Service provision and training for endoscopic ultrasound in the UK

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Endoscopic ultrasound (EUS) is a standard procedure that plays an important role in the management of both malignant and benign disease. The development of EUS services in the UK has been haphazard and training inconsistent. The British Society of Gastroenterology has charged a working group with the task of laying down a national framework for how such services might be commissioned, structured and regulated; with particular attention to defining how endoscopist skills might be acquired, assessed and maintained. This report lays out a map for this process and its future revision.

The goal of this Working Party is to produce a consensus statement of guidance about future service provision and training for endoscopic ultrasound (EUS) in the UK and to provide a foundation for informed future revisions of such guidance.

The development of EUS services worldwide varies considerably among countries both in terms of density of centres and approach to training. These differences reflect the influence of healthcare system, local custom in clinical practice and a lack of evidence-based theory to inform learning methodology.

There are approximately 65 centres in the UK equipped to offer EUS services (1 per million of population). This is a significantly lower proportion than that reported for other large European countries. The major use of EUS in the UK is for cancer management with application in benign conditions being subject to local custom.

The two major perceived impediments to EUS service development are training and the cost of equipment.

There are approximately 95 non-trainee endoscopists who perform EUS regularly in the UK, the greatest proportion of whom are gastroenterologists. The majority of centres have a single operator. Training for most endosonographers has been piecemeal and there are no national structures in place to ensure minimal proficiency or services of quality.

The main recommendations of this Working Party are:

A. EUS services, in respect of provision, must be accountable to commissioners and provide procedures of measurably high quality that are readily available and accessible for patients and referrers. A balance is to be struck between geographic accessibility and availability, these considerations being secondary to quality.
B. No proposed expansion in the number of EUS units to any defined number. Provision must follow a defined need and an ability to maintain standards.
C. New EUS services to be commissioned only after the establishment of local mechanisms to monitor, achieve and maintain a service of a definable high quality, that is, value for money and/or of social value. Where standards are not met, consideration should be given to moving equipment and personnel to other centres.
D. Training in EUS must address the needs of those acquiring or maintaining the skill, their support staff and those likely to draw on the service. Services must be underpinned by skills acquired through a structured programme of training that offers defined content, hands-on tutelage with an appropriate degree of procedure observation and the discussion of results in a multidisciplinary environment. There is no role for the self-teaching of EUS through trial and error.
E. Each EUS training centre or training network must provide access to linear and preferably also radial equipment; offer a suitable case-mix including oesophagogastric tumour staging, subepithelial lesions, pancreaticobiliary pathology, including guided fine-needle aspiration (FNA), for hands-on training as well as the possibility of

observing pancreatic pseudocyst drain placement. Observer experience should also be arranged for attendance at several transabdominal, anorectal and endobronchial ultrasound lists.

F. Trainees must have a nominated tutor for each of the major areas of EUS training: oesophagogastric cancer/subepithelial lesion staging, pancreaticobiliary procedures and FNA.

G. Each tutor must perform or directly supervise annually at least 50 EUS cases for oesophagogastric cancer and/or 120 pancreaticobiliary cases and/or 50 FNA procedures for solid pancreatic lesions. All EUS tutors must have attended a Joint Advisory Group (JAG) compliant 'Training the Trainers' course.

H. The Working Group proposes that the following threshold numbers of hands-on cases be performed before competency is formally tested with EUS region/procedure-specific summative direct observation of procedural skills (DOPS):
   1. cancers of oesophagus, stomach or rectum, 80 (to include at least 10 rectal tumours)
   2. subepithelial lesions, 20 (to include oesophagus, stomach and duodenum (no specific number for any site))
   3. pancreaticobiliary, 150 (at least half of which are likely pancreatic adenocarcinoma)
   4. FNA, 75 (of which at least 45 are likely pancreatic adenocarcinoma)

Those following a specialist pancreaticobiliary module must perform the given number of procedures for subepithelial lesions, FNA and observe at least five pancreatic drain insertions.

Trainees under the umbrella of a specialist endoscopic mucosal therapy fellowship must meet the requirements for cancers of the oesophagus, stomach and rectum, subepithelial lesions, perform FNA (altered requirement: at least 50 cases, to include mediastinal and coeliac lymph nodes as well as sampling of the left liver lobe and left adrenal (no specified number for any site)) and have experience of using high frequency catheter probes (no specified number). There is no requirement for pancreatic FNA.

Formative DOPS are to be completed for the final 50% of the required case numbers in each section. A certificate of completion of training is to be issued by JAG in line with other endoscopic procedures in the UK.

I. Each trained endosonographer ought to report annually at least 15 h of continuing professional development (CPD) specific to EUS and quality assurance measures to level B as demanded by the Global Rating Scale (GRS). The local cancer network, or EUS commissioning body, should report annual census data and compliance to JAG for individual endoscopists.

J. The British Society of Gastroenterology (BSG), JAG and UK/Ireland EUS Users' Group are positioned to detail a curriculum for training and ongoing skill development as well as to provide learning materials.

K. The Group envisage that the central collection of census data, quality indicator and DOPS data will inform future national strategy. We suggest that the BSG commission a review of the recommendations given in this document 5 years from its date of implementation.

Introduction

Endoscopic ultrasound (EUS) is a complex though routine endoscopic procedure performed by endoscopists of various professional backgrounds, the majority of whom to date in the UK have acquired their skills in an unstructured fashion (J Meenan, N Carroll, unpublished observation). The provision of EUS services in the UK has developed haphazardly, driven by perceptions of local need, rather than regional or national strategy.

Endosonography has diagnostic and therapeutic applications beyond its role in cancer management. Developments in cross-sectional imaging and increasingly complex treatment pathways, suggest that the future value of EUS is likely to be in tissue sampling and therapeutic procedures.

The unstructured expansion of EUS provision and the lack of a national framework for training are potentially wasteful of resources and impediments to ensuring services of quality and cohesion.

The goal of this Working Party is to produce a consensus statement of guidance about future service provision and training for EUS in the UK and to provide a foundation for informed future revisions of such guidance.

Working Party

The members of the Working Group are:

- John Meenan (Co-Chair; Chairman, UK/Ireland EUS Users' Group to November 2008).
- Ian Penman (Co-Chair; Endoscopy Lead for Scotland).
- Nicholas Carroll (Joint Advisory Group; Royal College of Radiologists; Chair, UK/Ireland EUS Users' Group from November 2008).
- Keith Harris (UK/Ireland EUS Users' Group).
- Colin McKay (Secretary, UK/Ireland EUS Users' Group).
- Sally Norton (Association of Upper Gastrointestinal Surgeons, UK).
- Kofi Oppong (British Society Gastroenterology, Endoscopy Committee).

The full group met twice: October 2008 and January 2009.

The members of the UK/Ireland EUS Users' Group were consulted prior to the first meeting of the Group. The Group's proposals were presented for public discussion at the annual BSG meeting, Liverpool, March 2010.

We are grateful to Ann Liddell, COOK and Teresa Moss, Cancer Action Team at Guy's & St Thomas'

Foundation Trust for their help in identifying EUS centres.

Background

General

EUS couples the strengths of ultrasound with those of endoscopy. The resulting ability to approximate an ultrasound transducer to organs adjacent to the gastrointestinal (GI) tract yields both views of great detail and the ability to sample or manipulate those structures in real time.

There are two forms of echoendoscope, differing in the plane of ultrasound view. Radial scopes give images similar to those of a CT scan, with a 360-degree picture. Linear scopes give a narrower window of view, more akin to that seen with standard transabdominal ultrasound but, they permit FNA, Trucut biopsy, drain insertion, injection and other procedures. The equipment required for EUS is expensive, a single echoendoscope and ultrasound processor cost in the region of £140 000.

Endosonography is used in the diagnosis, confirmation and staging of cancers of the upper and lower GI tract, the assessment of benign conditions including pancreatitis, choledocholithiasis and subepithelial lesions and for the therapy of pancreatic pain and fluid collections. In a limited number of centres, therapeutic drainage of the biliary system, pancreatic duct and pelvic fluid collections is performed. Experimental applications for EUS include ablation of pancreatic cysts, brachytherapy and natural orifice transluminal endoscopic surgery.

Endosonography, like other forms of imaging, displays strengths and weaknesses and is best used within a multidisciplinary setting.

EUS internationally

The development of EUS services worldwide varies considerably among countries both in terms of density of centres and approach to training. These differences reflect the influence of healthcare system, local custom in clinical practice and a lack of evidence-based theory to inform learning methodology. In Germany, there are approximately 450 centres offering EUS, the figure for France being up to 220 (C de Angelis, personal communication).[1]

Research supporting methodology in EUS training is sparse and largely subjective, guided by expert opinion. In the USA, the number of cases performed is central to establishing a threshold for a local competency assessment, whereas France offers a well-established diploma course in EUS, although two-thirds of EUS practitioners there follow a different learning route.[1 2]

EUS in the UK

Government directed and funded healthcare shapes the medical landscape in the UK.

EUS is a standard endoscopic technique practiced widely in the UK; units having been established on the basis of personal interest and a perceived local need in the absence of co-ordinated planning.

The concentration of cancer investigation and therapy to regional centres (one per million of population for oesophagogastric and one per two/three million of population for pancreatic cancer) has influenced the development of EUS services, both through the potential funding of new units and the redirection of cases from one centre to another.

There are approximately 65 centres in the UK equipped to offer EUS services (approximately 1 per million of population), 85% having linear (FNA) equipment (J Meenan, N Carroll, unpublished observation). The disparity in these numbers from those quoted for Germany and France does not necessarily reflect a gross under provision in the UK; however, only 55% of potential referrers in the UK feel that they have ready access to an EUS service for non-cancer cases.[3]

There are approximately 95 non-trainee endoscopists who perform EUS regularly. The majority of centres (55%) have a single operator with 20% and 18% having two or three endosonographers, the greatest proportion of whom are gastroenterologists (63%), with 27% and 10% being radiologists or surgeons, respectively (J Meenan, N Carroll, unpublished observation). Two nurse endosonographers, who have provided independent diagnostic upper GI EUS services for oesophagogastric tumour staging and benign pancreaticobiliary indications, no longer practice for reasons of changed professional role.

Training for most endosonographers has been piecemeal and unstructured. It remains unregulated. The British Society of Gastroenterology (BSG) published guidelines on EUS training in 2005 but there are no national structures in place to ensure baseline or ongoing minimal proficiency.[4] Several quality indicators are published by the BSG and are included in the Global Rating Scale (GRS) required for Joint Advisory Group (JAG) unit accreditation.[5]

An unaudited survey of the numbers of EUS procedures performed annually at each unit suggested an average of 175 radial cases with an additional 85 FNA cases in suitably equipped centres (J Meenan, N Carroll, unpublished observation). The major use of EUS in the UK is for cancer management with application in benign conditions being subject to local custom.

A survey of seven geographically diverse cancer centres (England and Scotland) by the members of the Working Group (tables 1 and 2) shows a minimum requirement for EUS in 100–169 (mean 131) cases per million of population for oesophagogastric cancer and 115–233 (mean 155) per million of population for pancreatic cancer indications. The wide range for the latter group reflects a difficulty in classifying benign from malignant disease and is influenced by local preference in the use of cross-sectional imaging. These

Table 1 Annual number of endoscopic ultrasound (EUS) performed for the staging of oesophagogastric cancer for several UK regions (2007–2008)

Region	Population (millions)	EUS performed	EUS/ million
England			
London (South East)	1.5	250	167
Anglia	1.3	220	169
Yorkshire	2.6	310	119
North East	1.75	250	143
South West	1.7	200	117
Peninsular	1.6	200	125
Scotland			
West	2.3	250	109
South East	1.5	150	100

Table 2 Annual number of endoscopic ultrasound (EUS) performed for the diagnosis, assessment and staging of likely pancreaticobiliary cancers for several UK regions (2007–2008)

Region	Population (millions)	EUS performed	EUS/ million
England			
London (South East)	3	700	233
Anglia	2	230	115
Yorkshire	2.6	310	119
North East	3.5	670	191
South West	1.7	200	118
Scotland			
West	2.3	350	152
South East	1.5	240	160

figures suggest potential annual national demand for between 6000 and 10 000 oesophagogastric and perhaps 7000–14 000 pancreaticobiliary EUS procedures. These numbers ought to be regarded as minimum levels as there are no measures for demand as opposed to capacity. The annual incidences for oesophageal and pancreatic cancers are 7860 and 5400, respectively.[6]

Across the wider gastroenterology community in the UK, with respect to benign disease, a significant proportion (59%) feel that cross-sectional imaging is superior to EUS for the investigation of choledocholithiasis, whereas in France the opposite position holds.[1 3]

The two major perceived impediments to EUS service development are training (79%) and the cost of equipment (59%).[3]

Service provision

EUS services must be accountable to commissioners and provide procedures of measurably high quality that are readily available and accessible for patients and referrers.

The quality of a national EUS service is not a direct function of the number of units available. It is likely that greater experience in performing EUS translates into better quality of procedure.

The Working Group does not propose an expansion in the number of EUS units to a specific level nor indeed to match those seen in other countries. This would be wasteful of resources, exacerbate a paucity of training opportunity and be unlikely to improve quality. Provision must follow a defined need and an ability to maintain standards.

The Working Group proposes that a balance be struck between geographic accessibility and availability, these considerations being secondary to quality.

EUS centres

Limited data suggest that case volume influences EUS accuracy rates for cancer staging.[7] Whereas a high throughput of cases does not necessarily assure quality, it can ensure adequate exposure to and thus experience of the varied and complex range of pathologies and clinical situations that will be met in performing EUS.

The Group recommends that proposed new EUS services be commissioned by a cancer network, hospital trust or independent sector provider, only after the establishment of local mechanisms to monitor, achieve and maintain a service of a definable high quality, which is value for money and/or of social value. Consequently, a realistic estimation of workload will be required. It would be reasonable to allow a period of 3 years for a new service to become established, with ongoing reporting of quality indicators.

It is envisaged that nearly all new services will be commissioned by a cancer network for reasons of case-mix. Where a National Health Service (NHS) is proposed for the management of benign disease alone, the expected case-mix is to be discussed with the relevant cancer network and the power of commissioning should pass to that network if more than one-third of cases might be discussed at a cancer multidisciplinary meeting (MDM). The Group cautions against the introduction of new services that ultimately may be wasteful of resources.

The Working Group recognises that many EUS centres were established prior to the introduction of cancer networks. The same measures ought to be applied to the revalidation of existing centres.

Where standards are not met, consideration should be given to moving equipment and personnel to other centres.

In time, audit of quality outcome measures and case volume would be expected to better define any link between these factors. Should such a relation be established, the above direction ought to be revised.

The establishment of a new EUS service, or the development of an existing one to include a new procedure such as FNA, must be predicated by a confirmed training plan for any endosonographer (or confirmation of

previous training to the recommended level), an agreed mechanism for reporting quality indicators to the local MDM/relevant private sector or trust body at least annually, agreed involvement by local cytopathology services and a defined plan of support and training for assistants. Many EUS units have a single operator. It is important that arrangements are in place with other regional centres to ensure continuity of access during times of leave. Any cost implications arising from these factors are to be incorporated into the initial business plan.

Where practicable, services for oesophagogastric and hepatobiliary cancers should be combined and consideration given to co-locating endobronchial ultrasound. The development of new EUS centres offering only radial procedures is not encouraged.

Training

Training in EUS must address the needs of those acquiring or maintaining the skill, their support staff and those likely to draw on the service.

Endosonography services in the UK must be underpinned by skills acquired through a structured programme of training that offers defined content, hands-on tutelage with an appropriate degree of procedure observation and the discussion of results in a multidisciplinary environment. There is no role for the self-teaching of EUS through trial and error.

Measures of outcome for such training must be objective; equally, ongoing professional development must be measurable in terms of quality of service offered and a demonstrable engagement in professional development specific to EUS.

Training programmes must foster a system of local mentors and the building of supportive networks for practitioners.

Several factors influence the proposed shape of any training scheme. They include the increasing rigour applied to training in all forms of endoscopy in the UK; current supporting national frameworks for endoscopy training; the broad range of professional backgrounds of those performing EUS; the complex nature of EUS training; the limited number of potential training centres; a need to define threshold levels of experience at which competency may reasonably be assessed and objective measures of that competence, in addition to the future role and likely demand for EUS.

Trainees

An ability to perform EUS ought not to form part of any standard professional curriculum.

No meaningful estimate can be given for the future number of those required to be trained in EUS. Preference of opportunity ought to be given to those with a defined need to perform EUS, for example, those establishing a new service for a cancer network or those extending the role of an existing EUS centre.

Trainees must complete summative DOPS (direct observation of procedural skills) examinations in diagnostic upper GI endoscopy and preferably flexible sigmoidoscopy prior to commencement of training in EUS.

The ability to perform EUS complements skills such as endoscopic retrograde cholangiopancreatography (ERCP) that might be learnt as part of a specialist training module. Equally, the application of EUS has matured to the extent that it is reasonable to regard its practice as a specialist interest in its own right.

There is no evidence-based measure for predicting aptitude for EUS. No particular professional background has been shown to confer an advantage in acquiring the requisite skills.[8] Equally, no advantage has been demonstrated for those who are able to perform ERCP or transabdominal ultrasound.

The Working Group recognises the important role that UK centres have in fostering international links and advancing healthcare elsewhere through accepting overseas trainees where possible.

Training centres

Individuals ought to undergo training either at a single EUS centre, or, through a co-ordinated scheme, at a regional network of units that can offer experience in all the required aspects of EUS. Such centres must permit trainees adequate hands-on experience to reach the threshold numbers of cases for assessment of competency within 18 months.

Each EUS training centre or training network must provide access to linear and preferably also radial equipment; offer a suitable case-mix including oesophagogastric tumour staging, subepithelial lesions, pancreaticobiliary pathology, including FNA, for hands-on training as well as the possibility of observing pancreatic pseudocyst drain placement. Observer experience should also be arranged for attendance at several transabdominal, anorectal and endobronchial ultrasound lists.

Trainees must have a nominated tutor for each of the major areas of EUS training: oesophagogastric cancer/subepithelial lesion staging, pancreaticobiliary procedures and FNA. The same tutor may fulfil all of these roles.

Given the limited number of potential training places for EUS, access to hands-on cases only rarely should be given outside of formal training to those with a defined need, for example, those establishing, joining or advancing an EUS service.

Training centres/networks must be part of a cancer network and demonstrably work in a multidisciplinary fashion with EUS results discussed at a regular MDM. Such centres must report not less than Level A Quality Assurance data for EUS, as defined by the BSG.

Trainers

All EUS tutors must have attended a JAG compliant 'Training the Trainers' course. A specific module for EUS ought to be developed.

Each tutor must perform or directly supervise annually at least 50 EUS cases for oesophagogastric cancer and/or 120 pancreaticobiliary cases and/or 50 FNA for solid pancreatic lesions. The purpose of these numbers is to ensure professional focus and ongoing relevant clinical experience. They are in line with recommendations from other countries.[9]

Curriculum

Knowledge

The relatively recent inclusion of EUS into routine practice and the limited number of EUS services nationally leads to a lack of understanding among the general medical community about this procedure.

The curriculum for training in EUS must take account of the broad range of professional backgrounds from which trainees come.

Those learning EUS must acquire in the course of their training (1) an understanding of safe and appropriate endoscopic practice; (2) a working knowledge of the clinical management of those conditions in which EUS might be used; (3) an understanding of the strengths and weaknesses of EUS in comparison to other imaging modalities and its role in multidisciplinary disease management; (4) an understanding of regional anatomy, the principles of both medical ultrasound and cytopathology as well as (5) a working knowledge of anorectal and endobronchial ultrasound.

Internet-based modules ought to be commissioned to deliver and measure the understanding of this knowledge.

Skills

In the future, the demands made on endosonographers are likely to become more varied and interventional.

The Working Group feels that ideally training ought to be comprehensive, but recognises that the introduction of specialist fellowships in pancreaticobiliary or endoscopic mucosal therapies would best be served by focusing on a specific area of EUS.

A general EUS training must include an ability to assess structures adjacent to both the upper and lower GI tract and to perform diagnostic and therapeutic EUS including FNA with at least observer experience of drain placement into pancreatic pseudocysts. The list of required skills may change in the future with changing approaches to management.

Hands-on training is perceived to be central to acquiring proficiency in EUS with observation, attendance at professional meetings/workshops and the use of educational aids having a supportive role.

The Working Group proposes that the following threshold numbers of hands-on cases be performed before competency is formally tested with EUS region/procedure-specific summative DOPS:

1. Cancers of oesophagus, stomach or rectum, 80 (to include at least 10 rectal tumours).
2. Subepithelial lesions, 20 (to include oesophagus, stomach and duodenum (no specific number for any site)).
3. Pancreaticobiliary, 150 (at least half of which are likely pancreatic adenocarcinoma).
4. FNA, 75 (of which at least 45 are likely pancreatic adenocarcinoma).

Those following a specialist pancreaticobiliary module must perform the given number of procedures for subepithelial lesions, FNA and observe at least five pancreatic drain insertions.

Trainees under the umbrella of a specialist endoscopic mucosal therapy fellowship must meet the requirements for cancers of the oesophagus, stomach and rectum, subepithelial lesions, perform FNA (altered requirement: at least 50 cases, to include mediastinal and coeliac lymph nodes as well as sampling of the left liver lobe and left adrenal (no specified number for any site)) and have experience of using high frequency catheter probes (no specified number). There is no requirement for pancreatic FNA.

Formative DOPS are to be completed for the final 50% of the required case numbers in each section.

These figures ought to be revised in the future against a central review of results from objective assessments (DOPS).

Given the relatively small numbers of endoscopists involved, the Group would envisage that an exit process from training akin to the 'driving test' for UK colorectal cancer screening would be established. Pending this, a certificate of completion of training is to be issued by JAG in line with other endoscopic procedures in the UK.

Maintenance of skills

Those performing EUS after formal training must maintain and continue to develop their skills. The development of skill at EUS is not a finite process and proficiency is likely to rise continuously with experience.[10 11] The situation where multiple endosonographers, each perform small numbers of cases at a single centre is to be avoided. The formation of regional EUS networks ought to be encouraged to support continuing professional development.

The Working Group does not advise a specific number of cases that are required to be performed annually by endosonographers in order to maintain skills; there being no evidence base currently to support such a recommendation. All those practising EUS, however, must make an annual report to their local oversight group (usually cancer network) detailing individual endoscopist figures for number of cases performed in the categories oesophagogastric cancer, rectal cancer, subepithelial lesions, pancreaticobiliary cases and FNA (solid pancreatic, other) as well Quality Assurance indicators for EUS as described by the BSG. These data are to be passed to JAG, as the oversight body. The Working Group envisages a revision of these

recommendations in 5 years, to be based on a review of national audit outcomes.

The outcomes of more invasive procedures such as cyst drain placement ought to be reported at an MDM on a case-by-case basis.

Practitioners of EUS ought to show a commitment to professional development by reporting annually at least 15 h of continuing professional development (CPD) specific to EUS.

Recertification reasonably might be based on audit data alone given the broad range of service and endoscopy quality indicators required by the GRS.

Attitudes

Those performing EUS must demonstrate an ability to work in a multidisciplinary fashion and an ongoing commitment to EUS service development through CPD.

Oversight

The mechanisms by which specific indicators used to measure the quality of an EUS service are established and are a function of the JAG. It is expected that they will change with time and practice. Their definition and the intervals in which they ought to be updated should fall to the remit of JAG.

Quality EUS services might best be ensured at local level by the reporting of key data, including quality assurance measures as well as endosonographer CPD and 360 degree assessment (from standard NHS annual appraisal process for consultants or equivalent process) to the commissioning cancer network as part of their validation process.

Accreditation by JAG for service provision ought to be based on GRS quality indicators with additional submissions for training centre/tutor recognition.

The BSG, JAG and UK/Ireland EUS Users' Group would be well positioned to detail a curriculum for training and ongoing skill development as well as to provide learning materials.

The EUS Users' Group, in collaboration with industry, could provide a mechanism for the performance of summative DOPS and establish networks of EUS centres where training is offered.

The Group envisage that the central collection of quality indicator and DOPS data will inform future national strategy. We suggest that the BSG commission a review of the recommendations given in this document 5 years from its date of implementation.

Competing interests None.

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