RESEARCH

Variation in preparation for gastroscopy: lessons towards safer and better outcomes

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ABSTRACT

Objective To identify the methods employed within the UK practice prior to diagnostic gastroscopy and compare with published guidelines for patients undergoing general anaesthesia.

Design National Health Service (NHS) endoscopy units were invited to take part in a structured telephone survey to determine the length of time patients are kept nil-by-mouth (NBM) for food and fluids prior to gastroscopy, and whether a preprocedure mucolytic drink was used.

Methods 212 NHS Trusts providing endoscopy services were identified from the Joint Advisory Group on GI Endoscopy. Trusts were excluded if they were children's hospitals (n=5).

Results 207 NHS Trusts were telephoned. 193 completed the survey (93%), 11 Trusts declined and there was no response from 3 Trusts. 13 separate policies regarding NBM timings were identified. 51 Trusts (21%) used the timings ratified by Surgical and Anaesthetic Societies (6 h NBM for food, 2 h for clear fluid). 135 Trusts (70%) used a policy which starved patients in excess of the standard surgical guidelines. No Trust used a mucolytic drink prior to gastroscopy.

Conclusions The survey revealed large variation in NHS Trust's policies regarding the times patients were starved prior to gastroscopy. Results of surgical studies demonstrate increased risk of significant pulmonary aspiration with increased fluid-starvation periods, 68% of NHS endoscopy policy would be deemed excessive by surgical practice. There is no routine use of a mucolytic drink to improve mucosal visualisation in the UK practice.

BACKGROUND

Good preparation prior to colonoscopy improves polyp and cancer detection by optimising mucosal visualisation.¹⁻⁴ The

British Society of Gastroenterology (BSG) provides guidelines on preparation for colonoscopy including the safety of preparatory methods.⁵ Conversely, there are no guidelines for preparation prior to routine gastroscopy, with the aim of optimising lesion detection. Usual practice for gastroscopy involves a period of nil-by-mouth (NBM) beforehand, but no UK studies have been produced determining the optimal preparatory period.

The policy of nil-by-mouth from midnight (NBMfM) for food has been phased out of surgical practice as a result of increasing evidence that solid food has a gastric transit time of less than 6 h.^{6, 7} Regarding NBM for fluids, it is universally accepted that consuming clear liquids up to 2 h before induction of anaesthesia results in less gastric content and a raised pH when compared with longer starvation times,^{7, 8} which decreases the risk of significant pulmonary aspiration.⁹

Studies have been performed on the effect of food-starvation scores on patient comfort in surgery¹⁰ and fluid-starvation scores in endoscopy,⁸ both concluding that while the volume of gastric content is unaffected by shorter starvation times, patient comfort is significantly less with NBMfM policies. The starvation period for solid food, or opaque liquids is now globally recognised as 6 h and for clear fluids 2 h prior to anaesthesia, by many surgical and anaesthetic societies^{11, 12} due to the decreased risk of pulmonary aspiration and increased patient comfort.

Data have been published demonstrating important diagnoses are delayed due to inadequate gastric mucosal visualisation.^{13, 14} Data from the Health Improvement Network, representing a

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primary care population of 6 million regionally and demographically matched patients, was presented at the 2013 BSG meeting and found 5% of patients diagnosed with oesophageal cancer had undergone gastroscopy within the past 3 years¹⁵ and 2.3% of patients had an oesophagogastroduodenoscopy (OGD) 1–3 years prior to a confirmed diagnosis of gastric cancer. While steps have been taken to improve the training of endoscopists,¹⁶ with a move towards a competency-based system of medical education,¹⁷ there has been little attention in the UK regarding improving the gastric mucosal lining for visualisation until recently from our group.¹⁸ Evidence is increasing regarding the use of a mucolytic in the assessment and treatment of Barrett's metaplasia,^{19–23} but not with regard to optimising the mucosal visualisation in the upper gastrointestinal tract.

Endoscopists in the Far East have been investigating the routine use of mucolytics and antifoaming agents since 1998 in routine gastroscopy²⁴ and have shown that mucosal visualisation is increased and missed diagnosis rates are decreased using mucolytics.^{25–27} The first UK trial of a mucolytic with antifoaming agent was recently published concluding that mucosal visualisation was improved.¹⁸

To examine the starvation rules employed in endoscopy units within the UK, a national survey was undertaken. A supplementary investigation about the use of mucolytics or antifoaming agents prior to routine gastroscopy to improve mucosal visualisation was performed.

Aim

The aim was to investigate the preparatory methods used in National Health Service (NHS) Trusts prior to gastroscopy in the UK. The two main objectives of the questionnaire were first to assess the length of time a patient is NBM prior to gastroscopy, both for food and fluids, and second to determine whether a mucolytic or other preparatory drink is routinely used.

METHODS

A structured telephone survey was undertaken by a single gastroenterology research fellow (JLC). A list of NHS endoscopy units (n=318) was obtained from the Joint Advisory Group on GI Endoscopy (JAG) via the JAG website (<http://www.thejag.org.uk/Units/JAGAccreditedUnits.aspx>, accessed on 25 Nov 2011). NHS Trusts with several endoscopy units and a shared preparatory policy (n=106) had their policy recorded once. Hospitals were excluded from the study if they were children's hospitals (n=5). The reason for excluding children's hospitals was that there is likely to be a high rate of gastroscopies under general anaesthetic and the preparation for anaesthesia could have influenced the data. Two hundred and seven NHS Trusts were included in the survey.

Each unit was asked questions to establish their preparatory method prior to gastroscopy. The first question asked was 'How long are patients kept NBM prior to gastroscopy?' Often the answer was provided by the nurse in charge and they would volunteer the differences between morning and afternoon lists, and between food and fluid. If these answers were not volunteered, questions were asked to establish if there was any difference between morning and afternoon lists or whether there were different periods of starvation for food and fluids.

The second line of enquiry was to establish whether the hospital used any form of preparatory drink or method to improve mucosal visualisation prior to gastroscopy. No single question sufficed to obtain all the details required for the survey so a range of questions was used by the authors, such as 'Does your hospital use any form of preparatory drink before gastroscopy?' and 'Do your patients undergo any form of specialised preparation, other than NBM, prior to gastroscopy?' Further questioning took place to clarify the Trust's policy.

Results 1: NBM period prior to gastroscopy

Two hundred and seven Trusts were eligible to be included in the survey, of which 193 took part in the survey (93% response rate). There was no answer from 3 Trusts to telephone enquiries and 11 Trusts refused to take part in the survey. Figure 1 shows a flowchart of unit participation. The results from the telephone survey are set out in table 1.

Results 2: Other preparatory methods

No Trust used a preparatory or mucolytic drink prior to diagnostic gastroscopy cases.

DISCUSSION

The survey produced an excellent response rate of 93% (193/207). The survey reveals a wide variation in starvation times across the UK practice, 13 different preparatory methods in all. The large variation in policies is perhaps to be expected without clear guidelines or published research into best practice. Fifty-one endoscopy units (21%) have the standard surgical rules of starvation—6 h NBM for food, 2 h for clear liquids.

Sixty-eight per cent (131/193) of units in the UK do not allow patients to have clear fluid within 2 h of gastroscopy. The risk of significant aspiration in patients undergoing general anaesthesia is increased, if clear fluids are withheld for longer than 2 h. A major risk factor for significant pulmonary aspiration in patients receiving general anaesthesia is reflux symptoms.⁹ As reflux symptoms are common indications for gastroscopy, it can be argued that all patients with reflux symptoms should be encouraged to drink clear fluid up to 2 h before gastroscopy.

Figure 1 Comparison of surgical standards and endoscopic practice. Excessive starvation is defined as a period of time longer than 6 h nil-by-mouth (NBM) for food or longer than 2 h for fluids. 'Other' includes: NBM food 6 h + fluids 1 h (n=1), NBM food 5 h + fluids 2 h (n=3) and NBM food 4 h + fluids 2 h (n=4).

Patient comfort scores are significantly worsened by food starvation of longer than 6 h, and fluid starvation longer than 2 h in patients undergoing general anaesthesia. Twenty per cent of endoscopy departments starve patients for longer than 6 h on morning endoscopy lists (38/193); however, only 2% (4/193) starve afternoon patients for more than 6 h. When the starvation period of fluids is considered, 68% (131/193) of endoscopy departments are potentially

exacerbating patient discomfort by excessive starvation times, as displayed in figure 1. Interestingly, 15% (29/193) of endoscopy units allow patients to eat solid food for less than the 6 h limit imposed on surgical patients, only 1 unit allows patients to drink up to 1 h prior to gastroscopy.

No endoscopy unit used a preparatory drink prior to routine gastroscopy. Our group showed the routine use of a preparatory drink reduced the number of intraprocedural flushes needed to clean the stomach,¹⁹ when compared with no preparatory drink, or water alone. The overall time taken for gastroscopy was the same. The time saved flushing the mucosal surface was used for detailed inspection. The cost of the preparatory drink was calculated at £0.91p per gastroscopy.

Specialist centres are currently using mucolytic agents in the inspection and preparation of oesophageal mucosa for radiofrequency ablation treatment of Barrett's oesophagus,²⁸ but not for routine visualisation of non-Barrett's patients. The identification of subtle lesions requires high-definition endoscopes, image processors and screens, along with an endoscopist trained in lesion recognition. However, if the region of interest is obscured with mucus, the lesion can still be missed and is an aspect of the gastroscopy procedure that has been ignored. Given the limited amount of time for inspecting the upper gastrointestinal mucosa even in a sedated patient, detailed inspection time is probably compromised by time spent cleaning the mucosa.

Our group believes research into starvation periods prior to gastroscopy should be undertaken to investigate whether the patient safety and comfort benefits seen in surgical and anaesthetic patients is replicated.

Table 1 The periods of NBM for food and fluids in NHS endoscopy units in the UK

NBM period	Trusts
NBM midnight (am), 6 h (pm)	26
NBM midnight (am), 4 h (pm)	8
Food 8 h—sips 3 h	1
Food 8 h—sips 2 h	3
Food and fluids 6 h	74
Food 6 h—sips 4 h	6
Food 6 h—sips 3 h	2
Food 6 h—sips 2 h	51
Food 6 h—sips 1 h	1
Food 5 h—sips 2 h	3
Food and fluids 4 h	13
Food 4 h—sips 2 h	4
Food and fluids 3 h	1
Total	193

Sips refers to a policy of allowing patients sips of clear fluid (water) until the hours stated. For those hospitals with *NBM from midnight* policies, the result includes both food and fluids. Where two policies are used within the same unit, the result is given as *NBM midnight (am), 6 h (pm)* where the morning patients are starved from midnight, those in the afternoon have a defined time period.

NBM, nil-by-mouth; NHS, National Health Service.

Key messages

What is already known on this topic?

Ideal preparation for gastroscopy has not been formally investigated. The use of preprocedural mucolytic and antifoaming agents has become standard in some centres for anticipated complex endotherapy.

What this study adds?

The survey reveals the wide range of starvation practice across the UK and confirms the suspicion that no centre uses mucolytics and antifoaming agents prior to routine gastroscopy.

How might it impact on clinical practice in the foreseeable future?

To improve the quality and safety of gastroscopy, standardised preparation and the routine use of preparatory drinks will increase mucosal visualisation.

In addition, we believe the routine use of a mucolytic and antifoaming agent will improve mucosal visualisation at minimal cost and may improve lesion detection rates. We will repeat this survey after the publication of the forthcoming global rating scale (GRS)/JAG standards for gastroscopy.

Contributors JLC and PP conceived the study. JLC undertook the telephone questionnaire and data recording. JLC wrote the manuscript. JRN, PCB, APS and PP revised the manuscript.

Competing interests None declared.

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