

Guided Percutaneous Cytology of Pancreatic Masses A Cytohistological Correlation

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Objective: To determine the diagnostic accuracy, usefulness and limitations of ultrasound guided FNAC of pancreatic masses.

Design: Cross-sectional analytical (comparative study).

Place and Duration of Study: Department of Histopathology, Sheikh Zayed Hospital Lahore, Study Period - 2 Years.

Materials and Methods: A total of 26 pancreatic masses were subjected to FNAC from January 2000 to December 2001. Adequate aspirates were obtained in all the cases, without any discrimination of age and gender. The smears were stained with Haematoxylin and Eosin (H & E), Papanicolaou staining (PAP) and May Grun-wald Giemsa stain (MGG). Results of FNAC were categorized as benign tumours (group I), malignant tumours (group II) and non-neoplastic/inflammatory lesions (group III). Tissue biopsy specimens from the same 26 patients were also obtained at the time of FNAC and stained with routine H & E staining. Histology was taken as the gold standard.

Results: On histological examination 12 of the 26 cases were categorized as malignant tumours, 8 as benign tumours and 6 as non-neoplastic/inflammatory lesions. Out of the 12 malignant cases FNAC picked up 9 cases. Rest of the 3 cases had a false negative diagnosis for malignant tumours. In addition one case had a false negative diagnosis for benign tumour, but no false positive diagnosis was made. Malignant tumours revealed a sensitivity of 75% and diagnostic accuracy of 83.3% while benign tumours showed a 87.5% sensitivity and 92.86% diagnostic accuracy. Non-neoplastic lesions revealed a 100% sensitivity and diagnostic accuracy. A 100% specificity was obtained for both neoplastic and non-neoplastic lesions. The cytological results were statistically evaluated and the diagnostic accuracy was ascertained by calculating sensitivity, specificity, positive predictive value and negative predictive value in accordance with methods employed by Galen and Gambino¹.

Conclusion: Majority of the pancreatic tumours, both benign and malignant can be categorized on FNAC, with a high degree of accuracy, but since due to a relatively high incidence of false negative diagnosis, good quality preparations, with adequate cellular content, and cytohistological correlation is necessary.

Key Words: FNAC, benign, malignant, non-neoplastic.

Introduction

Fine needle aspiration (FNAC) of pancreas is a simple, low risk, cost effective procedure, which is reliable and highly specific. Guided percutaneous FNAC is the investigation of choice in evaluating a pancreatic mass or cyst demonstrated on ultrasound or computed tomography (CT) since pancreas is so inaccessible and both large bore needle biopsy and open biopsy have a high morbidity². It is a particularly appropriate investigation since surgery is not often indicated for benign disease, and also most pancreatic carcinomas are inoperable at the time of presentation with less than 6 months median survival time irrespective of the degree of tumour differentiation³. FNAC can provide a preoperative diagnosis to facilitate surgical management of resectable tumours, but its main advantage is in avoiding a purely diagnostic laparotomy in cases of advanced cancer, pseudocyst or abscess.

This study was carried out to evaluate the diagnostic accuracy of pancreatic masses in our institute.

Materials and Methods

Between January 2000 to December 2001, 26 patients with

pancreatic masses underwent FNAC and tissue biopsy specimens, irrespective of age and gender. A clinical Proforma was filled in each case to document the particulars of the patient, clinical and radiological details, including tumour site (head, body or tail of pancreas) size and extent of the mass. Multiple passes and repeated attempts to obtain adequate aspirates were obtained with a 21 or 22 gauge needles attached with a 10 ml syringe. Five smears were prepared, including a clot after fixation in 10% neutral buffered formalin. Two of the smears were air dried for Giemsa staining and 1 smear each for papanicolaou and Haematoxylin and Eosin staining after wet fixation in 95% ethyl alcohol. The results after screening the smears were then categorized into benign (group-I), malignant (group-II) and non-neoplastic/inflammatory (group-III). The tissue biopsies from these cases were fixed in 10% formalin and processed in an automated tissue processor (Auto processor, model, 2LE, Shandon Germany). After tissue embedding and paraffin blocks formation, section cutting was done by rotary microtome (Model RM 2125, Leica Germany), followed by H & E staining. A cytohistological correlation was obtained. The

statistical analysis to determine the diagnostic role of FNAC was ascertained by calculating the sensitivity, specificity, positive and negative predictive values in accordance with methods employed by Galen and Gambino¹.

Results

From January 2000 to December 2001, a total of 26 patients with pancreatic masses underwent FNAC and tissue biopsies. These cases after microscopic evaluation were divided into 3 groups, including benign tumours (group-I), malignant tumours (group-II) and non-neoplastic/inflammatory lesions (group-III). On histological examination 12(46.15%) of the total 26 cases were categorized as malignant, 8 (30.77%) as benign and 6 (23.1%) as non-neoplastic. FNAC picked up 9 of the 12 malignant cases, with 3 false negative diagnosis. These 12 malignant cases included 9 cases of pancreatic ductal adenocarcinomas, and 3 cases of papillary solid epithelial neoplasm (PSEN). The three false negative diagnosis for malignant tumours included 2 cases of a well differentiated ductal carcinoma and 1 case of poorly differentiated ductal carcinoma, while FNAC revealed features of chronic pancreatitis only.

Table 1: Comparison of FNAC of pancreatic masses with histology (n = 26).

	No. of cases	True positive	True negative	False negative
Benign	8	7	-	1
Malignant	12	8	-	3
Non-neoplastic/ Inflammatory (TN)	6	-	6	-

Table 2: Different Indices Indicating diagnostic accuracy of FNAC of Pancreatic Neoplasms.

	Benign tumours	Malignant tumours	Neoplasms (both Benign & Malignant)
Specificity	100%	100%	100%
Sensitivity	87.5%	75%	80%
Diagnostic Accuracy	92.86%	83.3%	84.6%

Seven of the eight benign pancreatic tumours were correctly diagnosed, with 1 false negative diagnosis. These 8 cases included 6 cases of mucinous cystadenoma and 2 cases of serous cystadenoma, with 1 case misdiagnosed (false negative) on FNAC revealed benign pancreatic tissue only, while histological diagnosis showed features of mucinous cystadenoma. All the 6 non-neoplastic cases were correctly diagnosed, consisting of 4 cases of chronic pancreatitis and 2 pseudocysts (Table 1). No false positive diagnosis was made. Diagnostic accuracy of FNAC was calculated taking histological diagnosis as the gold standard. The sta-

tistical analysis showed a 75% sensitivity and 83.3% diagnostic accuracy for malignant tumours, while for benign tumours a 87.5% sensitivity and 92.86% diagnostic accuracy was achieved (Table 2). A 100% specificity and positive predictive value was achieved for both neoplastic and non-neoplastic lesions, while negative predictive value was 85.7% for benign tumours and 66.67% for malignant tumours.

Discussion

On FNAC a definite diagnosis was made in 22 patients (84.6%), with 4 false negative diagnosis, including 3 false negative for malignant tumours and 1 false negative for benign tumours, but no false positive diagnosis was made. The 3 false negative cases for malignant tumours reported as chronic pancreatitis on FNAC, were histologically found to be 2 cases of well differentiated ductal carcinoma and 1 case of poorly differentiated ductal carcinoma.

Pancreatic carcinoma is difficult to diagnose accurately from cytologic samples alone⁴ and the addition of modified aspiration needles and/or multiple passes may enhance the tissue yield and accuracy⁵⁻⁶. Benign tumours showed 1 false negative diagnosis of benign pancreatic tissue on FNAC, which was histologically confirmed as benign mucinous cystadenoma. In our study major discrepancies were seen in the malignant tumours. The reasons for these false negative diagnosis were attributed to schirrous, fibrotic, necrotic and haemorrhagic component of the mass, which resulted in scanty tumour cell representation. Chances of tumour being hidden by pancreatitis, as seen in our study could also be responsible for a relatively low diagnostic accuracy of malignant pancreatic masses. Diagnostic errors also arise if an attempt is made for a definitive diagnosis based on limited or poorly preserved material. In order to achieve satisfactory diagnostic accuracy, good quality preparations, with adequate cellular content must be obtained. However a false positive diagnosis is very rare because of the characteristic cytological appearances of pancreatic carcinoma⁷ and so diagnostic specificity for malignant pancreatic lesions is

Table 3: Comparison of Various studies of FNAC of malignant Pancreatic masses.

Year	Author	Sensitivity	Specificity
1977	Goldstein et al ¹⁶	78%	100%
1982	Wittenberg J ¹²	60-90%	100%
1984	Droese et al ¹⁷	70.9%	100%
1985	Mitchel ML ³	82%	100%
1986	Civardi et al ¹⁸	80%	100%
1986	Bret PM ¹⁰	80%	100%
1991	Tao Lc ¹¹	82-94%	100%
2001	Present study	75%	100%

100% in nearly all published series⁸. However, occasional false positive diagnosis have been reported in cases of chronic pancreatitis⁹. Reports on the accuracy and specificity of FNAC of the pancreas are rapidly accumulating.¹⁰⁻¹¹ Diagnostic sensitivity is much more variable, usually around 90% in intraoperative FNAC, and an overall accuracy in the range of 60-90% has been reported.¹² In contrast wedge biopsies or large bore needles have a high morbidity and low diagnostic accuracy.¹³⁻¹⁴ Core needle biopsy is discouraged if not contraindicated, in the pancreas¹⁵. Our results are fairly comparable to most of the published series in diagnosing pancreatic masses (Table 3).

Conclusion

Before reporting an aspirate from the pancreas, it is necessary to have full clinical, endocrine and radiological information about the patient including other tumours, history of previous pancreatitis, obstructive jaundice, endocrine problems and CT or ultrasound appearance. Since there is relatively high incidence of false negative diagnosis, a negative report on FNAC should be interpreted in the light of clinical and radiological findings. A repeat aspiration should be performed if clinical suspicion of malignancy persists.

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