ORIGINAL ARTICLE

Diagnostic Utility of Endoscopic Ultrasound Guided Aspiration Cytology in Evaluation of Pancreatic Masses

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ABSTRACT

Objective: To determine the sensitivity and specificity of endoscopic ultrasound (EUS) guided fine needle aspiration cytology (FNAC) in the evaluation of pancreatic masses.

Study Design: Analytical study.

Place and Duration of Study: Department of Pathology, Shaukat Khanum Cancer Hospital and Research Centre, from January 2006 to June 2011.

Methodology: Patients of either gender aged above 18 years who underwent EUS guided FNAC of pancreatic masses detected on abdominal CT, were included in the study. Biphasic abdominal CT scans were carried out for all the patients, followed by EUS guided FNAC. All material aspirated for cytologic evaluation was assessed for sample adequacy on-site, followed by formal examination for diagnostic purposes.

Results: The mean age of patients tested was 58.94 ± 12.84 years with age ranging from 23 to 78 years. Regarding gender 23/42 (54.76%) patients were male and 19/42 (45.24%) were female. Out of 42 cases, 27 (64%) cases were diagnosed as adenocarcinoma, 4 (9.5%) as benign, 4 (9.5%) as mucinous cystic neoplasm, 2 (4.7%) as chronic pancreatitis, 2 (4.7%) as non-diagnostic, 2 (4.7%) as atypical cells seen and 1 (2.38%) as non-Hodgkin's lymphoma. The results were in full concordance with radiologic findings.

Conclusion: EUS guided FNA is an excellent procedure for evaluation of pancreatic masses. The overall sensitivity of this procedure is 89% and the specificity is 67%.

Key Words: *Pancreatic cancer. Endoscopic ultrasound. Aspiration cytology.*

INTRODUCTION

Pancreatic cancer is one of the leading causes of death among gastrointestinal malignancies. Pancreatic malignancies include adenocarcinomas (90%), cystic neoplasms (5%) and neuroendocrine tumours (2 – 5%). Accurate pre-operative diagnosis is very helpful in defining prognosis and in aiding selection of appropriate treatment.

Advanced radiologic diagnostic modalities, such as CT scan and MRI have long been used to diagnose pancreatic masses. Endoscopic ultrasound (EUS) is very effective in visualization of the pancreas and its surrounding structures. It is more accurate than CT scan and MRI in diagnosing lesions less than 3 cm. In this particular area endoscopic ultrasound has been a success.[1] Endoscopic ultrasound guided fine needle aspiration cytology, or EUS-FNA, did not become technologically practical until the early 1990's when the first linear array echo-endoscopes were introduced.[2,3] While reasonably sensitive and specific, the previously used techniques were of limited benefit for lesions smaller than 3 cm in size.[4,5] PET-CT can detect small lesions and can also provide a measure of metabolic activity, but obviously cannot provide a tissue diagnosis.

The purpose of this study was to assess the usefulness of EUS guided FNAC in establishing a definitive diagnosis in patients with suspected pancreatic malignancy / radiologically detected pancreatic masses.

METHODOLOGY

This was a analytical study carried out on 42 patients who underwent EUS guided FNAC of pancreatic masses detected on abdominal CT. Patients of either gender and aged > 18 years were included. The study was carried out at Shaukat Khanum Cancer Hospital and Research Centre, Lahore, from January 2006 to July 2011.

Biphasic abdominal CT scans were carried out for all the patients, followed by EUS guided FNAC. All material aspirated for cytologic evaluation was assessed for sample adequacy on-site, followed by formal examination for diagnostic purposes. Sensitivity and specificity was calculated by comparing the results to final histologic diagnosis. Frequencies and percentages were calculated for qualitative variables such as gender, results of cytological diagnosis and mean SD were

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calculated for age. Data was analyzed by Statistical Package for Social Sciences (SPSS) version 19.0. Sensitivity and specificity of the test were carried out using 2 x 2 table subsequently.

RESULTS

The mean age of patients was 58.94 ± 12.84 years ranging from 23 to 78 years. Patients were nearly equally distributed among fifth (25.8%), sixth (22.6%), seventh (25.8%) and eighth (22.6%) decade of life. Twenty three (54.76%) patients were male and 19 (45.24%) were female. Out of 42 cases, 27 (64%) cases were diagnosed as adenocarcinoma, 4 (9.5%) as benign, 4 (9.5%) as mucinous cystic neoplasm, 2 (4.7%) as chronic pancreatitis, 2 (4.7%) as non-diagnostic, 2 (4.7%) as atypical cells seen, and 1 (2.38%) as non-Hodgkin's lymphoma.

Twenty eight (28) patients were suspected to have malignancy on radiologic criteria. Of these, 27 were diagnosed as adenocarcinoma and one case as non-Hodgkin's lymphoma (Figure 1). Four cases were reported as cystic lesions in radiology and were reported as mucinous cystic neoplasm on cytology. Therefore, there was 100% radiologic cytologic concordance.

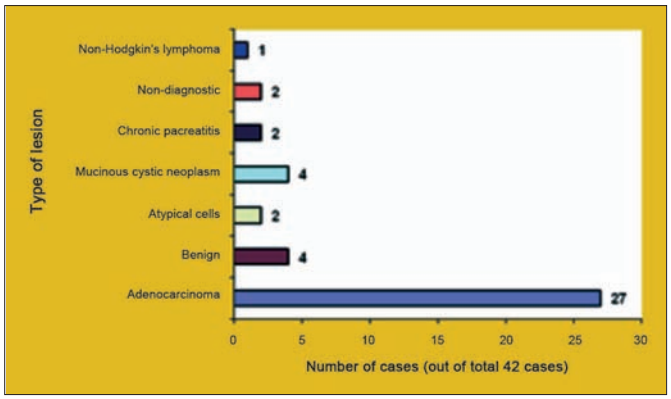

Figure 1: Frequency of different lesions diagnosed on cytopathology.

DISCUSSION

The foremost indication for EUS-FNA of the pancreas is for the definitive diagnosis of pancreatic masses. Approximately 90% of pancreatic neoplasms are adenocarcinomas,[6] another 5% are cystic lesions, and some 2 – 5% are neuroendocrine tumours.[7] The remainder are metastatic lesions to the pancreas, primarily from renal cancer, lung cancer, and lymphomas.[8,9] Because cystadenocarcinomas and neuroendocrine tumours of the pancreas have a significantly better prognosis than pancreatic adenocarcinoma, accurate cytologic pre-operative identification can significantly alter the subsequent management of these patients.[10] The management of the primary lesion may range from simple follow-up for a benign cystic lesion to an extensive surgical procedure for a ductal adenocarcinoma.[11]

The yield of EUS-FNA of primary pancreatic malignancies has been reported to range from 80 – 93%.[12] Obtaining a high yield of positive diagnoses in pancreatic EUS-FNA is dependent first and foremost on FNA technique and thereafter, on the active involvement of a cytopathologist.[13] Many active EUS-FNA centres have on-site cytopathology services, wherein a trained cytopathologist is present in the endoscopy room to stain and examine microscopically all aspirated material.[14] This helps to decide whether further material is necessary, and also to assess whether the material aspirated is adequate for diagnostic purposes. The presence of a cytopathologist on site is invaluable in situations where special stains are likely to be needed, or flow-cytometry is required for diagnosis. In such cases, more material can be obtained at the request of the cytopathologist.[15] Live feedback from a cytopathologist results in an approximate 10% increase in the likelihood of a positive diagnosis.[16]

EUS-FNA is a technique that has altered the management of pancreatic masses. Pancreatic EUS-FNA is amongst the most challenging of endoscopic techniques and should only be attempted by expert practitioners.[17] In the hands of experts, it should be possible to obtain diagnostic samples in more than 80% of pancreatic neoplasms with minimal morbidity.[18]

EUS guided FNA is also useful in evaluation of dual pathology as demonstrated by Ohtsuka *et al*. where they have proved its utility in case of ductal adenocarcinoma with concomitant intra cystic mucinous neoplasm.[19]

Evaluation of cystic lesions of the pancreas is also a grey area which requires expertise and if diagnosed by a mildly invasive procedure like EUS can dramatically alter the course of management for the patient.[20]

Primary pancreatic lymphoma (PPL), a localized lymphoma in the pancreas, accounts for < 0.5% of all pancreatic masses and presents with symptoms favouring the more common adenocarcinoma.

It is important to differentiate PPL from adenocarcinoma since their treatment and prognosis differ considerably. PPL is potentially curable with chemotherapy, especially if it is diagnosed at early stages. A definitive diagnosis can only be based on histopathological findings. Endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) is a reliable, minimally invasive and cost-effective method for this purpose.[21]

Ovarian adenocarcinoma has been reported as a primary site of pancreatic metastasis, but its diagnosis has rarely been reported by endoscopic ultrasound guided fine needle aspiration (EUS-FNA). The patient presented with severe epigastric pain which was initially treated as acute pancreatitis. Further imaging modalities

showed multiple large pseudocystic lesions in the pancreatic head and body. Subsequent EUS-FNA confirmed that the lesions were metastatic disease from an advanced ovarian carcinoma.[22]

Although CT scan has its limitations in evaluation of pancreatic masses due to the anatomical location of pancreas but correlation with radiology has been found to be very useful.[23] The concordance rate in this study was 100%. That also depends on the team-work between gastroenterologist, radiologist and a dedicated cytopathologist who are involved in the patient management and discussion of these cases in multi-disciplinary meetings.

In the center on-site evaluation and live feedback from a cytopathologist was available on all the 42 cases. The diagnostic accuracy was more than 80% in comparison to the international data (80%). There were no complications requiring hospital admission in this cohort of patients.

CONCLUSION

EUS guided FNA is an excellent procedure for evaluation of pancreatic masses. We found it to be safe, well tolerated, and accurate in obtaining a diagnosis in more than 80% of the cases. The sensitivity and specificity of our results is 89% and 67% which is comparable to international data. Interactive feedback during the procedure from a cytopathologist has been very helpful in improving the yield of the samples obtained.

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