Ultrasonography is not Reliable in Diagnosing Liver Cirrhosis in Clinical Practice

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ABSTRACT

Background: The diagnosis of liver cirrhosis is important in the evaluation and management of patients. Liver biopsy is the gold standard but it is invasive. Ultrasonography is a non-invasive and useful modality in assessing the liver for certain conditions but its sensitivity and specificity in diagnosing cirrhosis is unknown locally.

Aim: To assess the accuracy of ultrasonography in diagnosing compensated liver cirrhosis in daily clinical practice outside the context of clinical trials.

Methods: All the liver biopsies were identified from the Pathology Logbook retrospectively from January 1998 to March 2001. Only patients who had both liver biopsy and ultrasonography with no clinical evidence of cirrhosis were included. Patients with incomplete data, hepatoma or liver secondaries were excluded. Ultrasonographic diagnosis of cirrhosis was based on nodularity or irregularity of the liver surface, small liver size, coarse echotexture and increase attenuation by using the 3.5 to 5 MHz transducers.

Results: A total of 151 liver biopsies were performed during this period. Eighty-eight patients who had both ultrasound and liver biopsy were analysed. Seventeen patients had ultrasonographic diagnosis of cirrhosis but only six cases were proven by a liver biopsy. On the other hand, 10/16 cases of biopsy-proven cirrhosis were “missed” by ultrasound. Thus, the sensitivity of ultrasonography in diagnosing cirrhosis was 37.5% and the specificity was 84.7%. The positive and negative predictive values were 35.3% and 85.9% respectively.

Conclusion: Low frequency ultrasonography is not a sensitive test for the diagnosis of liver cirrhosis in daily clinical practice.

Keywords: cirrhosis, ultrasound, liver biopsy
were excluded. Ultrasonographic examination of the liver was performed by trained and experienced radiologists using Aloka multiview SSD-2000 3.5 MHz to 5 MHz transducers. The diagnosis of liver cirrhosis was based on a few signs: nodularity/irregularity of liver surface, small liver size, echo coarseness or increased attenuation with/without splenomegaly and ascites. Histological diagnosis of liver cirrhosis was the presence of portal and lobular fibrosis with bridging fibrosis and fibrous band with regeneration nodules or Scheuer classification stage 4 for chronic hepatitis cases.

RESULTS

A total of 151 liver biopsies were performed during this study period. However, only 88 cases met the inclusion criteria. The mean age was 33 +/- 16 years (ranged three months to 68 years). There were 50 men and 38 women. Ethnic distribution was Chinese 45 (51.1%), Malay 36 (40.9%), Indian 4 (4.5%) and others 3 (3.5%). None of the patients had any evidence of liver cirrhosis clinically.

Of the 88 cases included, the indication for liver biopsy (Fig. 1) were Hepatitis B 52 cases (59.1%), persistently elevated liver enzymes 20 cases (22.7%), Hepatitis C 11 cases (12.5%) and suspected liver cirrhosis from ultrasound 5 cases (5.7%). Histologically, only 16 patients (18.2%) had proven cirrhosis; 48 (54.6%) hepatitis of various degrees, 16 (18.2%) fatty changes, 6 (6.8%) normal histology, one case (1.1%) each of autoimmune hepatitis and haemochromatosis (Fig. 2).

Of the 16 cases of biopsy proven cirrhosis, only 6 (37.5%) were diagnosed accurately by the ultrasound. The other 10 cases (62.5%) were misdiagnosed or reported as normal (Table I). On the other hand, 11/17 cases (64.7%) of cirrhosis reported by ultrasonography were proven wrong by liver biopsy (Table I). The histological diagnoses were 5 hepatitis (45.5%), 5 fatty livers (45.5%) and 1 normal histology (9%) (Fig. 3). Therefore the sensitivity of ultrasound in diagnosing liver cirrhosis in our study was 37.5% and specificity 84.7%. The positive and negative predictive values were 35.3% and 85.9% respectively.

DISCUSSION

The diagnosis of liver cirrhosis is important in the further management and monitoring of patients. Even though liver biopsy is considered the gold standard, it carries a false negative rate of 10% to 20%.(4,5)

The accuracy of ultrasonography on liver surface had been controversial. In our study, the sensitivity and positive predictive value were only 37.5% and 35.5% respectively. Even though the sensitivity was higher than that of Ladenheim et al(10), it was relatively low compared to other studies where the sensitivity of as high as 91.1% was reported(7-9). There are several reasons to account for this discrepancy. Firstly, high frequency (7.5 MHz) ultrasound probe, which was used by Ferral(9) and Simonovsky(11), had the advantage of detecting surface nodularity of the liver. Secondly, it was operator dependent. Di Lelio's(8) report was impressive because they were able to predict cirrhosis in 88% of patients with false positive and negative rate of 6% and 12% respectively by using a 5 MHz probe. This was probably because of the different techniques used in assessing the liver surface and the experience of the operators.
of operator. Thirdly, laparoscopic biopsy was performed in Di Lelio’s(8) and Simonovsky’s(11) studies as opposed to percutaneous liver biopsy performed in our study and Ladenheim et al(10). This increased the sensitivity of a positive histology in the former two studies. Lastly, echo coarseness and increased attenuation, which is a subjective sign, was used in diagnosing cirrhosis in our study. This increased the false positivity rate to 64.7%.

Fatty liver and hepatitis accounted for the majority (91%) of the cases wrongly diagnosed as cirrhosis by ultrasound. To differentiate between cirrhosis and fatty infiltration using ultrasound therefore is difficult, as has been suggested by Sanford et al(12) and Gosink et al(7).

Ultrasonography had been extensively studied in the last two decades but results were variable. Studies on the caudate to right lobe of liver ratio had a sensitivity ranging from 43%(13) to 84%(14) but specificity in the last two decades but results were variable. To diagnose cirrhosis even in trial settings(7,12). Practice outside the context of a clinical trial. Previous will give us an insight into the usefulness of ultrasonography in cirrhotic patients and normal control.

Many earlier and higher peak enhancement than non-cirrhosis. They increased the sensitivity to 82.2%. In 37 patients, both histology and ultrasound diagnosis of cirrhosis was made in 47 patients by histology and 69 their kind assistance in the completion of this study.

In conclusion, low frequency ultrasound is not useful in the diagnosis of liver cirrhosis in daily clinical practice. However, the sensitivity can be improved if a high frequency probe is used and done by experienced and dedicated operators. Liver biopsy remains the gold standard especially when patients are clinically asymptomatic.

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REFERENCE