Preoperative Diagnosis of Pancreatic Carcinoma by Percutaneous Aspiration Biopsy

MARTIN L. GOLDMAN, MD, ZUHER M. NAIB, MD, JOHN T. GALAMBOS, MD, JOE C. RUDÉ III, MD, KHEE-TIANG OEN, MD, EDWARD L. BRADLEY III, MD, ATEF SALAM, MD, and ANTONIO C. GONZALEZ, MD

Carcinoma of the pancreas and chronic pancreatitis may be extremely difficult to differentiate by standard diagnostic methods preoperatively as well as at the operating table. Operative pancreatic biopsy may have a high morbidity, rare mortality, and can be misleading. Percutaneous aspiration biopsy may be of great potential benefit. It provides additional histological material not usually available, and an accurate diagnosis of malignancy can be made. In select patients a needless laparotomy may be avoided. It appears to be a safe procedure that should be considered in the evaluation of the patient with suspected pancreatic malignancy in which a mass lesion is demonstrated by ultrasonography, computerized tomography, angiography, or retrograde pancreatography.

Both preoperative and intraoperative diagnosis of pancreatic carcinoma is difficult (1-4). Despite recent advances in angiography, retrograde pancreatography, ultrasonography, and computerized axial tomography, differentiation between chronic pancreatitis and pancreatic carcinoma remains uncertain in 15-20% of patients (5). Scattered reports indicate a high diagnostic accuracy of 75-80% with percutaneous pancreatic aspiration biopsy (4, 6-8). To evaluate the safety and effectiveness of this technique at our institution, we studied consecutive patients with suspected pancreatic neoplasms.

MATERIALS AND METHODS

The present report is based on 8 men and 5 women, aged 26-81 (median 61) with suspected pancreatic malignancy. The pancreatic cancer was localized for aspiration biopsy by the combination of ultrasonography and angiography (Figure 1) or cholangiography (Figure 2). Abdominal ultrasound B-scan using bistable oscilloscopic display was used for the anterior localization and depth of the lesion. The skin directly over the suspected mass was marked under ultrasonic guidance. A slight skin abrasion was made using a fine sterile needle and the skin stained with umbilical cord disinfectant (Triple Dye, Kerr Chemical Company, Northville, Michigan). This stain is not removed by sterilization preps. After the anterior localization point was marked, the depth of the lesion was obtained from both the A and B ultrasounds. Then, as the pancreatic lesion was demonstrated by angiography, the catheter in the artery was advanced as close to the suspected tumor mass as possible. The catheter thus served as the posterior marker of the pancreas. The aspiration biopsy was performed during the course of the angiogram or cholangiogram. The patient was kept in a supine position and the skin was prepped with betadine. A 3-mm superficial skin nick was made over the anterior skin marker. The depth of the needle penetration was estimated by the previous ultrasound and controlled by fluoroscopy, using the angiographic catheter as the posterior marker to guide the needle.

The anterior abdominal wall was punctured with a fine 23-guage 15-cm "Chiba" needle (Tanaka Sansei Do, Inc., Tokyo 113, Japan) (0.7 mm OD). To facilitate the puncture in an obese patient, a 20-guage Medicut (Aloe Medical, St. Louis, Missouri 63103) intravenous cannula may
BIOPSY DIAGNOSIS OF PANCREATIC CARCINOMA

ULTRA SOUND

FLUOROSCOPE

Fig 1. Technique of percutaneous aspiration biopsy of the pancreas. The skin directly overlying the main portion of the pancreatic mass (as determined by ultrasonography) is punctured with a Chiba needle. Under fluoroscopic guidance the needle is directed to the region of abnormal vessels seen by angiography. The needle may pass through stomach or liver prior to its entry into the pancreatic mass.

first be placed within the anterior abdominal wall at the point of the anterior skin marked. The Chiba needle can then be advanced through the Medicut catheter.

When the needle was advanced to its proper depth and the needle entered a firm gritty mass, the inner stylet was removed and continuous maximum suction was applied with a 10-cc syringe. During maximum suction over a few seconds, the needle was vigorously moved up and down several times over a 1-cm distance.

At the end of the aspiration pressure was still maintained on the syringe as the needle was removed from the pancreas. Aspirates only slightly more than what fills the contents of the lumen of the Chiba needle are obtained. The syringe and needle are separated. An air-filled syringe was attached to the needle and the aspirate was expressed into a jar of sterile saline, and then both the needle and syringe were flushed several times with saline into the collection jar. Four to five separate pancreatic punctures were performed. The technique of aspiration biopsy added approximately 10-15 min to the angiographic procedure.

The specimen was immediately carried to the cytology laboratory where the saline was passed through one or two membrane filters of 5-µm pore opening and the cells were promptly fixed and stained to avoid degeneration of cytogenic detail.

Patients were maintained at bedrest for 6 hr and were observed clinically over 3 days with daily serum amylase determinations. The only contraindication for this procedure was an increased risk of bleeding due to hemostasis.

RESULTS

In all of the 13 aspirations that were performed, recognizable pancreatic glandular and duct cells were obtained. Carcinoma of the pancreas was documented by angiography, clinical follow-up, or by histology in 11 patients (Table 1). In 6 of the 11 patients with carcinoma, positive cytology for adenocarcinoma was obtained (Figure 3). In a seventh patient the cytological material was suspicious of cancer. Two of the 6 positive cytologies were from patients with large tumors greater than 6 cm in diameter with extension outside of the body of the pancreas and encasement of major arteries and veins. Three of the 6 positive cytologies were from patients with medium-sized tumors 3-6 cm in diameter with extension outside of the head of the pancreas and encasement of the gastroduodenal artery, but with normal veins. One positive cytology was from a patient with a small tumor less than 3 cm in diameter localized within the head of the pancreas and encasement of only small pancreatic arteries. In the seventh patient in which cytology revealed suspicious cells, the tumor involved was also of moderate size. In the remaining 4 cancer patients in which