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Endosonography and Cytology in Diagnosing and Staging Pancreatic Body and Tail Carcinoma

Preliminary Results of Endosonographic Guided Puncture

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Endosonography was performed in diagnosing and staging pancreatic body and tail carcinoma in two patients. In the first case endoscopy, abdominal ultrasound, and computed tomography were nondiagnostic in diagnosing the origin of submucosal gastric abnormalities. Endosonography diagnosed a pancreatic tail carcinoma with submucosal gastric involvement, and this was confirmed by endosonographic-guided cytology. Fundus varices due to segmented splenic vein involvement were found. Surgery was not recommended due to the advanced disease. In the second case pancreatic body carcinoma was diagnosed by ERCP and computed tomography. Transcutaneous ultrasonographic-guided cytological puncture confirmed the diagnosis. Endosonography revealed additional information of segmental portal hypertension with fundic varices due to splenic vein involvement. Autopsy confirmed the endosonographic diagnosis.

KEY WORDS: endosonography; cytology; pancreatic carcinoma; diagnosis; autopsy.

Despite advances in imaging techniques, pancreatic cancer is often diagnosed in an advanced stage. In the United States pancreatic cancer has become one of the important causes of death among gastrointestinal malignant diseases (1). Pancreatic carcinoma located in the body and tail of the pancreas may not cause obstructive jaundice, which may lead to the diagnosis nonpeptic ulcer dyspepsia. Abdominal pain radiating to the back and weight loss are the most common symptoms. Endoscopic retrograde cholangiopancreatography (ERCP) is accurate in diagnosing pancreatic cancer because the malignant disease often originates from the pancreatic duct (2–8). The extent of the disease, however, cannot accurately be assessed. Computed tomography (CT) is not always accurate in diagnosing and staging pancreatic tail carcinoma because small lesions may not be imaged (9). Cytological examination is recommended in ascertaining the diagnosis of malignancy (10). Transcutaneous abdominal ultrasound is not often accurate in diagnosing pancreatic body and tail cancer due to air accumulation in the bowel or stomach. Endosonography (ES) has been reported to be accurate in the staging of pancreatic and ampullary carcinoma by directly approaching the target lesion via the gastrointestinal lumen with a high-frequency ultrasonic beam (11–14). Tissue diagnosis with ES in diagnosing pancreatic carcinoma has not been reported. Recently, a prototype echoduodenoscope (Olympus XJF-UM3)

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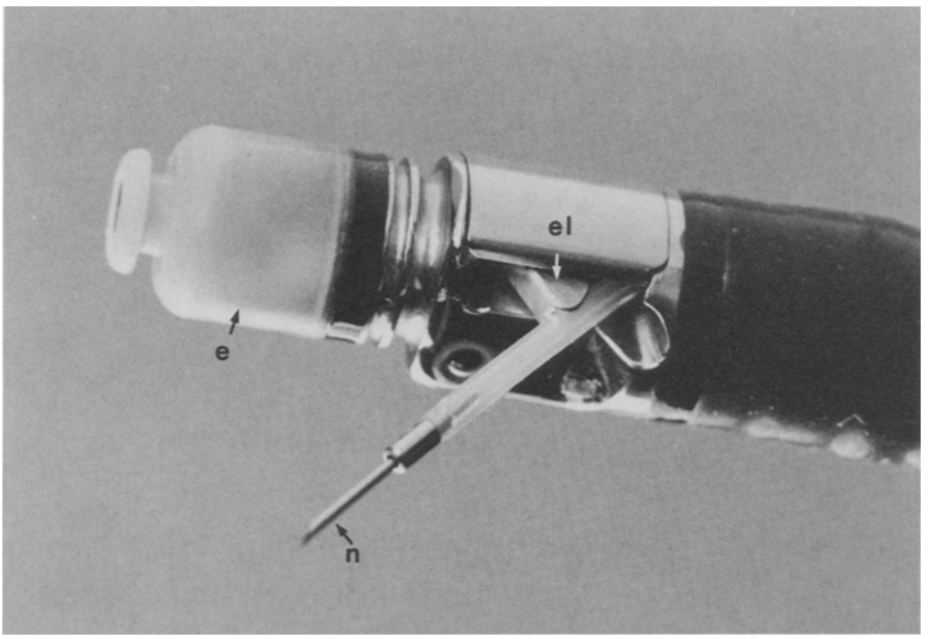

Fig 1. Echoduodenoscope (Olympus XJF-UM3) with a small echoprobe (e) and a modified sclerosing needle (n) passing through the biopsy channel for cytological puncture. Note the elevator (el) for endoscopic maneuvering of the puncture needle.

with a small echoprobe and an elevator for maneuvering the biopsy forceps or cytologic puncture needle became available (Figure 1). The aim of this study was to report the value of ES in staging pancreatic body and tail carcinomas. The role of ES-guided cytology was discussed.

MATERIALS AND METHODS

Patients. A 45-year-old female patient with abdominal pain for four months and weight loss was referred to the Academic Medical Center. Physical examination revealed no abnormalities. Laboratory data showed anemia and elevated sedimentation without abnormalities of cholestatic enzymes. Abdominal ultrasound showed a normal pancreas, liver and gallbladder. Gastroscopy showed a bulging lesion in the fundus of the stomach suspicious of a submucosal lesion. Computed tomography revealed some thickening of the gastric fundus without evidence of a pancreatic malignancy. ES performed with a recently available Olympus XJF-UM3 echoduodenoscope revealed submucosal hypoechoic infiltration of the fundus due to a pancreatic tail tumor (Figure 2). Segmental splenic vein obstruction due to tumor infiltration and fundus varices adjacent to the submucosal infiltration were found. The submucosal infiltration showed direct continuity with the pancreatic tumor. ES-guided cytological puncture using a modified sclerotherapy needle was done. The location of the needle at the mucosal level was visualized endoscopically. The position of the needle in the submucosal abnormality was imaged as a white spot followed by a dorsal shadowing endosonographically (Figure 3). Cytological examination showed malignant cells compatible with pancreatic adenocarcinoma (Figure 4). After consultation, surgery was not recommended due to the tumor extent and presence of segmental portal hypertension. Symptomatic pain treatment was given and the patient was discharged. Three months later the patient underwent surgery due to fecal peritonitis. Diffuse peritoneal metastases were found and palliative bypass procedure was not possible. The patient died one day later.

The second patient, a 68-year-old woman, presented with abdominal discomfort and back pain without obstructive jaundice and was referred to the Academic Medical Center. Endoscopy revealed some thickening of gastric folds without evidence of varices. Abdominal ultrasound showed a hypoechoic mass in the body of the pancreas. Ultrasonographic-guided cytological puncture revealed malignant cells strongly suspicious of adenocarcinoma. CT scan found an enlargement of the pancreatic body without evidence of vascular involvement. ERCP showed pancreatic duct obstruction in the pancreatic body with normal bile ducts. ES was performed for further evaluation. Intragastric ES revealed an extensive hypoechoic mass in the body of the pancreas with obstruction of the splenic vein associated with fundus varices (Figure 5). Surgery was not performed because the segmental splenic vein obstruction associated with gastric varices prohibits surgical resection. The patient received symptomatic pain treatment. Six weeks after ES the patient suddenly died at home during routine housework. Autopsy revealed an extensive pancreatic mass with splenic vein obstruction and multiple thromboses in the portal vein and pulmonary

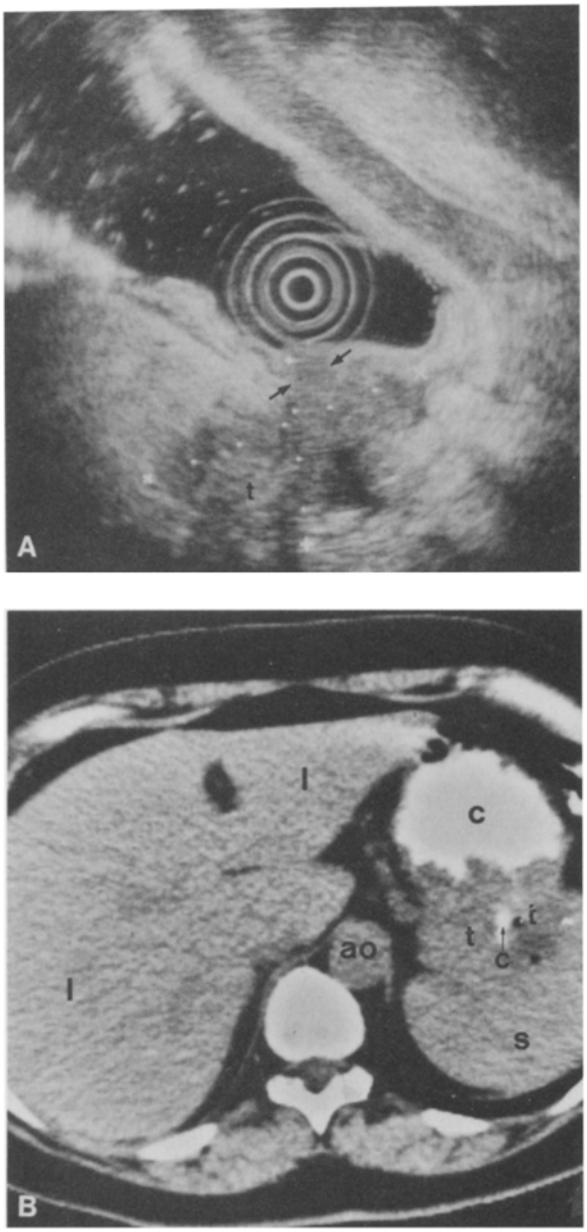

Fig 2. (A) Endosonogram reveals a hypoechoic submucosal wall infiltration (t) in the fundus of the stomach, which shows a continuity with a hypoechoic pancreatic tail tumor. The gastric wall adjacent to the liver (l) and spleen (s) shows no abnormalities (big arrows) in contrast to those of infiltrated area. Note the position of the needle as a echogenic spot (n) with dorsal shadowing. Olympus XJF-UM3 (frequency 7.5 MHz). (B) CT scan shows a circumscribed thickening of the fundus wall (t) located adjacent to the spleen (s) and aorta (ao) suspicious of submucosal lesion. Note the close relationship between the submucosal lesion and the spleen. c = gastric lumen filled with contrast, l = liver.

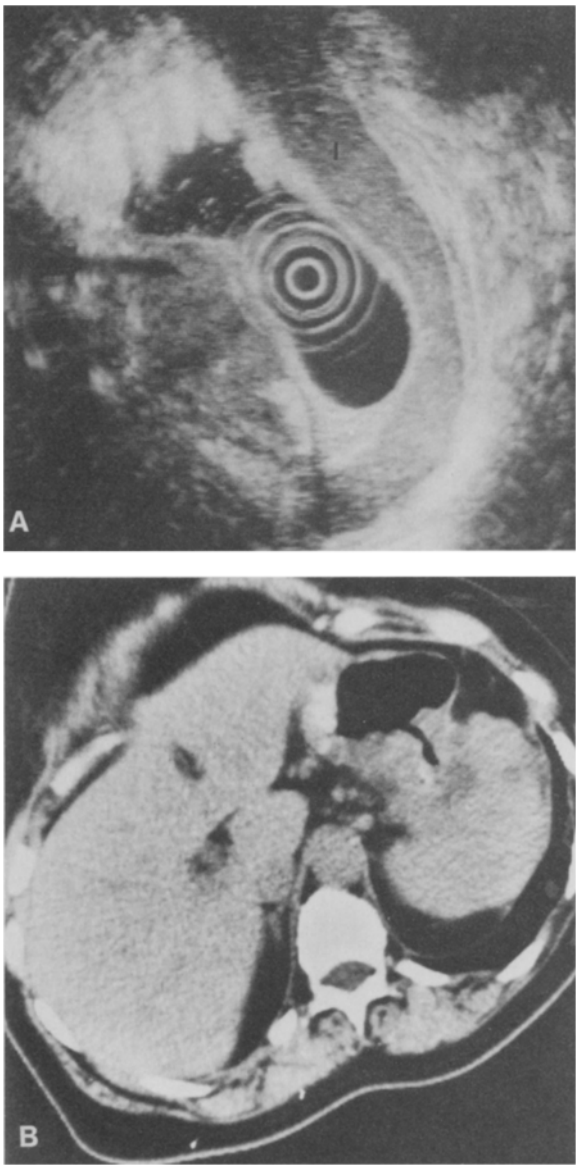

Fig 3. (A) Endosonogram (oblique section) reveals an hypoechoic tumor (t) in the pancreatic tail penetrating into the adjacent fundic wall (small arrows). Note the needle is visualized as a pattern with dorsal shadowing. (B) Corresponding CT (oblique section) reveals a tumor (t) mass at the fundic area adjacent to the spleen (sp) and pancreas (p). ao = aorta, cv = canal vein, l = liver, c = gastric lumen filled with contrast.

veins. The cause of death was cardiopulmonary insufficiency due to pulmonary thrombosis related to the advanced malignant pancreatic disease.

RESULTS AND DISCUSSION

The cases reported show that ES is helpful in diagnosing and staging of pancreatic body or tail carcinoma. Submucosal gastric involvement can be imaged clearly due to the capability of ES in imaging the gastric wall architecture and the primary pancreatic tumor (15). The diagnosis can be ascertained by ES-guided cytological puncture.

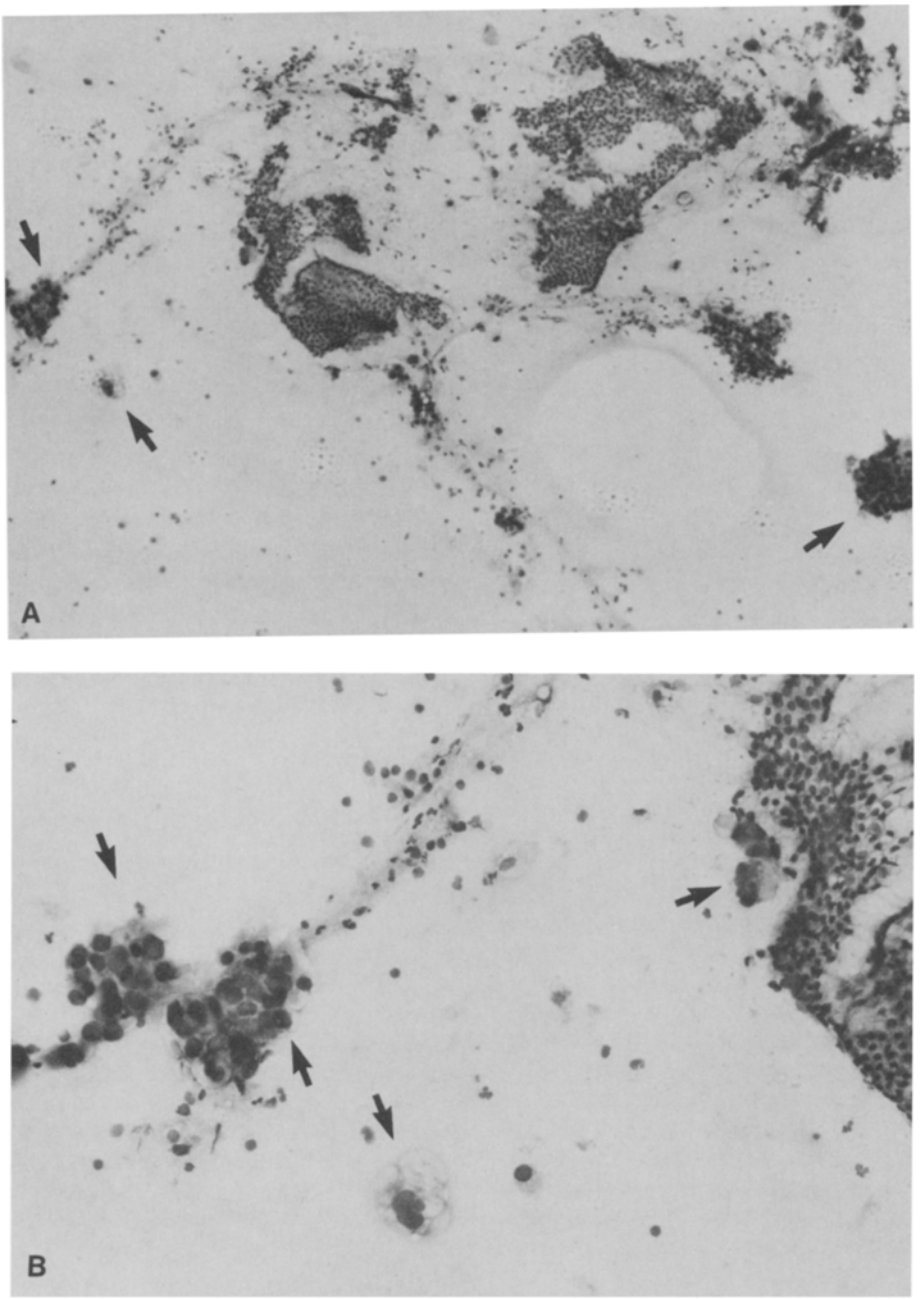

Fig 4. (A) Overview of some atypical cells suspicious of malignancy (arrows). Hematoxylin-eosin staining. (B) Magnification view shows adenocarcinoma cells fitted with the diagnosis of pancreatic carcinoma (arrows).

This is important because the gold standard of ES in diagnosing malignancy remains the tissue diagnosis. Moreover, ES-guided cytology may become an adjunct to endoscopy as endoscopic biopsy may often be nondiagnostic in the case of submucosal gastrointestinal tumor (15). Diagnosing metastatic lesions to the stomach by salvage cytology has also been reported (16). Fundic varices due to segmental splenic vein tumor obstruction can be imaged clearly. This is explained by the ability of ES to image the gastrointestinal wall architecture and the use of a real-time high-frequency ultrasonic beam (15). In clinical practice pancreatic carcinoma with segmental portal hypertension due to the tumor invasion should be considered to be nonresectable.

Fig 5. (A) Endosonogram shows an hypoechoic tumor mass (t) in the body of the pancreas penetrating (arrows) into the adjacent splenic vein (sv). pv = portal vein, ll = left liver lobe, lu = gastric lumen, sp = spleen. (B) Corresponding CT reveals a hypodense tumor (t) in the pancreatic head, ao = aorta, sma = superior mesenteric artery, cv = caval vein. (C) ERCP reveals an obstruction (o) of the pancreatic duct (pd) at the junction between the head and body of the pancreas. cbd = common bile duct.

In our previously published series, gastric involvement was not found in patients with ampullary or pancreatic head carcinoma, probably due to the relative long distance to the stomach (14). In this series gastric involvement was found without presentation of major clinical symptoms. The close proximity between the stomach and pancreatic body or tail carcinoma enabled direct tumor penetration into the adjacent gastric wall.

In conclusion, ES will become an important diagnostic procedure in diagnosing and staging of caudal pancreatic carcinoma. Submucosal gastric involvement by carcinoma can be diagnosed by ES-guided cytology. Fundic varices due to splenic vein involvement can be diagnosed by ES without invasive splenoportography. Implementation of color Doppler scanning, which is already available in transcutaneous ultrasound, may be helpful in assessing vascular abnormalities and portal hypertension.

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