ORIGINAL RESEARCH PAPER

Pathology

CYTOMORPHOLOGICAL STUDY OF PANCREATIC LESIONS THROUGH PERCUTANEOUS GUIDED FINE NEEDLE ASPIRATION

KEY WORDS: CT, FNA, USG

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ABSTRACT

INTRODUCTION: Every year pancreatic cancer causes over 2,00,000 deaths. Among different countries, the incidence of pancreatic cancer is relatively uniform with a maximum incidence in the seventh and eighth decades of life. Lesions of the pancreas can be diagnosed as non-neoplastic, benign neoplastic and malignant solid and cystic, however, adenocarcinoma generally outnumbers others [1].

AIM AND OBJECTIVES: To study the cytomorphology of pancreatic aspirates, to render cytodiagnosis and to find the adequacy rate.

MATERIALS AND METHODS: Radiologically and clinically diagnosed cases of pancreatic lesions were selected. The patients were then subjected to ultrasound (USG) or computed tomography (CT) guided fine needle aspiration (FNA) according to accessibility. Conventional May-Grunwald-Giemsa staining was done in all the 35 cases and the cytological diagnosis was rendered.

RESULTS: A total of 35 cases were studied. Adequate smears were obtained in 32 cases. Ductal adenocarcinoma was the most common malignant lesion (65.7%), followed by neuroendocrine carcinoma (8.5%). The commonest site for pancreatic lesions was the head and uncinate process of the pancreas.

CONCLUSION: Percutaneous guided FNA is a safe, reliable, inexpensive and rapid method to provide a reliable diagnosis of pancreatic lesions to the clinician at initial presentation, especially when used in conjunction with clinical and radiological data.

INTRODUCTION:

In cancer patients, one of the prime cause of mortality is pancreatic cancer. Untreated pancreatic cancer cases has poor survival rate, which is 19% and 4% respectively for one-year and the 5-year for all stages combined. Majority of pancreatic cancer cases are diagnosed in the metastatic phase. However, guided FNA offers the best opportunity for long survival or even cures, with 5-year survival approaching 40% when complete surgical resection with margin negative and node-negative is possible when performed at specialized centers[2].

During recent years, ultrasound and computed tomography (CT) scan guided FNA are being used for intra-abdominal and intrathoracic organs. The techniques of image-guided FNAC not only allow meticulous anatomical imaging and focusing of lesions, but also allow planning of a secure access route, with constant visualization of the needle tip during insertion, thereby reducing the probability of complications. The supremacy of ultrasound (US) guidance over CT scan is that it is swift, economical, no radiation exposure, comfortably perform again when necessary in real time and does not require an injection of contrast medium[3].

This study was done to detect the feasibility of US/CT guided FNA, to study the cytomorphology of various pancreatic lesion and to identify the problem areas.

AIM AND OBJECTIVES:

1. To study the cytomorphology of pancreatic aspirates and to render cytodiagnosis.
2. To study adequacy rates in pancreatic aspirates.
3. To identify the problem areas.
4. To study the complications related to guided FNAC.

MATERIAL AND METHODS:

Our study included 35 patients with clinically and radiologically diagnosed pancreatic lesion presenting to the Cytology section of the Department of Pathology. Consent was obtained from the patients after explaining the procedure to them. The patients were then subjected to USG or CT guided FNAC according to accessibility. After smearing and air drying of aspirated material May-Grunwald-Giemsa staining was done. Smears were then mounted with a cover slip and DPX mountant and examined under a light microscope. Based on the cytological features, the ultimate diagnosis was rendered in affirmation with the clinical and radiological features.

RESULTS:

A total of 35 cases were studied. The adequate aspirates were obtained in 32 cases, while 3 cases were inadequate. The aspirates were considered inadequate when they comprised of only a few cells, with or without blood and inflammation. The age range involved in our study was between 20 years to above 70 years. The maximum number of cases were in the range of 51 to 60 years (37.1%).

Overall male to female ratio in our study was 1.3:1. The overall head of the pancreas (65.7%) was found to be the most common site for all pancreatic lesions, followed by body and tail (15.6%) each. Only 1 case (2.8%) was found to be multifocal with the lesions in head, body, and tail of pancreas [Table.1].

Table.1: Distribution of cases according to the location of the lesion in the pancreas:

Location	Number of cases	Percentage of cases
Head	23	65.7%
Body	05	15.6%
Tail	05	15.6%
Multifocal	01	2.8%
Total	35	100%

On imaging, 34 cases in our study presented as a solid mass and only 1 case presented as cystic lesion [Table.2].

Table.2: Distribution of cases according to the presentation on imaging:

Presentation	Number of cases	Percentage of cases
Solid	34	97.1%
Cystic	01	2.9%
Total	35	100%

In our study, out of 35 cytologically diagnosed lesions, 29 cases (82.8%) were found to be malignant, 3 cases (8.5%)

were found to be benign and 3 cases (8.5%) were found inconclusive. Out of 29 malignant cases, adenocarcinoma was found to be the most common tumor (65.7%), followed by neuroendocrine carcinoma (8.5%), adenosquamous (6.2%) and squamous cell carcinoma (2.8%) [Table.3].

Table.3: Distribution of cases according to cytodiagnosis

Diagnosis	Number of cases	Percentage of cases
Adenocarcinoma	23	65.7%
Adenosquamous carcinoma	02	5.7%
Squamous cell carcinoma	01	2.8%
Neuroendocrine carcinoma/tumor	03	8.5%
Benign	03	8.5%
Inconclusive	03	8.5%
Total	35	100%

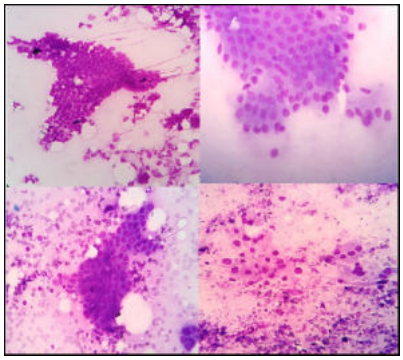
In our study, out of 35 cases, 3 cases (8.6%) were categorized as I (inadequate), another 3 cases (8.6%) as II (benign), 2 cases (5.8%) as category IV B2 (neoplastic non mucinous) and 27 cases (77%) as category VI (PDAC and others). None of the cases were categorized as III (atypical), IV A (neoplastic benign), IV B1 (neoplastic mucinous) and V (suspicious for malignancy) [Table.4].

Table.4: Distribution of cases according to standard terminology and nomenclature by Papanicolaou society:

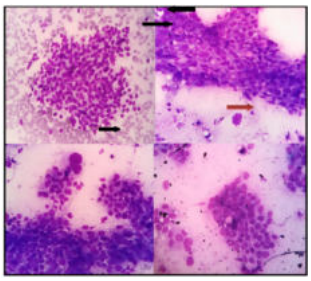
Category		Number of cases	Percentage of cases
I		03	8.6%
II		03	8.6%
III		00	00%
IV	A	00	00%
	B1	00	00%
	B2	02	5.8%
V		00	00%
VI		27	77%
Total		35	100%

Maximum cases (85.7%), in our study, were aspirated by USG guidance and only 5 cases (14.3%) were aspirated by CT guidance. Contamination from other parts of gastrointestinal tract (GIT) was found in 2 cases. One case had contamination from liver and other from the duodenum.

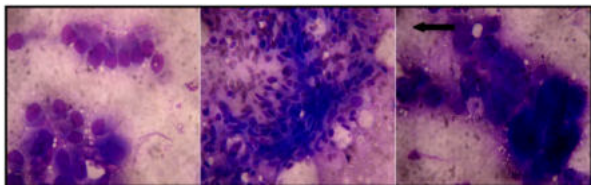
Cytomorphological features of benign lesions: Three benign cases were diagnosed on cytology. Cells were in sheets showing benign ductal epithelium having scant to moderate amount of basophilic cytoplasm with a round to oval nuclei. None of the cases revealed mitoses. [Fig.1a,b,c,d].



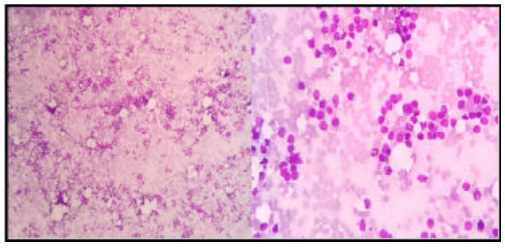
Cytomorphological features of malignant lesions: Twenty three cases were diagnosed as adenocarcinoma. All the aspirates were cellular. Sheets of neoplastic cells with loss of normal honeycomb pattern revealed nuclear crowding and overlapping. Nucleomegaly (nuclei with a diameter at least 1.5 times that of neighbouring red blood cells) and irregular nuclear membrane were seen. Intracellular and extracellular mucin was noted in 13 cases. Mitoses were seen only in 4 high-grade cases. [Fig.2a,b,c,d]



Diagnosis of adenosquamous carcinoma was rendered by the presence of glandular differentiation with at least focal squamous differentiation. Smears of squamous cell carcinoma were typically composed of polymorphic, well-demarcated squamous cells having dense blue cytoplasm and pyknotic nuclei. [Fig.3a,b,c]



Cells of the pancreatic neuroendocrine tumor were monomorphic with loosely cohesive clusters. Nuclei were round to oval and chromatin had salt-and-pepper appearance. None of the cases showed mitoses and vascular core. Cells of small cell carcinoma were very fragile. Bare nuclei, stripped of cytoplasm and crush artifact with the smearing of nuclear DNA was common. Adjacent nuclei show frequent molding. [Fig.4a,b,c,d]



Problem areas: 1) Contamination from other parts of GIT were found in 2 cases. One case had contamination from the liver and other from the duodenum. 2) Identification of well-differentiated adenocarcinoma was particularly problematic because the cytomorphological features may be subtle. 3) Diagnosis of cystic swelling in pancreas having sparse cellularity and subtle features of malignancy was difficult until compared with benign epithelium.

Complications:

Few patients experienced pain after the procedure. Apart from this, no other complications were encountered in our study.

DISCUSSION:

In the present study, thirty-two out of thirty-five aspirates turned out to be adequate as they had cellular smears. The overall adequacy rate was 91.4%. Our adequacy rate was almost similar to the studies done by Bhatia P et al[4], reported an adequacy rate of 97.4% and Mitsuhashi T et al[5], reported an adequacy rate of 94.8%. Improper positioning of the needle, operator dependency, high vascularity, cystic swelling, and abundant inflammatory infiltrate could be a possible reason for inadequacy in our study.

In our study, 23 cases(65.7%) were diagnosed as ductal adenocarcinoma which is overall the most common type of lesion. It was the expected outcome as ductal neoplasms have a frequency of >90% among all pancreatic tumors[6]. Similar results were shown by Mitsuhashi T et al[5], Shah SM et al[7] and Zamboni GA et al[8]. Features required for categorizing a case

as ductal adenocarcinoma are high cellularity, monolayered sheets, nuclear membrane irregularity, nuclear enlargement, and anisonucleosis. Studies were done by Lin F et al [9]and Bellizzi AM et al[10] also reported similar findings.

In the present study, 2 cases (6.2%) were diagnosed as adenosquamous carcinoma and 1 case (2.8%) as squamous cell carcinoma. Together they constituted 10.3% of all malignant lesions which is in contrast to their required frequency of about 2% of all pancreatic cancers[6].

In our study, 2 cases (6.2%) were of well-differentiated pancreatic neuroendocrine tumor. Their cytological features were concordant with those reported by Mitsuhashi T et al[5]and Bellizzi AM et al[10]. One case (2.8%) was of small cell neuroendocrine carcinoma, whose cytological features were the same as shown in the study of Bhatia P et a [4].

In our study, contamination from other parts of GIT was found in two cases (5.7%). In the study by Mitsuhashi T et al[5], contamination from normal duodenal and gastric epithelial cells was demonstrated in 52.4% and 30% cases respectively. Kocjan G et al[11] and Salla C et a[12] have also reported contamination from various parts of GIT.

Diagnosis of well-differentiated adenocarcinoma of the pancreas was difficult because their cytomorphological features may be subtle. But the cells showed nuclear enlargement and significant loss of polarity. These features were minimally present in reactive epithelium on comparing with adenocarcinoma. This is in concordance with the study done by Lin F et al[9].

Diagnosing cystic swellings having sparse cellularity and subtle features of malignancy were difficult until compared with benign epithelium. Similar findings were reported by Centeno BA et al[13].

In our study, apart from mild pain, no complications were seen. This was in keeping with the study of Bhatia P et al[4] and Tyng et al[14], who reported no complications. This was in contrast to the study done by Jani BS et al (15) who reported pancreatitis in 1.1%, bleeding in 0.3%, infection in 0.2%, abdominal pain in 0.8% and fever in 0.3% cases.

CONCLUSION:

We can conclude that percutaneous guided FNAC is an excellent diagnostic technique for pancreatic lesions with high adequacy and accuracy in conjunction with a rapid on-site evaluation. Pitfall like contamination from other parts of GIT, differentiation of benign from malignant should be well recognized to avoid misinterpretation.

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