EUS-guided liver biopsy for parenchymal liver disease

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In recent years we have witnessed the emergence of endoscopic-ultrasound-guided liver biopsy (EUS-LB) as an effective alternative to traditional liver biopsy techniques. Since the first published cases of EUS-LB in 2007 using a novel Tru-Cut core biopsy needle (QuickCore; Cook Medical, Winston Salem, NC, USA), comparative studies have demonstrated that both endoscopic and non-endoscopic approaches are similar in terms of diagnostic adequacy, accuracy, and adverse events (1). However, EUS-LB still affords many advantages over percutaneous (PC-LB) and transjugular approaches. Due to the proximity of the ultrasound device to the liver, EUS allows for a detailed view of a patient's anatomy in real-time and the avoidance of other structures, including the adjacent vasculature and major bile ducts, thus reducing procedure-related complications (2). In this way, multiple cores from both right and left liver lobes can be obtained, increasing the adequacy and yield of tissue (3). Additionally, EUS-LB is performed with either conscious sedation or under anesthesia, significantly improving patient tolerance and comfort (4). The procedure is quick, adding only a few minutes to the overall procedure time. We often perform EUS for the evaluation of elevated liver enzymes in patients with a dilated common bile duct, and in case of non-diagnostic findings, patients can undergo EUS-LB in the same session, which is likely to reduce overall time, cost of multiple procedures, and expedite clinical management (3). Finally, EUS-LB has a shorter average recovery time compared to conventional LB methods (4).

The latest meta-analysis which included twenty-three studies with a total of 1326 patients using both 19G and 22G FNA/FNB needles showed a high diagnostic yield of more than 90% which is comparable with the yield of PC-LB. Moreover, after excluding studies using EUS-TB technique with QuickCore™ needle which is not available in the market anymore due to the technical difficulties associated with higher failure rates, diagnostic yield increased to ≥ 95% using EUS-FNB technique with either standard or core-type needles (5). In the past several years, multiple dedicated EUS-guided fine-needle biopsy (FNB) devices with enhanced tip designs for maximal tissue acquisition have been made available for commercial use. When comparing 22G FNB versus 19G FNA needles, tissue adequacy is higher for the 19G FNAs (88% vs. 68%, $p = 0.03$), mainly because samples obtained from a smaller caliber needle are more prone to fragmentation during specimen processing (6). Specimen fragmentation remains a significant limitation of EUS-LB because it can significantly compromise diagnostic accuracy. Recent data suggest that EUS-LB with a 19 G FNB needle provides better histologic specimens than does the technique in which FNA needles are used (7). In a recent systematic review and meta-analysis to compare the safety and efficacy of EUS-LB with second-generation needles and PC-LB that included five studies with 748 patients, pooled diagnostic adequacy and overall adverse events were not significantly different between PC-LB and EUS-LB (96.6% versus 94.9%, OR: 0.81 (95% CI: 1.65–0.03; I2 0%), $P = 0.06$.), the former was superior in terms of the mean number of complete portal tracts (CPT) and total specimen length (8). Beyond the needle design and size, there is also the issue of optimal technique to improve the diagnostic yield of EUS-LB. Many endoscopists use suction or slow-pull techniques with FNA.

The wet suction technique, which uses a saline-filled pre-vacuum syringe, showed high effectiveness for EUS-LB, using the 19G Sharkcore or a standard 19G FNA needle even with a single pass and one actuation, as reported in a retrospective study on 165 patients (9). Furthermore, priming the needle with dilute heparin instead of saline can decrease the formation of blood clots in the needle and improve tissue handling. It has been demonstrated that heparin priming does not lead to bloodier specimens, nor does it increase adverse events of FNA. In a prospective study on 40 patients, using heparin-primed needles improved tissue adequacy compared with dry suction techniques (10). The most recent meta-analysis indicates that using an FNB needle with the slow-pull technique may provide better specimen quality and higher diagnostic yield (5). Nevertheless, we need more prospective comparative studies to assess the superiority of various EUS-LB techniques more precisely.

There are several limitations to the widespread utilization of this technique. EUS requires a prolonged learning curve to achieve competency in comparison to conventional techniques, which require less technical expertise. Endoscopic equipment and the devices utilized for the procedure are expensive. Conscious sedation or anesthesia further increases the cost, and there are also certain risks in an endoscopic procedure. However, EUS-LB is an evolving technique that already has an important role in settings with relevant expertise, mainly because of the superior control of the operating field, low incidence of adverse events, accessibility of the various parts of the liver, and greater patients' comfort (1).

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