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Clinicoradiological Evaluation Of Patients At Jabalpur (M.P.) Presenting With Right Hypochondrial Liver Masses With Special Reference To Ultrasonography.

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ABSTRAC T : Ultrasound is a diagnostic tool for various abdominal disorders. With induction of ultrasound in medical practice, ultrasonography has replaced conventional radiography to become mainstay of route in radiological examination of patient with mass in any region of the abdomen. Ultrasonography play an important role in detecting liver masses. Sonography along with other imaging modalities play an important role in early diagnosis of liver masses before advancement of the mass. Liver cancer represents the second leading cause of mortality in men and the sixth cause of women world wide.(Bosch FX et al)(1).

MATERIAL AND METHODS:

This prospective study was conducted in Radiodiagnosis Department of NSCB Medical College Jabalpur in September 2004 to September 2005. (one year duration). The data were collected from the study conducted by me during my post graduation period from September 2003 – September 2006. Total of 50 cases were taken for this study. The study included patient reffered to ultrasound examination of liver from various department of our institute with pain and lump in right hypochondrium.

RESULTS:

A total of 50 cases were included for observation. This study group consist of all the patients in age group ranging from 20-65years.The total benign and malignant lesions constituted 52% and 48% respectively. Most of benign masses observed in younger age group less than 40 years where as majority of malignant masses were seen in cases older than 50years. Maximum number of the benign lesion were liver abscess 18(36%), followed by haemangioma 6 (12%), and hydatid cyst 2(4%). Most of malignant lesions were liver metastasis 12 (24%), hepatocellular carcinoma 10(20%),and cholangiocarcinoma were 2(4%) observed in elder people.

CONCLUSION:

The objective of this study was to diagnose and analyse the sonographic pattern of various right hypochondrial masses arising from liver, by performing USG as the initial imaging screening modality .

Key words: Abscess ,Haemangioma, Hepatocellular carcinoma. USG HCC FNAC.

BACKGROUND:

The liver is one of the most complex organ in the body .Liver masses includes the heterogenous group of pathology from solitary benign lesion to multiple metastasis from a variety of primary tumor.(Dr Henry Knipe and Dr Jeremy Jones et al) (2).Ultrasonography is a first line modality for examination of liver because it is low in cost, convenient to use and does not expose the patient to radiation. With appropriate interpretation of the clinical history and physical examination and the judicious use of laboratory and imaging studies , the majority of liver masses can be characterized noninvasively. The liver masses are classified as benign or malignant. Benign hepatic lesion can be either solid or cystic, within these types the sub type include liver abscess (the most common), hemangioma, hydatid cyst, focal nodular hyperplasia, focal fatty changes and bile duct cyst (Cogley JR et al and Noult JC et al) (3,4) . Ultrasound elastography is a new imaging technique that allow a non invasive estimation and imaging of tissue elasticity distribution within biological tissue using conventional real time ultrasound equipment with modified software.(Liana G et al) (5)

AIMS AND OBJECTIVE: To evaluate the ultrasonographic feature of liver masses presenting in right hypochondrium and correlate the USG findings with histopathological diagnosis .

I. MATERIAL AND METHOD:

The study was conducted in Department of Radiodiagnosis in NSCB Medical College Jabalpur in September 2004- September 2005.This

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study included patient referred for ultrasonographic examination of abdomen with complain of right hypochondrial pain and lump in right hypochondrium. Study to be done in 50 patients. Ultrasonography done by using Machine

A. Siemen Sono Nova – 500
B. Probe Type – Curvilinear and Linear array
C. Frequency – (1) 3.5 to 5 MHz
(2) 7.5 to 10 MHz

The patient were scanned by using ultrasonographic probe through the intercostal spaces and from subcostal plane, after taking detailed history and clinical examination.

The Sonographic appearance of normal liver;

The normal liver is moderately echogenic and homogenous. Its echogenicity slightly less than that of pancreas. The homogenicity is interrupted only by the position of hepatic vein and portal system as well as various ligaments and tissues within the liver.

Vascular anatomy of liver

The major hepatic veins courses between the lobes and segments (inter lobar and inter segmental).The middle hepatic vein courses within the main lobar fissure and separates the anterior segment of the right lobe from the medial segment of the left. The right hepatic vein runs within the right inter segmental fissure and divides right lobe into anterior and posterior segments.

The left hepatic vein runs within the left inter segmental fissure and divides left lobe into medial and lateral segments. Portal veins run centrally within the segments (inter segmental), with the exception of the ascending portion of the left portal vein, which runs in the left inter segmental fissure.

The left inter segmental fissure, separates the medial segment of the left lobe from the lateral segment. The right lobe of liver is further divided into anterior and posterior segment by the right inter segmental fissure.

Couinaud's anatomy

- Because sonography allows evaluation of liver anatomy in multiple planes, the radiologist can precisely localize a lesion to a given segment for the surgeon. There are the right, middle and left hepatic veins divide the liver longitudinally into four sections. Each of these sections is further divided transversely by an imaginary plane through the right main and segments of left lobe respectively.
- Segment IV which is further divided into IVa and IVb, is the medial segment of left lobe
- The right lobe consists of segment V and VI, located caudal to the transverse plane
- Segment VII and VIII which are cephaled

The caudate lobe (segment I) may receives branches of both the right and left portal veins. Segment I is the caudate lobe, Segment II and III are the left superior and inferior segment of lateral lobe.

Statical Analysis plan :

All the records will be recorded by using structural schedule (Case Report Forms) and entered in Microsoft Excel Sheet. All the records will be rechecked for their completeness and consistencies. Non numeric entries will be coded numerically into nominal / ordinal distribution before analysis. Categorical variables was summarized in frequency and percent distribution and Chi-square or Fishers exact test will be performed as appropriate.

Inclusion criteria - Cases of hepatic masses detected by ultrasonography during the study period at Radiodiagnosis department of NSCB Medical college.

Exclusion criteria- Cirrhosis of liver, fatty infiltration , storage disease.

II. RESULTS:

The study was undertaken in the Department of Radiodiagnosis, NSCB Medical college, Jabalpur, to evaluate the role of ultrasound in evaluation of liver masses.

Results of 50 cases with complain in right hypochondrium were recorded for observation. The study group consisted of all the patients in age group ranging from 20 to 65yrs. The total benign and malignant lesions constituted 26 (52%) and24 (48%) respectively.

Most of benign mass observed in younger patients less than 40yr of age. Maximum number of benign lesions were liver abscess 18(36%), haemangioma 6(12%),and hydatid cyst 2 (4%) . Most of malignant liver lesions were liver metastasis12 (24%), hepstocellular carcinoma 10 (20%) and cholangiocarcinoma was 2 (4%). USG proved to be a good screening modality with a sensitivity of 82.7 %, specificity 95.6% PPV 82.7% and NPV 95.6 (p value < 0.001 and kappa value 0.678).

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TABLE NO. 1
Age wise distribution of liver lesions:

Age group	Number of cases
20-30	08 (16%)
31-40	12 (24%)
41-50	15 (30%)
51-60	10 (20%)
61-65	05 (10%)
Total	50 (100%)

AGE WISE DISTRIBUTION OF THE STUDIED CASES. AGE RANGE FROM 41-50 YRS HAD A HIGHEST PROPORTION OF CASES BY 30%., LESS THAN 40 YRS OF AGE GROUP OBSERVED IN 40 % OF THE STUDIED CASES, WHILE 20% CASES OBSERVED ABOVE 50YRS OF AGE AND 10% CASES WERE ABOVE 60YRS.

TABLE NO. 2
USG ECHOPATTERN OF RIGHT UPPER QUADRANT MASSES

SYMPTOMS	NO. OF CASES	PERCENTAGE (%)
HYPERECHOIC	14	28
HYPOECHOIC	17	34
ANECHOIC	2	4
HETEROGENOUS	17	34

Most common echopattern of liver lesions were hypoechoic (34%) and heterogenous (34%) in our study.

TABLE NO. 3
Distribution of cases based on number of lesions

Lesions	Number of cases
Solitary	23 (46%)
Multiple	27 (54%)
Total	50 (100%)

MOST COMMON LIVER LESION WERE MULTIPLE (54%) AND SOLITARY WERE (46%) IN OUR STUDY.

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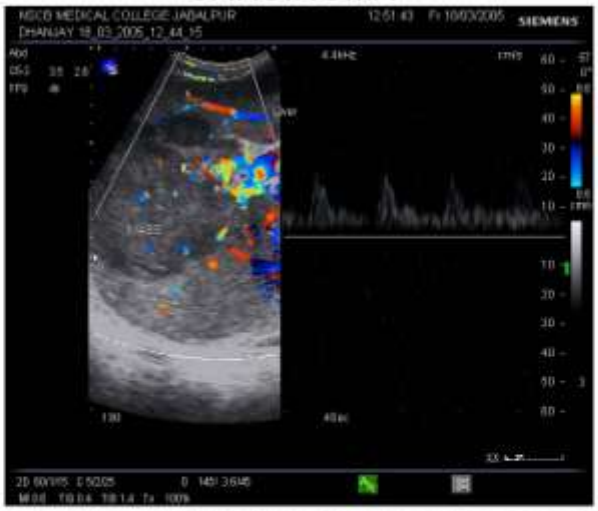
PLATE - 1

HETEROGENOUS MASS LESION
PREDOMINANTLY HYPOECHOIC WITH IRREGULAR
MARGIN SEEN IN RIGHT LOBE OF LIVER
S/O HEPATIC MASS ? HEPATOCELLULAR
CARCINOMA



SAME MASS WHICH SHOWS INCREASED
VASCULAIRTY WITH ARTERIAL WAVE PATTERN
S/O MALIGNANT HEPATIC MASS
? HEPATOCELLULAR CARCINOMA

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III. DISCUSSION:

The study was conducted in the department of Radiodiagnosis at NSCB Medical college Jabalpur to evaluate the role of ultrasound in evaluation of liver masses. A total of 50 patients were included in this study.

1. AGE AND SEX DISTRIBUTION- In our study the youngest patient was 20 year old, and oldest patient was 65 year old. Most of the benign lesions were seen in 20-40 years of age group, whereas maximum number of malignant lesions were seen in 50-65years of age group. Out of 50 patients there were 38 male and 12 females. The male predominance is due to more number of abscess and HCC in our study. Mukul P Agrawal et al (6) studied 18 case of intra hepatic space occupying lesions by ultrasound. In their study 22 were male and 6 were female. In our study most of the solitary lesion present in right lobe of liver. Similar findings were seen in the study conducted by Venkatesh and Beckingham et al. (7)
2. INCIDENCE OF BENIGN AND MALIGNANT LIVER LESION - In our study, 52% lesions proved to be benign and 48% lesions were malignant on histopathology.

BENIGN LESION ;

LIVER ABSCESS - In our study the most commonly seen liver lesion was liver abscess. This correlate well with study of Metos et al. (8) The most of the abscess was present in right lobe 66% and in left lobe alone 22% and in both lobe 12%. Phillips W. Ralls et al (9) found right lobe involvement in 73.4% of their cases. Abscess in both lobes of liver were seen in 12% of cases. Similar findings were seen in the study conducted by Mavilia MG et al.(10) Out of 18 cases of hepatic abscess in our series, we found 8 cases of amoebic liver abscess. Definite diagnosis was given in 95% of the cases of liver abscess. Cases of pyogenic abscess presented of multiple hypoechoic mass lesion in liver, confirmed on histopathological examination . The most common presentation was pain in abdomen, fever with chills and tender hepatomegaly. Sonographically, an accurate diagnosis was possible in 95% cases . USG- Liver abscess are typically poorly demarcated with a variable appearance, ranging from predominantly hypoechoic (with some internal echoes) to hyperechoic. Gas bubble may also seen)

Color Doppler- will demonstrate the absence of central perfusion.

A retrospective series of 32 cases of hepatic abscess was collected in the radiology department of Ibn Roch University Hospital (Casublanca), over a period of 43 months (may 1989 – September 1992). Among these 32 cases, 16 were amoebic (based on the dysenteric syndrome and especially positive amoebic serology) and 16 had pyogenic causes.

b. HEMANGIOMA

Next common benign lesion in our study was hemangioma (4 cases, 8%) and more common in females than males. Similar findings was seen in study by Ishak KG et al (11). Most of hemangioma (99%) in our study were smaller (less than 10cms) in size. Mayo Foundation for Medical Education and Research had describe that the most of hepatic hemangioma are small, single an does not produce symptoms. . On USG- Typically well defined hyperechoic lesion at the periphery and near to vessels. Color Doppler- may shows peripheral feeding vessel.(

c.- Focal nodular hyperplasia

Focal nodular hypersia is the benign hepatic tumor constituting approximately 8% of primary hepatic tumor at autopsy. Usually it is a solid lesion, but in approximately 7-20% of patients it may be multiple . Vassiliades et al 1992(12) found that this lesion may have variable echogenicity but many are hyperechoic to the normal liver due to intratumoral haemorrhage. Calcification may be present in association with areas of necrosis and manifest as hyperechoic foci with acoustic shadowing. Detectable lesion will demonstrate a central scar with the displacement of peripheral vasculature on color Doppler. .In our study no patient was diagnosed as focal nodular hyperplasia.

d.- Hepatic adenoma

Hepatic adenoma occurs in women taking oral contraceptives. Patient is usually remain asymptomatic until they spontaneously rupture (intratumoral hemorrhage) ,resulting in abdominal pain. On Ultrasound a hepatic adenoma usually present as solitary well demarcated heterogenous mass with variable echogenicity , McGahan P et al (13) A hypoechoic halo of focal fat sparing is also seen. No case in our study was diagnosed as hepatic adenoma.

Simple liver cyst and hydatid cyst were found in few number of cases and ultrasound findings of these lesions were similar to the study conducted by Bajenara et al and Polat P et al.(14).

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e.- HYDATID CYST - The right lobe of the liver is most frequently involved part of liver with hydatid infection. The ultrasound appearance of the hydatid cyst may shows double wall echogenic lines separated by a hypoechoic layer. Maguillansk SJ et al (15). Some hydatid lesions are multi cystic with echogenic sand in it.

The Gharbi Ultrasound classification consist of five stages.

Stage I- Homogenously hypoechogenic cystic thin walled lesion.
Stage II- Septated cystic lesion.
Stage III- Cystic lesion with daughter lesions.
Stage IV- Pseudotumour lesion.
Stage V- Calcified or partially calcified lesion (Inactive cyst)

f.- SIMPLE LIVER CYST – They are typically round or ovoid structures that have an imperceptible wall. These cyst are usually multiple in number and vary in size. The ultrasound features are fluid filled anechoic structure with thin echiogenic wall. . Few septa may be present but no internal vascularity on color Doppler.

MALIGNANT HEPATIC LESIONS -

Focal malignant lesion can be either primary or secondary (metastases). The commonest primary malignant liver neoplasm is hepatocellular carcinoma (HCC) and the second most common primary neoplasm is Cholangiocarcinoma. There are other rare liver neoplasm as angiosarcoma and hepatoblastoma .(Bastsi N et al) (16) .

1.- HEPATOCELLULAR CARCINOMA - showed that maximum number of cases were found in 51- 60 yrs of age and few were 61-70 yrs of age with male , female ratio is 3:1. Male predominance seen in 32 pateints studied by P. A. Dubbins et al. (17) The echotexture of HCC was either hyperechoic or mixed echogenicity with ill defined margins Associated findings were portal vein thrombosis, lymphadenopathy at porta hepatis and few patients had ascitis. Bala R. Subramaniyam et al studied 15 cases of HCC by USG and found portal vein thrombosis in 32% cases. Diffuse HCC may be difficult to distinguish from background cirrhosis. Fibrolamillar HCC is a rare type of HCC that is more responsive to treatment than other type of primary liver malignancy. HCC can have variety of appearance.

A- Massive: Large mass with necrosis , fat and calcification.
B - Nodular: Multiple masses of variable attenuation , have central necrosis.
C Infiltrative (Diffuse): May be difficult to distinguish from associated cirrhosis.

2.-CHOLANGIOCARCINOMA ; -: It is commonly known as bile duct cancer develop in small bile ducts in the liver. Most of these are adenocarcinoma. Cholangiocarcinoma classified as ductal or peripheral depending on the site of origin. Tumor may arise from the extrahepatic and large intrahepatic bile ducts at the portahepatis to the smallest bile ductile at the periphery of hepatic lobule.This is called peripheral cholangiocarcinoma. Tumor arise from right and left hepatic ducts are known as hilar cholangiocarcinoma. (Klatskin Tm)

All cases of cholangiocarcinoma had age group more than 60yrs with slight male predominance. Patient had jaundice and hyper billirunemia at presentation. Bloom et al describe similar presentation in their study.(18) All cases had solitary , iso to hypoechoic lesion associated with dilated intra hepatic billiary radecals. Nisha et al had similar usg findings.(19)

3.- HEPATIC ANGIOSARCOMA - It is a rare hepatic tumor, originating from endothelial and fibroblastic tissue . Primarily made up of vessels and composed of abundant vasculature. It represents only 0.1-2% of all primary liver malignancies Mani H et al.(20) The mass typically demonstrated different echogenicity depending on necrosis or hemorrhage. Hepatic angiosarcoma was not seen in our study.

4.- HEPATOBLASTOMA - Hepatoblastoma is a malignant liver tumor occurring in infants and children. They usually present with an abdominal mass. On ultrasound hepatoblastoma appear as predominantly echogenic mass. In larger tumor heterogenicity and variable echogenicity is common.Even when large they tend to be well defined. Intra lesional calcification may be visible as area of shadowing. Hepatoblastoma was not seen in our study.

5.- LIVER METASTASIS - Maximum patients were 40-60 yrs age group and male female ratio were 1.5:1. l Our study group included metastases from gastrointestinal tract (17%), gall bladder (13%), breast (10%) and unknown primary site (10%) . Simillar cases were found by study conducted by Zavadsky KE et al (21) . The most common pattern observed was echopoor lesions, while the least common was the calcified type. In the study by Wernecke K, et al (22) similar pattern were observed. The lesions appeared strongly echogenic in 18% and target type in 27% . Lesions are anechoic [4%] and heterogenouse echotexture.6%,, necrotic 10.6%, calcific 2. % and

diffuse pattern of involvement was noted in 16% cases.

IV. SUMMARY

The objective of this study to analyse the sonographic pattern of various masses arising from liver by performing ultrasonography as the initial imaging, screening modalities The study was conducted in Radiodiagnosis Department of NSCB Medical College Jabalpur.

Results of 50 cases recorded in observation, could be compared to other authors,. The study group consist of the patients in the age group ranging from 20 to 65 years of age. The total benign and malignant lesions constituted 52% and 48% of total lesions respectively. Most of the benign masses observed in less than 40years of age whereas mojoroty of malignant masses were seen in patients older than 40 years.

Out of 50 cases 2 cases which were thought to be benign on sonography turned out to be malignant on biopsy. The percent of false negative report was 4 %. No other false positive case were reported in our study.

The difference in vascularity was noted on color Doppler. Benign lesion shows mild vascularity in periphery while moderate lesions shows moderate to marked vascularity in both peripheral as well as in central region of mass.

The FNAC was done under USG guidance The purpose was to take tissue from the most likely area of pathology. The significance of USG guided FNAC for its high rate of probability of taking tissue from the site of pathology is remarkable.

The study was only for the early diagnostic procedure and with minimal cost effective method. The correlation with CT, elasography, MRI could not be done as the purpose of this study was to provide maximum information with minimum cost to patient. So, study was only ultrasonographic and color Doppler evaluation.

COMPUTED TOMOGRAPHY – Computed tomography is useful for the evaluation and diagnosis of liver masses Bonder A et al. (23).The evaluation of liver mass should be performed with a triphasic CT ,this modality includes 5 phases-

- Non- contrast
- Arterial phase
- Portal venous phase.

On CT , characteristic findings of liver mass include solitary or multiple lesion, solid or cystic and rounded lesion .Oliver JH et al(24)

MRI - Characterization of focal liver lesions detected on ultrasound (USG) or computed tomography (CT) is a common indication for magnetic resonance imaging (MRI) of liver. Accurate characyerization of focal liver lesions is necessary because management differs not only between benign and malignant lesions but also between different benign lesions. Buell JF et al (25) . The use of gadolinium – containing contrast agent with both extracellular blood poo l and hepatocyte specific properties has been add new information in characterization of liver masses. Zech CJ et al .(26)

V. CONCLUSION

In our study we have summed up the characteristics of different benign and malignant tumors on2D ultrasound. Color Doppler evaluation is also useful for differenciating between benign and malignant masses of liver. Efficacy of ultrasonography will be arrived in relation to final diagnosis by FNAC/ Surgery/ Cytohistopathology. The liver can be image in multiple plane, thus enabling us to know the exact location , number and vascularity of lesion. and diagnosing the associated findings like lymphadenopathies , ascitis and portal vein thrombosis in malignant hepatic masses. Ultrasonography is a useful, easily available , non invasive, devoid of side effects and cost effective method to diagnosed liver masses accurately.

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