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Ultrasonographic and Tomographic Evaluation of the Chronic Liver Diseases

Ultrasonograficzna i tomograficzna ocena przewlekłych schorzeń wątroby

INTRODUCTION

The morphological examinations of the liver biopunctate are the essential diagnostic elements in the diagnosis of the chronic liver diseases.

Recently the usefull function of the examinations called "visualization methods" has more and more often been stressed. Those methods include the radiologic, ultrasonographic, CT and isotopic examinations. In the case of liver they complement the morphological evaluation of the biopunctate. Among them the methods of ultrasonography (USG) and computer tomography (CT) are extremely useful. It should be noticed that those methods do not decide about the diagnosis but are very helpful and supportive. They are performed mainly to evaluate the liver size, its structure, to find the possible focal changes in the parenchyma, to assess the diffused fatty, inflammatory, cirrhotic changes.

Most recently, especially USG has become the routine diagnostic method in the hepatic parenchyma changes (2).

The aim of the paper was to compare the ultrasonographic and tomographic evaluations of the liver structures with the clinical and morphological pictures. Moreover, all patients were examined as to the development of the neoplastic changes resulting from the cirrhosis being the consequence of the chronic active hepatitis.

MATERIAL AND METHODS

The study included 71 patients, aged 23—73, among them 50 men and 21 women treated in the Department and Gastroenterology. 22 patients showed the chronic active hepatitis and 49 hepar cirrhosis (40% of active cirrhosis and 60% of inactive cirrhosis).

The diagnosis was based on the history, clinical symptoms, physical examination, biochemical studies and the morphological evaluation of the liver.

On taking the history in 59 cases the acute hepatitis was reported and in each patient with the diagnosis of chronic liver disease the presence of HBsAg in serum was found.

All patients underwent USG of the abdominal organs assessing the liver size considering its dimensions and the sagittal diameter of the right and left lobes, the spleen size, the diameter of portal vein. 27 patients were subject to CT evaluating the liver size, the density of its parenchyma, the spleen size.

RESULTS

In the majority of the cases the results of the ultrasonographic examinations were in agreement with the clinical pictures and the histopathological diagnosis of the chronic hepatic diseases.

Table 1 presents the ultrasonographic pictures of the liver and spleen structures. In 16 patients with chronic active hepatitis the hepatomegaly was observed (sagittal diameter of the right lobe over 14 cm, of the left lobe over 9 cm or the liver dimensions exceeding 14×10 cm), which constitutes 73% of the cases. In 7 patients (32%) the changes of the liver echogenity were noticed and in 2 patients (9%) the reduction of the vascular picture was found. The splenomegaly was observed in 2 patients — 9% (the dimensions bigger than 12×7 cm). In 2 cases (9%) the presence of hepatic cystis in the right lobe was proved.

Among the patients with hepar cirrhosis, the hepatomegaly was observed in 25 (51%), the hyperechogenity structure of its parenchyma in 34 (69%) and the splenomegaly in 33 (67%). In as many as 39 patients (80%) the reduction of the liver vascular picture was noticed, in 38 (78%) the portal vein diameter increased over 14 mm and in 6 (12%) the splenic vein diameter was bigger than 10 mm. One patient showed the presence of hyperechogenic focus of 4 cm diameter in the right lobe pointing to the possible neoplastic lesions, two — the hepatic cysts, and one — ascites.

In all cases in which the clinical picture and the histopathological diagnosis did not correspond to the USG results or the ultrasonographic evaluations were uncertain as to the imaging of the hepar, spleen and portal structures or required more precise interpretation, CT of the abdominal cavity was performed. It was performed in 27 cases: in 8 patients with chronic active hepatitis and in 19 with hepatic cirrhosis (Table 2).

Among the patients with chronic active hepatitis in 5 (62.5%) only the hepatomegaly was observed. In all the remaing cases the CT pictures were normal.

Table 1. The ultrasonographic picture of hepatic and spleen structures in patients with chronic active hepatitis and cirrhosis

Type of pathologic changes	Cirrhosis $n=49$	CAH* $n=22$
Hepatomegaly	25 (51%)	16 (73%)
Splenomegaly	33 (67%)	2 (9%)
Ectasis of portal vein	38 (78%)	1 (9%)
Ectasis of splenic vein	6 (12%)	1 (5%)
Reduction of hepatic vascular picture	39 (80%)	2 (9%)
Hyperechogeneity of hepatic parenchyma	34 (69%)	6 (27%)
Irregular echogeneity of hepatic parenchyma	0	1 (5%)
Nodular structure of liver	2 (4%)	0
Presence of hepatic cysts	2 (4%)	2 (9%)
Ascites	1 (2%)	0
Presence of neoplastic focus in liver	1 (2%)	0

* Chronic active hepatitis.

In hepatic cirrhosis all patients showed splenomegaly and the reduction of the hepatic vascular picture. In 12 patients (63%) the liver was enlarged and in 17 (89%) it had the nodular structure. In most cases the density of the hepar parechyma was normal. In 2 cases (11%) the presence of cysts suggested in USG was proved, in 1 patient the enlarged paraaortal lymph nodes and the enlarged lymph nodes in the right iliac fossa were observed. In further examinations the Hodgkin's disease was diagnosed. In one patient the presence of the neoplastic focus suggested ultrasonographically was confirmed. On the basis of the morphological evaluation of the specim collected during the laparoscopy from the above mentioned focus the presence of carcinoma hepatocellulare was found. In one patient the lesion suggesting the pancreatic neoplasm was reported.

DISCUSSION

"The methods of organ imaging" opened a new chapter in the diagnosis of many diseases including the liver diseases. In particular, the role of ultrasono-

Table 2. CT picture of hepatic and spleen structures in patients with chronic active hepatitis and cirrhosis

Type of pathologic changes	Cirrhosis $n=19$	CAH* $n=8$
Hepatomegaly	12 (63%)	5 (62,5%)
Mean density of hepatic perenchyma	59 u.H.	61 u.H.
Splenomegaly	19 (100%)	0
Reduction of hepatic vascular picture	19 (100%)	0
Nodular structure of liver	17 (89%)	0
Presence of hepatic cysts	2 (11%)	0
Ascites	1 (5%)	0
Presence of neoplastic focus in liver	1 (5%)	0

* Chronic active hepatitis.

graphic examinations and CT should be stressed. Nowadays USG become the routine examination in the diagnosis of liver diseases. Its common usage resulted from the lack of any contraindications, low costs, short time and complete safety of the people examined (2).

The chronic active hepatitis in the USG picture is commonly characterized by the irregular and irregularly increased echogenity of the liver — in our material in as much as 73% of the cases; the organ enlargement is often a typical feature — 32%. When accompanied by the stroma collagenization of various intensity, the bands of tissue repercussion of significantly increased echogenity separating the lobules are visible.

The cirrhosis picture varies with the intensity of the lesions and their origin. In the post-inflammatory cirrhosis resulting from chronic active hepatitis the irregularly increased echogenity of the parenchyma dominates. The lesion intensities in the USG picture may be different although the clinical pictures may be similar. Due to portal hypertension the extrahepatic parts of the portal vein and its vessels widen. In normal condition its diameter is about 14 mm while the splenic vein diameter — 10 mm. Moreover, it is possible to visualize the collateral vessels of portal system (3, 4, 6, 13). This is proved by the studies performed in which 80% showed the reduction of the vascular picture, 78% — the ectasis of portal vein and 12% — the ectasis of splenic vein. The sensitivity of the method concerning the inflammatory changes and hepatic cirrhosis ranges from 60 to 80% according to various authors (8).

Having the histopathological diagnosis, the USG examination may be used to monitoring the drug effectiveness in the course of the disease, for example in chronic hepatitis, determining the degree of progression and regression of the lesions. One cannot neglect the role of USG in the evaluation of the focal lesions, mainly the primary neoplasms or metastatic neoplasms (2,9). Its sensitivity in those cases varies from 94 to 96.5% (10).

In the study presented CT of the abdominal cavity was performed in the cases where the ultrasonographic diagnosis was uncertain. Unfortunately its high cost and low availability limit the usage of this method to the patients in whom other methods, including USG, failed or are not sufficient (12). This technique enables to visualize the liver structures, to evaluate its density which varies in different diseases, which may also be the diagnostic element (normal density is about 60 u.H.) In the early hepatic cirrhosis CT sometimes reveals the enlarged, smooth homogeneously infiltrated liver. Its advanced phase is characterized by the lobe and segment atrophy and high nodular irregularity of the surface and the whole liver contour depending on the presence of the regenerative nodules, which was observed in 39% of the cases. In general the density of hepatic parenchyma is normal (12) — in our material — about 59 u.H. In 63% of the patients the hepatic diagnosis was made manifesting the normal parenchyma density, uneven nodular surface, enlargement of the left lobe and the whole organ, splenomegaly.

Due to the possibility of the layer examination of the liver, the deep lesions, unavailable for the ultrasonographic examinations, whose diameters are smaller than 2.5 cm (11) can be observed. It should be remembered that CT examination following the contrast administration enables to determine the focal abnormalities in cirrhotic liver. In the so-called dynamic CT examination following the contrast injection the peak contrast intensification was later and smaller than in the normal liver (12).

In the majority of the cases of the present study the ultrasonographic picture of the hepatic structures corresponded to the clinical picture and the morphological diagnosis. In the cases where the USG picture was uncertain CT gave all the explanations and was in agreement with the histopathological and clinical evaluations. Those findings were confirmed by other authors (1, 5, 7).

Conclusions

1. Following the histopathological diagnosis the USG and CT examinations may be very useful methods evaluating the course of chronic liver diseases.

2. The USG and CT examinations play an important role in the prophylactic monitoring of the neoplastic lesions which develop in the course of chronic inflammatory hepatic changes and hepatic cirrhosis.

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STRESZCZENIE

Porównano ocenę ultrasonograficzną i tomograficzną struktur wątroby z obrazem klinicznym i morfologicznym u 71 chorych z przewlekłym aktywnym zapaleniem i marskością wątroby. W większości przypadków obraz ultrasonograficzny i tomograficzny pozostawał zgodny z obrazem klinicznym i rozpoznaniem morfologicznym. U 1 pacjenta z marskością wątroby w obydwu badaniach stwierdzono obecność ogniska nowotworowego w wątrobie. Badania ultrasonograficzne i tomografia komputerowa mogą być pomocne w ocenie przebiegu przewlekłych schorzeń wątroby i pozwalają profilaktycznie monitorować zmiany nowotworowe rozwijające się na tym tle.