Our cumulative experience with transendoscopic miniprobes

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ABSTRACT

Introduction: transendoscopic miniprobes (TEMPs) have nowadays precise indications, but may become a diagnostic alternative to both radial and sectorial endoscopic ultrasonography (EUS) in the near future.

Patients and methods: from November 1996 to July 2004 we carried out 620 examinations using TEMPs (124 during the last 12 months in 2003, with currently a mean of 11 examinations/month). Twenty explorations were performed with radial, 12.5 MHz (20 mm penetration), 6.2 F (2 mm diameter), 950 mm or 2000 mm Microvasive Endosound probes. Twenty explorations were performed using a 12 MHz (29 mm mean penetration) or 20 MHz (18 mm penetration) Olympus UM-2R/3R, or with a 12 MHz UM-DP12-25R or 20 MHz UM-DP20-25 R DPR-fitted Olympus probe, 2.5 mm in diameter and 2050 mm in length. A 20 MHz, 2.2 mm, wire-guided G20-29R was used for intraductal studies.

In all, 580 examinations were carried out with both radial and linear, 12 MHz (240 E) or 20 MHz (60 E) Fuji probes, 2.6 mm in diameter and 1900 mm in length; and with a 7.5 MHz, 2.6 mm radial balloon microprobe with the well-known "preload" system that we have been using during the 1999-2004 period (280 E). Here we used a 3.2 mm working channel, whereas a 2.8 mm working channel was used with the remaining TEMPs.

Results: twenty GI-tract examinations were performed with one Microvasive probe, which broke down when attempting its passage through the papilla.

Currently we use a 20 MHz, 2.2 mm Olympus G20-29R guided microprobe for intraductal studies.

We performed 100 gut examinations using one single Fuji TEMP (12 or 7.5 MHz).

Organs explored included: esophagus and stomach, 60%; rectum and colon, 30%; other (duodenum, papilla, bile ducts), 10%.

Indications: cancer staging, 35%; submucosal lesions, 30%; other, 35% (including 20% of esophageal non-tumoral conditions).

Complications: aspiration, perforation, and mortality, 0%. Morbidity, 10%, at the expense of abdominal pain as induced by endoscopy itself.

All strictures were successfully passed, except for one malignant stenosis in the rectum.

Conclusions: during a 93-month period (1996-2004) we performed 620 explorations with TEMPs, with a current average of 11 examinations/month. TEMP durability is around 100 gut explorations. The esophagus and stomach were examined in 60% of cases. Primary indications included gut cancer staging and submucosal lesions (65%). Perforation and mortality rates amounted to 0%.

Key words: Transendoscopic ultrasound or sonographic miniprobes. High-frequency miniprobes. Miniprobe ultrasonography. Intraductal or endoluminal echography or ultrasonography.

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INTRODUCTION

Transendoscopic miniprobes (TEMPs) have nowadays precise indications (1), including the study of biliopancreatic and gastrointestinal tract stenoses (2), colon cancer staging, and the assessment of non-tumor esophageal conditions and submucosal lesions below 2 cm in size; they also may even become an alternative to both radial and sectorial endoscopic ultrasonography (EUS) in the diagnostic setting (3), since TEMP indications are increasingly more numerous and technical refinement is higher.

In the therapeutic field TEMPs may be of help for echoendoscopy-guided mucosectomy and tumorectomy.

The goal of this publication is to report on a retrospective, descriptive study of our experience with TEMPs.

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PATIENTS AND METHODS

From November 1996 to July 2004 (more than 7 years, namely 93 months) we performed 620 examinations with TEMPs (124 in the last 12 months during 2003, with currently 11 explorations/month on average during 2004).

Twenty explorations were performed with radial, 12.5 MHz (20 mm penetration), 6.2 F (2 mm diameter), 950 mm or 2000 mm Microvasive Endosound probes.

Twenty explorations were performed using a 12 MHz (29 mm mean penetration) or 20 MHz (18 mm penetration) Olympus UM-2R/3R, or with a 12 MHz UM-DP12-25R or 20 MHz UM-DP20-25R DPR-fitted Olympus probe, 2.5 mm in diameter and 2050 mm in length. A 20 MHz, 2.2 mm, wire-guided G20-29R was used for intraductal studies.

In all, 580 examinations were carried out with both radial and linear, 12 MHz (240 explorations) or 20 MHz (60 explorations) Fuji probes, 2.6 mm in diameter and 1900 mm in length; and with a 7.5 MHz, 2.6 mm radial balloon microprobe with the well-known "preload" system that we have been using from February 1999 to June 2004 (280 explorations).

Here we used a 3.2 mm working channel, whereas a 2.8 mm working channel was used with the remaining TEMPs.

Whenever possible TEMPs were used using the water-immersion method, and otherwise the direct contact method. No latex miniballon was used, except with the 7.5 MHz microprobe.

All explorations were performed following the obtaining of the patient's informed consent.

In 1996 the percentage of sedations was 10%, which has become greater than 90% in 2004 because of patient requests in our private center.

See a number of reviews for more technical details on TEMPs (3-6).

The following information was obtained: number of explorations performed, duration of TEMP examination, indication and organ to be explored, complications, morbidity and mortality.

Data were processed using the SPSS vs. 11 software package.

RESULTS

In all, 620 examinations were carried out during the specified period of time.

Twenty GI-tract examinations were performed with one Microvasive probe, which broke down when attempting its passage through the papilla.

Currently we use a 20 MHz, 2.2 mm Olympus G20-29R guided microprobe for intraductal studies.

We performed 100 gut examinations using one single Fuji TEMP (12 or 7.5 MHz).

Organs explored included: the esophagus and stomach in 60% (372/620) of cases; the rectum and colon in 30%

(186/620) of cases; and other (duodenum, papilla, bile ducts) in 10% (62/620) of patients.

Indications: cancer staging in 35% (217/620) of cases; submucosal lesions in 30% (186/620) of cases; and other in 35% (217/620) of patients, including 20% of esophageal non-tumoral conditions.

Impact: there was a change in the diagnostic and therapeutic management of 44 cases among our 100 first patients studied (7). In such cases demographic data, indications, anatomic region to be explored, and changed diagnostic and therapeutic approach—which occurred following the TEMP study—were all recorded.

In the study of gastrointestinal tract strictures, all stenosis were ultimately passed except for one anorectal malignant stricture.

Complications: aspiration, perforation, and mortality, 0%. Morbidity, 10%, at the expense of abdominal pain as induced by endoscopy itself, particularly when sedation was not used.

DISCUSSION

Studies performed on TEMP durability are few; in relation to intraductal conditions, Napoléon's team (8) limits the use of each individual TEMP to 30 examinations.

Our experience of the gastrointestinal tract using endoluminal TEMP examinations amounts to 100 explorations with one same individual Fuji TEMP.

Nesje et al. (9) studied 123 patients and found additional information for 70% of cases, whereas Waxman (10) studied 23 patients and found additional information in 74% and changed patient management in 57%. The organ most commonly investigated was the esophagus, and major indications included submucosal or mucosal tumors, and esophageal stenoses.

Chak et al. (11) studied 66 patients and performed a comparative investigation of EUS and TEMPs with similar results—18 *versus* 16% regarding diagnostic changes, and 21 *versus* 15% (31% in total) regarding therapeutic changes. Organs most commonly explored were the esophagus and stomach, and major indications included mucosal and submucosal tumors, and stenoses (15 cases).

These results are similar to those obtained by our group with a clinical impact of 44%, with the esophagus and stomach being the most commonly explored organs, and staging and submucosal lesions being the main indications seen.

Hünerbein et al. (12) performed locoregional TN staging for 173 patients with esophageal-gastric cancer (63 esophageal, 110 gastric), and concluded that results are similar whether with a 12.5 MHz TEMP or 7.5 MHz linear EUS, with an excellent clinical impact with both procedures.

There is thus scientific evidence that TEMPs may induce changes in the management and therapy of patients with gut and/or malignant conditions in over 30% of cases.

Our experience with intraductal TEMP's is insufficient; we have used them in the staging of ampullary tumors and for the study of residual lithiasis.

It offers very positive results in the assessment of pancreatobiliary tumors (13,14), including the precise diagnosis of tumoral extension using 3-D or DPR (14).

The major benefits of TEMP's include fast examinations, the ability to go through strictures and to enter the common bile and pancreatic ducts, better maneuverability in areas such as the cardia and pylorus, and their potential being of help in mucosectomies and tumorectomies.

Disadvantages or shortcomings include a need for longer training *versus* EUS, its shorter penetration (3 cm at most, whereas EUS reaches 6 cm on average) and greater fragility, and its inability to support FNAP and interventionist procedures (neurolysis, puncture-injection, etc.). Major indications of EUS and TEMP's include digestive cancer staging and the assessment of submucosal lesions.

To conclude, for 93 months (November 1996 – July 2004) we carried out 620 examinations with TEMP's, with currently 11 explorations/month on average.

TEMP durability is approximately 100 gastrointestinal tract examinations. The esophagus and stomach were explored in 60% of patients. Major indications included gut cancer staging and the study of submucosal lesions (65%). Clinical impact had amounted to 44% in a previous study.

Perforation and mortality rates amounted to 0%, and morbidity was 10% at the expense of abdominal pain as induced by the endoscopic procedure itself.

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