

Cross-Sectional Study to Assess Endoscopic Ultrasound Practice in Portugal

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Keywords

Endoscopic ultrasound · Echoendoscopy · Portugal · Survey questionnaire

Abstract

Background: Despite the increasing number of national departments performing endoscopic ultrasound (EUS), there are no official data regarding clinical EUS practice in Portugal. **Objectives:** We aimed to evaluate the current practice of EUS in Portugal. **Methods:** By email, we invited 1 physician of each one of the 26 national Gastroenterology Departments which perform EUS to complete a survey questionnaire available on the Google Forms platform. The online questionnaire was available from September 2017 until February 2018 and was answered only by physicians who perform EUS. **Results:** A total of 21/26 (80.8%) national Gastroenterology Departments answered the questionnaire. In Portugal, there are 42 echoendoscopes in total; most of the echoendoscopy units have only 1 EUS processor (81%), 1 ra-

dial echoendoscope (66.7%), 1 linear echoendoscope (76.2%), 1 anorectal probe (57.1%), but no miniprbes (85.7%). About 81% have histological core acquisition needles. In 81% of the units, there are at least 2 ultrasonographers who perform echoendoscopy together (at least 2 ultrasonographers per EUS) in 47.6% of these departments. The ultrasonographers also performed abdominal ultrasound (US), anal US, and endoscopic retrograde cholangiopancreatography in 71.4, 66.7, and 42.9%, respectively. The echoendoscopy units have 2.4 ± 1.1 periods of echoendoscopy per week and 4 ± 1.5 EUS per period (499.2 ± 416.8 EUS per year). Subepithelial lesions and biliopancreatic lesion evaluation as well as gastrointestinal neoplasia staging were the most common EUS indications. The number of FNA (fine-needle aspirations) ranges from 10 to 160/year. Rapid on-site evaluation (ROSE) is available in 60% of units and is performed by the cytopathologist (66.7%) in the majority of cases. The main reason for omitting ROSE is the limited pathology staff. Cytopathological material is prepared by the ultrasonographer in 25% of the units. Air drying (50%) and

formalin (50%) are most frequently used to fix and preserve smears, respectively. Pancreatic pseudocyst drainage (66.7%), celiac plexus neurolysis (52.4%) and pancreatic necrosectomy (42.9%) are the most widespread therapeutic procedures. **Conclusions:** This survey provides the first insight into the current status of digestive echoendoscopy in Portugal. There is a great variability in diagnostic and therapeutic echoendoscopy practice.

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Estudo transversal de avaliação da prática de ecoendoscopia digestiva em Portugal

Resumen

Introdução: Apesar do crescente número de serviços nacionais a realizar ecoendoscopia digestiva, não existem dados sobre a prática da ecoendoscopia no nosso país. **Objetivos:** Pretendemos avaliar a prática da ecoendoscopia em Portugal. **Métodos:** Por e-mail convidámos um elemento de cada dos 26 serviços nacionais de Gastrenterologia que realizam ecoendoscopia a preencher um questionário disponível na plataforma *google forms*. O questionário esteve disponível *via online* de setembro de 2017 a fevereiro de 2018 e foi respondido apenas por médicos que realizam ecoendoscopia. **Resultados:** Obtivemos resposta de 21 dos 26 serviços convidados (80.8%). Em Portugal existe um total de 42 ecoendoscópios. A maioria das unidades possui 1 ecógrafo (81%), 1 ecoendoscópio radial (66.7%), 1 ecoendoscópio linear (76.2%), 1 sonda rectal (57.1%) mas não dispõem de mini-sondas (85.7%). 81% dispõem de agulhas de aquisição de core histológico. Em 81% dos serviços existem pelo menos 2 ecoendoscopistas que realizam ecoendoscopia em conjunto em 47.6% dos serviços. Os ecoendoscopistas também realizam ecografia abdominal, ecografia anal e colangiopancreatografia retrógrada endoscópica em 71.4, 66.7 e 42.9% respectivamente. Os serviços têm em média 2.4 ± 1.1 períodos de ecoendoscopia/semana realizando em média 4 ± 1.5 ecoendoscopia/período (499.2 ± 416.8 ecoendoscopias/ano). A avaliação de lesões subepiteliais e bilio-pancreática, assim como o estadiamento de neoplasias do tubo digestivo são as indicações mais frequentes para a realização de ecoendoscopia. O número de punções diagnósticas guiadas por ecoendoscopia varia entre 10 e 160/ano. A maioria dos serviços (60%) dispõe de rapid on-site pathological evaluation (ROSE) que é realizada pelo citopatologista na maioria das vezes (66.7%). A carência

de funcionários nas unidades de Anatomia Patológica é o principal motivo para a ausência de ROSE. A preparação do material citopatológico é realizada pelo ecoendoscopista em 25% dos serviços. A secagem ao ar (50%) e o formol (50%) são o método de fixação dos esfregaços e o meio de preservação mais usados, respetivamente. A drenagem de pseudocisto pancreático (66.7%), neurólise do plexo celiaco (52.4%) e necrosectomia pancreática (42.9%) são os procedimentos terapêuticos mais disseminados. **Conclusões:** Este trabalho fornece os primeiros dados sobre a prática de ecoendoscopia digestiva em Portugal. Existe uma grande variabilidade nos exames diagnósticos e terapêuticos.

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Introduction

Endoscopic ultrasound (EUS) has been widely used for diagnosing, staging, and treatment of gastrointestinal, pancreatobiliary, anorectal, and mediastinal diseases [1]. Despite EUS being routinely used in many national Gastroenterology Departments, there are no official data regarding EUS practice in Portugal. In this study, we aimed to assess the current status of EUS in Portugal and seek to identify areas where the development of EUS expertise could be further enhanced.

Materials and Methods

Selection of Study Subjects

An online survey questionnaire was sent by email to 1 physician of each of the 26 national Gastroenterology Departments (26 in total of 38 governmental hospitals with Gastroenterology department) which perform EUS. The questionnaire was answered only by physicians who perform EUS. Consent to participate in the study was inferred from voluntary completion of the questionnaire.

Survey Questionnaire

An online questionnaire using the Google Forms platform with 42 questions (Appendix) was developed and took less than 15 min to complete. The survey questionnaire was divided into five sections: the first part (A) focused on description of the echoendoscopy unit; the second (B) examined the equipment and technology used; the third (C) included questions about echoendoscopy unit staff; the fourth (D) included questions regarding the practice of EUS including techniques, tissue processing, and analysis; the final part (E) of the survey examined training and local research studies in EUS.

Table 1. Characterization of echoendoscopy in Portugal

Variable	Frequency
Type of hospital where the echoendoscopy unit is included	21
University/central hospital	7 (33.3%)
District hospital	14 (66.7%)
Total number of echoendoscopes (radial and linear)	42 (18/24)
Total number of ultrasonographers	47
Total number of EUS performed per year	499.2±416.8
Total number of EUS-FNA procedures performed per year	69.5±43.09
Total number of EUS-guided therapeutic procedures	2.13±1.84

Data are presented as mean ± standard deviation or as stated.

Table 2. Echoendoscopy unit description

Variable	Frequency
Number of echoendoscopy rooms	1.19±0.68
1	19 (90.5%)
≥2	2 (9.5%)
Exclusive room for echoendoscopy	
Yes	14 (66.7%)
No	7 (33.3%)
Echoendoscopy room is shared with another department	
No	1 (4.8%)
Yes	20 (95.2%)

Data are presented as mean ± standard deviation or as stated.

Questionnaire Administration

Physicians were approached by email with a study invitation and were provided a direct link to the questionnaire. The online questionnaire was available from September 2017 until February 2018, and answering all questions was needed to complete the questionnaire. A reminder was sent by email once a week requesting the participation of the physicians who had not responded to the questionnaire. Subjects who did not respond until February 2018 were considered to be nonrespondents. The confidentiality of the survey and the anonymity of the respondents were ensured.

Statistical Analysis

Only completed survey questionnaires were used for data analysis. Data were tabulated as raw data and analyzed using a Microsoft Office Excel® spreadsheet; only a descriptive statistical analysis was performed. The variables in one question (question D4) were evaluated based on a score of frequency of responses, express-

ing a ranking of importance among the variables (sum of the score [1–5; 1 = least frequent and 5 = most frequent] given by the unit at each listed indication). Descriptive statistics, including frequencies, means, standard deviations, median, and range were generated for the variables of interest.

Results

A total of 26 national Gastroenterology Departments (governmental hospitals) were invited to respond to a survey questionnaire, of which 21 responded (80.8%). Table 1 summarizes general characteristic of echoendoscopy practice in Portugal.

Echoendoscopy Unit Description

The echoendoscopy unit features are shown in Table 2. The majority of the requested departments have 1 exclusive echoendoscopy room. Only one department shares the echoendoscopy room with another department (General Surgery).

Echoendoscopy Equipment Description

The echoendoscopy equipment and technology used in national echoendoscopy units are shown in Table 3.

Almost all echoendoscopy units have only 1 EUS processor (81%), 1 radial echoendoscope (66.7%), 1 linear echoendoscope (76.2%), 1 anorectal probe (57.1%), but no miniprbes (85.7%). About 81% have histological core acquisition needles. Elastography and contrast-enhanced study are available in 66.7 and 61.9% of the echoendoscopy units, respectively.

Table 3. Equipment used in the echoendoscopy unit

Variable	Frequency
Number of endoscopic ultrasound processors per echoendoscopy unit	
1	17 (81%)
2	4 (19%)
Number of radial echoendoscopes per echoendoscopy unit	
0	5 (23.8%)
1	14 (66.7%)
2	2 (9.5%)
Number of linear echoendoscopes per echoendoscopy unit	
0	1 (4.8%)
1	16 (76.2%)
2	4 (19%)
Number of rectal probes per echoendoscopy unit	
0	8 (38.1%)
1	12 (57.1%)
2	1 (4.8%)
Therapeutic linear echoendoscope in echoendoscopy unit	
Yes	17 (80.9%)
No	4 (19.1%)
Echoendoscope brand	
Pentax®	9 (42.9%)
Olympus®	10 (47.6%)
Pentax® and Olympus®	2 (9.5%)
Endoscopic ultrasound scan allows	
Elastography	14 (66.7%)
Contrast enhanced	13 (61.9%)
3D	5 (23.8%)
None of the previous	5 (23.8%)
Needles brand	
Cook®	17 (81%)
Boston®	16 (76.2%)
Olympus®	7 (33.3%)
Covidien	3 (14.3%)
Other	3 (14.3%)
Histological core acquisition needles in echoendoscopy unit	
Yes	17 (81%)
No	4 (19%)
Mini-probes in echoendoscopy unit	
Yes	3 (14.3%)
No	18 (85.7%)

Echoendoscopy Staff Description

The echoendoscopy staff description is presented in Table 4.

In 81% of the participating departments, there are at least 2 ultrasonographers who perform EUS together (at

Table 4. Echoendoscopy unit staffing description

Variable	Frequency
Number of ultrasonographers per echoendoscopy unit	
	2.24±0.83
1	4 (19%)
2	9 (42.9%)
3	7 (33.3%)
4	1 (4.8%)
Ultrasonographer works	
Alone	11 (52.4%)
With other ultrasonographer	10 (47.6%)
Number of ultrasonographers who perform anal US	
	1.29±1.2
0	7 (33.3%)
1	5 (23.8%)
2	6 (28.6%)
3	2 (9.5%)
4	1 (4.8%)
Number of ultrasonographers who perform ERCP	
	0.52±0.68
0	12 (57.1%)
1	7 (33.3%)
2	2 (9.5%)
Number of ultrasonographers who perform abdominal US	
	1.14±1.06
0	6 (28.6%)
1	9 (42.8%)
2	4 (19%)
3	1 (4.8%)
4	1 (4.8%)

Data are presented as mean ± standard deviation or as stated. EUS, endoscopic ultrasound; ERCP, endoscopic retrograde cholangiopancreatography; US, ultrasound.

least 2 ultrasonographers per EUS) in 47.6% of these. The ultrasonographers also performed abdominal ultrasound (US), anal US and endoscopic retrograde cholangiopancreatography (ERCP) in 71.4, 66.7, and 42.9% of the inquired units.

EUS Practice

The EUS practice description is shown in Table 5. The echoendoscopy units have 2.4 ± 1.1 periods of echoendoscopy per week and 4 ± 1.5 EUS per period (499.2 EUS per year [range 169–1,001]). The most common EUS indications were subepithelial lesion evaluation (score 85),

Table 5. EUS practice in the echoendoscopy unit

Variable	Frequency
Number of periods (morning or afternoon) of EUS per week	2.43±1.12
Number of EUS per period	4±1.48
EUS period consists only in EUS performing	
Yes	10 (47.6%)
No	11 (52.4%)
Score of indications for EUS	
Gastrointestinal neoplasia staging	54
Subepithelial lesions evaluation	85
Biliopancreatic diseases evaluation	74
Anorectal disorders evaluation	50
Lymph nodes/masses evaluation	52
EUS-FNA is performed in echoendoscopy unit	
Yes	20 (95.2%)
No	1 (4.8%)
Volume (number) of FNA performed per year	69.5±43.09
Rapid on-site pathologic evaluation (ROSE) is available	
Always	6 (30%)
Sometimes	6 (30%)
Never	8 (40%)
Reasons not to always have ROSE	
Disbelieve in its additive value	4 (19%)
High costs	1 (4.8%)
Additional procedure time	4 (19%)
Limited pathology staff	10 (47.9%)
Other	6 (28.6%)
ROSE is performed by	
Cytopathologist	8 (66.7%)
Cytotechnician	4 (33.3%)
Cytopathological material is prepared by	
Cytotechnician	9 (45%)
Nurse	6 (30%)
Ultrasonographer	5 (25%)
Smears are fixed by	
Air drying	10 (50%)
Direct fixation with alcohol	7 (35%)
Other	3 (15%)
Smears are preserved by	
Cytolyt	6 (30%)
A fixative (formalin)	10 (50%)
Alcohol	4 (20%)
Cell block technique is applied in echoendoscopy unit	
Always	10 (50%)
Sometimes	10 (50%)
Multidisciplinary meeting with at least 1 ultrasonographer	
Yes	13 (61.9%)
No	8 (38.1%)
Echoendoscopy unit has a database of patients performing EUS	
Yes	12 (57.1%)
No	9 (42.9%)

Data are presented as mean ± standard deviation or as stated. EUS, endoscopic ultrasound; ERCP, endoscopic retrograde cholangiopancreatography; FNA, fine-needle-aspiration; US, ultrasound; ROSE, rapid on-site evaluation.

Table 6. EUS-guided therapeutic procedures performed in Portuguese echoendoscopy units

Type of EUS-guided procedures	Frequency	
	units which perform EUS procedures	procedures performed in the last year (2.13±1.84)
Celiac neurolysis	11 (52.4%)	1.80±1.48
Celiac blockage	2 (9.5%)	1.50±0.71
Pseudocyst drainage	14 (66.7%)	3.21±2.52
Pancreatic necrosectomy	9 (42.9%)	1.78±0.83
Biliary (gallbladder) drainage	1 (4.8%)	1.00±0.00
Biliary (bile ducts) drainage	6 (28.6%)	1.67±1.63
Pancreatic (Wirsung) drainage	1 (4.8%)	1.00±0.00
Pelvic abscesses drainage	2 (9.5%)	1.50±0.71
Fiducial placement	0	–
Gastrojejunostomy	0	–
Vascular lesion embolization/sclerosis	2 (9.5%)	1.50±0.71
Solid lesion ablation	0	–
Cystic lesion ablation	0	–
None of the above is performed	5 (23.8%)	–

Data are presented as median ± standard deviation or as stated.

Table 7. Echoendoscopy unit staff description

Variable	Frequency
Residents who perform EUS training in own echoendoscopy unit	
Yes, mandatory	8 (38.1%)
Yes, optional	9 (42.9%)
No	4 (19%)
Echoendoscopy unit has provided EUS training to elements of other units	
Yes	9 (42.9%)
No	12 (57.1%)
Echoendoscopy unit has cooperated in EUS prospective research studies	
Yes	11 (52.4%)
No	10 (47.6%)
Echoendoscopy unit has led EUS prospective research studies	
Yes	7 (33.3%)
No	14 (66.7%)
EUS, endoscopic ultrasound.	

biliopancreatic lesions evaluation (score 74), and gastrointestinal neoplasia staging (score 54).

The majority of units perform EUS-FNA (95.2%) and the number of EUS-FNA ranges from 10 to 160 per year (69.5 ± 43.09 per year). Rapid on-site evaluation (ROSE) is available in 60% of units and is performed by the cytopathologist (66.7%) in the majority of units. The main reason for omitting ROSE is the limited pathology staff. Cytopathological material is prepared by a cytotechnician, a nurse or an ultrasonographer in 45, 30, and 25% of the units, respectively. Air drying (50%) and formalin (50%) are mostly used to fix and preserve smears, respectively. The cell block technique is applied in all echoendoscopy units which perform EUS-FNA.

EUS-guided therapeutic procedures are described in Table 6. In Portuguese echoendoscopy units, 2.13 ± 1.84 (mean ± SD) therapeutic procedures were performed per year. Pancreatic pseudocyst drainage, celiac plexus neurolysis and pancreatic necrosectomy are the most widespread therapeutic procedures (66.7, 52.4, and 42.9%, respectively). Pancreatic pseudocyst drainage is the procedure most frequently performed (3.21 ± 2.52 per year). In 61.9% of the departments, at least 1 ultrasonographer is involved in multidisciplinary meetings. There are EUS databases in 57.1% of the units.

Training and Local Research Studies

For 80.9% of all respondents, the EUS training integrates the residents training program, and in 42.9% of the units EUS training was given to elements of another unit. The majority of units (52.4%) have cooperated in EUS prospective research studies, but only 36.8% have led research studies (Table 7).

Discussion

This is the first study to assess the current EUS practice in Portugal. Furthermore, this survey was completed by almost all invited echoendoscopy national units (response rate of 80.8%). It jointly assesses issues relating to echoendoscopy equipment use, staff, techniques, training, and local EUS research.

In terms of EUS equipment use, almost all national echoendoscopy units have equipment to perform diagnostic and therapeutic procedures which are usually performed by 2 ultrasonographers together. This compares to equipment use by ultrasonographers in the Asia-Pacific, where the majority of the ultrasonographers used radial echoendoscope (94.3%), linear echoendoscope

(52.1%), and catheter US probe (66.2%) [2]; the same results were found in an international survey (radial [94.8%] and linear [79%] echoendoscopes and catheter US probes [60.2%] were generally used) [3].

In this survey, ultrasonographers tend to be more diagnostic than interventional endoscopists, since most of them perform diagnostic procedures such as abdominal and anal US (71.4 and 66.7%, respectively) and only 42.9% of them also perform ERCP. In other studies, most ultrasonographers performed ERCP [2–5]. In 1999, in the United States, 84% of the ultrasonographers performed ERCP [5]. In 2004, Das et al. [3] compared North American ultrasonographers with other international ultrasonographers; the study showed that they were more interventional and also performed ERCP and EUS-guided interventional procedures more often than other international ultrasonographers (86.4 vs. 67.9% and 86.4 vs. 63%, respectively). One study published in 2006 concluded that in Asia the majority of the surveyed ultrasonographers performed ERCP (87.3%), while more than half of them carried out transabdominal US procedures (53.5%) [2]. Most recent research showed that in Latin America the percentage of ultrasonographers who also performed ERCP was 70% [4].

An interesting finding of this survey is that national echoendoscopy units perform a median of 500 EUS per year (range 169–1,001), and subepithelial lesion and biliopancreatic lesion evaluation as well as gastrointestinal neoplasia staging are the most common EUS indications.

In the majority of previous studies, the data about the number of EUS performed are shown as number of procedures performed during each ultrasonographer's career, reflecting the ultrasonographer's experience. In the 1999 United States survey, the median number of procedures ever performed was 200 (range 20–4,000) [5]. In the 2004 international survey, more than a third of ultrasonographers had been performing EUS for at least 5 years [3]. In the 2006 Asian survey, the respondents had a median experience of 5 years (range 0–17) in EUS practices and performed a median of 500 procedures (range 3–6,000) in their career [2]. However, in 2016, van Riet et al. [6] proposed to evaluate practice patterns within the international endosonographic community and revealed that most of the international respondents performed >300 EUS (58%) and >100 EUS-FNA procedures per year (68%).

Regarding indications for EUS, our results are consistent with other researches. A United States survey revealed that esophagogastric and pancreaticobiliary evaluations were the most common [5]; in a Latin America survey, pancreaticobiliary evaluation was the most com-

mon EUS indication [4] supporting our data. However, this may still reflect the level of knowledge of national ultrasonographers about EUS indications. The research conducted in 2006 by Yusuf et al. [7] aimed to assess the level of knowledge of American Society of Gastroenterology (ASGE) members about the indications of EUS and showed that the levels of knowledge of colorectal applications of EUS are the poorest for the four studied organ systems (esophagus, gastroduodenum, hepatopancreatobiliary, and colorectum).

Another interesting finding of this survey is that the vast majority of procedures are diagnostic. EUS-FNA is the most common interventional procedure being performed in 95.2% of the national units (69.5 ± 43.09 per year). Therapeutic procedures are performed by 76.2% (16/21 of the total requested units). However, these procedures are rarely performed (2.13 ± 1.84 per year), with pancreatic pseudocyst drainage, celiac plexus neurolysis, and pancreatic necrosectomy being the most frequent (performed in 66.7, 52.4, and 42.9% of the departments, respectively). These data are supported by Drigo et al. [4] who revealed that FNA (median 319, range 0–2,500), neurolysis (median 12, range 0–189), and pseudocyst drainage (median 10, range 0–178) were the procedures most frequently performed by Latin American ultrasonographers in their entire career.

It is important to notice that in our survey, ROSE is available only in 60% of units and is performed by the cytopathologist in most cases (66.7%). Limited pathology staff is the main reason for omitting ROSE. van Riet PA et al. showed only half of the European and Asian respondents used ROSE. In this study, respondents who refrain from using ROSE consider limited pathology staff (74%) and disbelieve in its additive value (32%) as the main reasons for omitting it [6]. These data were corroborated by DiMaio et al. [8] in a survey study which demonstrated that the vast majority of American ultrasonographers (76.2%) utilize ROSE when performing EUS-FNA.

In our study, air drying (50%) and formalin (50%) are most frequently used to fix and preserve smears, respectively. van Riet et al. [6] showed that after EUS-FNA, a majority of the ultrasonographers air dried (43%) and used formalin to preserve FNA specimens (62%).

In our survey, the cell block technique is applied in all echoendoscopy units which performed EUS-FNA. These data are in line with the results of van Riet et al. [6] which demonstrated that the majority of respondents applied the cell block technique (85%), but it was used to a lesser extent in Europe (85%) and Asia (70%) than in the United States (96%).

Also noteworthy is the general involvement of at least 1 ultrasonographer in multidisciplinary meetings (61.9%) and the existence of a local EUS database (57.1%).

The last, but certainly not the least remarkable finding concerns the EUS training and research. The majority (80.9%) of national echoendoscopy units train their own residents, and 42.9% have provided EUS training to elements of another hospital. The majority of units cooperated in EUS prospective research studies (52.4%). These data reflect the current EUS training program which has been practiced in Europe and consists of a combination of two methods of learning EUS: fellowship program and informal training (short repeated exposures to “hands-on” experience) [9].

The main strength of our survey is the high rate of response which ensures that our data reflect EUS national practice. Our survey has however some potential limitations. First, a reporting or goodwill bias is likely to exist, since this is inevitable in retrospective surveys that are based on self-reporting. Second, we evaluated the unit as a whole and not the individual practice, which may differ within each unit.

Conclusions

This study provides an overview and the first insight into the current status of EUS in Portugal revealing that there is a great deal of variability in diagnostic and therapeutic echoendoscopy.

Although our results suggest that Portuguese EUS practitioners are not behind their overseas counterpart in terms of technology adoption and practical experience, the same does not apply to therapeutic procedure experience.

Our survey questionnaire could serve as a model for the assessment and monitoring of national EUS practice with the involvement of all Portuguese ultrasonographers. Our data may be a benchmark for future studies.

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Statement of Ethics

Protection of Human and Animal Subjects

The authors declare that the procedures followed were in accordance with the regulations of the relevant clinical research ethics committee and with those of the Code of Ethics of the World Medical Association (Declaration of Helsinki).

Confidentiality of Data

The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to Privacy and Informed Consent

Consent to participate in the study was inferred from voluntary completion of the survey questionnaire.

Disclosure Statement

The authors have no conflicts of interest to declare.

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Author Contributions

Juliana M. Costa wrote the manuscript. Dália Fernandes, Bruno Gonçalves, Raquel Gonçalves, and João B. Soares revised the manuscript. All authors read and approved the final manuscript.

Survey questionnaire

CROSS-SECTIONAL STUDY TO ASSESS THE ECHOENDOSCOPY PRACTICE IN PORTUGAL

A-ECHOENDOSCOPY UNIT DESCRIPTION

A1. Please, specify the name of your hospital?

A2. Please, specify the population (number of patients) served by your echoendoscopy unit?

A3. How many rooms are equipped to perform echoendoscopy?

A4. Is there an exclusive room for echoendoscopy?

- Yes
 No

A5. Is the room shared with other departments?

- Yes (please specify) _____
 No

B- ECHOENDOSCOPY EQUIPMENT DESCRIPTION

B1. How many endoscopic ultrasound scan do you have in your echoendoscopy unit?

B2. How many radial echoendoscopes do you have in your echoendoscopy unit?

B3. How many linear echoendoscopes do you have in your echoendoscopy unit?

B4. How many rectal probes do you have in your echoendoscopy unit?

B5. Is there therapeutic linear echoendoscope in your echoendoscopy unit?

- Yes
 No

B6. What is the brand of echoendoscopes in your echoendoscopy unit? (more than one answer possible)

- Pentax®
 Olympus®
 Fuji®
 Other

B7. The endoscopic ultrasound scan available on your echoendoscopy unit allows ... (more than one answer possible)

- Elastography
 Contrast enhanced
 3D
 None of the previous

B8. What is the brand of the needles in your echoendoscopy unit? (more than one answer possible)

- Cook®
 Boston®
 Olympus®
 Covidien®
 Other
 No applicable

B9. Is there histological core acquisition needles (e.g. Procore needles) in your echoendoscopy unit?

- Yes
 No

B10. Is there mini-probes in your echoendoscopy unit?

- Yes
 No

C- ECHOENDOSCOPY STAFF DESCRIPTION

C1. How many elements perform echoendoscopy in your echoendoscopy unit?

C2. In your unit, do ultrasonographers work alone or together?

- Alone (an ultrasonographer per echoendoscopy)
 With other ultrasonographer (2 ultrasonographers per echoendoscopy)

C3. Of those who perform echoendoscopy, how many perform anal ultrasound?

C4. Of those who perform echoendoscopy, how many perform ERCP?

C5. Of those who perform echoendoscopy, how many perform abdominal ultrasound?

D- ECHOENDOSCOPY PRACTICE

D1. What is the number of periods (morning or afternoon) of echoendoscopy per week?

D2. What is the number of echoendoscopies for each period?

D3. Is each endoscopy period composed only of echoendoscopies?

- Yes
 No

D4. Using the number 5 for the more frequent indication and the number 1 for the less frequent indication, classify the frequency of indications for echoendoscopy.

- Staging of gastrointestinal neoplasia (esophagus, stomach, duodenum and rectum)
 Subepithelial lesions evaluation
 Bilio-pancreatic diseases evaluation
 Anorectal disorders evaluation
 Lymph nodes / masses evaluation

D5. In your echoendoscopy unit, is EUS-FNA performed?

- Yes
 No

D6. What is the volume (number) of EUS-FNA performed per year in your echoendoscopy unit? (if applicable)

D7. Is on-site pathological evaluation of the specimen (ROSE) available in your echoendoscopy unit?

Please choose only one of the following:

- Never
 Sometimes
 Always
 Not applicable

D8. Why is ROSE not available in your echoendoscopy unit? (more than one answer possible)

- Disbelieve in its additive value
- High costs
- Additional procedure time
- Limited pathology staff
- Other
- Not applicable

D9. Please specify who performs ROSE in your echoendoscopy unit.

Please choose only one of the following:

- Cytopathologist
- Cytotechnician
- Ultrasonographer
- Other
- Not applicable

D10. Please specify who prepared cytopathological material in your echoendoscopy unit.

Please choose only one of the following:

- Cytotechnician
- Nurse
- Ultrasonographer itself
- Other
- Not applicable

D11. What is the smears fixation method used in your echoendoscopy unit?

Please choose only one of the following:

- Air dry
- Direct fixation with alcohol
- Other
- Not applicable

D12. What is the smears preservation method used in your echoendoscopy unit?

Please choose only one of the following:

- Saline solution
- Cytolyt
- A fixative (formalin)
- Alcohol
- Other
- Not applicable

D13. Is the cell block technique applied in your echoendoscopy unit?

Please choose only one of the following:

- Always
- Sometimes
- Never
- Not applicable

D14. Which of the following echoendoscopic procedures have already been performed in your unit? (please specify the number of procedures performed in the last year for each technique)

	Number of procedures in the last year
<input type="checkbox"/> Celiac neurolysis	
<input type="checkbox"/> Celiac blockage	
<input type="checkbox"/> Pseudocyst drainage	
<input type="checkbox"/> Pancreatic necrosectomy	
<input type="checkbox"/> Biliary (gallbladder) drainage	
<input type="checkbox"/> Biliary (bile ducts) drainage	
<input type="checkbox"/> Pancreatic (Wirsung) drainage	
<input type="checkbox"/> Pelvic abscesses drainage	
<input type="checkbox"/> Fiducial placement	
<input type="checkbox"/> Gastrojejunostomy	
<input type="checkbox"/> Vascular lesions embolization/sclerosis	

- Solid lesions ablation
- Cystic lesions ablation
- None of the previous
- Not applicable

D15. Is there a multidisciplinary meeting in your hospital with the involvement of at least 1 ultrasonographer?

- Yes
- No

D16. Please, specify the specialties which take part in these meetings? (more than one answer possible)

- Gastroenterology
- Surgery
- Radiology
- Oncology
- Radiotherapy
- Nuclear Medicine
- Pathology
- Other
- Not applicable

D17. Please specify the regularity of these meetings?

Please choose only one of the following:

- Weekly
- Fortnightly
- Monthly
- Yearly
- Not applicable

D18. Is there a database with the patients performing EUS in your echoendoscopy unit?

- Yes
- No

E- TRAINING AND LOCAL RESEARCH STUDIES

E1. Do the residents of your unit perform EUS training in their own echoendoscopy unit?

Please choose only one of the following:

- Yes, mandatory
- Yes, optional
- No

E2. Has your echoendoscopy unit ever provided training in echoendoscopy to elements of another unit?

- Yes
- No

E3. Has your echoendoscopy unit cooperated on EUS prospective research studies?

- Yes
- No

E4. Has your echoendoscopy unit led any EUS prospective research study?

- Yes
- No

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