Translumbar Approach to CT Guided Biopsy of the Pancreas

Abstract

We performed a review of 115 computed tomography guided biopsies of the pancreas done over a 4-year period to evaluate our experience with the trans lumbar approach to primary pancreatic masses.

The accuracy rate was statistically similar for the transabdominal (87%) and the trans lumbar (90%) approaches. Fewer complications were noted with the trans lumbar approach (0%) than with the transabdominal approach (5%). Overall, we believe that patients experienced less pain with the trans lumbar approach than with the transabdominal approach.

The trans lumbar approach to pancreatic biopsy is a reasonable alternative to the standard transabdominal approach.

Index terms: Biopsies, complications; Biopsies, technology; Pancreas; Pancreas, biopsy; Pancreas, interventional procedure; Pancreas, neoplasms; Percutaneous fine-needle biopsy; Pancreatitis.

Introduction

Percutaneous fine-needle biopsy of pancreatic lesions is routinely performed to obtain tissue for diagnosis. A diagnostic biopsy obviates surgical exploration in patients in whom cross sectional imaging demonstrates that the disease is unresectable.

Although several publications (1-4) have described fine-needle biopsy of the pancreas, none has described the trans lumbar approach. The experience at our institution with biopsies of intraabdominal masses suggests that the trans lumbar approach is less painful and much better tolerated by patients than is the transabdominal approach. Therefore, a retrospective review of a group of patients who underwent computed tomography-guided pancreatic needle biopsy by either the transabdominal or the trans lumbar approach was performed to determine accuracy and complication rates.

Materials and Methods

We conducted a retrospective review of pancreatic needle biopsies performed in patients referred for the procedure by The Section of Pancreatic Tumor Surgery from 1990 through 1994. One hundred seven patients with primary pancreatic masses underwent 115 needle biopsies; 23 procedures were performed using the posterior, trans lumbar approach, and 92 were done using the conventional anterior, transabdominal approach. Eight patients underwent biopsies on two separate occasions. We counted two procedures for each of these eight patients.

Diagnosis and staging of pancreatic carcinoma were performed acording to routine institutional procedure, which includes thin-section contrast-enhanced CT of the pancreas, laparoscopic evaluation with peritoneal washings, and fine-needle biopsy of the pancreatic lesion to obtain tissue for cytological evaluation (5, 6). Coagulation measurements were performed routinely in all patients before biopsy. Local anaesthesia and mild analgesics or sedatives were used during biopsy in all cases.

Patients were observed and their vital signs were monitored for at least 1 hour after all biopsy procedures.

The biopsy site and the approach were selected by the interventional radiologist on the basis of the diagnostic CT scan. The position of the needle tip was documented with CT in all cases.

Either 20-, 21-, 22-gauge needles or an 18/22-gauge coaxial needle system was used. The trans lumbar approach to lesions in the head of the pancreas consisted of needle insertion through the paraspinal musculature between the right kidney and the inferior vena cava, through the inferior vena cava, or between the inferior vena cava and the vertebral column (Fig.1); cava, or between the inferior vena cava and the vertebral column (Fig.1); lesions in the body or tail of the pancreas were approached by directing the needle between the left kidney and the vertebral column (Fig. 2) or just cephalad to the left kidney. The anterior, transabdominal approach consisted of needle insertion by way of the shortest route to the pancreatic lesion. Preliminary cytological analysis was performed in all cases immediately after each pass, and results were available within a few minutes. If the initial aspirate was nondiagnostic, additional specimens were obtained immediately in almost all cases. Final cytological and histological studies (in cases of core biopsies) were performed later. Patient follow-up included CT scanning of the pancreas or the pancreatic bed. Laparoscopic examination with peritoneal washings was performed in patients with potentially re-sectable primary tumors.

Results

In this retrospective review of 115 needle biopsies of the pancreas, 23 biopsies were performed using the trans lumbar approach, and 92 were performed using the transabdominal approach. The sites of the pancreatic masses were comparable in both groups. Of the 23 masses biopsied using the trans lumbar approach, 62% were in the head, 23% were in the body, and 15% were in the tail. Of the 92 masses biopsied using the transabdominal approach, 71% were in the head, 24% were in the body, and 5% were in the tail.

The accuracy of the needle biopsies was similar regardless of the approach used. Twenty (87%) of 23 biopsies performed using the trans lumbar approach and 83 (90%) of 92 biopsies performed using the transabdominal approach were diagnostic.

There were five major complications among 115 biopsies, for an overall major complication rate of 4.4%. All the major complications occurred in the transabdominal approach group (5.4% complication rate for the group). The complications were three cases of pancreatitis, one bile leak from the common bile duct, and one small pneumothorax. The needle biopsy was diagnostic of adenocarcinoma in all patients who developed complications. The bowel was transgressed in two of the three patients who developed pancreatitis. Normal pancreatic cells along with the cancerous tissue were noted in only one of the three biopsy specimens obtained from the three patients who developed pancreatitis.

No cases of tumor seeding of the needle track were found during a median follow-up period of 8.1 months. In the group of patients who underwent needle biopsy using the transabdominal approach, 4 patients (4.3%) were found to have peritoneal spread of cancer upon initial evaluation, and 4 patients (4.3%) developed peritoneal spread during the follow-up period (determined by peritoneal lavage). One patient (4.3%) in the trans lumbar approach group was found to have peritoneal spread at initial evaluation, and one patient (4.3%) developed peritoneal spread during the follow-up period.

Discussion

Several publications have described the usual transabdominal technique for fine-needle biopsy of the pancreas (1-4), but the trans lumbar approach has not been described in the medical literature. Our retrospective review of CT-guided pancreatic biopsies demonstrates that the trans lumbar approach to pancreatic biopsy is a viable alternative to the traditional transabdominal approach. The accuracy rates for the two techniques are not significantly different and are well within the 86% - 94% range of accuracy rates previously reported for pancreatic biopsy.

The complication rate for the trans lumbar approach (0%) is, however, lower than that for the transabdominal approach (5.4%). Two of the three patients who developed pancreatitis were known to have had needle transgression of the bowel. In a previous series of 184 pancreatic biopsies (7), it was noted that three of the five patients who developed severe post-biopsy pancreatitis had known needle transgression of bowel, which suggests that it might be a factor in the development of severe pancreatitis. Although the difference in the complication rates between the two techniques was not significant in our series, one explanation for the absence of pancreatitis in the trans lumbar approach group could be the absence of intestinal transgression and the preservation of needle-tip sterility. It has been suggested that the incidence of pancreatitis is related to the number of needle passes made during the biopsy (8). However, the number of needle passes is probably indicative of the technically difficult biopsies. The latter result in a higher incidence of target misses and puncture of normal pancreatic parenchyma resulting in pancreatitis or an obstructed bile duct resulting in bile leaks. In our experience, the trans lumbar approach to pancreatic mass needle biopsy is less painful and better tolerated by

patients than the trans abdominal approach because, we believe, it avoids visceral structures as well as the parietal peritoneum. In addition, the trans lumbar approach facilitates needle biopsy of pancreatic masses because respiratory and bowel motions (if the bowel is trans versed) will not affect direction of the needle. Thus, the trans lumbar approach is especially helpful for physicians with little experience with CT-guided biopsies. Of note is that an equal percentage of patients in each biopsy group(4.3%) had subsequent peritoneal spread of tumor. Thus, in our study, peritoneal transgression (assuming its absence in the trans lumbar approach group) did not have any influence in the peritoneal spread of the tumor. In any case, previous studies (8, 9) including one from our institution (8) have concluded that needle biopsy of pancreatic carcinoma does not influence patient survival and it is not associated with an increased rate of positive peritoneal washings.

In conclusion, the diagnostic yield of the trans lumbar approach to
CT-guided biopsy of pancreatic masses is comparable to that of the traditional transabdominal approach. CT-guided biopsy is facilitated by the trans lumbar approach because it avoids respiratory and bowel motion that might deflect the biopsy needle and, in our experience, it is less painful for the patients.

References

1. Brandt KR, Charboneau JW, Stephens DH, et al. CT and US guided biopsy of the pancreas. Radiology 1993; 187: 99-104.

2. Mitty HA, Efremidis SC, Yeh H. Impact of fine-needle biopsy on management of patients with carcinoma of the pancreas. American Journal Roentgenol 1981; 137: 1119-1121.

3. Phillips VM, Hersh T, Erwin BC, et al. Percutaneous biopsy of pancreatic masses. Journal Clinical Gastroenterology 1985; 7:506-510.

4. Del Maschio A, Vanzuli A, Sironi S, et al. Pancreatic cancer versus chronic pancreatitis: diagnosis with CA 19-9 assessment, US, CT, and CT guided fine needle biopsy. Radiology 1991; 178: 95-99.

5. Charnsangavej C. Imaging of pancreatic adenocarcinoma. Cancer Bulletin 1994; 46:472-477.

6. Fuhrman GM, Charnsangavej C, Abbruzzese JL, et. al. Thin-section contrast enhanced computed tomography accurately predicts the resectability of malignant pancreatic neoplasms. Am J Surg 1994 167:104-113.

7. Mueller PR, Miketic LM, Simeone JF, et al. Severe acute pancreatitis after percutaneous biopsy of the pancreas. American Journal Roentgenol 1988; 151:493-494.

8. Leach SD, Rose JA, Lowy AM, et. al. Significance of peritoneal cytology findings in patients with potentially resectable adenocarcinoma of the pancreatic head. Surgery (in press)

9. Balen FG, Little A, Smith AC, et al. Biopsy of inoperable pancreatic tumors does not adversely influence patient survival time. Radiology 1994; 193:753-755.

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