Clinical Topics

Ultrasound-guided percutaneous fine-needle aspiration cytology in pancreatic cancer

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Abstract

Fifty-five patients underwent ultrasound-guided fine-needle aspiration from the pancreas. Adequate material was obtained from 33 of the 41 patients with pancreatic malignancy. A cytological diagnosis of cancer was made in 31 (94%) of these; the overall clinical success rate was 75.6%. There were no false-positive results or complications. The sensitivity of the procedure may be increased by repeating the punctures.

Introduction

The incidence of pancreatic cancer has risen over recent years; despite therapeutic and diagnostic improvements mortality is still high, the five-year survival rate being less than 1%.¹

The conclusive diagnosis of pancreatic cancer continues to be a challenge. Detailed preoperative assessment is important, to plan adequate surgery and to avoid unnecessary laparotomy in patients with inoperable disease. Procedures such as wedge biopsy and large-bore needle biopsy at operation are inaccurate and hazardous.²⁻⁵ Duodenoscopy allows brush and juice cytology from the pancreatic duct; however, results have been disappointing and the techniques are not in widespread use.^{6,7}

Percutaneous fine-needle aspiration is used routinely for cytodiagnosis of the prostate,⁸ breast, subcutaneous nodules, lymph nodes, and thyroid,⁹ and has given encouraging results in the pancreas. We report our initial experience over a three-year period.

Material and methods

Between September 1978 and November 1981 55 patients underwent percutaneous pancreatic fine-needle aspiration. The sex and age distribution is shown in table I.

The aspirations were carried out on the fasting patient in the supine position, usually without premedication. Real-time ultrasound equipment was used to localise the tumour and the needle tip in the last 30 patients after conventional B-scan technique had been applied. No special transducer was used. After the tumour had been located the anterior abdominal skin was disinfected and a local anaesthetic was first injected subcutaneously and then extended through the abdominal

wall to the peritoneum. A 22 SWG needle with an internal stylet was inserted under ultrasound guidance into the suspected pancreatic lesion. With some experience the investigator could feel a gritty resistance when the needle entered the tumour.

When the needle tip was in the tumour the stylet was removed and a 20-ml plastic syringe attached to the needle. Negative pressure was applied, and the needle passed several times back and forth within the tumour with a rotary action. The negative pressure was returned to normal before withdrawal of the needle to prevent the material being sucked into the syringe. The aspirated material was immediately blown on to clean glass slides for cytological evaluation. Usually, half the number of slides were air-dried for Giemsa preparations, while the rest were wet-fixed in alcohol for subsequent Papanicolaou staining. In each case samples were obtained from punctures from three separate sites in the tumour. On average, 10-12 slides were prepared at each examination.

A final independent diagnosis of malignancy was made at laparotomy in 13 patients and at necropsy in six. The diagnosis in the remaining 22 patients with cancer was confirmed on clinical follow-up (mean duration 5.2 months). Five of the patients with benign pancreatic lesions underwent surgery: the other six were followed up clinically for an average of 20.5 months (range 6-36 months) without evidence of malignant disease.

TABLE I—Age and sex distribution of the patients

Age (years)	No of men	No of women	Total
30-39	1	0	1
40-49	7	0	7
50-59	10	6	16
60-69	11	5	16
70-79	8	3	11
80	1	3	4
Total	38	17	55

TABLE II—Final diagnoses and cytological results

Final diagnosis	No of patients	FNA positive
Pancreatic cancer	40	30
Malignant apudoma	1	1
Non-Hodgkin lymphoma	1	0
Gastric cancer	2	1
Benign apudoma	2	0
Various benign conditions	9	0

FNA = Fine-needle aspiration.

Results

Table II shows the final diagnoses and cytological results obtained on fine-needle aspiration in the 55 patients. Adequate material was obtained in 33 of the patients with pancreatic cancer; 31 of these had positive cytology, including a patient with a malignant apudoma. The aspirate showed scanty and necrotic material in eight patients, resulting in an overall clinical false-negative rate of 24.6%. Abnormal lymphoid cells were seen in a patient with non-Hodgkin's lymphoma, but a

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definite diagnosis could not be made cytologically. Two patients were found to have gastric carcinoma, in one of whom the fine-needle aspiration was positive due to local invasion of the pancreas. Eleven patients had various benign disorders, including two with benign apudomas.

There were no false-positive reports and no clinical complications. The investigation was repeated in six patients with negative cytology. Five of these were eventually found to have pancreatic carcinoma: two of the repeat aspirations were positive. Table III shows the relation of tumour site and size to the cytological findings in patients with false-negative results.

TABLE III—Site and size of tumour and cytological findings in patients with false-negative results

Patient	Site of tumour	Size (cm) of tumour	Cytological evaluation
1	Head of pancreas	2 × 3	Sampling error
2	Head of pancreas	2 × 2	Sampling error
3	Head of pancreas	2 × 2	Scanty material
4	Head of pancreas	4 × 3	Scanty material
5	Head of pancreas	2 × 3	Scanty material
6	Head of pancreas	3 × 3	Necrotic material
7	Head of pancreas	3 × 3	Necrotic material
8	Head of pancreas	3 × 3	Blood only
9	Body of pancreas	4 × 3	Scanty material
10	Body of pancreas	"Large"	Scanty material

Discussion

This study confirms that fine-needle aspiration of the pancreas is safe and accurate. The specificity was 100% and the sensitivity 94% when adequate samples were obtained; the overall clinical sensitivity was 76.6%. The results are comparable with those reported previously (table IV). The sensitivity may be increased by repeating the investigation. Recommendations vary on how many samples are required to ensure satisfactory specimens. Our results, like those of Ferrucci *et al.*¹⁴ indicate the need to aspirate material from at least four different sites within the tumour.

TABLE IV—Some previous reports on percutaneous fine-needle aspiration cytology in pancreatic cancer

Author	Year	No of patients	Sensitivity (%)	Specificity (%)
Hancke <i>et al.</i> ¹⁰	1975	21	81	100
Tylén <i>et al.</i> ¹¹	1976	29	76	100
McLoughlin <i>et al.</i> ¹²	1978	23	83	100
Itoh <i>et al.</i> ¹³	1979	10	80	100

In common with many reports we experienced no clinical complications.⁴ Review of publications does show one fatality from pancreatitis in a patient with pancreatic carcinoma.¹⁵ Two non-fatal cases of pancreatitis have also been reported.^{12, 16}

Although seeding of viable tumour cells along the needle track has been described in two patients,^{17, 18} it has no bearing on prognosis.¹⁹ No evidence of such spread was found in our study.

The average size of tumours in patients with positive cytology was 4 × 4 cm as measured by ultrasound. With one exception (table III) the false-negatives and inadequate samples arose from puncturing smaller tumours with an average diameter of 2.7 cm. Necrosis in large tumours may also account for inadequate specimens.

Our experience has prompted several changes. We assess the adequacy of the aspirates immediately and repeat the punctures as necessary, giving some analgesia and sedation to make this more acceptable. More emphasis is placed on sampling different parts of the tumour and on accuracy of needle placement, which can sometimes be enhanced by simultaneous x-ray control.

The study was retrospective, and it is therefore difficult to evaluate the clinical impact of the cytological findings in individual

patients. The main value of positive cytology is to avoid diagnostic laparotomy in patients with unresectable lesions, unfortunately the majority,²⁰ and is particularly important under the increasing use of non-operative techniques for palliation of jaundice. Negative cytology does not exclude malignancy, and it is therefore often appropriate to take further samples.

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What is traumatic osteitis pubis, and how can it be treated?

Traumatic osteitis pubis, which occurs in athletic men, consists of pain and local tenderness in the lower abdomen, groin, and adductor area of the upper thigh. It is associated with radiological changes in the symphysis. These are marginal irregularity, reactive sclerosis, and instability. In some of these athletes similar lesions are found in the sacroiliac joint. It is thought to be caused by minor repeated trauma, for which the treatment is rest, often prolonged. It was once thought to have an infective background, but this has not been satisfactorily proved. Surgical fusion of the symphysis is rarely indicated. Non-steroidal anti-inflammatory drugs occasionally relieve the pain.—C D R LIGHTOWLER, consultant orthopaedic surgeon, London.

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