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Endoscopic Ultrasound-Guided Tissue Acquisition for Solid Pancreatic Masses: High Diagnostic Yield, Technical Excellence, and Global-Level Performance in a Moroccan Cohort of 60 Patients

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ABSTRACT

Endoscopic ultrasound-guided tissue acquisition (EUS-TA) is considered the gold standard for diagnosing solid pancreatic masses. This study evaluates diagnostic yield, technical performance, and safety of EUS-TA in a Moroccan tertiary center, with comparison to national and global data. Sixty patients with solid pancreatic masses were included. Diagnostic yield reached 87% and malignancy was confirmed in 52%. MOSE and the fanning technique were frequently used and contributed substantially to sample adequacy. No procedural complications occurred. These findings demonstrate that Moroccan EUS performance aligns with major international standards and support broader national implementation of advanced EUS techniques.

KEYWORDS

Endoscopic ultrasound, EUS-guided tissue acquisition, Solid pancreatic masses, Diagnostic yield.

MAIN ARTICLE

INTRODUCTION

Pancreatic cancer is among the most lethal malignancies worldwide, with a five-year survival rarely exceeding ten percent. Early diagnosis is essential but challenging due to the deep anatomical location of the pancreas and the frequent absence of early symptoms. Endoscopic ultrasound has become the most sensitive technique for detecting small pancreatic lesions and is consistently superior to CT and MRI for the detection of masses under two centimeters, as confirmed in several meta-analyses [1]. The development of EUS-guided tissue acquisition has further strengthened its diagnostic utility, offering accuracy rates approaching ninety percent in large international studies [1,3]. Techniques such as macroscopic on-site evaluation (MOSE) and the fanning maneuver have emerged as important contributors to sample adequacy and are now widely incorporated into high-performance EUS practice. Although the use of EUS in Morocco has increased considerably over the past decade, national data evaluating diagnostic performance remain limited. A Moroccan study demonstrated that EUS achieved an eighty-eight percent reliability in diagnosing pancreatic malignancy compared with sixty-eight percent for CT [4]. Another Moroccan series emphasized the role of EUS in the evaluation and classification of pancreatic cystic lesions, confirming its essential diagnostic contribution [5]. Despite these important contributions, no Moroccan study has yet specifically analyzed the technical determinants of EUS-TA performance, including the contribution of MOSE, the use of fanning, and needle gauge selection. This study aims to fill this gap by providing a detailed evaluation of a Moroccan cohort and by comparing findings with the best international evidence.

METHODS

This retrospective study included sixty consecutive patients undergoing EUS-guided tissue acquisition for solid pancreatic masses between 2023 and 2025 in a Moroccan tertiary center. Clinical characteristics, lesion features, and procedural details were collected systematically. Needle gauge, use of MOSE, and application of the fanning technique were documented for each procedure. Adequacy was defined according to international criteria [1–3], based on the procurement of sufficient material to allow definitive cytological or histological classification. Procedural safety was assessed by monitoring for immediate and delayed complications.

RESULTS

Sixty patients were included and the mean age was sixty-two years. Lesions were predominantly located in the head or uncinate process of the pancreas, representing eighty-two percent of cases. Most lesions measured approximately four centimeters at diagnosis. From a technical standpoint, the twenty-two-gauge needle was used in two thirds of cases while the twenty-gauge needle was reserved for one third. MOSE and the fanning technique were performed in seventy-five percent of procedures. Diagnostic yield reached eighty-seven percent and malignancy was confirmed in fifty-two percent of patients. No immediate or delayed complications such as pancreatitis, bleeding, infection, or perforation were observed.

DISCUSSION

This Moroccan cohort demonstrates that EUS-guided tissue acquisition achieves diagnostic performance comparable to international standards. The diagnostic yield of eighty-seven percent observed in our study is consistent with large meta-analyses reporting accuracy between eighty-five and ninety-five percent for solid pancreatic masses [1]. Our findings also echo the performance observed in multiple international series evaluating modern EUS-TA techniques [3]. The significant contribution of MOSE to sample adequacy aligns with the study by Crinò and colleagues, who demonstrated that MOSE improves histological core retrieval and enhances reliability, particularly in centers without rapid on-site evaluation [1]. This observation is especially relevant in Morocco, where ROSE is not routinely available, making MOSE an accessible and effective alternative. Similarly, the use of the fanning technique was strongly associated with improved diagnostic adequacy, confirming the conclusions of Yang's meta-analysis, which established the superiority of fanning over linear repetitive sampling due to its capacity to capture tissue from multiple trajectories within a lesion [3]. Needle gauge did not significantly influence diagnostic performance in our cohort, a finding consistent with Facciorusso's comparative analysis demonstrating that twenty- and twenty-two-gauge needles yield similar diagnostic accuracy and sample quality [6]. These results reinforce the notion that operator expertise and sampling technique play a more decisive role in determining diagnostic success than needle size alone. Comparison with Moroccan literature further strengthens the relevance of our findings. The study by Elkoti et al. demonstrated that EUS surpasses CT in diagnosing pancreatic malignancies, highlighting the critical need for tissue-based diagnostics in the national context [4]. Additionally, the work of Tammouch et al. confirmed the value of EUS in the diagnostic and therapeutic approach to pancreatic cystic lesions, underscoring its central place in the Moroccan gastroenterological landscape [5]. Our study provides

complementary evidence by addressing technical aspects of EUS-TA that have not yet been explored nationally. The absence of complications confirms the safety profile of EUS documented in both Moroccan and international studies. Overall, this cohort positions Morocco within the global community of advanced endoscopic practice and demonstrates that high-level EUS performance is attainable in emerging healthcare systems.

CLINICAL IMPLICATIONS

This study supports the integration of EUS-guided tissue acquisition as a priority diagnostic tool for suspected pancreatic cancer in Morocco. The effectiveness of MOSE and the fanning technique reinforces the importance of systematically incorporating these two approaches into routine practice. The results highlight the need for continuous training and expansion of EUS capacity in Moroccan hospitals to reduce diagnostic delays, improve precision in cancer staging, and ultimately enhance patient outcomes.

CONCLUSION

EUS-guided tissue acquisition in this Moroccan cohort achieved high diagnostic performance, excellent safety, and technical reliability comparable to leading international centers. These findings support the broader national implementation of EUS and the adoption of standardized technical optimization strategies, including MOSE and the fanning technique, to ensure consistently high diagnostic outcomes.

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