ORIGINAL ARTICLE

Experience of Endoscopic Ultrasound Fine Needle Aspiration in Tertiary Care Hospital

Samreen Naz[1*], Amna Khursheed[1], Mehtab Hussain Shah[1] and Asad Abbas Jafri[1]

[1]*Department of Histopathology, Liaquat National Hospital and Medical College, Karachi, Pakistan*

Abstract

Objective: The objective of the study is to determine the spectrum of endoscopic ultrasound fine needle aspiration (EUS FNA) in the diagnosis of the pancreas, GIT, hepatopancreatobiliary tract, mediastinal lymph node and hepatic lymh node by using rapid on-site evaluation (ROSE).

Methodology: A retrospective study was conducted at the department of Histopathology and endoscopy suit (Liaquat National Hospital and Medical College) during the period of March 2019 to March 2022. A total of 55 patients undergoing EUS FNA were included in our study. 22 gauge needle was used for performing EUS FNA and stained with PAP alcohol fixed slides while stained with Diff –Quick air dried slides, as well as sample, also needed for cell block preparation.

Results: The mean age of the patient was 56.1. A total of 55 patients were included among them 33 patients were males and 22 females. The most common site was the pancreas, 38 cases with diagnosed as 68.4% were adenocarcinoma, mediastinal lymh node 9 cases 6.4%, gastric 4 cases 7.3%, rectal 1 case 1.8%, duodenal 1 case 1.8%, hilar mass 1 case 1.8% and hepatic lymh node 1 case 1.8%.

Conclusion: EUS FNA is a valuable, safe procedure that can be done under conscious sedation but rare complications included bleeding and pancreatitis. It provides at least a cost-effective mode of provisional diagnosis for the diagnosis and cost-effective testing of the pancreas, GIT, post mediastinum or related organs. Close interaction with cytopathologists is essential to improve diagnostic yields. The final diagnosis is based upon the correlation of clinical, EUS and cytological features along with relevant immunohistochemical markers on paraffin embedded block.

Keywords: *EUS-FNA, diagnosis, pancreas, GIT, hepatopancreatobiliary tract, mediastinal lymph node and hepatic lymh node.*

INTRODUCTION

EUS was first introduced by Dr. Euger DiMagno in the 1980s [1]. EUS is an outpatient daycare procedure and can be done under conscious conditions, not needing to be anesthetised. This is a safe and useful procedure and has an accurate modality for characterizing lesions from the pancreas, lymph node, GIT wall, retroperitoneum, liver, biliary tree and adrenal gland. It is considered the most sensitive imaging modality to detect pancreatic masses [2, 3]. The close interaction of cytopathologists and endoscopists plays an important role in improving the diagnostic yield [1]. The final diagnosis is based on the correlation of clinical EUS and cytologic features. In recent years, a pathological diagnosis based on EUS FNA has made it possible to provide accurate treatment methods also for respiratory organs and otorhinolaryngology.

The aim of this study is to evaluate the spectrum of endoscopic ultrasound fine needle aspiration in the diagnosis of the pancreas and other related organs.

Several methods have been introduced that provide us with good diagnostic materials. EUS-guided FNAB with rapid on-site evaluation (ROSE) method, we can obtain better diagnostic yields and this acquired material increases the passes of fewer needles [4-6]. ROSE has some limitations, it is unavailable in a significant number of institutions due to a shortage of experienced pathologists and it results in prolonged procedure duration and increased costs [7,8]. For getting adequate samples and accurate diagnosis fewer numbers needle passes are applied [9-11]. We have decided to evaluate the utility of EUS in our department. EUS(ROSE) method in our institution is considered a safe and cost-effective procedure by which we provide a provisional diagnosis of different sites of the lesion like the pancreas, GIT, *etc.*

MATERIAL AND METHODS

A retrospective study was conducted at the department of Histopathology and Endoscopy suit (Liaquat National Hospital and medical college) during the period of March 2019 to March 2022. In our study, we have included all consecutive 55 cases. For specimen adequacy, a 22 gauge needle was used to perform all EUS FNA / EUS FNB in the presence of a cytopathologist/ cytotechnologist. These samples were stained with Pap and Diff quick. For pap staining, alcohol-fixed slides were used while Diff quick staining is applied on Air-dried slides. At the end of the procedure, the needle was rinsed and specimens were collected in formalin for cell block. As both glass slides were prepared with alcohol and cell block in formalin/alcohol. Therefore, this procedure is a combination of FNB and FNA. After

**Corresponding author: Samreen Naz, Department of Histopathology, Liaquat National Hospital and Medical College, Karachi, Pakistan; Email: simra.lnh@gmail.com*

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considering adequacy by the cytopathologist adequate sample were further categorized into neoplastic or non-neoplastic. Data was analyzed using SPSS version 21. Descriptive statistics were computed. Frequency and percentages were computed for categorical variables. Mean and standard deviation was computed for numerical variables

RESULTS

The mean age of the patients was 56.1 years of the total 55 cases, 33 were males and 22 were females.

Table 1: Distribution of EUS FNA from different lesions.

Site	Frequency	Percent(%)
Pancreas	38	69.1
Mediastinal LN	9	16.4
Gastric	4	7.3
Rectal	1	1.8
Duodenal	1	1.8
Hilar Mass	1	1.8
Hepatic LN	1	1.8

In our study, the most common suit was pancreatic lesion 38 cases (**Table 1**).

Table 2: EUS FNA from pancreas.

Diagnosis	Frequency	Percent %
Adenocarcinoma	26	68.4
Solid Pseudopapillary Neoplasm	1	2.6
Mucinous Cystic Neoplasm	2	5.3
Negative for Malignancy	6	15.8
Neuroendocrine tumor	1	2.6
Cystic Fluid	1	2.6
Inadequate	1	2.6

Some of the cases like solid pseudopapillary neoplasm and neuroendocrine tumors were diagnosed with the help of immunohistochemical stains *i.e.* Cytokeritin, Chromogranin, Synaptophysin, CD-56, Beta Catenin.

Whereas, 9 cases from mediastinal lymph nodes out of which 6 cases (66.7%) were metastatic carcinoma and 3 cases (33.3%) of reactive changes / granulomatous inflammation. While 4 cases from gastric, 2 of which were GIST (50%), 1 case (25%) was a neuroendocrine tumor and 1 case (25%) was negative for malignancy. 1 case (100%) from rectal which was negative for malignancy, 1 case (100%) from duodenal which was adenocarcinoma, 1 case (100%) from the hilar mass which was adenocarcinoma and 1 case (100%) from hepatic lymph node was metastatic carcinoma (**Table 2**). The post-procedural complications like bleeding and acute pancreatitis did not happen in any of our patients. Recovery of all patients was uneventful.

DISCUSSION

From our results, we can conclude that ROSE detects malignancies in EUS-guided FNA.

Pancreatic mass and diagnosis of malignancy on examination of pooled cell blocks. Therefore, we strongly recommend keeping the cell block material, as it will be available for immunohistochemistry. A limitation of our study is the surgical resection of the same case. No further validation is possible, because our institute didn't do that.

In other studies EUS diagnosis has revealed about 70% yields while in our study yield is much better as mentioned in our results probably because of fewer numbers of passes and onsite cytopathologist/cytotechnologist.

Recent studies have also shown that there is no difference in the diagnostic yields of malignancy in the following condition of pancreatic masses with and without ROSE by EUS-guided FNA [12]. Further studies are needed to investigate ideal sample preparation to maximize diagnostic yields of ROSE and It is also possible to determine the optimal number of FNA passes to perform during this process. New techniques such as EUS-guided core biopsy appear to have comparable pathologic diagnostic yields to EUS-guided FNA, requiring fewer passes [13]. These studies also recommend tissue examination in the form of a cell block or core biopsy as these studies are essential to the final diagnosis.

The use of ROSE in EUS-guided FNA of pancreatic mass does appear to increase the diagnostic yield by encouraging additional FNA passes when malignant cells are not initially detected. Current methods in ROSE sample preparation may also need to change to optimize the detection of atypical cells in this procedure.

There are some limitations, more than three passes may affect the diagnostic yields of EUS-FNB and EUS-FNA. However, on-site cytological evaluation prior to histological evaluation adequate cellularity seemed to reduce the passes and improve the diagnostic yield. The endoscopist knows the type of needle used during tissue sampling, although the pathologist knows to turn a blind eye to it. Both EUS-FNB and EUS-FNA were performed in the same SET. This may lead to increased complications (including bleeding); however, no procedure-related complications were noted in our study. This study did not directly evaluate the effect of on-site cytology on cellularity because on-site cytological evaluation assessments were performed in all SETs. It concluded that EUS-FNB reduces the needle passes and produces a higher proportion of adequate cellularity on the first needle pass as determined by on-site cytological evaluation. However, further studies are needed to confirm the ability of EUS-FNB and on-site cytological evaluation to improve the diagnosis [14-20].

CONCLUSION

EUS is a valuable, safe procedure and it provides at least a provisional diagnosis with a cost-effectiveness modality for diagnostic and cost-effective tests for

pancreas, GIT, post mediastinum or related organs. The use of ROSE during EUS FNB decreases the number of needle passes to obtain adequate cellularity and better diagnostic yields. Close interaction with cytopathologists is vital in improving the diagnostic yield. The final diagnosis is based upon the clinical correlation, EUS and cytological features as well as Immunohistochemical studies.

ETHICS APPROVAL

A retrospective study does not require ERC approval.

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA

Not applicable.

FUNDING

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CONFLICT OF INTEREST

The authors declare there is no conflict of interest.

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Declared none.

REFERENCES

1. S. Iqbal, D. Friedel, M. Gupta *et al,* "Endoscopic-Ultrasound-Guided Fine-Needle Aspiration and the Role of the Cytopathologist in Solid Pancreatic Lesion Diagnosis", Pathology Research International, vol. 2012, pp. 317167, 2012.
2. F. G. Gress, R. H. Hawes, T. J. Savides *et al.*, "Role of EUS in the preoperative staging of pancreatic cancer: a large singlecenter experience", Gastrointestinal Endoscopy, vol. 50, no. 6, pp. 786–791, 1999.
3. K. Yasuda, H. Mukai, M. Nakajima, and K. Kawai, "Staging of pancreatic carcinoma by endoscopic ultrasonography", Endoscopy, vol. 25, no. 2, pp. 151–155, 1993.
4. Koul A, Baxi AC, Shang R *et al.* "The efficacy of rapid on-site evaluation during endoscopic ultrasound-guided fine needle aspiration of pancreatic masses". Gastroenterol Rep (Oxf), vol. 6, pp. 45 – 48 2018.
5. Iglesias-Garcia J, Dominguez-Munoz JE, Abdulkader I *et al.* "Influence of on-site cytopathology evaluation on the diagnostic accuracy of endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) of solid pancreatic masses". Am J Gastroenterol, vol. 106, pp. 1705 – 1710, 2011.
6. Wei Zhou, Shi Yu Li,*, Hui Jiang, Li Gao *et al.* Optimal number of needle passes during EUS guided fine needle biopsy of solid pancreatic lesions with 22G ProCore needles and different suction techniques: A randomized controlled trial. 2021; 10: 1: 62-70
7. Polkowski M, Jenssen C, Kaye P *et al.* "Technical aspects of endoscopic ultrasound (EUS)-guided sampling in gastroenterology: European Society of Gastrointestinal Endoscopy (ESGE) Technical Guideline". Endoscopy, vol. 49, pp. 989 – 1006, 2017.
8. Uehara H, Sueyoshi H, Takada R *et al.* "Optimal number of needle passes in endoscopic ultrasound-guided fine needle aspiration for pancreatic lesions". Pancreatology, vol. 15, pp. 392 – 396, 2015.
9. Seicean A, Badea R, Moldovan-Pop A *et al.* Harmonic contrast-enhanced endoscopic ultrasonography for the guidance of fine-needle aspiration in solid pancreatic masses. Ultraschall Med 2017; 38: 174 – 182 .
10. Attili F, Pagliari D, Rimbas M *et al.* Endoscopic ultrasound-guided histological diagnosis of a mucinous non-neoplastic pancreatic cyst using a specially designed through-the-needle microforceps. Endoscopy 2016; 48 : E188 – E189
11. Mohamadnejad M, Mullady D, Early DS *et al.* "Increasing number of passes beyond 4 does not increase sensitivity of detection of pancreatic malignancy by endoscopic ultrasound-guided fine-needle aspiration". Clin Gastroenterol Hepatol, vol. 15, pp. 15: 1071 – 1078, 2017.
12. Wani S, Mullady D, Early DS *et al.* The clinical impact of immediate on-site cytopathology evaluation during endoscopic ultrasound-guided fine needle aspiration of pancreatic masses: a prospective multicenter randomized controlled trial. Am J Gastroenterol 2015;110:1429–39.
13. DiMaio CJ, Kolb JM, Benias PC *et al.* Initial experience with a novel EUS-guided core biopsy needle (SharkCore): results of a large North American multicenter study. Endosc Int Open 2016;4; E974–9
14. Dumonceau JM, Deprez PH, Jenssen C *et al.* Indications, results, and clinical impact of endoscopic ultrasound (EUS)-guided sampling in gastroenterology: European Society of Gastrointestinal Endoscopy (ESGE) Clinical Guideline – Updated January 2017. Endoscopy 2017; 49: 695 – 714
15. Mounzer R, Yen R, Marshall C *et al.* Interobserver agreement among cytopathologists in the evaluation of pancreatic endoscopic ultrasound-guided fine needle aspiration cytology specimens. Endosc Int Open 2016; 4: E812 – E819
16. Cho E, Park CH, Kim TH, *et al.* A prospective, randomized, multicenter clinical trial comparing 25 gauge and 20 gauge biopsy needles for endoscopic ultrasound guided sampling of solid pancreatic lesions. Surg Endosc 2020;34:1310 7
17. Leung Ki EL, Lemaistre AI, Fumex F, *et al.* Macroscopic onsite evaluation using endoscopic ultrasound fine needle biopsy as an alternative to rapid onsite evaluation. Endosc Int Open 2019;7:E189 94. 22.
18. O'Connor K, Cheriyan DG, Li-Chang HH. *et al.* Gastrointestinal endoscopic ultrasound-guided fine-needle aspiration biopsy specimens: adequate diagnostic yield and accuracy can be achieved without on-site evaluation. Acta Cytol 2015;59:305–10.
19. Ryan DP, Hong TS, Bardeesy N.. Pancreatic adenocarcinoma. N Engl J Med 2014;371:1039–49.
20. Gonzalo-Marin J, Vila JJ, Perez-Miranda M.. Role of endoscopic ultrasound in the diagnosis of pancreatic cancer. World J Gastrointest Oncol 2014;6:360–8.