OPINION

Improving quality in endoscopy: are we nearly there yet?

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Today in the UK we take it for granted that our individual performance at endoscopy is regularly scrutinised by our colleagues in our own service, and nationally if we undertake colonoscopy or flexible sigmoidoscopy as part of the bowel cancer screening programme (BCSP). In addition, most aspects of the patient journey, endoscopy performance, the endoscopy environment, training and workforce are scrutinised by the Joint Advisory Group for Endoscopy (JAG), and in England, financial penalties are incurred by trusts which consistently fail to meet minimum assessed standards. Fifteen years ago this level of quality assurance and performance management would have seemed inconceivable, and indeed internationally that is still generally the case.

The UK can rightly be proud for leading the quality agenda in endoscopy internationally over the past 10 years, and as an example of improvement in performance, the British Society of Gastroenterology (BSG) colonoscopy audit undertaken in 1999¹ showed a dismal unadjusted caecal intubation rate of 76.9% compared with 92.3% in 2011.² This was driven initially by a government desire to deliver a national BCSP with faecal occult blood testing and colonoscopy, based on improvements in colorectal cancer mortality in clinical trials.^{3–6} In order to achieve this, we had to improve colonoscopy performance as the previous level of caecal intubation was woefully inadequate for an effective screening programme and also the endoscopy service needed to improve in parallel. Waiting times for endoscopy of 3–6 months were fairly standard 15 years ago and much longer waits not uncommon. Booking processes were haphazard in many cases, and lists ran inefficiently. There was no standard assessment of safety issues such as decontamination or

levels of sedation. Challenges remain today, but a template for this exists through the endoscopy Global Rating Scale, standards are monitored closely by JAG, and these have vastly improved over the past 10 years. This was supported by the Endoscopy Programme which was initially hosted by the NHS Modernisation Agency. The performance of individual endoscopists was assessed by quality assurance using key performance indicators (KPIs) against standards. The national and regional endoscopy training centres were funded centrally and delivered JAG approved courses in endoscopy which have expanded in number and variety over subsequent years to encompass advanced therapeutic techniques as well as basic skills. Improvements in endoscopic performance and service delivery enabled the national BCSP to commence in England in 2006 with subsequently demonstrated beneficial outcomes.^{7 8}

Internationally, quality in endoscopy has become an important priority in recent years. In 2006, the American Society for Gastrointestinal Endoscopy (ASGE) and American College of Gastroenterology issued a joint statement highlighting the urgent need for quality measures and quality improvement in endoscopy.⁹ Influencing quality in the American Healthcare System with multiple private providers and many office-based endoscopists is a greater challenge than within the UK NHS, but progress has been made. Appropriate indications for endoscopic procedures have been published¹⁰ and quality assurance standards for all common procedures.¹¹ The ASGE Unit Recognition Programme accredits units based on a number of factors including patient assessment for procedural risk, adequacy of bowel preparation, caecal intubation rate, adenoma detection rate (ADR), adverse event

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tracking and use of patient satisfaction surveys. Unlike JAG accreditation in the UK, this accreditation is voluntary and no penalties are imposed for failing to reach standards. Endoscopy quality is now also high on the agenda in Europe, and the European Society of Gastrointestinal Endoscopy (ESGE) has recently formed the ESGE Quality Improvement Committee with the aims of improving quality of endoscopists, endoscopy training and service. Quality assurance standards are in development and will be incorporated into ESGE guidelines.

Despite the progress made at home and abroad, quality improvement evolves with changes in technology, techniques or evidence and challenges remain.

COLONOSCOPY

As mentioned above, great improvements have been achieved in the standard of UK endoscopy over the past 10 years. At the time of the 1999 BSG audit, a minimum unadjusted caecal intubation rate of 90% would have seemed a monumental challenge, but is now accepted as the norm. The national BCSP in England has been very successful, and we are able to measure this accurately and reliably through the Bowel Cancer Screening System database which records a wide variety of aspects of every procedure, and through a system of adverse event reporting we can capture complication data. For the non-BCSP service, a National Endoscopy Database (NED) is in development which will automatically capture key data from all of the endoscopy reporting systems in common use in the UK and upload this to a central server. This will provide a very powerful quality assurance and research tool. Despite our best efforts, study of back-to-back colonoscopies demonstrates a miss rate for polyp detection of 13% for adenomas 6–9 mm in size, and 6% for adenomas ≥ 1 cm (24% overall miss rate),¹² and study of large endoscopy databases demonstrate a miss rate for cancer of 4%–5.9% for right-sided cancer^{13 14} and up to 8.6% overall.¹⁵ ADR is an important KPI for both the symptomatic and BCSP services, although this has proven much simpler to measure for the latter where histology data is routinely linked to endoscopic data. Key features of colonoscopy training aim to improve mucosal visualisation by measures including position change,^{16 17} and slower withdrawal times^{18 19} thus increasing ADR. ADR has been increasingly recognised as a critical KPI, particularly with studies demonstrating an inverse relationship between ADR and postcolonoscopy cancer rates.^{20 21}

Quality improvement in colonoscopy has initially been focused on diagnostic skill and accuracy, but improvements in technology, diagnostic techniques and therapy create further challenges and opportunities for quality improvement. Lesion recognition and assessment using enhanced imaging techniques has become recognised as valuable, but its use is not

universal and there is little quality assurance (QA) of those practitioners that use it. Therapeutic techniques such as endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD)^{22 23} have revolutionised management of early colonic neoplasia, but there are technical challenges to achieving effective therapy and increased risks compared with ‘standard’ colonoscopy. Colonoscopic perforation rate in the latest BSG national audit was 0.04% compared with perforation rates of 1.3%²⁴ for EMR and 4.9%–6.2% for ESD^{24 25} in expert Japanese hands. QA standards and KPIs are therefore required for these procedures, backed up by adequate and appropriate training. To this end, draft BSG/Association of Coloproctology of Great Britain and Ireland (ACPGBI) guidelines and KPIs for the management of large, non-pedunculated colonic polyps have been developed. ESD carries the highest risk, and the BSG are supporting development of a national registry, which will be voluntary, but should help monitor standards in this evolving technique.

GASTROSCOPY

While considerable improvements in colonoscopy quality have been achieved in the UK, gastroscopy has been relatively neglected. The incidence of oesophageal cancer has been increasing steadily over the past four decades and the UK has the highest incidence of oesophageal cancer in Europe. Conversely, the incidence of gastric cancer has been decreasing. Survival rates for both cancers are, however, among the poorest in Europe. Retrospective studies of patients diagnosed with gastric cancer have demonstrated miss rates of 4.6%–13.9% in European and American series^{26–31} indicating that we may be able to improve our diagnostic capabilities at endoscopy.

Over the past decade our technical potential to improve endoscopic diagnosis has potentially improved greatly with high definition endoscopes, and the development of enhanced imaging techniques to aid detection and delineation of early neoplastic lesions. Moreover we now have the tools to effectively treat high grade dysplasia or intramucosal carcinoma in the upper gastrointestinal (GI) tract at endoscopy. Use of EMR and radiofrequency ablation^{32–34} are well-established techniques for oesophageal dysplasia. ESD is limited to a small number of specialist centres in the UK. This is partly, and appropriately, due to the technical demands of the procedure and relatively high complication rate. Expansion of ESD expertise within these centres and elsewhere is, however, to a large extent limited by the small number of cases of early gastric neoplasia detected. This, in turn, may possibly reflect a low prevalence of early neoplastic lesions, but the missed cancer studies indicate that this is not the case.

Current training in upper GI endoscopy in the UK is focused very much on the technical skills to

examine the upper GI tract as far as the duodenum and is directed towards the detection of gross pathology such as ulceration or advanced cancer. The detection of subtle mucosal abnormalities which might indicate early neoplasia is not taught, nor assessed by the Direct Observation of Procedural Skills assessments.³⁵ Mucosal washing with antifoam or mucolytics is not mentioned, and there are only three KPIs in the JAG QA standards for diagnostic upper GI endoscopy: success of intubation, completeness of procedure and repeat endoscopy for gastric ulcers. A similar curriculum for gastroscopy exists in the USA.³⁶ This contrasts with the larger number of KPIs and QA standards for colonoscopy and also reflects a lack of data and previous research in this area. This should be a priority for the future, and interesting work is emerging supporting longer withdrawal times for upper GI endoscopy.^{37 38} The BSG Endoscopy Committee has identified quality improvement in upper GI endoscopy as a priority for 2015 onwards and will be working with the BSG Oesophageal and Gastroduodenal sections, and with the Association of Upper Gastrointestinal Surgeons to develop new quality assurance standards for upper GI endoscopy. These can then be used by JAG as a guide to training and practice to ultimately improve outcomes. In an era of widespread media advertising to encourage members of the UK population with persistent upper GI symptoms to undergo endoscopy with the aim of detecting cancer earlier, it will be important that this endoscopy is performed to the highest standards. Ultimately, detection of early upper GI neoplasia, rather than advanced cancer presenting with 'alarm symptoms' is likely to have the greatest benefit on cancer outcomes.

ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY

Endoscopic Retrograde Cholangiopancreatography (ERCP) is one of the most technically challenging endoscopic procedures and also has potential for serious complications. Over the past two decades, alternative imaging techniques such as MRI and endoscopic ultrasound have superseded ERCP for diagnostic imaging, and consequently, ERCP is now almost exclusively a therapeutic modality. Fewer, but more complex, ERCPs are being undertaken than previously and this has consequences for training, expertise and outcomes. Despite the lack of need for diagnostic ERCP, the number of units delivering ERCP has not diminished significantly and therefore numbers performed by individual practitioners and endoscopy services are low in many instances. Recent UK Hospital Episode Statistics data indicated that approximately 40% of units were undertaking fewer than 200 ERCPs per year, and 10% undertaking fewer than 100 per year. Stipulating minimum numbers of procedures is contentious and challenging to individuals and

services, but several studies have reported better outcomes in units performing at least 200 procedures per year.^{39–41} A large UK audit of more than 5000 ERCPs demonstrated favourable complication rates, but poor success rates with only three quarters of endoscopists achieving a cannulation rate of at least 80%, and completion of therapeutic intent in only 70% of procedures.⁴² Numbers of procedures capture the attention of endoscopists, but is clearly not the only factor affecting performance. ERCP is becoming more complex as technology and evidence progresses. Insertion of pancreatic stents should be commonplace now but carries risks as well as benefits. Cholangioscopy and electrohydraulic lithotripsy is now available in specialist centres. The ASGE have categorised complexity of ERCP,⁴³ and networks and referral pathways should exist for those patients requiring the more specialist therapeutic procedures. Low volume units will struggle to see enough cases to develop expertise in advanced ERCP and very low volume centres may struggle to maintain expertise in basic ERCP. Adequate training in ERCP is critical, and JAG stipulates that units undertaking training should be performing at least 200 procedures per year. In 2014 the BSG published a groundbreaking ERCP standards document setting out a wide range of KPIs and quality standards.⁴⁴ Critically, this also includes KPIs for ERCP services and for training. With the support of JAG we have the opportunity to improve outcomes in ERCP in the UK.

OTHER ENDOSCOPIC PROCEDURES

New endoscopic techniques and technologies provide opportunities to expand our diagnostic and therapeutic capabilities, but in a technology-driven specialty this often precedes a strong evidence base and opportunities for adequate training in new skills. Endoscopic ultrasound is an example of a technology that has moved rapidly from a diagnostic modality to a complex therapeutic one. At the onset, training was often undertaken by established consultants, but this is now available to selected trainees now that the procedure is well established. This training needs to become more formalized, and JAG is supporting the development of specific training courses similar to those for gastroscopy or colonoscopy. There is a need for KPIs and QA standards, and these are in development.

Capsule endoscopy has revolutionised small bowel imaging, and has created a demand for deep enteroscopy. This is another field where the technology is in advance of training and quality assurance, and KPIs and standards should be developed accordingly.

ENDOSCOPIC NON-TECHNICAL FACTORS

We have focused very much on the technical skills and competencies required for the safe effective practice of endoscopy. Other factors such as attitude of the operator, and decision-making analysis are key to effective performance but more challenging to define

or measure. Recent work has set out to define these characteristics and design training interventions to positively influence attitudinal skills.⁴⁵ While this remains a challenge, we all encounter instances where attitudes to communication, risk or error have impacted on performance.

CONCLUSION

The UK has led the world in development of endoscopy quality improvement and quality assurance, and this is now a well-established agenda internationally. We have the advantage in the UK of a National Health Service as the provider to the great majority of the population, and the training and regulatory body JAG to implement and monitor standards. This discussion has focused primarily on the endoscopic procedures but quality assurance processes through JAG encompass the entire patient journey, and the environment in which endoscopy is undertaken.

Are we there yet? We have certainly made tremendous advances over the past decade, particularly for colonoscopy, but there remains a need for continual quality improvement for all our routine endoscopic work, and quality improvement initiatives will need to keep up with new techniques and new technologies.

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