

Aspiration biopsy of carcinoma of the pancreas

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SUMMARY Peroperative pancreatic aspiration biopsies were performed on 21 patients with pancreatic lesions using a standard 20-ml disposable syringe and a 21-gauge needle. No complications were recorded which could be attributed to this procedure. A further 10 aspiration biopsies were carried out on postmortem specimens in an attempt to determine the accuracy of this method in the diagnosis of carcinoma of the pancreas. It is concluded that peroperative pancreatic needle biopsy is a safe procedure which is easily performed without special instruments. It can be of enormous value to the surgeon in planning the treatment of patients with pancreatic lesions. In cases where there is an operable mass in the pancreas it offers a simple and quick method of determining the presence of malignant cells and thus definitive surgery may be performed with confidence. For the inoperable cases it offers a method of histological confirmation of the operative findings.

Pancreatic carcinoma often presents late at which time there is little that surgery can offer in the eradication of the disease. However, some pancreatic masses present early with obstructive jaundice and it is these cases that are difficult to diagnose with certainty even at operation, and in which a reliable histological diagnosis would be most beneficial to eliminate the unhappy situation of performing a pancreaticoduodenectomy for a benign lesion.

Cattell and Pynteck (1949), Hartman (1923), and Carlson (1950) have shown that confusion between carcinoma and benign lesions of the pancreaticoduodenal region is often misdiagnosed and figures of 10 to 19% are quoted. Since the work of Whipple (1935) on the surgical treatment of carcinoma of the head of the pancreas, it became imperative to make a precise diagnosis at operation. Conventional pancreatic biopsies have never been popular due to the complications that can occur, namely, haemorrhage and fistula formation (Bowden, 1959; Schultz and Saunders, 1963). The specimens which are obtained by this method are usually not representative of the tumour which often lies deep and surrounded by an area of pancreatitis. The unreliability of the normal biopsy method has been exemplified by many workers, including Crile (1970) who now performs a bypass operation without any biopsy because of the danger of histological misdiagnosis.

To overcome the problem of pancreatic biopsy the Vim-Silverman needle was used and found to be a great advantage (Kirtland, 1951; Coté, Dockerty, and Priestly, 1959).

The Fränzen syringe with a 21-gauge needle was later used to lessen still further any tendency to fistula formation or haemorrhage (Fosgren and Orell, 1973).

Materials and Methods

Aspiration biopsies were performed using a standard 20-ml disposable syringe and a 21-gauge needle. It was found that this simple equipment was available in every theatre and also in the postmortem room. The one-hand-operated syringe of Fränzen has been used widely in the past but no great advantage was obtained by using this apparatus and, as it was not standard equipment, it was more convenient to use disposable apparatus.

Aspiration biopsy using a standard 20-ml syringe and 21-gauge needle is easily performed with one hand. The needle is firmly placed in the barrel and the plunger worked to ensure that the barrel does not stick. The tissue to be biopsied is located and the needle passed into the centre of the mass. The thumb of the right hand is then placed over the lip of the outer barrel and the plunger pulled up with the fingers. While suction is being applied in this way the needle is gently moved up and down in the mass in a sawing movement. Before removing the needle the pressure is gently taken off by releasing the plunger. The needle is then removed from the mass. To remove the tissue fluid in the needle the syringe is removed and filled with air. At this stage the syringe is attached once more to the needle and the fluid gently blown out on to a clean,

dry microscope slide. The tissue fluid can easily be spread thinly over the slide by use of the needle or by another slide. After drying the specimen in air it is fixed with methyl alcohol and stained using buffered Giemsa stain.

The needle biopsy may be repeated in several sites and at least three or four specimens should be taken from any suspicious area. There is no need for extensive dissection in order to isolate the mass as the needle may be safely passed through the duodenum, stomach or omentum to reach the pancreas.

Needle aspiration of the pancreas was performed on 31 patients: of these 18 were men and 13 were women. Their ages ranged between 40 and 80, the majority being over 60 years. Peroperative biopsies were performed on 21 patients and 10 biopsies were performed on postmortem specimens. All the peroperative patients came to laparotomy following extensive investigation with a history of either jaundice or abdominal pain with weight loss and a presumptive diagnosis of carcinoma of the pancreas. In the cases where the specimens were taken at necropsy the cause of death varied but all were seen to have a pancreatic mass and all specimens were taken within 36 hours of death.

Results

Of the 21 cases where biopsies were taken peroperatively, 18 cases showed malignant cells and in all cases the diagnosis was confirmed either by standard biopsies or later at necropsy. Three cases showed no malignant cells and subsequent follow-up has confirmed the absence of malignancy of the pancreas. The operative findings in two of the patients were difficult to assess. An operable mass was present in both patients in the head of the pancreas. Needle biopsies were performed but only inflammatory cells were seen. In both cases repeated needle biopsies did not reveal any malignant cells and no further operative procedure was performed. Both patients have remained well since operation. The third case was thought to be of chronic pancreatitis at operation as most of the pancreas was involved. Needle biopsies did not show any malignant cells and this patient has also remained well since operation.

It must be emphasized that a needle biopsy of a pancreatic mass which shows some inflammatory cells does not exclude a carcinoma. Some pancreatitis may be present around a growth and it is therefore important to repeat the biopsies in these cases. It was for this reason that multiple aspiration biopsies were performed in all the cases reported in this paper.

The 10 cases of biopsies taken at necropsy showed malignant cells in six cases and, of these, four had

metastatic deposits which confirmed the diagnosis. One case was confirmed by further histology and the last case was a carcinoma of the stomach which had spread to involve the pancreas.

No malignancy was found in the other four cases even after sectioning the pancreas. The cytology on these cases had shown only inflammatory cells.

Interpretation of the slides obtained by the above technique is usually relatively simple because a good yield of cells is easily obtained. The diagnosis of malignancy is made if the following features are present on the slides: (1) irregularity in size, shape, and density of the nuclei; (2) high nuclear cytoplasmic ratio; (3) irregular and large nucleoli; and (4) dense chromatin pattern.

From this small series of cases it is clear that needle biopsy is valuable in helping in the diagnosis of carcinoma of the pancreas. It has the advantage of being able to be repeated several times in one patient and it is unnecessary to perform extensive mobilization. The only minor complication in this series was in a patient who was deeply jaundiced and who had secondary spread to the liver. Haemostasis had been difficult to control during the laparotomy and following the needle biopsy there was some haemorrhage which was controlled by applying pressure to the site for a few minutes.

Discussion

Aspiration biopsies are now widely used in the histological diagnosis of various masses in the body, for example, breast, kidney, liver, thyroid, salivary glands, prostate etc. It has been stated (Martin and Ellis, 1930, 1934; Martin and Steward, 1936) that as this is a relatively atraumatic procedure as long as the mass is accessible there are no contraindications for its use.

In the past, however, needle biopsies have been slow to be adopted due to the complications that have occurred when using the larger needles. One criticism was the spread of tumour cells along the needle tract. Crile and Hazard (1951) using a Vim-Silverman needle found that a year after biopsy of a papillary carcinoma of the thyroid, tumour growth was present at the site of the needle puncture of the skin. Tumour spread has been reported in other tissues, for example, prostate (Burkholder and Kaufman, 1966), squamous cell carcinoma and melanoma (Ackerman and Wheat, 1955). However, when a fine needle was used (18 to 22 gauge) Engzell, Esposti, Rubio, Sigurdson, and Zajick (1971) were unable to find any recorded cases of tumour extensions. In a series of 469 cases of prostate carcinoma and 157 of salivary tumours they found no evidence of local extensions of the growth that

could be attributed to the biopsy. Unless there is some contraindication, spread along the needle tract is unlikely to cause trouble because radical surgery is usually performed as soon as the malignancy has been diagnosed.

The dissemination of tumour cells into the blood stream was investigated in rabbits by Engzell *et al* (1971). The finding showed that fine needle aspiration of a tumour did not cause an increase in vascular dissemination of cancer cells.

Peroperative pancreatic aspiration using a Vim-Silverman needle has been reported by several workers (Kirtland, 1951; Crile and Vickery, 1952; Coté *et al*, 1959) with good results. It was found that the same results could be obtained by fine needle aspiration (gauge 22 or less) using the one-hand-operated syringe described by Fränzen, Giertz, and Zajicek (1960). The advantages were obvious. A good yield of tissue fluid could be obtained and the likelihood of complications such as haemorrhage and fistulae formation was very much reduced. In this series it has been found unnecessary to use the Fränzen syringe and thus special equipment has been eliminated.

In this series there were no false positives. The biopsies were easily performed and added only a few minutes to the operating time. Results can be obtained in the same time as it takes to perform a standard frozen section. There are several important advantages in using the method. Coté, *et al*, (1959) found that in pancreatic lesions biopsies, using a Vim-Silverman needle, were in fact more likely to demonstrate a malignant lesion than wedge-type specimens and the complications were eliminated.

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References

- Ackerman, L. V., and Wheat, M. W. (1955). The implantation of cancer: an avoidable surgical risk? *Surgery*, 37, 341-355.
- Bowden, L. (1954). The fallibility of pancreatic biopsy. *Ann. Surg.*, 139, 403-408.
- Burkholder, G. V. and Kaufman, J. J. (1966). Local implantation of carcinoma of the prostate with percutaneous needle biopsy. *J. Urol.*, 95, 801-804.
- Carlson, R. I. (1950). The problem of diagnosis at the time of operation in tumors of the head of the pancreas. *Surgery*, 28, 672-679.
- Cattell, R. B., and Pyrttek, L. J. (1949). An appraisal of pancreaticoduodenal resection: a follow-up study of 61 cases. *Ann. Surg.*, 129, 840-849.
- Coté, J., Dockerty, M. B., and Priestly, J. T. (1959). An evaluation of pancreatic biopsy with the Vim-Silverman needle. *Arch. Surg.*, 79, 588-596.
- Crile, G. Jr. (1970). The advantages of bypass operations over radical pancreatico-duodenectomy in treatment of pancreatic carcinoma. *Surg. Gynec. Obstet.*, 130, 1049-1053.
- Crile, G., Jr., and Hazard, J. B. (1951). Classification of thyroiditis with special reference to the use of needle biopsy. *J. clin. Endocr.*, 11, 1123-1127.
- Crile, G., Jr., and Vickery, A. L. (1952). Special uses of the Silverman biopsy needle in office practice and at operation. *Amer. J. Surg.*, 83, 83-85.
- Engzell, U., Esposti, P. L., Rubio, C., Sigurdson, A., and Zajick, J. (1971). Investigation on tumour spread in connection with aspiration biopsy. *Acta Radiol. Ther. Phys. Biol. (Stockh.)*, 10, 385-398.
- Franzen, S., Giertz, G., and Zajicek, J. (1960). Cytological diagnosis of prostatic tumours by transrectal aspiration biopsy: a preliminary report. *Brit. J. Urol.*, 32, 193-196.
- Fosgren, L., and Orell, S. (1973). Aspiration cytology in carcinoma of the pancreas. *Surgery*, 73, 38-42.
- Hartman, H. R. (1923). Jaundice in surgical cholecystitis without stones. *Med. Clin. N. Amer.*, 7, 89-95.
- Kirtland, H. B., Jr. (1951). A safe method of pancreatic biopsy. *Amer. J. Surg.*, 82, 451-457.
- Martin, H. E., and Ellis, E. B. (1930). Biopsy by needle puncture and aspiration. *Ann. Surg.*, 92, 169-181.
- Martin, H. E., and Ellis, E. B. (1934). Aspiration biopsy. *Surg. Gynec. Obstet.*, 59, 578-589.
- Martin, H. E., and Stewart, F. W. (1936). The advantages and limitations of aspiration biopsy. *Amer. J. Roentgenol.*, 35, 245-247.
- Schultz, N. J., and Sanders, R. J. (1963). Evaluation of pancreatic biopsy. *Ann. Surg.*, 158, 1053-1057.
- Whipple, A. O., Parsons, W. B., and Mullins, C. R. (1953). Treatment of carcinoma of the ampulla of Vater. *Ann. Surg.*, 102, 763-77.