Liver tumors diagnosis by ultrasound or CT scan guided FNA

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Abstract

Tumors of the liver are relatively uncommon but are increasingly recognized. It is either benign or malignant (Primary or metastatic). Malignant hepatic tumors are a leading cause of death throughout the world. Routine Laboratory studies usually reflect abnormalities associated with the underlying chronic liver disease. Imaging techniques that aid in the diagnosis include ultrasound, CT and MRI. Percutaneous fine – needle biopsy may be needed to confirm the diagnosis. To investigate the value of ultrasound with FNA and or CT scan with contrast with FNA in the diagnosis of liver tumors. The study include 58 patients (Males and females) suspected to have liver tumors depending on the history, clinical examination and risk factors for developing hepatic tumors were examined in Tikrit teaching hospital by both ultrasound and CT-Scan followed by FNA of the mass under either ultrasound or CT-Scan. Both ultrasound and CT-Scan can detect hepatic lesions especially if good circumstances are available such as good technique, operator and contrast agent however in CT-scan the slices might be smaller in size and the homogeneity play a small role in the diagnosis of this technique. Fine needle cytology may help in the diagnosis and define the nature of the mass and help to decide about the nature of the treatment by a relatively simple and safe procedure.

Introduction

Liver is the largest gland in the body; it has a wide variety of functions; as filtration, metabolism, production and secretion of bile. Because of this wide variety it may be affected by many types of diseases, among which the most dangerous are the tumors (1).

Primary liver cancer is a relatively rare disease in the united state, representing about 2% of all malignancies. It is much more common in other part of the world representing from 10-15 % of malignancies in Africa and parts of Asia (2).

The metastatic liver cancer is about 20 times as common in the united state as primary liver cancer (2). When liver tumor is suspected, patient history and physical examination searching for swelling and hard liver, masses or lumps in the liver, ascites, and some time the ability to hear abrupt or friction rub due to the vascularity of the tumor (2).

Laboratory test searching for risk factors such as hepatitis B or C infection which might be detected in about two third of patients with liver cancer (3). High blood serum level of alpha-fetoprotein which seen in 50-75% of patients with primary liver cancer, however it can't be used to confirm a diagnosis because high levels may occur in other condition such as cirrhosis or chronic hepatitis. Abnormal liver function test cannot establish the diagnosis of liver cancer (3).

Several types of medical techniques for diagnosis of liver neoplasm among which are ultrasound and CT-Scan. Ultrasound depends on non ionizing radiation (ultrasound waves). Ultrasound is extremely useful in the visualization of soft-tissue interfaces of homogenous, fluid-filled or solid organs and molecules or masses throughout the body (4,5) the quality of ultrasonography depends upon the
operator and technical factors, the accuracy of sonography in detecting hepatic disease is 80-85% (5).

CT-Scan depend on X-Ray were it divide the area under study into many horizontal small slices for detecting the lesion. This cross sectional image make CT scan distinguish more minute differences among various tissue than conventional radiography (5). If there is no fatty liver which would reduce attenuation intrahepatic vessels appear as hypodense structure.

Imaging studies are used to detect specific areas of abnormal tissue in the liver and it may be used to guide the physician in selecting the best location for obtaining the biopsy sample. So liver biopsy provides the definite diagnosis of liver cancer, this sample of liver or tissue mass is removed with a fine–needle and in more than 70% of cases, the biopsy is positive for cancer and there is little risk to the patient from the biopsy procedure (2). Histology is the only standard of reference for differentiation of liver tumors and metastasis and is necessary for optimal therapy (6, 7).

**Patients and Methods**

During the period from December 2005 to May 2007, 58 patients were included in the study. There ages ranges between 13-96 years. 36 were male with mean age (49.9) and 22 female with mean age (50.3) suspected to have liver tumors were examined.

Information was obtained for each patient such as gender, age, previous risk factor followed by thorough clinical examination and Laboratory test such as liver function tests. All of these cases were examined by ultrasound (real – time) and spiral CT-scan to confirm the diagnosis. Fine needle aspirate and cytology done for all patients under either ultrasound or CT-Scan.

The result of ultrasound and CT-Scan was compared and the biopsy finding is represented according to the type of the lesion and the percent of each technique is detected.

**Results**

From the 58 cases under study only 50 cases were included in the study and 8 cases were excluded because they found to have no lesion by both ultrasound and CT-Scan. Out of 50 patients under study, 39 (78%) were found to have liver mass by ultrasound (Table 1). Forty five (88%) of the cases were found to have liver mass by CT-Scan with contrast.

Fine needle aspirate cytology done for all cases under ultrasound or CT-Scan. Primary liver tumor (Hepatocellular carcinoma) reported in 16 (32%) of cases, metastatic in 20 (40%), benign in 7 (14%), inadequate specimen in 2 (4%) and not tumor in 5 (10%) cases with overall sensitivity reaching 86% in detecting liver tumor (table 2).

**Discussion**

The liver neoplasms are the most serious type of lesion affect the liver. These tumors can be detected by ultrasound technique which depends on the operator and technical factors in addition to the size and echogenicity of tumors, so small focal lesion and high homogeneity of tumors with hepatic parenchyma difficult or not detected by ultrasound. CT-Scan detection depends on homogeneity of tumor in addition to the technical factors therefore contrast medium used to increase the appearance of the lesion or we reduce the slices size examination to detect lesion. In our study 78% of the liver masses, diagnosed by ultrasound compared with CT-Scan (88%).

This might be due to multiple factors including the size of the mass under study and the operator (different graduation) in addition we use plain ultrasound without contrast which increase the diagnostic accuracy of
ultrasound as in other study (8,9) were they find marked improvement in the accuracy of ultrasound and decrease recommendation for further investigation in addition many of the patients with liver tumors have underlying cirrhosis in which ultrasound is often difficult to identify liver tumors in these circumstances (10).

The finding of CT-Scan in our study (88%) does not go with some studies (80%). This might be due to low health care and patient attention in addition most of the patient visit non specialized doctors leading to advancing disease with easy detection. In addition to the use of contrast in our study which improve the diagnostic accuracy. TSOU M.et al 1998, reported that the most common type of hepatic tumors are malignant (primary and metastatic), followed by benign tumors and those are comparable with the present finding (11).

The sensitivity of the present study (86%) comparable to other study (12) however B. Ohlsson etal report a higher degree of sensitivity of the fine needle cytology reaching up to 96% (13).

As a conclusion and recommendations; ultrasound is uneasy procedure that depends on the operator (specialist) and we may increase the accuracy of this technique by use of contrast agents. CT-Scan is indicated when the ultrasound study was negative or not conclusive to detect smaller lesions by decreasing the slices, to detect the number of the lesion and to study the nature of the masses (Benign or malignant and even the type of some benign lesion) by the use of contrast.

These radiological studies under good circumstances might decrease the need for invasive procedures such as biopsy. Fine needle cytology can be use to define the nature of the lesion and decide about early intervention however non conclusive cases (insufficient sample or other lesions than tumor) can be followed by regular radiological examination or multiple samples at different time can be obtained to increase the sensitivity of this test.

References

5- David Sutton. Textbook of radiology and imaging,5th ed, 1993; 1115-1120
Table (1) Comparison between ultrasound and CT-Scan with contrast in detecting liver masses

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<th>Type</th>
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<td>CT with Contrast</td>
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Table (2) Fine needle cytology findings

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