Controversies in EUS

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EUS was introduced >40 years ago as a purely diagnostic procedure. High-end skills of endoscopy and knowledge of ultrasound techniques were needed. For the first time in the history of endoscopy, controlled and safe transmural diagnostic and therapeutic procedures became possible. The introduction of EUS-guided sampling initiated a paradigm shift in visceral medicine and oncology.[1,2] Therefore, EUS was named the "royal discipline" of endoscopy.[3] The introduction of linear echoendoscopes with larger instrumental channels and the combined development of various new tools and devices enabled a number of new applications of minimally invasive, EUS-guided transluminal interventions of the pancreas, biliary system, and peri-gastrointestinal structures. Examples include EUS-guided drainage of peripancreatic fluid collections, drainage of abscesses of nonpancreatic origin, bile duct access and drainage, gallbladder drainage, pancreatic duct access and drainage, EUS-coeliac plexus block and EUS-celiac plexus neurolysis, fiducial placement and tattooing, solid and cystic tumor ablation, drug delivery and brachytherapy, EUS-gastroenterostomy, access to the stomach in patients with prior gastric bypass to facilitate endoscopic retrograde cholangiopancreatography, angiotherapy, treatment of nonvariceal gastrointestinal hemorrhage, treatment of gastric varices, and other EUS-guided angiotherapy.

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New diagnostic ultrasound technologies have been implemented to increase the pretest probability to guide or avoid interventions, namely EUS-elastography[4] and contrast-enhanced EUS.[5] As an example, a small (<15 mm), soft, solid pancreatic lesion is almost never a pancreatic ductal adenocarcinoma (PDAC), whereas stiff solid pancreatic lesions might be malignant or benign.[6] The smaller the lesion, the better the differentiation. In addition, PDAC is generally hypovascular and therefore, hypoenhancing, whereas the differential diagnosis (neuroendocrine neoplasia, metastases, solid serous microcystic neoplasia, intrapancreatic accessory spleen, and others) is often hypervascular and therefore hyperenhancing.[7,8]

Nowadays, EUS is used as a routine procedure by many disciplines including gastroenterology, surgery, pneumology, and radiology. EUS is an important imaging modality evaluated in meta-analysis and recommended by many panels and guidelines.[1,2,9-13] Despite this success story, there are still controversies about the use of EUS. There are different approaches on the use of EUS instruments (linear *vs.* radial), orientation (cranial, caudal to the left side), how to handle the instrument, the value of elastography and contrast-enhanced ultrasound (CEUS), the preference of cytology *versus* histology and also controversies on indications and other issues.

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A group of interdisciplinary authors (gastroenterologists, surgeons, radiologists, pneumologists) recently published a series of papers on "how to perform" EUS and "controversies" in EUS and its subspecialties.[4,5,14-17] The experience of writing these papers stimulated the preparation of a questionnaire to better understand the wide variation of the current practice of EUS in different settings and cultures. In addition to epidemiological questions (*e.g.*, age, sex, origin and location of employment) the education, discipline, and research activity are documented. Topics discussed and questions asked include the frequency of transcutaneous US before EUS, the use of elastography and CEUS, the frequency of conventional endoscopy before EUS (mandatory or facultative), education and application of TUS in general, screen orientation of TUS and EUS, the percentage of diagnostic radial and/or longitudinal EUS and the use of miniprobes. The education and use of the above-mentioned EUS-based treatment options including the best use of ultrasound features ("knobology") are also addressed. The requirement for coagulation tests before EUS-guided sampling, the management of patients taking antiplatelet who need a biopsy and the topic of mandatory antibiotic prophylaxis before certain interventions are also discussed.

The discussion of the combined use of EUS and EBUS techniques (*e.g.*, conventional upper gastrointestinal EUS, endobronchial and endorectal techniques, miniprobes) has been included in this series of papers. In addition, the practical use of strain and shear wave elastography and how to perform contrast-enhanced ultrasound has been tackled.

A close collaboration between the World Federation for Ultrasound in Medicine and Biology and the European Federation of Societies for Ultrasound in Medicine and Biology is proving beneficial for coordinating the projects.

All practicing EUS endoscopists from across the world are invited to participate and answer this questionnaire but also to contribute to evolving reviews discussing standard practice with regard to currently available evidence and personal preference. The analysis of intercultural differences in behavior and application of techniques should act as a stimulus to improve skills and knowledge. A matter of debate is the education in ultrasound and the transcutaneous application before almost any EUS. Some interventionalists are very skilled in US, whereas others are using the US only as an adjunct concentrating on the endoscopic features of this method. Currently, educational issues are a focus of interest including the training via simulators. The reader is kindly invited to contact the group and to give input into the current projects. The interdisciplinary journal "EUS" is dedicated to support and to offer a platform for this fruitful discussion aiming in better knowledge, exchange of experience and friendship.

Conflicts of interest

There are no conflicts of interest.

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