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The correlation of US and CT values in the diagnostics of giant pseudo-cysts of the liver

Cysts of the liver are classified as congenital, infectious (parasitic-Echinococcal) and traumatic. Cystic liver tumors give rise to cystoadenomas (1). Hepatic cysts are usually asymptomatic and detected accidentally in routine abdominal US in 2.5%–4.6% of examined subjects (2, 3). Most cysts become symptomatic due to accompanying infection, bleeding causing pain and mass effect. Big cysts giving clinical symptoms are qualified for surgical treatment, usually on the basis of CT examination.

The aim of the study is a comparative analysis of the value of US and CT examination in the diagnostics of giant hepatic pseudo-cysts.

MATERIAL AND METHODS

The material comprised 15 cases of complex hepatic pseudo-cysts whose diameter exceeded 5 cm and which in 6 cases had traumatic etiology, in 4 neoplastic (cystoadenomas and cystoadenocarcinomas) and in 5 cases infectious etiology (post-inflammatory and parasitic).

CT examination with contrast enhancement was done. Histological verification was the basis of diagnosis.

RESULTS

Thick, hyperechogenic walls with irregular inner contours were revealed with US exam in 3 cystoid tumors, 2 posttraumatic cysts and 2 post-inflammatory cysts. CT exam did not show any abnormality of the walls.

Posttraumatic cyst of the liver (Fig. 1a and b)

Fig. 1a. CT picture shows the presence of hypodensic area sized 12 x 14 cm within the right hepatic lobe. Homogenous cystoid change. Well separated, with even contours. Visible mass effect in the form of displacement of the left lobe and cramming of intestinal loops

Fig. 1b. On US found uneven contours with intussuscepting into the cyst lumen of thin wall septa and discreetly marked thin walls. The cyst content has slightly increased echogenicity with internal reflections of the echo

Neoplastic cyst (cystoid adenocarcinoma) (Fig. 2a and b)

Fig. 2a. CT section visualized hypoechogenic area sized 11 x 17 cm with even contours

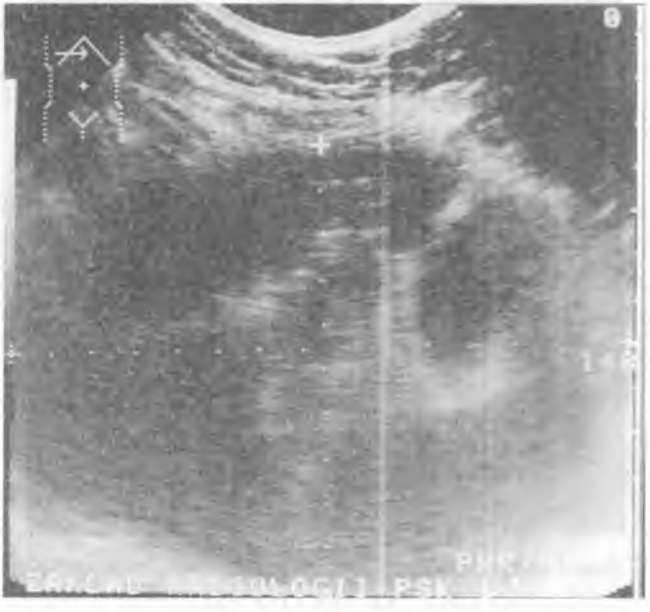

Fig. 2b. US reveals numerous thin wall internal septa

Parasitic, Echinococcal cyst (Fig. 3a and b)

Fig. 3a. Hypoechogenic area with numerous thin- and thick wall septa, well visible cyst walls (US)

Fig. 3b. Hypoechogenic round area with 8 cm diameter with septa of different thickness getting enhanced by contrast medium and with central calcification

Similarly, smooth inner contours in CT were shown by posttraumatic cysts (Fig. 1a) while in US in all cases irregular contours were found with thin partitions intussuscepting to the inside of the cysts (Fig. 1b.). In 2 cases of neoplastic cysts thin inner septa were imperceptible in CT examination (Fig. 2a). CT picture corresponded with simple cysts while in US the septa were clearly visible (Fig. 2b), only a part was visible in CT scans (Fig. 3b). Increased internal hyperechogenicity was found in 4 cysts complicated by bleeding or infection. In 3 parasitic cysts CT revealed calcifications within walls and septa.

DISCUSSION

Congenital hepatic cysts originate from the peripheral endothelium of biliary tracts. When added to acquired cysts they occur in 5–14% of the population. In most cases their diameter is 1–2 cm. In 25% cases they are multiple and usually occur in the right hepatic lobe and in women (2, 5).

Walls whose thickness is 1 mm are usually lined with a layer of cuboid or squamous endothelium. Adjacent hepatic tissue may be normal, fibrotic or inflammatory (4).

In parasitic cysts Echinococcal larvae grow in the fluid filling endocyst. They contain external membrane composed of chitin-like substance and internal rudimentary layer. Descendant cysts develop from internal rudimentary layer forming scolexes (heads of tapeworm). The third layer "ectocyst" forming during cyst growth results from inflammatory reaction of compressed surrounding tissue, causing the formation of granulation and fibrosis. Liver cysts grow slowly for many years, increasing their diameter annually by about 1–3 cm. About 30% cysts rupture spontaneously and decline partly or completely, calcifying secondarily. Complete calcification of pericyst periphery indicates lack of further growth.

The liver is the commonest localization of Echinococcal cysts which can rupture spontaneously into the system of biliary tracts causing mechanic jaundice. Traumatic ruptures into free peritoneal space also happen. Descendant cysts form small structures which are found inside mother cyst. They sometimes occupy only its peripheral field. The fluid of a descendant cyst, has lower density than that of mother cyst and linear structures visible within mother cyst correspond to free, flowing fragments of wall membranes of ruptured descendant cysts. Widened biliary tracts can also contain small descendant cysts of high density.

Radiograms reveal Echinococcal cysts forming peripheral calcifications of the walls in 70% cases resembling egg shell (3).

US picture depends on the stage of cyst's evolution. Typical characteristics is echoless content, even contours, imperceptible walls and subsequent acoustic enhancement dependent on the size. During bleeding or infection internal reflection of echo can be visible. US shows high sensitivity in revealing both thick- and thin wall partitions as well as

the solid component of cystoid tumors. It enables visualization of the walls and their inner contours. Thin wall partitions are invisible in CT examination, like some uneven wall contours.

Free, flowing membranes within cysts are observed at a late stage of their growth. A cyst containing descendant cysts forms small, multiseptal masses with calcifications having the character of arcuate hyperechogenic structures with acoustic shadow. Semilunar or annular calcifications of walls and linear calcifications of septa are best visible in CT scans. In the assessment of the topography of giant cysts CT enables better presentation of mutual relations. Giant hepatic cysts were in CT well separated, spheric or oval, hypodensic with density of 0–20 H.u. During bleeding or infection, side by side with increased cyst density, there may be observed sedimentation, like at the presence of free Echinococcal descendant cysts. Enhancement, both in CT and MRI helps differentiate cysts from cavernous angiomas and metastases. However, differentiating an Echinococcal cysts from metastases or secondary malignant tumor only in CT scans can be difficult (6).

Hepatic cysts in MRI show long in T1 and T2 relaxation time forming homogenous, clearly separated hypointensive areas in T1 sequence and distinctly hyperintensive in T2 sequence. Visualization of peripheral ring with small intensity of signals both in T1 and T2 is regarded as typical. Following Gadolinum injection the cyst does not show enhancement, which helps in differentiating it from cavernous angioma. Fast MRI sequences without contrast medium are recommended in differentiating small, accidentally detected cysts from metastases (3).

The internal structure of a cyst is well reconstructed in MRI. Yet, recognition is hindered by fibrosis, small volume and deteriorated quality of the picture in T2 sequence. With optimal quality of pictures MRI can identify cysts whose diameter is smaller than 1 cm. In angiograms cysts are without vessels, but the compression of the surrounding hepatic parenchyma when they are big can form hypervascular pseudocapsule, like in liver tumors.

CONCLUSIONS

Considerable disproportions of US and CT pictures of complex hepatic cysts point to the necessity of combining these two imaging techniques in their diagnostics. US shows high sensitivity in revealing septa, determining internal contours and wall thickness. CT reveals calcifications and after contrast enhancement vascularised walls, septa and tissue component. CT is useful in determining topographic relations of big hepatic cysts.

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SUMMARY

The aim of the study was a comparative assessment of the value of US and CT examinations in the diagnostics of giant hepatic pseudo-cysts. The material comprises 15 cases of complex hepatic pseudo-cysts with diameter exceeding 5 cm, which in 6 cases had traumatic etiology, in 4 neoplastic (cystoadenomas and cystoid adenocarcinomas) and in 5 cases infectious (postinflammatory and parasitic). Considerable disproportions in US and CT pictures of liver cysts were revealed. Posttraumatic cysts showed smooth inner contours in CT while in US irregular contours with thin septa intussuscepting to the inside were found. In 2 cases of neoplastic cysts thin inner septa were only shown with US examination. In parasitic cysts CT visualized only a part of septa visible in US. It was found out that considerable disproportions of US and CT pictures of complex hepatic cysts require combination of both imaging methods in their diagnostics. US shows high sensitivity in revealing septa, determining internal contours and wall thickness. CT reveals calcifications and after contrast enhancement vascularised walls, septa and tissue component. CT is useful in determining topographic relations of big hepatic cysts.

Korelacje wartości USG i TK w diagnostyce olbrzymich torbieli rzekomych wątroby

Celem pracy jest porównawcza ocena wartości badania USG i TK w diagnostyce olbrzymich torbieli rzekomych wątroby. Materiał stanowi 15 przypadków złożonych torbieli rzekomych wątroby, średnicy powyżej 5 cm, które w 6 przypadkach miały etiologię ura-

zową, w 4 nowotworową (torbielakogruczolaki i torbielakogruczolakoraki) a 5-krotnie infekcyjną (pozapalną i pasożytniczą). Ujawniono znaczne dysproporcje w obrazach USG i TK torbieli wątroby. Torbiele pourazowe wykazywały gładkie zarysy wewnętrzne w TK, gdy w USG stwierdzano nieregularne kontury z wpuklającymi się do wnętrza cienkimi przegrodami. W dwu przypadkach torbieli nowotworowych cienkie przegrody wewnętrzne wykazano jedynie badaniem USG. W torbielach pasożytniczych w TK uwidoczniono tylko część przegród widocznych w USG. Stwierdzono, że znaczne dysproporcje obrazów USG i TK złożonych torbieli wątroby wymagają kojarzenia obu metod obrazowania w ich diagnostyce. USG wykazuje wysoką czułość ujawniania przegród, określania zarysów wewnętrznych oraz grubości ścian. TK ujawnia zwapnienia, a po wzmocnieniu kontrastowym unaczynione ściany, przegrody i komponentę tkankową. TK jest przydatne w określaniu stosunków topograficznych dużych torbieli wątroby.