



ROLE OF USG IN STUDY OF ETIOLOGICAL FACTORS IN LIVER DISEASE

Radiology

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KEYWORDS

INTRODUCTION:

Real-time ultrasound is given the first preference for investigating liver diseases; rightfully so, as the procedure is convenient, non-invasive, economical, needs no prior preparations and does not expose the patient to any radiation. Although if the Gall bladder and/or Pancreas are to be evaluated, it is preferred to have the patient fast overnight (facilitates greater dilatation of gall bladder). Even though it's the largest abdominal organ, it is difficult to evaluate clinically due its anatomic site. Ultrasound here provides the clinicians an excellent means to evaluate and assess both diffuse and focal parenchymal abnormalities in the internal structure of the liver.

Normal anatomy on ultrasonography:

Liver is a triangular-shaped organ, with its base towards right side and the Diaphragm, and apex towards the feet and left side. Normal echopattern of liver parenchyma is homogenous moderately echogenic, interspersed with echolucent tubular blood vessels. Inferior vena cava is shown as a black strip right to the midline; aorta is seen to its left. Gall bladder is seen a well-defined oval anteriorly towards right side. Ligaments and fissures are also clearly visible, as collagen and fat are highly reflective.

1) Echogenic: Margins ill-defined, neither shadow nor produce acoustic enhancement. Increase reflection they produce probably correlates with increased vascularity and connective tissue contents. Large bowel carcinomas, carcinoma of pancreas, intestinal carcinoids and other intra-abdominal adenocarcinomas produce this type of metastasis.

2) Target: Has an echogenic central part and surrounding poorly reflective margin. Central haemorrhage and patchy necrosis in an otherwise echo-poor deposits. This pattern is seen in larger metastasis.

3) Cystic, calcific, necrotic Metastasis: Usually, appearance on USG and this texture is called moth-eaten appearance.

4) Miliary metastasis: Small innumerable millimetre sized Metastasis found throughout liver. Appearance indistinguishable from fatty liver and early cirrhosis.

5) Lymphoreticular disorder: Widespread cellular infiltration into liver occurs. Liver is enlarged.

6) Simple cyst: Benign liver cyst have thin & clearly defined wall, black lumen on gray-scale image.

7) Hydatid cyst: Single parent cyst with well-defined capsule and containing multiple daughter cysts gives it multi-locular or honeycomb appearance. Hydatids and daughter cysts confirm the diagnosis of hydatid cyst disease.^[1]

8) Polycystic disease: Associated with cystic disease of Pancreas and Kidneys. Liver may be considerably enlarged.

9) Amoebic abscess: Most common hepatic abscess. The classic appearance is a non-homogeneous, hypoechoic, round or oval mass with well-defined borders.^[2]

10) Pyemic abscess: Characteristic patterns are – single or multiple, size 1 cm to extremely large, right lobe more common, round or ovoid shape, irregular walls with poor definition, anechoic to highly echogenic, acoustic enhancement seen.

11) Hematoma: Ultrasound shows transonic area which is well defined and at periphery of liver. Fresh hematomas tend to appear echo free, but when clotting occurs low level echoes may appear. These will disappear if liquidification of hematoma takes place or will increase in amplitude if organisation of thrombus occurs.

12) Fatty infiltration: Produce high intensity echoes throughout liver more uniform distribution than cirrhotic liver. In severe form, marked increase in fine echoes with poor or non-visualisation of intrahepatic vessels, borders, diaphragm, posterior portion of lobe.

13) Cirrhosis of liver: Coarse and scattered increase in echogenicity and altered shape of cirrhotic liver is sufficiently characteristic to permit differentiation from fatty infiltration. Normal architecture is distorted by bands of connective tissue joining portal areas and central veins, forming pseudolobules. More echogenic than renal parenchyma.

14) Hepatitis: With acute hepatitis, sonographic pattern is seen as accentuated brightness, more extensive demonstration of portal vein radicle walls, and overall decreased echogenicity of liver. With chronic hepatitis, there is decrease in brightness of liver and number of portal vein radicle walls and overall increase in liver echogenicity.

Ultrasonography in Liver diseases:

(1) Focal Liver Diseases:

(I) Benign liver diseases:

- Hepatoma
- Focal nodular hyperplasia
- Benign hepatic adenoma

(II) Primary malignant lesions:

- Hepatoblastoma
- Hepato-cellular carcinoma

(III) Secondaries in Liver:

- Focal deposits
- Generalised involvement

(IV) Non-malignant lesions:

- Cysts
- Abscesses
- Pyemias
- Hematoma

(2) Diffuse liver diseases:

- Fatty infiltration
- Cirrhosis of liver
- Hepatitis

MATERIALS AND METHODS:

The study for "role of ultrasonography in liver diseases" was carried out for 50 cases at Smt. NHL Municipal Medical College and Vadilal Sarabhai General Hospital. Cases were selected clinically; all patients belonged to different age groups. Appropriate laboratory, biochemical, haematological, histopathological and radiological investigations were carried out by respected departments. Ultrasonography of liver was carried out in all cases.

Clinical diagnosis were followed up with liver function tests and radiological investigations including ultrasonography, plain x-rays for

chest and abdomen, barium meal swallow, barium enema, C.T. Scan and lastly PTC. These were then followed up with pre-operative findings, liver biopsy and histopathology report.

OBSERVATION AND DISCUSSION:

Out of 50 cases of liver diseases, amoebic liver abscess is the most common disease in the Indian population at 36%. Followed by hydatid cyst of liver at 22% and secondaries in liver at 18%.

Amoebic liver abscesses, secondaries in liver and primary hepatic tumors were commonly seen as mixed echogenic; all the hydatid cysts were cystic; whereas cirrhosis of liver gave echogenic findings. Amoebic Liver abscess was common in right lobe of liver. Secondaries commonly involved both lobes. Primary hepatic tumours were more common in the right lobe. Hydatid cysts showed equal occurrence in both lobes.

(I) Amoebic Liver Abscess: Ultrasonography examination has become routine procedure in diagnosing amoebic abscesses. Of the 18 cases studied, 14 showed right lobe involvement, 3 showed left lobe involvement and 1 showed both lobes involvement. All were mixed echogenic lesions. Ultrasound is invaluable because it locates the presence, positions, size and number of the abscess. It is also useful in the percutaneous aspiration of abscess. Amoebic abscess has lack of significant wall echoes, configuration and echogenicity less than normal liver parenchyma.^{[3][4]}

(II) Secondaries in Liver: Common age group was 30 to 50 years. Out of 9 patients, 6 patients had hepatomegaly. They were all mixed echogenic in nature. 4 patients had right lobe involvement, 5 had both lobe involvement. Metastasis usually present as low or high echogenic areas, diffuse or localised. These vary in size and shape.

(III) Hydatid Cyst of Liver: Common age group 20 to 40 years. Out of 11 patients, 9 had hepatomegaly and 2 had splenomegaly. All cases were cystic in nature. 5 had right lobe involvement, 2 patients had left lobe involvement and 4 had both lobe involvement. Parent cyst containing multiple daughter cysts with well-defined capsule gives it multilobular appearance.^[5]

(IV) Simple Liver Cyst: One patient noted. Hepatomegaly was present, right lobe was involved. It had thin, clearly defined wall with black lumen on gray scale image. Cyst showed anechoic, well defined and acoustic enhancement.^[6]

(V) Primary Hepatic Tumor: Out of 4 patients, 3 had hepatomegaly and 1 had ascites. All were mixed echogenic lesions. 3 patients had right lobe involvement, 1 had both lobes involvement. Hepatoma is more commonly seen in male; in this study all hepatomas are in male patients. Hepatoblastoma patient was a 4 year old girl. Hepatomegaly present, ascites present, splenomegaly also present. Chest X-ray showed pulmonary Metastasis in right upper zone and elevated right dome of diaphragm. Mass is mixed echogenic, calcification was not seen. Hepatoblastoma is a malignant liver tumor whereas Hepatoma is benign. Focal nodular hyperplasia is a solitary, well-circumscribed, non-encapsulated multinodular mass.

(VI) Cirrhosis of Liver: Common age group 41 to 50 years. All patients were male; this is predominant in males. Ascites was present in 2 patients. Lesions were hyper-echogenic in nature. Cirrhosis is more common in alcoholics. Cirrhotic liver parenchyma is more echogenic than normal.^[8]

(VII) Generalised enlargement of liver: 2 patients noted; both had hepatomegaly, 1 had splenomegaly and 1 had ascites. Lesions appeared mixed echogenic.

(VIII) Polycystic Liver disease: One patient noted, male. Hepatomegaly and splenomegaly were present. Cystic in nature, both lobes of liver involved. Plain X-ray showed hepatomegaly, IVP showed polycystic left kidney. Multiple cysts seen in Liver and both Kidneys on ultrasonography. More in left kidney than right. Pancreas and spleen were normal.

(IX) Hemangioma of Liver: One patient noted, female. Mixed echogenic lesion. Left lobe was involved. Hemangiomas are common in females. Composed of large network of vascular endothelium-lined spaces filled with red blood cells. Mixed echogenic CT-scan, hypodense area before I.V. enhancement; becomes hyperdense after

I.V. contrast injection. Biopsy proved.^[10]

(X) Hematoma of Liver: One patient noted, male, middle-aged. History of abdominal trauma positive. Fresh hematomas appear echofree, but when clotting occurs low level echoes. These will disappear when liquification takes place; or will increase in amplitude only if the organisation of thrombosis occurs.^[11]

SUMMARY:

In the present study "Role of Ultrasonography in Liver Diseases", a study of 50 cases was carried out in VS General Hospital in the city of Ahmedabad. In all these cases, ultrasonography was performed for the liver. Out of the 50 cases, 18 cases (36%) were of amoebic liver abscess, 9 cases (18%) of secondaries in liver, 11 cases (22%) of hydatid liver disease, 1 case (2%) of simple liver cyst, 4 cases (8%) of primary hepatic tumor, 3 cases (6%) of cirrhosis of liver, 2 cases (4%) of polycystic liver disease and 1 case (2%) each of hemangioma of liver and hematoma of liver were found. Ultrasonography was diagnostic in all cases.^[7] Many disorders of liver are being imaged routinely and ultrasound is playing a major role in the diagnosis of several liver diseases.

CONCLUSION:

Ultrasonography is convenient, non-invasive, economical, and does not expose the patient to any radiation. It provides an excellent means of assessing internal structure of liver and evaluating both diffuse and focal abnormalities to identify the etiological factors in commonly occurring liver diseases.

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