein, hepatic vein and IVC invasion respectively. No patients had benign lesions had similar vein invasions.

Conclusion

The results of the present study therefore conclude that CT is a useful modality for the diagnosis of hepatic masses both malignant and benign. Since the CT diagnosis correlate with histopathological connection it is a sensitive modality on the basis of the above findings.

References

1. Wilson SR, Burns PN. Liver mass evaluation with ultrasound: the impact of microbubble contrast agents and

pulse inversion imaging. In, Seminars in liver disease; 2001:147-159

2. Machi J, Uchida S, Sumida K, Limm WML, Hundahl SA, Oishi AJ, Furumoto NL, Oishi RH. Ultrasound-guided radiofrequency thermal ablation of liver tumors: percutaneous, laparoscopic, and open surgical approaches. Journal of Gastrointestinal Surgery 2001;5:477-489

3. Harvey CJ, Albrecht T. Ultrasound of focal liver lesions. European radiology 2001;11:1578-1593

4. Sahani DV, Holalkere N-S, Mueller PR, Zhu AX. Advanced Hepatocellular Carcinoma: CT Perfusion of Liver and Tumor Tissueâ€"Initial Experience 1. Radiology 2007;243:736-743

5. Mortel KJ, Ros PR. Cystic Focal Liver Lesions in the Adult: Differential CT and MR Imaging Features 1. Radiographics 2001;21:895-910

6. Bruix J, Sherman M, Llovet JM, Beaugrand M, Lencioni R, Burroughs AK, Christensen E, Pagliaro L, Colombo M, Rods J. Clinical management of hepatocellular carcinoma. Conclusions of the Barcelona-2000 EASL conference. Journal of hepatology 2001;35:421-430

7. Teefey SA, Hildeboldt CC, Dehdashti F, Siegel BA, Peters MG, Heiken JP, Brown JJ, McFarland EG, Middleton WD, Balfe DM. Detection of Primary Hepatic Malignancy in Liver Transplant Candidates: Prospective Comparison of CT, MR Imaging, US, and PET 1. Radiology 2003;226:533-542

8. Burns PN, Wilson SR. Focal Liver Masses: Enhancement Patterns on Contrast-enhanced Imagesâ€"Concordance of US Scans with CT Scans and MR Images 1. Radiology 2007;242:162-174

9. Massoptier L, Casciaro S. A new fully automatic and robust algorithm for fast segmentation of liver tissue and tumors from CT scans. European radiology 2008;18:1658-1665

10. Assy N, Nasser G, Djibre A, Beniashvili Z, Elias S, Zidan J. Characteristics of common solid liver lesions and recommendations for diagnostic workup. World journal of gastroenterology: WJG 2009;15:3217

11. Perini MV, Herman P, D'Albuquerque LAC, Saad WA. Solitary fibrous tumor of the liver: report of a rare case and review of the literature. International journal of surgery 2008;6:396-399

12. Saad NEA, Saad WEA, Davies MG, Waldman DL, Fultz PJ, Rubens DJ. Pseudoaneurysms and the Role of Minimally Invasive Techniques in Their Management 1. Radiographics 2005;25:S173-S189

13. Nair A, Kuban BD, Tuzcu EM, Schoenhagen P, Nissen SE, Vince DG. Coronary plaque classification with intravascular ultrasound radiofrequency data analysis. Circulation 2002;106:2200-2206

14. Colli A, Fraquelli M, Casazza G, Massironi S, Colucci A, Conte D, Duca P. Accuracy of ultrasonography, spiral CT, magnetic resonance, and alpha-fetoprotein in diagnosing hepatocellular carcinoma: a systematic review. The American journal of gastroenterology 2006;101:513-523

15. de Ladinghen V, Laharie D, Lecesne R, Le Bail B, Winnock M, Bernard P-H, Saric J, Couzigou P, Balabaud C, Bioulac-Sage P. Detection of nodules in liver cirrhosis: spiral computed tomography or magnetic resonance imaging? A prospective study of 88 nodules in 34 patients. European journal of gastroenterology & hepatology 2002;14:159-165

16. Zacherl J, Scheuba C, Imhof M, Zacherl M, Longle F, Pokieser P, Wrba F, Wenzl E, Mahlbacher F, Jakesz R. Current value of intraoperative sonography during surgery for hepatic neoplasms. World journal of surgery 2002;26:550-554