RESEARCH

Administration of *hyoscine-n-butylbromide* during colonoscopy: a survey of current UK practice

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Abstract

Objective Current British Society of Gastroenterology (BSG) guidelines suggest that *hyoscine-n-butylbromide* (*Buscopan*) should be avoided during colonoscopy in patients with a history of angle-closure glaucoma. Angle-closure glaucoma, however, is not very common, is asymptomatic before onset and is treated definitively by a single laser treatment (if spotted early). Open-angle glaucoma is not affected by *hyoscine*. The aim of this study was to assess the use of *hyoscine* among colonoscopists, with particular reference to glaucoma.

Design and setting Following BSG endoscopy subcommittee approval, a short questionnaire was electronically administered to members of the BSG and the Association of Coloproctology of Great Britain and Ireland.

Main outcome measures *Hyoscine* use among colonoscopists, and effect of glaucoma history upon prescribing practice.

Results 188 colonoscopists responded to some or all of the questions. 123/183 (67.2%) of respondents claimed they were aware of the BSG guidelines. 160/187 (85.6%) sometimes or always use *hyoscine*, while 27/187 (14.4%) never do. 137/177 (77.4%) always enquire about glaucoma history prior to administration, although 147/176 (83.0%) make no differentiation between open-angle or angle-closure forms. 126/178 (70.8%) would (incorrectly) withhold *hyoscine* if the patient declares a history of any form of glaucoma. 140/179 (78.2%) do not substitute glucagon as an antispasmodic. 4/180 (2.2%) had encountered ophthalmic complications post-administration.

Conclusions Current BSG guidelines pertaining to *hyoscine* use and glaucoma are inappropriate; the authors recommend revision. Patients undergoing colonoscopy who have received *hyoscine* should, instead, be advised to seek urgent medical advice if they develop ophthalmic symptoms.

Introduction

Colonoscopy is the procedure of choice for the investigation of patients with suspected disease of the colon and/or terminal ileum.¹ It is also used within bowel cancer screening programmes to aid detection of colorectal neoplasia.²

The anticholinergic drug, *hyoscine-n-butylbromide* (*Buscopan*, Boehringer Ingelheim GmbH) is a smooth muscle relaxant regularly used in endoscopic procedures to reduce gastrointestinal spasm. Advocates of the use of *hyoscine* believe that it facilitates a 'complete' colonoscopy and can also aid in other endoscopic procedures, such as endoscopic retrograde cholangiopancreatography.^{3,4}

Current British Society of Gastroenterology (BSG) guidelines state that a past medical and drug history should be obtained from all patients before commencing any procedure, and that *hyoscine* should be used with caution or avoided completely in patients with a history of angle-closure glaucoma.⁵ Intravenous glucagon can, instead, be substituted for *hyoscine* if an antispasmodic is required.

Glaucoma is a common eye condition that affects approximately 480 000 people in the UK alone.⁶ The disease is defined as an optic neuropathy resulting in both structural and functional defects within the eye (optic disc damage and visual field loss).⁷ There are two main forms of the disease; open-angle and angle-closure. Owing to its anatomical basis, angle-closure glaucoma can be precipitated by *hyoscine* administration; open-angle glaucoma, however, cannot. When an attack of angle-closure glaucoma does occur, the patient usually has had no prior clinical history, and the subsequent treatment (iridotomy) is definitive.⁷

We believe that the current BSG guidelines are misleading, as by definition the patient at risk of developing angle-closure glaucoma will have no prior history and, in addition, if a patient has been treated for angle-closure glaucoma, they are no longer at risk (as treatment is definitive). *Hyoscine* does not affect open-angle glaucoma and, therefore, if clinicians do not differentiate between the two forms of glaucoma, *hyoscine* may be withheld incorrectly, thus potentially reducing the chances of a 'complete' colonoscopy.

The aim of this study was to assess the current use of *hyoscine* among UK colonoscopists. In particular, we aimed to examine what effect any history of glaucoma may have on prescribing practice.

Design and setting

A nine-point questionnaire was devised following consultation between colleagues from the departments of endoscopy and ophthalmology within our trust (table 1). BSG endoscopy subcommittee approval for the survey was obtained prior to it being electronically distributed (via the online survey package *SurveyMonkey*) to members of the BSG and the Association of Coloproctology of Great Britain and Ireland.

The survey (and accompanying link) was advertised through the endoscopy section on the BSG website. Four hundred and eighty-seven Association of

Coloproctology of Great Britain and Ireland consultant members were also sent an email requesting that they complete the survey. The survey was live from August 2011 until March 2012.

The Mann–Whitney U test was used to indicate significance (at the 95% level) where comparisons between groups of responses were made.

Results

One hundred and eighty-eight respondents replied to all or some of the questions (table 1). One hundred and sixty-three questionnaires were completed in full (86.7%). One hundred and twenty-three of 183 respondents (67.2%) claimed that they were aware of the BSG guidelines pertaining to *hyoscine* use in endoscopy. Awareness of the BSG guidelines did not affect *hyoscine* use (86.2% (106/123) of aware versus 88.3% (53/60) of unaware, $p=0.686$).

Of those respondents who stated that they were aware of the BSG guidelines, 81.2% stated that they routinely enquire about a history of glaucoma prior to administering the drug. This compared with 69.5% of those who stated they were not aware of the guidelines ($p=0.081$). Despite being aware of the guidelines, only 19% of respondents routinely differentiate between open- and closed-angle forms of glaucoma, and 70% (incorrectly) withhold *hyoscine* if the patient

Table 1 Questionnaire administered to members of the British Society of Gastroenterology and the Association of Coloproctology of Great Britain and Ireland with subsequent responses

Question number	Question	Respondents	Answer options	Response count	%
1	Do you give patients Buscopan during gastrointestinal endoscopy?	187	Always Sometimes Never	22 138 27	11.8 73.8 14.4
2	Before administering Buscopan, do you routinely enquire about the patient's past medical history and drug history?	180	Always Sometimes Never	151 19 10	83.9 10.6 5.6
3	Are you aware of the British Society of Gastroenterology guidelines concerning the use of anti-cholinergic agents in endoscopy?	183	Yes No	123 60	67.2 32.8
4	Have you ever had a patient develop cardiovascular complications following the administration of Buscopan?	182	Yes No	17 165	9.3 90.7
5	Have you ever had a patient develop an acutely painful red eye requiring intervention post-Buscopan administration?	180	Yes No	4 176	2.2 97.8
6	Do you routinely enquire about any history of glaucoma before administering Buscopan?	177	Yes No	137 40	77.4 22.6
7	When enquiring about glaucoma history, do you routinely differentiate between open- and closed-angle glaucoma?	176	Yes No	30 146	17.0 83.0
8	If the patient gives a positive history for glaucoma do you still give Buscopan?	178	Yes Never Depends on which form	9 126 43	5.1 70.8 24.2
9	Do you routinely substitute glucagon for Buscopan® if the patient has contraindications to its use?	179	Yes No	39 140	21.8 78.2

declares a history of any form of glaucoma. This compared with 13.6% and 71.9%, respectively, in the group who stated they were unaware of the guidelines ($p=0.371$ and $p=0.793$, respectively, relative to 'aware' group).

Seventy-eight per cent of respondents who were aware of the guidelines do not substitute glucagon as an antispasmodic if they feel *hyoscine* is contraindicated. Only 4 of 180 total respondents (2.2%) had encountered ophthalmic complications post-administration.

Discussion

Hyoscine-n-butylbromide is an ammonium derivative of *hyoscine*, an alkaloid produced by the Solanaceae family of plants.⁸ It competes with acetylcholine producing an antagonist effect on the muscarinic receptors of the parasympathetic system.^{9 10} It is non-selective and thus produces a number of autonomic responses depending on the dose administered. At lower doses, depression of salivary and bronchial secretions, tachycardia and pupillary dilatation are seen. Urinary retention and decreased intestinal tone and motility are precipitated by higher doses.¹¹

Hyoscine has a number of potential side effects pertaining to its anticholinergic action. One such effect is pupillary dilatation with the corresponding risk of precipitating an attack of angle-closure glaucoma in an anatomically susceptible individual. There are two main subtypes of glaucoma: open-angle and angle-closure. Open-angle glaucoma accounts for over 90% of all glaucoma and is akin to essential hypertension affecting the eye. The condition progresses slowly over months to years and typically affects patients over 60 years of age.⁷ Symptoms first become apparent through mid-peripheral visual field loss; however, few patients progress to total blindness. Treatment is usually with long-term medication (eye-drops) aimed at reducing the intraocular pressure.⁷ Open-angle glaucoma is not affected by *hyoscine*.¹¹

Angle-closure glaucoma occurs in an eye with pre-existing anatomical abnormality (the eye is relatively small and/or the lens is relatively large) which results in crowding of the anterior part of the eye with subsequent susceptibility to compromise in the drainage of aqueous fluid. Sudden dilatation of the pupil (eg, with anti-cholinergic agents such as *hyoscine*) can cause interruption to fluid drainage, with a consequent acute increase in the intraocular pressure; this can precipitate an attack of angle-closure glaucoma.⁷ The elevation in intraocular pressure initially causes ocular or brow ache, halos in the vision and a red eye. Nausea and vomiting occur later followed by severely reduced vision.¹¹ The cornea becomes hazy, and typically, the pupil is fixed in mid-dilatation. Prompt action is required to reduce the intraocular pressure in order to prevent permanent loss of vision.¹¹ Intravenous and topical medications lower the pressure, and ultimately, laser iridotomy is required to prevent recurrence.

The contralateral eye may also be at increased risk of future angle-closure attacks, and thus, definitive laser treatment is given to both eyes at the first presentation.¹¹

BSG guidelines currently advocate that *hyoscine* is used with caution or avoided completely in individuals with a prior history of angle-closure glaucoma.⁵ As discussed above, however, neither the patient with chronic open-angle glaucoma nor the patient with the history of angle-closure glaucoma are at risk of acute glaucoma from *hyoscine* administration.

Our survey has demonstrated that the majority of colonoscopists who responded use *hyoscine* during colonoscopy (85%), and 67% stated they were aware of the BSG guidelines pertaining to its use. Only 19% of respondents who were aware of the guidelines, however, differentiate between open-angle and angle-closure subtypes, and 70% would (incorrectly) withhold *hyoscine* should the patient have had any form of glaucoma in the past.

Similar inconsistency in advice around administration of *hyoscine* has previously been identified by radiologists.¹¹ In 1995, Fink and Aylward reported that >80% of fellows of the Royal College of Radiologists would withhold *hyoscine* if the patient gave a positive history of glaucoma (either form).¹² In that survey, nearly 90% of radiologists reported substituting *glucagon* for *hyoscine*; in our study, 78% of colonoscopists who were aware of the BSG guidelines reported that they do not routinely offer a substitute antispasmodic if they feel *hyoscine* is contra-indicated.

An absolute benefit of *hyoscine* use in colonoscopy has not been conclusively determined. In a trial setting, administration of *hyoscine* during colonoscopy has been found to result in less colonic spasm, with quicker insertion and increased ease of the procedure.³ *Hyoscine* administration has also been found to increase ease of ileal intubation and length of ileum visualised, and decrease the pain associated with colonoscopy.¹ *Hyoscine* reduces colonic muscle spasm and, in a randomised controlled trial, a trend towards an increased colonic polyp detection rate was found among subjects experiencing marked colonic spasm upon colonoscope insertion, but subsequently displaying a good response to *hyoscine* administration.¹² As adenoma detection rate is a key marker of colonoscopy quality, it could be inferred that *hyoscine* use may lead to improved colonoscopy performance.¹³

These positive effects have not been uniformly replicated, however.^{14 15} Mui and colleagues documented an increased rate of haemodynamic instability among patients given *hyoscine*; furthermore, fewer patients declared themselves willing to have a repeat procedure after having been given *hyoscine*.¹⁷

Recording of the use of intravenous *hyoscine* to facilitate colonoscopy has recently been recommended as a colonoscopy quality indicator within the NHS Bowel Cancer Screening Programme.²

Conclusions

The majority of colonoscopists responding to this survey use *hyoscine* in their practice, but do not differentiate between forms of glaucoma before deciding to withhold it. In our opinion, current BSG guidelines pertaining to *hyoscine* use and a history of angle-closure glaucoma are inappropriate. Patients who might develop acute glaucoma after *hyoscine* administration are also not currently receiving appropriate advice concerning the action to take if they do develop ophthalmic symptoms. We suggest that the guidelines should be revised. Further study is required to clarify the role of *hyoscine* during intestinal endoscopy.

Competing interests None.

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