Beyond Cytology

Why and When Does the Oncologist Require Core Tissue?

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KEYWORDS

- Endoscopic ultrasound (EUS) • Fine-needle aspiration (FNA)
- Core needle biopsy (CNB) • Pancreatic cancer
- Gastrointestinal stromal tumor (GIST) • Lymphoma

KEY POINTS

- The need for core tissue to improve diagnostic accuracy and facilitate tumor and/or molecular profiling is justified in lymph node biopsy (thoracic and abdominal tumor staging; lymphomas), pancreatic and periampullary tumors, gastrointestinal stromal cell tumors, and soft tissue sarcomas.
- There are 2 main reasons why oncologists may require additional tissue and a histologic section in addition to cytopathology from fine-needle aspiration (FNA) specimens: improved diagnostic accuracy and molecular characterization of tumors.
- Rather than mutually exclusive diagnostic procedures, endoscopic ultrasound (EUS) FNA and EUS core needle biopsy (CNB) must be viewed as supplementary techniques, and both approaches should be incorporated as essential tools in the current endoscopic armamentarium.
- EUS-FNA remains the cornerstone of diagnostic biopsy procedures for upper gastrointestinal tumors, pancreatic neoplasms, and their surrounding lymph nodes.
- EUS-CNB with histologic assessment may be useful in cases such as pancreatic tumors other than pancreatic adenocarcinoma, tumors surrounded by chronic pancreatitis, submucosal and intramural gastrointestinal tumors, and for the biopsy of lesions or lymph nodes in which lymphoma is suspected.
- The added value of histologic architecture as well as thorough immunohistochemical staining may further improve diagnostic accuracy in those settings.

INTRODUCTION

Tissue acquisition is of paramount importance to confirm diagnosis and guide treatment in a wide variety of thoracic and abdominal neoplasms. In the past decade, endoscopic and minimally invasive techniques have become the procedures of

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choice to sample deep structures that could only be biopsied through open techniques in the past. The introduction of endoscopic ultrasound (EUS) has revolutionized the management of patients presenting with gastrointestinal (GI) malignancies, reaching the status of standard of care in most industrialized nations. Tumors that in the past required surgical biopsies with prolonged convalescence are now routinely accessed endoscopically, allowing expedited recovery and accelerated initiation of definitive therapies. A high sensitivity and specificity coupled with an excellent safety profile has turned EUS–fine-needle aspiration (FNA) into the preferred approach for staging mediastinal lymph node involvement in lung cancer, biopsy of pancreatic and periampullary tumors, diagnosis of submucosal tumors of the GI tract (particularly GI stromal tumors [GISTs]), and biopsy of deep-seated lymphomas. Growing experience with pancreatic and gastric tumors has allowed expansion of the indications of this approach to now include other conditions such as esophageal cancers, rectal tumors, and lung diseases. To date, EUS-guided FNA procedures offer a diagnostic accuracy of 70% to 98% depending on the location of the target lesion and experience of the operator.[1,2]

Despite current widespread availability of EUS-FNA, the technique is associated with limitations related to accessibility and interpretation of cytology samples.[3] Among the limitations of this technique, is that it only provides a cytologic specimen often with scant cellularity and, by definition, devoid of histologic architecture. EUS-FNA requires multiple needle passes and an on-site cytopathologist. Disruption of the tissue architecture during sampling of malignancies necessitating complete tissue analysis fordiagnosis and grade differentiation, such as sarcomas or lymphomas, is the most notable limitation.[4–6] In addition, patients with inflammatory processes that mimic cancer pose challenges to the endoscopist and cytopathologist interpreting the results.[7–9] Furthermore, in the era of molecular profiling and personalized oncologic therapies, the need for complete histologic samples has become of paramount importance. Because of these restraints, growing interest in the use of larger caliber needles has prompted trials comparing FNA with core biopsy techniques or a combination of both.[10–17] Several studies have shown the efficacy and safety profile of EUS-guided core biopsies in a variety of different sites.[18–20] This article discusses the importance of core tissue acquisition in GI oncology, specifically focusing on upper GI and hepatopancreatobiliary conditions.

DIAGNOSIS OF PANCREATIC AND PERIAMPULLARY TUMORS

The diagnostic yield for EUS-FNA of solid pancreatic tumors ranges from 75% to 98%, with rare false-positives and a false-negative rate up to 15% in the setting of chronic pancreatitis.[21] EUS-FNA has also been proved to be helpful in the evaluation of periampullary masses that cannot be well visualized on computed tomography scan.[22] EUS core needle biopsy (CNB) seems to be a useful adjunct in those cases in which lymphoma or histology other than ductal adenocarcinoma are suspected. By providing a histologic specimen, a better microscopic examination of the tissue may be performed while providing additional tissue for immunohistochemical characterization.

Early studies have investigated the accuracy of EUS-CNB with no clear advantage compared with FNA. In a pilot study of 18 patients, 3 of whom had pancreatic masses, Varadarajulu and colleagues[17] determined the specimen adequacy and diagnostic accuracy of both techniques and concluded that there were no significant differences between EUS-CNB and EUS-FNA in diagnostic accuracy (78% vs 89%). Wittmann and colleagues[23] subsequently published their experience in 83 pancreatic patients