SHORT COMMUNICATION

Report of first experience with endoscopic ultrasonography in Slovak Republic

Kuzela L, Sutka J, Vavrecka A

Clinic of Gastroenterology, Slovak Postgraduate Academy of Medicine, St. Cyril and Method's Hospital, Bratislava, Slovakia.
kuz.laco@pobox.sk

Abstract

Background: **Endoscopic ultrasonography (EUS) is a method that takes the advantage of a combination of endoscopy and ultrasound, where a miniature probe that functions as a transducer (which functions as both a transmitter and a receiver of ultrasound), is incorporated in the tip of the endoscope. From the introduction, this modality has found it s uninterchangable place all over the world not only in the diagnosis, but also in the therapy of gastrointestinal diseases and the diseases of the surrounded structures and organs. Indications for EUS can be simply divided into three main categories: submucosal abnormalities, staging of tumors of the gastrointestinal tract and pancreatobiliary diseases. In December 2000 we began at the Clinic of Gastroenterology of Slovak Postgraduate Academy of Medicine at St. Cyril and Method s Hospital in Bratislava, Slovak Republic with the EUS evaluation with radial mechanical probe, as the first one in the Slovak Republic. In this article we describe our first experience with the EUS at our clinic.**
Conclusions: **All together 64 patients were evaluated from December 2000 to the end of March 2001 from all over the Slovakia. In this article we describe in more detailed form the indications and also the findings in our group of patients.** ***(Short communication)***

It has been in this year that already 21 years passed ago since first articles in the medical literature described a new, fascinating and also a promising modality — endoscopic ultrasonography (EUS) (1, 2). During these years it has been consecutively shown and nowadays there is among endoscopists a consensus, that EUS is the most difficult diagnostic procedure in gastrointestinal endoscopy (3).

It is an imaging method that is using a combination of endoscopy and ultrasound, where a miniature probe that functions as a transducer (that can function as both a transmitter and a receiver of ultrasound) is incorporated in the tip of the endoscope. The high ultrasonic frequencies used (7.5—20 MHz) provide excellent resolution, distinguishing between structures and lesions (as small as 2—3 mm). However the depth of penetration is limited (approximately 6 cm) as there exists a direct relationship between absorption and the frequency of sound utilized (4).

Continuous advances, that can be seen in all fields of medicine interferes also in this relatively "new" modality. Rapid advances led to development of a number of new EUS devices, instrumentation and accessories. Currently available systems for endoscopic application include 2 systems:

— ebdoscope-based,

— catheter-based.

The endoscope-based systems are two basic design types of flexible instruments:

— a 360 radial mechanical scanner (this type of echoendoscope was also the first to be commercially available) providing a ultrasonic panoramic view that is perpendicular to the shaft axis of the instreument and

— a linear-type of electronic echoendoscope providing a 100 sector parallel to the shaft axis, that is equipped with an instrumentation channel for providing a facility for EUS-guided biopsy (5).

Clinic of Gastroenterology, Slovak Postgraduate Academy of Medicine, St. Cyril and Method s Hospital, Bratislava, Slovakia.

Address for correspondence: L. Kuzela, MD, PhD, Clinic of Gastroenterology, SPAM, St. Cyril and Method s Hospital, Antolska 11, SK-851 07 Bratislava 5, Slovakia.
Phone: +421.2.68673566

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The standard instrument, whit which most studies have been carried out, is the 360 radial scanner (5).

Electronic echoendoscopes are nowadays becomming more widely disseminated as they allow besides diagnostic interventions like fine-needle aspiration also therapeutic interventions like endosonographic-guided drainage of pancreatic pseudocysts or EUS-guided celiac plexus block (6).

The standard echoendoscopes are limited by their diameter and resultant inability to gain access to ductal systems (pancreatic, biliary) or through stenoses. Ultrasound probes were developed to offer access to narrow intraluminal spaces and the pancreaticobiliary system (5). One endosonographic feature that is constant throughout the gastrointestinal tract, no matter what kind of echoendoscope is used, is the echo structure of the wall. Under most circumstances (at 5 to 12 MHz frequencies) the gut wall is represented by five echo layers that are in continuity. The measurable thickness of the intestinal tract is 2 to 3 mm. A thickness greater than 3 to 4 mm generally represents a pathologic state. Surprisingly, there is no single reliable blind, controlled study that addressed the normal dimensions of the gastrointestinal wall and pancreas as visualized by EUS. Limitations of realizing such a study are varying contractility status of several layers, applied balloon compression and angle of scanning (3).

There are two primary targets for echoendoscopists: the gastrointestinal wall and the pancreatobiliary area, both with surrounding vessels and other structures in the mediastinum, perigastric area and retroperitoneum. Current criteria for clinical indicators are based on data demonstrating that the information provided by EUS can be used in making therapeutic decisions and in resolving clinical problems. Indications for EUS can be simply into divided into three main categories:

1) submucosal abnormalities,

2) gastrointestinal tumor staging,

3) pancreatobiliary disease (Tab. 1) (7).

EUS-guided fine-needle aspiration for cytology seems to improve the differential diagnosis of submucosal lesions, lymph nodes and pancreatic masses (6).

The only contraindications to EUS (other than those associated with endoscopy in general) are those related to the size and stiffness of currently available ultrasound endoscopes. The instruments used for upper gastrointestinal examination have a relatively large diameter (of approximately 13 mm) and a rigid distal tip (approximately 4 cm in lenght). Another limitation is also the optics, that are forward-oblique or side viewing. Because of the size, stiffness and weight of the echoendoscope, "palpatory sense" is diminished. Rapid dilation of a narrow stricture followed by passage of the ultrasound endoscope has been associated with a 20—24 % risk of perforation (8).

Despite advances in diagnostics and therapy of gastrointestinal diseases in our patients and also despite success that achieved Slovakian gastroenterology also at international forum we have to claim, that we waited until the year 2000, for introduction of this modality in our country. In December of 2000 we began to perform EUS at the Clinic of Gastroenterology of Slovak Postgraduate Academy of Medicine (SPAM) at St. Cyril and Method Hospital in Bratislava with the radial mechanical echoendoscope as the first one in Slovak Republic. Thanks to the agreement between the board of management of the St. Cyril and Method Hospital, the head of Clinic of Gastroenterology of SPAM at St. Cyril and Method Hospital and Olympus C&S company, we have had the opportunity to begin with the investigation with the echoendoscope GF-UM20 (Olympus America Inc.), which was lend by the Olympus company for 4 months, before the St. Cyril and Method Hospital have bought it. Overall EUS was performed from the introduction of this modality (in over mentioned December 2000) till the end of the March 2001 in a total of 64 patients from all over the Slovakia. Most of them were seen on outpatient basis.

Tab. 1. Indications for EUS (6).

Established indications	Potential indications
Submucosal abnormalities	Monitor variceal therapy
Intramural vs extrinsic	Inflammatory bowel disease
Tumor size and structure	Esophageal motility disease
Large gastric folds	Benign ulcer healing
Gastric varices	Pancreatic pseudocysts drainage
Gastrointestinal cancer staging (esophagus, stomach, colorectal)	Chronic pancreatitis
Pancreatobiliary disease	Fine-needle puncture
Cancer staging	Cancer diagnosing/staging (including lung cancer)
Localize endocrine tumors	Celiac axis neurolysis
Detect common bile duct stones	Achalasia: botulinum toxin injection

The most common indication for EUS was a suspicion for pancreatobiliary disease (n=29), the second most common indication was evaluation for elucidation of the etiology of submucosal abnormalities (n=18). Besides these two major indication groups patient at our clinic were investigated for TNM staging of esophageal cancer (n=7), diagnosis or exclusion of the presence of gastric varices (n=5) and for differential diagnosis of stenosis of the esophagus of unknown etiology with histologically not proven malignancy (n=5).

The most common diagnosis seen in our patients group was chronic pancreatitis (n=11), whereat the diagnosis was based upon the recognized EUS criteria (9). In the present chronic pancreatitis is still classified as a potential indication, because in diagnosing of chronic pancreatitis it reaches the sensitivity, but still does not reach the specificity of the diagnostic standard, which is nowadays ERCP (9).

Second most common finding (n=10) was normal EUS finding at the site of evaluation.

The third most common seen finding in our patients group were malignant tumors of the esophagus (n=7).

Among other frequently seen findings we diagnosed benign esophageal tumors (n=5), extraluminal impression (n=4), pancreatic pseudocysts (n=4), intragastric varices (n=3), postinflammatory stenosis of the esophagus (n=2), lipomatosis of the pancreas (n=2) and paragastric varices (n=1).

EUS helped in our so far very small patients hroup significantly not only in differential diagnostic process, but also in establishing of further therapeutical advancement mostly in patients with tumors of the esophagus, pancreas, but also in patients with submucosal tumors of the stomach.

Of course as every modality used in evaluation which depends on the skills and knowledge of the examining endoscopist, also for EUS the echoendoscopist must pass a relative long learning curve at which we stand with our knowledge and experience still somewhere at the beginning.

At the end we can conclude, that after a very long time of waiting that passed since the introduction of EUS in clinical praxis all over the world, we finally succeeded and nowadays have the ability to perform EUS also in Slovak Republic and therefore we will be able to further help our patients not only in terms of better diagnosing the gastrointestinal diseases and the diseases of surrounding tissue and vessels, but also that we will be able to help them in terms to "guide" the most appropriate therapeutical approach for each one of our patients.

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