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The value of ultrasound diagnostics in the monitoring of patients after operation of the pancreas

The development of surgical techniques of pancreas leads to changes of pancreatic morphology and its topographical relations. Distorted postoperative anatomy made it difficult to assess treatment effectiveness and possible complications.

The aim of the study is to assess the value of US examination in the assessment of the postoperative condition of pancreas.

MATERIAL AND METHODS

The material comprises 41 patients, aged between 38 and 73 years (mean 66 years). 16 patients were after operation with Whipple's method, 3 patients were after operation with Puestow's method, and 4 were after operation with Jurasz's method. 3 patients had partial resection of pancreatic tail. 11 patients were treated with surgery due to acute hemorrhagic-necrotic pancreatitis, 4 had shunting palliative operations. Histopathologically 23 adeno-carcinomas of pancreas and 6 of Vater's papilla, 8 chronic pancreatitis and 4 biliary ducts carcinomas were found. US examinations were performed with the apparatus Hitachi EUB 410, within 4–5 years after surgery.

RESULTS

In the early postoperative period of 6 patient liquid, areas were found in the area of the pancreas, in the hepatorenal recess, right paracolic recess and in the place of anastomosis. They were transient, with diameter below 3 cm and they resolved spontaneously within 4–6 weeks after surgery. In 3 cased gas bubbles found within them required needle aspiration to exclude abscess.

The abscess was recognized in 2 cases in the area of ducto-enteral anastomosis due to bile discharge (Fig.1). Drainage of liquid collections due to anastomosis discharge was made under ultrasonographic control.

In 12 patients after operation with Wipple's method, the structure of the remaining pancreatic parenchyma was normal. But in 4 cases it was hiperechogenic. In other 4 patients there ware edematous inflammation changes surrounded by a liquid streak (Fig. 2). In 6 cases features of chronic pancreatitis were found as an increased parenchyma echogenicity, patchy hiperechogenic focuses of fibrosis and parenchymal calcifications (Fig. 2).

Dilatation of pancreatic ducts was segmental and irregular. In 2 cases it was found after anastomosis of the head cyst with the intestinal loop (Fig. 3) and in 2 cases after anastomosis of the tail cyst with Jurasz's method (Fig. 4). 3 patients had pancreatic tail resection. In patients draining due to hemorrhagic-necrotic pancreatitis US apart from liquid areas reveals the localization of the drain ends. In 1 case the drain was dislocated into the gall bladder (Fig. 5).

In patients after palliative procedures the grade of intrahepatic bile ducts and choledochus dilatation were assessed (Fig. 6). The cholestasis was usually very intense. Introduction of the drain into the choledochus required localization of its end. US monitoring enables assessment of the drainage efficiency.

Thickening of the pylorus walls and the proximal part of duodenum up to 5–10 mm was revealed in 8 patients, within 2–3 months after finishing postoperative radiotherapy. This thicke-

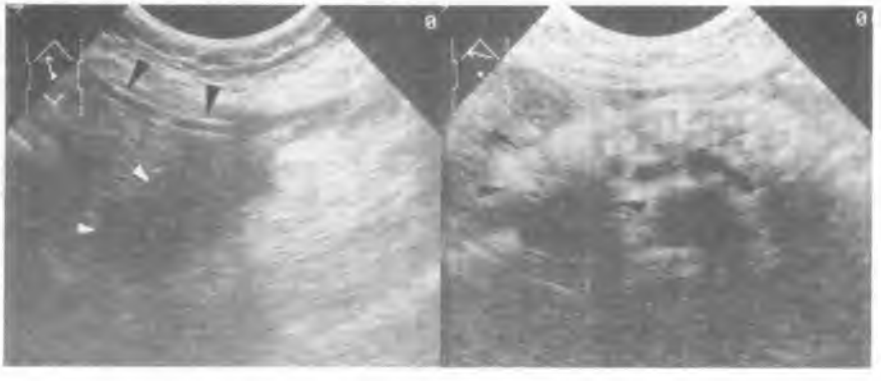

Fig. 1. Condition after Whipple's surgery. Hypoechogenic liquid area in the region of anastomosis, abscess caused by bile sagging (white arrows), the end of the drain localized in its upper part (black arrows)

Fig. 2. Condition after Whipple's surgery. In the projection of the pancreatic head visible intestinal loop (arrows). Retained fragment of pancreatic body and tail with numerous, intense echo reflections corresponding to calcifications – chronic pancreatitis

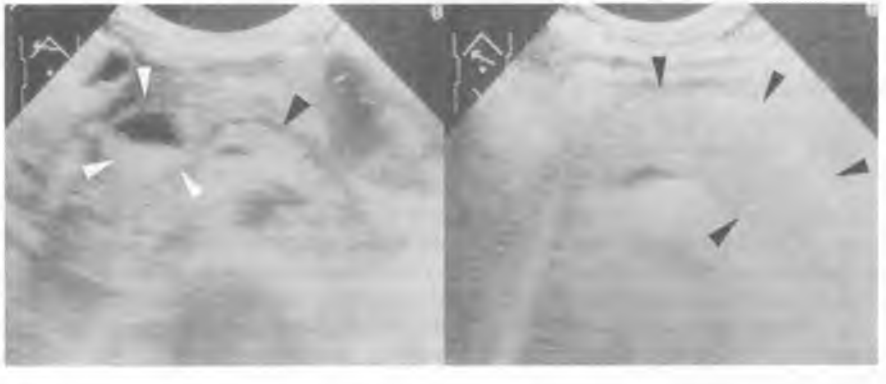

Fig. 3. Condition after anastomosis of the cyst of pancreatic head with intestinal loop, the cyst partly filled with getting leveled hiperechogenic content (white arrows). Widened pancreatic duct (black arrow)

Fig. 4. Chronic pancreatitis after operation for a cyst of the pancreatic tail with Jurasz's method. Widened pancreatic duct (black arrow)

ning simulates the presence of recurrence, excluded by further examinations. In 4 patients thickening of fascia surrounding mesentery vessels makes it difficult to assess fat tissue in the pancreatic areas, especially in addition to changes after radiotherapy. In 5 patients recurrence was found in the pancreatic areas, infiltrating remaining pancreatic parenchyma by the tissue masses surrounding mesentery vessels and fusing with the fat tissue, which showed increased thickness.

The enlargement of lymph nodes was found in 9 cases as a result of inflammation or operation, chemio- and radiotherapy. Stabilization in control examination confirms that their enlargement was reactive. The diameter of lymph node up to 1.5 cm was considered to be normal. Only in 3 patients evident recurrence in lymph was found. In 12 cases the presence of aerobilia after interventions on bile ducts was found. In 2 patients the presence of ascites was considered to be a symptom of neoplastic dissemination. The metastases in the liver were found in 4 patients, and were considered as distant complications.

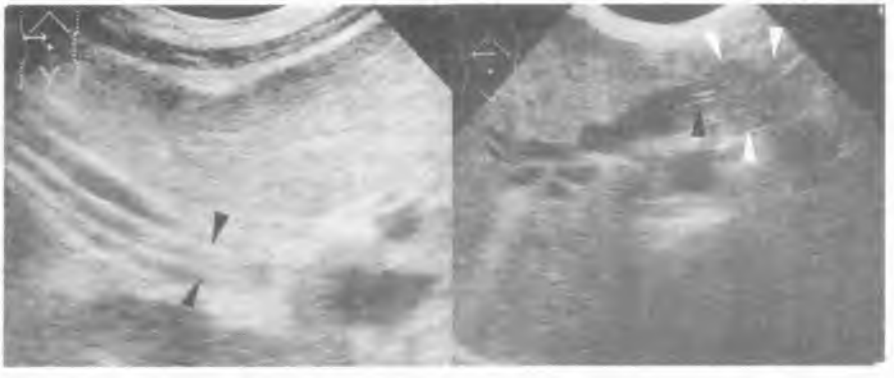

Fig. 5. Condition after operative treatment of hemorrhagic-necrotic pancreatitis. Drain in the gall bladder (black arrows) – iatrogenic complication

Fig. 6. Tumor of pancreatic head (white arrows). Widened intrahepatic biliary ducts and visible catheter end in the lumen of intrahepatic biliary ducts (black arrows)

DISCUSSION

The frequency of cancer of the pancreas increases, and despite the improvements in the therapy, the prognosis remains poor (5). Adenocarcinoma is the most frequent malignant tumor of the pancreas and in the developed countries is the fifth cause of the death among the neoplastic diseases (5). The 5-year survival after the resection was below 4% (5). After the resection of the intraductal papillary mucinous tumors of the Vater's papilla, asymptomatic period was between 6 to 38 months (9). About 10–20% of pancreatic tumors are operable while the others are suited only for palliative procedures (5).

Radical pancreaticoduodenectomy is a standard technique used in the tumors of Vater's papilla while the local resection is the alternative in the highly differentiated tumors (3). The therapy mainly consists in decompression of the bile ducts and pancreatic duct and in the pain relief. To avoid late complications of the duodenal block the ducto-enteral anastomosis should be connected to gastrointestinal anastomosis. If only biliary by-pass was made, the duodenal obstruction occurred in 3–47% (mean 17%) of cases (5). The advantages of the use of the endoscopic metallic stent were emphasized (5). The techniques saving the pylorus and proximal part of duodenum lead to better postoperative weight gain, reduced biliary reflux and frequency of intestinal ulceration. The longer survival rate and better life quality after pylorus saving operation

are emphasized (13, 14). At present the 5-year survival period is achieved in 20% of adenocarcinomas and in 40% of other tumors of Vater's papilla (11). The resection of the pancreatic head saving the duodenum is an alternative to partial duodenopancretectomy in chronic pancreatitis (14).

The early local recurrence is occasional in the case of resection made within margins of healthy tissues. The most frequent localization of the recurrence was the tissue residue in the place of intervention and local lymph nodes (6,9).

The most frequent place of metastasis was the liver (1,11). The mean asymptomatic period was 11.8 month after the operation (9). With the local recurrence in the area of pancreas the most often coexisted paraaortic or retroperitoneal adenopathy (6,9). The pancreatic ductal adenocarcinoma tends to metastatize to the pancreaticoduodenal lymph nodes. The pyloric walls thickening may represent the recurrence, but it was not confirm in the biopsy results. They may be results of radiotherapy or biliary reflux.

The pancreaticoentostomy loop (as well as Roux loop) filled with gas or liquid in the hilus of the liver and in the area of the head of pancreas must be differentiated with the abscess, pseudocyst or recurrence (2,7). In the chronic pancreatitis to achieve pain relief the purposefulness of peripheral pancreatectomy is emphasized (8). The anastomosis with Puestow's method ensures pain relief in up to 60-80% of patients with the wide pancreatic ductal drainage without the necessity of the pancreatectomy (4). In some cases, the intestinal loop connected to pancreatic duct may form spherical structure imitating the tumor localized anteriorly to the pancreas.

The most frequent complications after pancreatectomy were related to the pancreatic-coenterostomy (10,12). The pancreaticoenterostomy side to side with Puestow's method is used in the extensive pancreatic duct dilatations, since in small dilatations it is not effective (8). It is the technique of choice to relieve heavy pain in patients suffering from chronic pancreatitis and with the pancreatic duct dilatation associated with the patency impairment. The parapancretic strikes form soft-tissue density lines surrounded the operated pancreas, as a result of inflammatory or postoperative changes.

CONCLUSIONS

1. Ultrasonography is the fundamental diagnostic modality in monitoring patients after surgical treatment of pancreatic diseases, enabling recognition of both early and distant complications.

2. US examination is more readily accessible, cheaper and may be practically repeated with no limits, without exposing patients to x-ray radiation.

3. In diagnostically difficult cases US examination requires additional CT examination simultaneously reducing the number of performed CTs.

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SUMMARY

The aim of the study is to assess the value of ultrasound examination in the postoperative assessment of the pancreas. The material comprises 16 patients after operation with Whipple's method, 3 patients after operation with Puestow's method, 4 patients after the operation with Jurasz's method, 11 patients after surgical treatment of acute hemorrhagic-necrotic pancreatitis and 4 patients after palliative interventions. In 2 patients after operation with Whipple's method the presence of the abscess was observed due to bile discharge that requires drainage. In 4 cases edematous inflammation changes surrounded by a liquid streak were found. 6 patients had features of chronic pancreatitis. The segmental pancreatic duct widening was found in 4 patients, and 2 of them were after operation with Jurasz's method. In patients drained due to hemorrhagic-necrotic pancreatitis, US apart from liquid areas, reveals the localization of the drain end. In patients after palliative procedures the grade of intrahepatic bile ducts and choledochus dilatation were assessed. In 5 patients recurrence was found. US examination is a valuable diagnostic method in postoperative monitoring of patients after surgical treatment of pancreatic diseases.

Wartość diagnostyki ultrasonograficznej w monitorowaniu pacjentów po operacji trzustki

Celem badania była ocena wartości badania ultrasonograficznego po operacji trzustki. Materiał stanowiła grupa 16 pacjentów po operacji metodą Whippla, 3 po operacji metodą Puestowa, 4 po operacji metodą Jurasza, 11 po operacyjnym leczeniu ostrego krwotoczno-martwiczego zapalenia trzustki i 4 pacjentów po paliatywnych zabiegach omijających. U pacjentów po operacji metodą Whippla w dwu przypadkach stwierdzono obecność ropnia, który wymagał drenażu w wyniku wycieku żółci. W czterech przypadkach stwierdzono obrzękowe zmiany zapalne, otoczone pasemkiem płynowym. W sześciu przypadkach stwierdzono cechy przewlekłego zapalenia trzustki. W czterech przypadkach stwierdzono odcinkowe poszerzenie przewodu trzustkowego, w tym w dwóch przypadkach po operacji metodą Jurasza. U pacjentów drenowanych z powodu krwotoczno-martwiczego zapalenia trzustki USG obok zbiorników płynowych ujawniło lokalizację końcówek drenów. Po zabiegach paliatywnych oceniano stopień poszerzenia dróg wewnątrzwątrobowych i PŻW. U 5 chorych stwierdzono wznowę miejscową w łożysku trzustki. Należy wnioskować, że USG jest wartościową metodą diagnostyczną w monitorowaniu pacjentów po leczeniu chirurgicznym chorób trzustki.