Ultrasonic and X-ray Tomographic Findings of Schistosomiasis Japonicum

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Summary: Imaging diagnosis based on ultrasonic findings of the liver with Schistosomiasis Japonica has been recently reported (Nakayama et al. 1981; Uto et al. 1984). In the present study, attempts were made to classify the ultrasonic patterns of the liver infected with Schistosoma Japonicum. The calcification and fibrosis of the liver were evaluated by comparative investigation with an ultrasonogram and computed tomography (CT). Schistosomiasis Japonica was examined in 23 patients who were more than 45 years of age. It was diagnosed by liver needle biopsy, an intracutaneous test, or autopsy. The cases with a fish scale and network pattern had attenuation of the liver on ultrasonography and were unspecific on CT. Histological findings demonstrated moderate liver fibrosis. The cases with a sieve pattern had attenuation on ultrasonography, and the CT disclosed a retractive liver and the CT number of that liver was increased. Histological findings demonstrated a severe fibrotic liver. The cases with a mottled pattern had increased reflective spotty echo with an acoustic shadow, and the CT disclosed calcification. The histological findings demonstrated a marked calcification of the eggs. The cases with a mixed pattern, which consisted of mottled and sieve based on fish scale and network, had no retraction with less increase in the CT number. These results suggest that the peculiar reflective echo pattern of Schistosomiasis Japonica was due to not only calcification but also fibrosis of the liver.

Key words: liver — Schistosomiasis — ultrasonography — computed tomography — liver fibrosis

Introduction

Recently, the CT scan and ultrasonic tomography have become important diagnostic tools for non-invasive imaging particularly in hepatic, cholecystic, pancreatic, and splenic diseases. Ultrasonic tomography has been widely used for the diagnosis of focal and also diffuse hepatic diseases, since Howry et al. (1952) first applied this method to the diagnosis of hepatic disorders in 1952.

Schistosomiasis Japonicum is an endemic disease initially described by Katsurada et al. in 1904. With the increasing use of hepatic ultrasonic tomography, several reports have been made on the characteristic sonographic features of this disease. The present report describes the ultrasonic tomograms of Schistosomiasis Japonicum. They are classified into 4 types and compared with the results from CT scans.

Subjects and Methods

23 patients over 45 years of age with Schistosomiasis Japonicum confirmed by
hepatic biopsy or autopsy, and intracutaneous reaction were the subjects for this study. An ultrasonic tomograph (Model SSD 250, SEARLE CONTACT COMPOUND, AROKA CO.) and a CT scanner (NUCLEAR CT, AROKA) were used.

Results

Comparison of Ultrasonic and X-ray Tomograms of the Liver

Nakayama et al. (1981, 1983) reported that a network pattern is characteristic for hepatic ultrasonic tomograms observed in Schistosomiasis japonicum; however, many patients with different patterns were encountered. Therefore the subjects were classified into 4 types (Uto et al. 1984): Type I (14 cases), the network pattern described by Nakayama et al.; Type II (3), a mottled pattern; Type III (4), a sieve pattern; and Type IV (2), a mixed pattern exhibiting all the above features (Fig. 1).

Ultrasonic tomograms of each group were compared with the corresponding CT scans. CT pictures of Type I showed neither hepatic atrophy nor intrahepatic calcification, and the CT numbers were within the normal range. Ultrasonic tomograms also exhibited neither a decrement in the deep echo nor acoustic shadows. No notable fibrosis was observed with histological techniques (Fig. 2).

Ultrasonic tomograms of Type II showed mottled echoes with high reflectivity accompanied by acoustic shadows. CT pictures, in contrast, revealed a network pattern in diffuse regions with high CT numbers (Fig. 3).

Ultrasonically, Type III had a relatively uniform echo pattern with high reflectivity diffusely distributed over the entire liver and a decrement in the deep echo. Hepatic atrophy and high CT numbers were observed in the CT scans suggesting an advanced fibrosis of the liver (Fig. 4).

Type IV had a network pattern mixed with a mottled or sieve pattern in the ultrasonograms and no particular changes were noted in the CT (Fig. 5).

<table>
<thead>
<tr>
<th>Type of Echo pattern</th>
<th>Ultrasonogram</th>
<th>No, of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I, Fish scale (Network)</td>
<td>![Type I Ultrasonogram](Fig. 1.png)</td>
<td>14</td>
</tr>
<tr>
<td>Type II, Mottled</td>
<td>![Type II Ultrasonogram](Fig. 1.png)</td>
<td>3</td>
</tr>
<tr>
<td>Type III, Sieve</td>
<td>![Type III Ultrasonogram](Fig. 1.png)</td>
<td>4</td>
</tr>
<tr>
<td>Type IV, Mixed</td>
<td>![Type IV Ultrasonogram](Fig. 1.png)</td>
<td>2</td>
</tr>
</tbody>
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Fig. 1.
Fig. 2. Type I (56 years ♂)

Fig. 3. Type II (63 years ♂)

Fig. 4. Type III (53 years ♂)
Discussion

Conventionally, a network pattern has been reported to be characteristic of ultrasonic tomograms of the liver infected with Schistosoma japonicum. Echograms, previously undescribed in the literature, were obtained in this study and classified into 4 types: network, mottled, sieve and mixed patterns.

Comparison of the CT pictures and ultrasonic tomograms was made. Patients exhibiting decrements of the deep echo (Joseph et al. 1979; Gosink et al. 1979; Dewbury et al. 1979) with a diffuse sieve pattern on the ultrasonic tomogram had marked atrophy and high CT numbers in the CT pictures. These findings are considered to be suggestive of a highly advanced fibrosis or calcification of the hepatic parenchyma.

The CT picture for some patients was not significantly changed, although a network pattern was observed in the ultrasonic tomograms. This difference in findings may be related to the stage of fibrosis. On the other hand, patients with no typical findings in the ultrasonic tomograms but a network pattern with a high CT number were observed. The high reflectivity in the ultrasonic tomograms may reflect not only calcification of the schistosomic eggs but also hepatic fibrosis.

Nakashima et al. (1983) classified hepatocirrhosis due to schistosomiasis japonicum into 3 stages according to the extent of the fibrosis; Stage 1 was a mild fibrosis but the liver had a normal morphology with a smooth surface, Stage 2 exhibited an irregular hepatic surface with a considerably advanced fibrosis, and Stage 3 was characterized by hepatocirrhosis with a highly advanced fibrosis.

Although Schistosomiasis japonicum is accompanied by various degrees of hepatic fibrosis, hepatocirrhosis eventually occurs in the most advanced stage. The different ultrasonographic findings seem to correspond to different stages of hepatic fibrosis.

References


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