Endoscopic Ultrasonography with Fine-needle Aspiration

New Techniques for Interpretation of Endoscopic Ultrasonography Cytology and Histology Specimens

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KEYWORDS

• Endoscopic ultrasonography • Fine-needle aspiration • Cytology • Histology

KEY POINTS

- Diagnostic accuracy of gastrointestinal lesions by EUS depends on multiple factors such as acquiring adequate tissue, proper histocytologic triage and selecting appropriate ancillary testing.
- The adequate tissue acquisition is impacted by the location of lesion, the size of needle and employment of rapid on-site evaluation by cytology expert.
- The proper triage and preparation of FNA sample for histocytologic evaluation is imperative. The combination of cytology and histology preparation can enhance the diagnostic accuracy.
- Utilization of ancillary testing such as immunohistochemistry, flowcytometry and molecular testing is crucial for determination of diagnosis, prognosis and therapeutic plan.
- Needle core biopsies have been introduced for tissue acquisition in certain clinical scenarios. Different studies have compared the advantages and disadvantages of the current core biopsy needles.

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INTRODUCTION: BRIEF OVERVIEW OF TISSUE ACQUISITION BY ENDOSCOPIC ULTRASONOGRAPHY

Endoscopic ultrasonography (EUS) with fine-needle aspiration (FNA) is an established method for sampling and diagnosing gastrointestinal cancers. It has been shown to be a safe and effective technique that is superior in the assessment of smaller lesions and superior to and safer than computed tomography–guided or ultrasonography-guided percutaneous tissue acquisition for tumors that are accessible.[1,2] Parallel to many of the technical advances that have allowed the procedure to be performed with greater safety and increasing ease, there has been significant success in understanding the biology of many tumors that are biopsied. This success has led to an increasing demand to not only provide highly accurate diagnoses but also obtain specimens that can be used to classify tumors or understand their responsiveness to different therapies. This article provide a highly practical approach to choosing biopsy sites and needle types, and how to process the material to ensure diagnostic accuracy and availability for downstream testing.

TARGETED TISSUE ACQUISITION

Performing high-quality EUS/FNA first involves locating the target tissue and determining the ideal needle approach. A single-center retrospective study showed that use of general anesthesia (GA) is associated with increased diagnostic yield (83% with GA compared with 73% without GA) when performing EUS/FNA of pancreatic masses.[3] Despite these results, current practice in most institutions is to perform the procedure using moderate sedation or monitored anesthesia care. Notably, recent studies have shown much higher diagnostic yield than either group in the previously noted study.

Limitations in approaching a pancreatic mass include small size, necrosis, vascularity, and difficult location. The mass is ideally located at the 6 o'clock position with the ultrasonography transducer applied to the luminal wall with suction. A transgastric approach is simplest when possible. This approach avoids angulation of the scope, which can make passage of the needle through the biopsy channel more challenging. However, the gastric wall is thick, which can make it more difficult to pass the needle through the wall. Acute angulation of the scope is often required when performing transduodenal FNA. A site with minimal intervening vasculature should be chosen using Doppler imaging to avoid bleeding.

The impact of needle size on the diagnostic yield of EUS/FNA for pancreatic lesions is controversial. Needles range from the small and highly flexible 25-gauge needles, to the most commonly used 22-gauge needle, to even larger 19-gauge needles. A meta-analysis comparing 25-gauge needles and 22-gauge needles for FNA of pancreatic masses found that sensitivity was higher (93% vs 85%; $P = .0003$) with 25-gauge needles.[4] The 25-gauge needle may be superior to the 22-gauge needle for accessing head and uncinate process lesions.[5,6] However, several studies have found comparable diagnostic yields when using the 22-gauge needle versus the 25-gauge needle.[6–9] A standard 19-gauge needle or a 19-gauge ProCore can provide good samples in more than 90% cases, although transduodenal puncture can be challenging.[10,11] The literature has consistently shown that smaller gauge needles should be chosen when performing transduodenal FNA of the head and uncinate process of the pancreas given the bend and tension on the distal scope that limits needle movement. One prospective study suggests that a 22-gauge or 25-gauge needle should be used for a transduodenal approach, whereas a 19-gauge needle should be used for a transgastric approach, or if more tissue is desired.[12]