



RESEARCH

The provision of paediatric gastrointestinal endoscopy services in the United Kingdom

Rafeeq Muhammed,¹ Mike Thomson,² Paraic McGrogan,³
Robert M Beattie,⁴ Huw R Jenkins⁵

► Additional data are published online only. To view these files please visit the journal online (<http://fg.bmj.com>)

¹Department of Child Health, Birmingham Children's Hospital, Birmingham, UK

²Department of Child Health, Sheffield Children's Hospital, Sheffield, UK

³Department of Child Health, Royal Hospital for Sick Children Glasgow, Glasgow, UK

⁴Department of Child Health, Southampton General Hospital, Southampton, UK

⁵Department of Child Health, Children's Hospital for Wales, Cardiff, UK

Correspondence to

Dr Huw R Jenkins, Department of Child Health, University Hospital of Wales, Heath Park, Cardiff CF14 4XW, UK; Huw.Jenkins2@wales.nhs.uk

Received 29 May 2012

Accepted 1 June 2012

Published Online First

26 July 2012

Abstract

Objective There are no specific data available regarding paediatric endoscopy provision in the UK and anecdotal experiences suggest that such provision varies widely between the units. The aim of our study was to identify the current provision of paediatric endoscopy services in the UK, the number of endoscopies performed in each unit, the number of operators performing these endoscopies and whether endoscopies were performed under sedation or general anaesthesia.

Methods and results An email questionnaire was sent to all 31 units in the UK performing paediatric endoscopies and responses were received from 25 centres (81%). The median number of total endoscopies (upper and lower) per unit each year was 332 (range 64–2040). The median number of gastroscopy per consultant in each centre was 101 (range 20–288) and median number of colonoscopies performed per consultant per year was 49 (range 10–215). 18 of the 25 centres performed all endoscopies under general anaesthesia with 7 centres using sedation as well as general anaesthesia. Percutaneous endoscopic gastrostomy insertion (PEG) was performed in 24 out of 25 centres with the service undertaken by paediatric surgeons in 11 centres. 11 centres provided formal out of hours endoscopy services.

Conclusion There is wide variation in paediatric endoscopy provision and the British Society of Paediatric Gastroenterology, Hepatology and Nutrition (BSPGHAN) endoscopy working group is collaborating with the Joint Advisory Group (JAG) to provide specific standards for paediatric endoscopy services in the UK.

Introduction

Endoscopy is an essential part of delivering a paediatric gastroenterology service, but the national UK provision of such a

service has not been planned coherently. Historically paediatric endoscopy services have developed in the UK in a piecemeal fashion, following the appointment of trained specialists and the emergence of a number of paediatric gastroenterology and hepatology centres over the last 20 years.

There has been recent progress in the provision and standardisation of adult endoscopy services based around training in the UK following the involvement of the Joint Advisory Group (JAG) on Endoscopy. There is a need for a similar process of standardisation in paediatrics in the UK. In order to plan such endoscopy services for children it is important to determine baseline data regarding the current provision of paediatric endoscopy in the UK as this is essential to plan for both service and training needs. There are no specific data available regarding paediatric endoscopy practice in the UK and anecdotal experiences have suggested that such provision and individual practice varies widely between units, including whether the procedures are performed under sedation or general anaesthesia (GA). A survey performed by North American colleagues¹ confirmed that there was considerable variation in USA regarding sedation/general anaesthetic practice for endoscopy.

The aim of our study, therefore, was to identify the current provision of paediatric gastrointestinal (GI) endoscopy services in the UK and the number of endoscopies performed in each unit, the number of operators performing these endoscopies and whether the endoscopies were performed under sedation or GA. This may have implications for the

transition arrangements to adult gastroenterology services. In addition, information was sought regarding out-of-hours emergency provision.

Methods

A survey questionnaire was sent in 2007 to each Paediatric Gastroenterology Unit in the UK (one consultant answering for colleagues in each centre, including paediatric surgical colleagues). The number of consultant paediatric gastroenterologists undertaking endoscopy in 2007 varied from one to five per centre. We felt that the quickest and most efficient way to obtain a 'snapshot' view of the number of endoscopies undertaken in children in each unit was to ask one senior individual (via the questionnaire and backed up by a personal phone call) to record the overall practice and data from their own unit. The questions included the number of endoscopies (upper and lower) performed each year and by whom, the location of endoscopy services for children, method of sedation/GA, provision of percutaneous endoscopic gastrostomy (PEG) placement and the provision of emergency endoscopy services. Responses were collated by the authors and were entered into a database via customised entry screens for data analysis (SPSS Inc, Chicago, Illinois, USA). Descriptive statistics were used to illustrate results in percentages and frequencies.

A follow-up telephone/personal contact survey was undertaken in 2011 specifically addressing how the endoscopies were performed (sedation or anaesthesia) in each unit and whether this had changed over the 4 years since the first survey.

Results

The survey questionnaire was sent to all 31 units in the UK which were performing paediatric endoscopy and responses were received from 25 (81% response rate) with all the major units performing endoscopy in children in the UK responding. The median number of total endoscopies (upper and lower) per unit each year was 332 (range 64–2040), with the median number of oesophagogastroduodenoscopy (OGD) being 225 (range 54–1176) and the median number of colonoscopies being 107 (range 10–864). Endoscopies were often performed by several consultants and trainees within each unit, with the median number of OGD per year per consultant in each centre being 101 (range 20–288) and the median number of colonoscopies performed per consultant—49 (range 10–215). Of the 25 centres who responded, 19 had trainees undertaking endoscopy training in paediatric gastroenterology (median number of trainees 1, with range 1–4) and the median number of OGD and colonoscopies per year per trainee was 175 (range 25–375) and 96 (range 19–275) respectively.

Paediatric endoscopies were performed in operating theatres in 14 of the 25 centres, in designated paediatric endoscopy units in two centres with nine centres

sharing the provision in theatre or endoscopy units (shared with adult colleagues). Ten of the units were based in stand-alone Children's Hospitals.

Eighteen of the 25 centres performed all endoscopies under GA with seven centres using sedation as well as GA. In these seven centres performing endoscopies under sedation, the median percentage was 40% (22%–99% range). Regarding the sedation used, five of the seven centres used Midazolam and Pethidine for both upper and lower endoscopies, with one centre using Midazolam and Fentanyl and a further centre using Propofol and Fentanyl. The endoscopist administered the sedation in five centres but in one centre sedation was administered by a paediatric intensive care consultant or registrar and in the final centre an anaesthetist provided the sedation. Where endoscopies were performed under sedation, the children had a median age of 10 years (range 0–12 years). All centres used supplemental oxygen for endoscopies under sedation. In three centres, topical Lignocaine (throat spray) was used before performing upper GI endoscopies under sedation.

PEG insertion was performed in 24 out of 25 centres with the service undertaken solely by paediatric surgeons in 11 centres, by paediatric gastroenterologists in four centres and jointly by both specialities in nine centres. One centre did not provide a PEG insertion service.

Eleven out of 25 centres provided formal out-of-hours endoscopy services (seven provided by paediatric gastroenterologists and four by paediatric surgeons) and a further four centres provided an informal out-of-hours endoscopy service (performed by paediatric gastroenterologists). The median number of endoscopies performed per unit out-of-hours per year was 10 (range 2–100).

In response to the 2011 survey on the methods used (sedation or anaesthesia) to undertake the procedures, 29 centres, including all 25 of those who had responded to the 2007 survey, provided Supplemental information to that given in the 2007 questionnaire survey. Eighteen of 29 centres continue to perform all endoscopies under GA, as in 2007, with five units still using a combination of sedation (35%–80%) of all (using Midazolam and Fentanyl/Pethidine) and GA and another six units using Propofol administered by an anaesthetist. A number of units stated that they were about to change their practice (from general anaesthetic to Propofol).

Discussion

This is the first survey of paediatric endoscopic provision in the UK and the data are vital in order to plan services, including the transition of care from paediatric to adult services, as well as training for the future. The need for endoscopy in children has gone up in line with the change in epidemiology of coeliac disease and inflammatory bowel disease.^{2 3} Unlike

adult practice, most endoscopies undertaken were diagnostic with only a small number involving therapeutic procedures. It is clear that there is a wide variation in practice throughout the UK in terms of the number of endoscopies performed, and whether the procedures are performed under sedation or general anaesthetic. This variation in the number of endoscopies performed could be interpreted as some centres doing more investigations compared to others, but it is difficult to come to any firm conclusions based on our study, because we have not collected the data on catchment population of each centres. Some centres also provide services supra regionally for endoscopy for conditions such as colonic polyposis and this could increase the number of endoscopies compared to the others. Similar variation in admission rates for children for upper and/or lower GI endoscopy by Primary Care Trusts in England was also published recently.⁴ We acknowledge that paediatric endoscopy practice may change in the future because of changes in the diagnostic pathway of coeliac disease and the emerging trend to achieve and document mucosal healing in patients with inflammatory bowel disease. It is clear that there is a wide variation also in the number of procedures performed by trainees in each of the centres and it is thus vital that a trainee is able to rotate between accredited training centres in order to gain wide experience.

There was variation in the location of paediatric endoscopy services in different hospitals. Most centres rely on operating theatres or adult endoscopy suites and this may be due to the fact that there is not enough volume of paediatric endoscopies in each centre to justify a separate paediatric endoscopy suite. Since most of the paediatric endoscopies were done under GA, anaesthetic service availability also was a factor.

Many centres perform all endoscopies under GA, and there has been an interesting trend over the previous 4 years. Some 25% of paediatric gastroenterology centres who responded, used sedation for a proportion of endoscopic procedures in 2007, and this number had fallen to 16% in 2011. There has been a striking increase in the proportion of endoscopies carried out after the administration of Propofol, which should correctly be regarded as an anaesthetic procedure rather than sedation. Recent guidelines produced by NICE⁵ have suggested safe alternatives for endoscopic procedures in children (the use of Midazolam and Pethidine with the ability of staff trained in resuscitation) but it seems there is gradual drift away from sedation for GI endoscopic procedures in children. This may have implications for the future as fewer gastroenterologists will have been trained in the use of sedation techniques and there is an issue in the transitional care of adolescents and young people requiring endoscopy as adult gastroenterologists perform almost all procedures under

sedation. There is a strong argument that, prior to handover to adult gastroenterology care it is important that final endoscopy performed on the paediatric unit is performed under sedation, rather than general anaesthetic, although there is no evidence base for this practice. However this is an important point to consider as it has been raised by many adolescents in the Transition clinics which are run in several centres (personal information). It is clear that a number of factors influence the way endoscopies are performed, including cultural norms, endoscopic experience and procedural training.^{6–8} It is also apparent that the provision of adequate paediatric anaesthetists (and operating-theatre time) is an important factor in how services are organised in each unit. There are no firm data from the UK regarding complications following procedures performed under sedation or anaesthesia, and the personal experience from one of the authors (HJ) over 20 years of more than 1000 endoscopies done under sedation and under GA (unpublished data), suggests that there is little evidence that endoscopies performed under sedation are more unsafe than those performed under GA, at least in older children. Reports of paediatric procedural sedation from North America in more than 100 000 procedures show that major complications are rare and there are not statistically significant differences in complication rates between anaesthetists and other providers of sedation.^{9–10} Indeed, it could be argued that providing both techniques in each unit is important and that older children and young adults should undergo these procedures using sedation which will be their experience after transition to adult units.

There was a wide variation in the provision of PEG and in most centres this service was provided by the paediatric surgical team. It is clear that some paediatric gastroenterology trainees are not exposed to PEG insertion and the opportunities for such training should be available to those who wish to avail themselves of it. In the current endoscopy curriculum for paediatric gastroenterology training in the UK, PEG insertion skills are considered as additional optional skills, not needed for all trainees.

There was also a wide variation in the number of out-of-hours endoscopies performed in each unit. The majority of units do not offer a dedicated out-of-hours service and this is in large part because many paediatric gastroenterologists continue to take part in general paediatric rotas (and indeed there is not enough numbers of specialists per unit to undertake a separate Paediatric Gastroenterology rota). Perhaps the best approach to provide out-of-hours endoscopy support would be through the development of managed clinical networks to provide regional solutions.

It should be emphasised that at the time of the survey in 2007 there had been little formal organisation and assessment of paediatric endoscopy services

in the UK and, indeed, little involvement with JAG processes. Since then (and in part prompted by this survey) there has been much closer cooperation with JAG and now more robust arrangements for training and assessment of units are being developed which will be helpful in prompting commissioners to follow standards for the future designation of such services. The focus for this drive is the British Society of Paediatric Gastroenterology, Hepatology and Nutrition Endoscopy Working Group which is collaborating with JAG to provide a paediatric curriculum for paediatric endoscopy as well as providing a Directly Observed Procedural Skills assessment. This group will continue to work to provide specific standards for paediatric endoscopy services in the UK, which will need to reflect the needs of the particular childhood population.

In conclusion, we have shown that there is a wide variation in the provision of paediatric endoscopy services across the UK. To the best of our knowledge, there is no similar study published comparing paediatric endoscopy provision and these data will be invaluable in helping to plan for a robust and equitable UK-wide service and in providing the optimum arrangements for transition of young people to adult units.

Acknowledgements The authors sincerely thank all the paediatric gastroenterologists and paediatric surgeons who had participated in this survey.

Contributors RM and HJ devised the concept and the questionnaire for the study and collected the data. RM had initially formulated the draft paper and all

the authors equally contributed to the further revision of the paper. HJ is the guarantor of the paper.

Provenance and peer review Not commissioned; externally peer reviewed.

References

1. Lightdale JR, Mahoney LB, Schwarz SM, *et al.* Methods of sedation in pediatric endoscopy: a survey of NASPGHAN members. *J Pediatr Gastroenterol Nutr* 2007;**45**:500–2.
2. Ravikumara M, Tuthill DP, Jenkins HR. The changing presentation of coeliac disease. *Arch Dis Childhood* 2006;**91**:969–71.
3. Molodecky NA, Soon IS, Rabi DM, *et al.* Increasing incidence and prevalence of the inflammatory bowel disease with time, based on systematic review. *Gastroenterology* 2012;**142**:46–54.
4. <http://www.sepho.org.uk/extras/maps/NHSAAtlas2011/atlas.html> (accessed 26 Feb 2012).
5. Sedation for diagnostic and therapeutic procedures in children. <http://www.nice.org.uk/nicemedia/live/13296/52131/52131.doc> (accessed 28 Sep 2011).
6. Tolia V, Peters JM, Gilger MA. Sedation for pediatric endoscopic procedures. *J Pediatr Gastroenterol Nutr* 2000;**30**:477–85.
7. Lightdale JR. Sedation and analgesia in the pediatric patient. *Gastrointest Endosc Clin North Am* 2004;**14**:385–99.
8. Gilger MA. Gastroenterologic endoscopy in children: past, present, and future. *Curr Opin Pediatr* 2001;**13**:429–34.
9. Couloures KG, Beach M, Cravero JP, *et al.* Impact of provider specialty on pediatric procedural sedation complication rates. *Pediatrics* 2011;**127**:e1154–60.
10. Cravero JP, Beach M, Blike GT, *et al.* The incidence and nature of adverse events during pediatric sedation/anesthesia with propofol for procedures outside the operating room: a report from the pediatric sedation research consortium. *Anesth Analg* 2009;**108**:795–804.