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Can the Conventional Cytology Technique be Sufficient in a Center Lacking ROSE?

Abstract

While rapid on-site evaluation (ROSE) is considered to be an additional tool to optimize the yield of tissue acquisition during EUS-guided FNA of the gastrointestinal tract,[1,2] it is not readily available at all times while performing these procedures. We reviewed twenty-seven EUS-guided FNA procedures done at our institution in Tripoli central hospital with general working center restrictions due to local COVID-19 prevention protocols. Approximately 92.6 % of tissue adequacy was achieved despite the lack of ROSE which is comparable to ROSE-based tissue acquisition results. This is a small-size retrospective chart review study to illustrate the optimal tissue adequacy during EUS-guided FNA of the upper gastrointestinal tract in a suboptimal hospital setting, lack of ROSE and merely utilizing visual inspection of those specimens by the performing physician and its effects on the diagnosis.

Keywords

Pancreatic cancer, Endoscopic ultrasound, Hepatobiliary diseases, COVID-19

Introduction

The Endoscopic Ultrasound (EUS) machine is a combination of an endoscope with an ultrasound device that has been used in the diagnostic and therapeutic assessment of the gastrointestinal system and has changed the approach of gastrointestinal pathologies in modern medicine.[3] Endoscopic ultrasound-guided-fine needle aspiration (EUS-guided FNA) is now performed routinely in many advanced endoscopy centers around the globe and has enhanced the ability to diagnose pancreatic pathologies.[4] The development of linear ultrasound endoscopes led to EUS-FNA being carried out with great precision in real-time, with the FNA needle being visualized throughout the procedure. It has been found that EUS-guided FNA is most useful in making an initial tissue diagnosis of malignancy, carrying a high diagnostic value with a low complication rate. It is also cost-effective in accurately preoperatively staging patients with pancreatic solid masses and has greatly improved the prognosis by reducing unnecessary surgical interventions and eventual morbidity and mortality in patients with advanced cancer.[6,7] Early diagnosis of pancreatic tumors is essential to identifying patients who are eligible for surgical intervention. Therefore, EUS-guided FNA is considered an important tool, since it is capable of identifying neoplasms less than 3mm that are rarely noticed by other imaging modalities.[10] EUS-guided FNA also has limitations, however, and imperfections,[3] as the utility of EUS in obtaining pancreatic samples or tissue of any gastrointestinal pathology depends on multiple factors. These include the physician's experience and training and adequate supervision and rapid on-site evaluation (ROSE), which provides a real-time evaluation of the acquired specimen. Furthermore, needle size, patient sedation, patient age, past medical history, and the location, size, and consistency of the lesion must all be considered.

A medical literature review to evaluate the role of EUS-guided FNA for diagnosis of solid pancreatic masses showed 78-95% sensitivity, 75-100% specificity, 98-100% positive predictive value, 46-80% negative predictive value (NPV), and 78-95% accuracy. The reported

complications rate of EUS-guided FNA for pancreatic solid masses was 0-2%, although the criteria for complications varied among the studies.[7]

Method

This is a retrospective chart review of 27 patients that had undergone FNA-guided EUS from the beginning of March until the end of August 2020. These cases occurred during the COVID-19 pandemic, which meant that ROSE was not being used during the evaluation of these patients. Our histopathology department provided histological reports for all of the EUS-guided FNA samples, which were read by the same histopathologists. Descriptive analysis and cross-tabulation were done using SPSS.

Limitations

This study reviewed a retrospective chart, as opposed to conducting randomized control trials, which is known to have more reliable results. A larger cohort of the reviewed cases, instead of the actual used number, would have more definitively assessed the small differences in diagnostic yield and allowed a better understanding of the reliability and enhanced measurement quality of the tissues acquired. Due to the pandemic prevention protocol in our center, several EUS cases were postponed. Additionally, there were several technical and clinical obstacles during those procedures, including the unavailability of an anesthesiologist physician or CRNA, an absence of staff training on the EUS machinery, and assistance techniques which forced the operator to multitask while performing those procedures.

Discussion

All procedures were done in a tertiary center located in Tripoli and were performed by a trained Libyan physician in collaboration with a qualified U.S. physician. FNAs were obtained using both the standard and fanning techniques, with and without suction, using a 20cc syringe. No adverse events were reported during or immediately after those procedures. Patient ages ranged between 18 and 77 years old with a mean age of 55 years, with gender distribution showing an almost equal representation of male and female patients.

The vast majority of specimens were collected using 22-gauge needles, with 19-gauge needles also being used. All of the samples were collected in both containers and slides which were air-dried on site. All samples were visually inspected by the operator to assess tissue adequacy before they were eventually sent to the histopathology laboratory and ultimately analyzed by three experienced histopathologists. Among the 42 patients who were required to undergo a EUS evaluation as a result of prior imaging findings that necessitated further evaluation, EUS-guided FNA was done for only 28 of them. Out of those 28 cases, we were able to collect 27 results, as we were unable to follow up with one patient. Within those 27 specimens, 21 were confirmed to be adenocarcinomas. All 21 of those patients were referred to an oncologist for further management.

In terms of tissue acquisition, all of the 27 specimens contained sufficient tissue. As most of the patients that received EUS-guided FNA had radiological findings that suggested malignancy, FNA results showed a sensitivity of 77.8% and a positive predictive value of 100%. Six results

were considered to be inconclusive as the histopathology reports did not match the radiological findings or the surgical biopsy results, even though those tissue specimens were adequate. Among the 27 specimens, 25 (92%) of them were in both conventional smears and cell block samples. The remaining two specimens contained only cells as noted by the conventional smear method (8%). One specimen that was obtained from the gallbladder was inconclusive, while the other one was confirmed to be malignancy of the pancreatic head. This confirms the significance of the tissue obtaining technique implemented throughout the procedure. According to the histopathology results, the most identified neoplasm was adenocarcinoma (40+%). Almost 20% of the diagnosed cases were undifferentiated malignant epithelial neoplasms. There was only one sample that had extensive cellular destruction during preparation.

25-gauge needles are considered the most optimal recommended needle size for the sampling of pancreatic masses and are known to have a higher negative predictive value and cause less tissue damage than standard 22-gauge needles.[5] The majority of our specimens were collected using 22-gauge needles, although 19-gauge needles were also used.

One prospective randomized study aimed to compare the diagnostic yield of 22-gauge and 25-gauge needles. It was found that cytology was diagnostic in 91.6% of cases, while no statistically significant differences were found between the two groups when a similar number of passes were performed in both arms.[8] Our study suggests similar findings to those in the above study.

It has been explained that EUS-guided FNA is limited by the lack of cytology expertise. It has also been foreseen that EUS-guided fine needle biopsy (FNB) may likely overcome these limitations by moving the practice of EUS from cytology to histology, which will result in expanding the use of EUS and facilitating targeted therapies and treatment monitoring.[9]

Conclusion

We concluded that our results of tissue acquisition and analysis with the standard (off-site) histopathology techniques are comparable to those in more developed centers where ROSE is readily available. Although the site in Tripoli lacked high-standard training and experienced a significant shortage of properly equipped facilities, most of the patients who received management in our care provided adequate tissue samples collected mainly using 22-gauge needles with results that confirm or exclude neoplasms. According to the previously presented data, with consideration of the working clinical conditions, our results retained reliability of sample acquisition and efficacy in the detection of pancreatic and hepatobiliary tumors. We suggest that ROSE is a helpful tool, but may not be necessary in the presence of an experienced physician.

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