

## The Use of Butyl Bromide Medication amid Colonoscopy

Fadi Mohammed Albulayhishi<sup>1</sup>, Ibrahim Abdulkarim Alsayegh<sup>2</sup>, Asaad Abdellahi Bilal<sup>3</sup>, Abdullah Sami Dahlawi<sup>4</sup>, Hanan Rashed Hassan Alsohabi<sup>5</sup>, Alzayer Mohammed Ali y<sup>6</sup>, Norah Mohammed H Alharthi<sup>7</sup>, Hassan Saud Alshehri<sup>4</sup>, Abrar Ghazi A Najjar<sup>8</sup>, Saber Mutlaq Baseem<sup>9</sup>, Redwan Muneer A Farghal<sup>10</sup>, Rami Mohammed Hamed Almutairi<sup>11</sup>

1- King Faisal University , 2- King Fahad Specialist Hospital Buraydah , 3- ( General Practitioner ) King Abdulaziz University , 4- King Abdulaziz University , 5- South Qunfuda General Hospital , 6- Imam Abdulrahman Bin Faisal University , 7- Arabian Gulf University, 8- Umm Alquraa University , 9- Aljouf University , 10- University Of Jeddah , 11- \*Ohud\* Hospital Medina

### ABSTRACT

**Objective:** the hyoscine-n-butylbromide (Buscopan) is ought to be avoided during colonoscopy in patients with a history of angle-closure glaucoma. Angle-closure glaucoma, nonetheless, 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.

**Purpose:** the purpose of this study was to evaluate the use of hyoscine amid colonoscopists, with certain reference to glaucoma. **Materials and Methods:** a short questionnaire was electronically managed to members of the Saudi Society of Gastroenterology and the Association of Coloproctology of KSA. The use of Hyoscine among colonoscopists and the effect of glaucoma history upon the prescribing practice.

**Results:** sixty-three colonoscopists responded to some or all of the questions. 41/61 (67.2%) of respondents claimed they were aware of the guidelines. 53/62 (85.5%) sometimes or always use hyoscine, while 9/62 (14.5%) never do. 45/59 (76.3%) always enquire about glaucoma history prior to administration, even though 48/58 (82.8%) make no differentiation between open-angle or angle-closure forms. 42/59 (71.2%) would (incorrectly) withhold hyoscine if the patient declares a history of any form of glaucoma. 46/59 (78.2%) do not substitute glucagon as an antispasmodic. 2/60 (3.3%) had encountered ophthalmic complications post-administration. **Conclusions:** current guidelines pertaining to hyoscine use and glaucoma are inappropriate. Patients undergoing colonoscopy who have received hyoscine should, instead, be advised to seek urgent medical advice if they develop ophthalmic symptoms.

**Keywords:** butyl bromide , Colonoscopy.

### INTRODUCTION

Colonoscopy is the process of choice for the analysis of patients with suspected ailment of the colon and/or terminal ileum<sup>(1)</sup>. It is similarly utilized within bowel cancer screening programmes to aid detection of colorectal neoplasia<sup>(2)</sup>. The anticholinergic drug, hyoscine-n-butylbromide (Buscopan) is a smooth muscle relaxant frequently utilized in endoscopic procedures to decrease gastrointestinal spasm. Advocates of the utilization of hyoscine believe that it facilitates a complete colonoscopy and may similarly help in other endoscopic procedures, for example, endoscopic retrograde cholangiopancreatography<sup>(3,4)</sup>.

Current guidelines state that a past medical and drug history ought to be attained from all patients before commencing any procedure, and that hyoscine ought to be utilized with caution or avoided completely in patients with a history of angle-closure glaucoma<sup>(5)</sup>. Intravenous glucagon can, as an alternative, be substituted for hyoscine if an antispasmodic is needed<sup>(2)</sup>.

Glaucoma is a mutual eye condition that affects many people around the world<sup>(6)</sup>. The

sickness is defined as an optic neuropathy resultant in both structural and functional defects within the eye (optic disc damage and visual field loss). There are two main forms of the illness; open-angle and angle-closure. Due to its anatomical basis, angle-closure glaucoma can be precipitated by hyoscine administration; open-angle glaucoma, nonetheless, cannot. When an attack of angle-closure glaucoma does arise the patient regularly has had no prior clinical history, and the consequent treatment (iridotomy) is definitive<sup>(7)</sup>. We believe that the current guidelines are confusing, as by definition the patient at risk of developing angle-closure glaucoma will have no prior history and, furthermore, 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, consequently, if clinicians do not differentiate between the two forms of glaucoma, hyoscine might be suspended incorrectly, accordingly potentially decreasing the chances of a complete colonoscopy.

The purpose of the present study is to evaluate the current utilization of hyoscine amid

Saudi colonoscopists. In specific, we meant to examine what effect any history of glaucoma may have on prescribing practice.

### MATERIALS AND METHODS

A nine-point questionnaire was developed following consultation between colleagues from the departments of endoscopy and ophthalmology within our trust. A short questionnaire was electronically managed to members of the Saudi Society of Gastroenterology and the Association of Coloproctology of KSA. Hyoscine use among colonoscopists, and effect of glaucoma history upon prescribing practice. The survey was advertised through the endoscopy section. Association of Coloproctology of KSA consultant members was also sent an email requesting that they complete the survey. The survey was live from November 2016 until April 2017. The Mann–Whitney U test was utilized to specify

significance (at the 95% level) where comparisons between groups of responses were made. **The study was done according to the ethical board of King Abdulaziz university.**

### RESULTS

Sixty-three colonoscopists responded to some or all of the questions. 41/61 (67.2%) of respondents claimed they were aware of the guidelines. 53/62 (85.5%) sometimes or always use hyoscine, while 9/62 (14.5%) never do. 45/59 (76.3%) always enquire about glaucoma history prior to administration, even though 48/58 (82.8%) make no differentiation between open-angle or angle-closure forms. 42/59 (71.2%) would (incorrectly) withhold hyoscine if the patient declares a history of any form of glaucoma. 46/59 (78.2%) do not substitute glucagon as an antispasmodic. 2/60 (3.3%) had encountered ophthalmic complications post-administration.

**Table 1.** Questionnaire with subsequent responses

Question number	Question	Respondents	Answer options	Response count	%
1	Do you give patients Buscopan during gastrointestinal endoscopy?	62	Always	7	11,3%
			Sometimes	46	74,2%
			Never	9	14,5%
2	Before administering Buscopan, do you routinely enquire about the patient's past medical history and drug history?	60	Always	50	83,3%
			Sometimes	6	10,0%
			Never	4	6,7%
3	Are you aware of the British Society of Gastroenterology guidelines concerning the use of anti-cholinergic agents in endoscopy?	61	Yes	41	67,2%
			No	20	32,8%
4	Have you ever had a patient develop cardiovascular complications following the administration of Buscopan?	60	Yes	5	8,3%
			No	55	91,7%
5	Have you ever had a patient develop an acutely painful red eye requiring intervention post-Buscopan administration?	60	Yes	2	3,3%
			No	58	96,7%
6	Do you routinely enquire about any history of glaucoma before administering Buscopan?	59	Yes	45	76,3%
			No	14	23,7%
7	When enquiring about glaucoma history, do you routinely differentiate between open- and closed-angle glaucoma?	58	Yes	10	17,2%
8	If the patient gives a positive history for glaucoma do you still give Buscopan?	59	No	48	82,8%
			Yes	3	5,1%
			Never	42	71,2%
			Depends on which form	14	23,7%
9	Do you routinely substitute glucagon for Buscopan® if the patient has contraindications to its use?	59	Yes	13	22,0%
			No	46	78,0%

Of those respondents who stated that they were aware of the guidelines, 80.5% stated that they routinely enquire about a history of glaucoma prior to administering the drug. This compared with 68.5% of those who stated they were not aware of the guidelines ( $p=0.079$ ). In spite of 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 declares a history of any form of glaucoma. This compared with 13.8% and 71.7%, respectively, in the group who stated they were unaware of the guidelines ( $p=0.368$  and  $p=0.795$ , 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 2 of 60 total respondents (3.3%) had encountered ophthalmic complications post-administration.

### Discussion

Hyoscine-*n*-butylbromide is an ammonium derived of hyoscine, an alkaloid created by the Solanaceae family of plants<sup>[8]</sup>. It competes with acetylcholine producing an antagonist effect on the muscarinic receptors of the parasympathetic system<sup>[9,10]</sup>. 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<sup>[11]</sup>.

Hyoscine has a number of potential side effects affecting to its anticholinergic action. One such effect is pupillary dilatation with the consistent danger of precipitating an attack of angle-closure glaucoma in anfunctionally susceptible individual. There are two leading subtypes of glaucoma: open-angle and angle-closure. Open-angle glaucoma accounts for over 90% of all glaucoma and is similar to necessary hypertension affecting the eye. The condition evolvments slowly over months to years and naturally affect patients over 60 years of age<sup>[7]</sup>. Symptoms first become apparent through mid-peripheral visual field loss; nonetheless, few patients progress to total blindness. Treatment is usually with long-term medication (eye-drops) aimed at reducing the intraocular pressure<sup>[7]</sup>. Open-angle glaucoma is not affected by hyoscine<sup>[11]</sup>.

Angle-closure glaucoma occurs in an eye with pre-existing anatomical irregularity (the eye is relatively small and/or the lens is comparatively large) which consequences in crowding of the anterior part of the eye with consequent susceptibility to compromise in the drainage of

aqueous fluid. Sudden dilatation of the pupil (e.g., with anti-cholinergic agents such as hyoscine) may cause interruption to fluid drainage, with a consequent acute rise in the intraocular pressure; this can precipitate an attack of angle-closure glaucoma<sup>[7]</sup>. 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. The cornea becomes hazy, and typically, the pupil is fixed in mid-dilatation. Prompt action is needed to decrease the intraocular pressure in order to avoid permanent loss of vision. Intravenous and topical medications lower the pressure, and eventually, laser iridotomy is necessary to avoid recurrence. The contralateral eye might similarly be at increased hazard of future angle-closure attacks, and accordingly, definitive laser management is given to both eyes at the first presentation<sup>[11]</sup>. Guidelines presently advocate that hyoscine is used with carefulness or avoided completely in individuals with a prior history of angle-closure glaucoma<sup>[5]</sup>. As discussed above, conversely, neither the patient with chronic open-angle glaucoma nor the patient with the history of angle-closure glaucoma are at danger of acute glaucoma from hyoscine management.

Similar irregularity in advice around management of hyoscine has earlier been recognized by radiologists<sup>[11]</sup>. In 1995, Fink and Aylward<sup>(12)</sup> 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)<sup>[12]</sup>. In that survey, approximately 90% of radiologists reported substituting glucagon for hyoscine; in the present study, 78% of colonoscopists who were aware of the guidelines reported that they do not routinely offer a substitute antispasmodic if they feel hyoscine is contra-indicated. A total benefit of hyoscine utilization in colonoscopy has not been decisively determined. In a trial setting, management of hyoscine throughout colonoscopy has been found to result in less colonic spasm, with quicker insertion and increased ease of the procedure<sup>[4]</sup>. Hyoscine management has likewise been found to increase ease of ileal intubation and length of ileum visualized, and reduce the pain related with colonoscopy. Hyoscine decreases colonic muscle spasm and, in a randomised controlled trial, a trend towards an increased colonic polyp detection rate was found amid subjects suffering marked colonic spasm upon colonoscope insertion, but consequently displaying a good response to hyoscine management<sup>[12]</sup>. As adenoma detection rate is a key marker of

colonoscopy quality, it can be inferred that hyoscine use might lead to enhanced colonoscopy performance<sup>[13]</sup>.

These positive effects have not been consistently replicated<sup>[14, 15,16]</sup>, nonetheless, **Mui et al.**<sup>[17]</sup> documented an increased rate of haemodynamic uncertainty between patients given hyoscine; moreover, fewer patients acknowledged themselves ready to have a repeat process after having been given hyoscine<sup>[17]</sup>. Recording of the utilization of intravenous hyoscine to facilitate colonoscopy has lately been suggested as a colonoscopy quality indicator within the NHS Bowel Cancer Screening Programme<sup>[2]</sup>.

## CONCLUSIONS

The majority of colonoscopists responding to this survey use hyoscine in their practice, but do not distinguish between forms of glaucoma before determining to withhold it. In our judgment, present guidelines relating to hyoscine utilization and a history of angle-closure glaucoma are unsuitable. Patients who may develop acute glaucoma after hyoscine management are correspondingly not currently getting suitable advice regarding the action to take if they do develop ophthalmic symptoms. We propose that the guidelines should be revised. Further study is needed to elucidate the role of hyoscine throughout intestinal endoscopy.

## REFERENCES

- Misra SP, Dwivedi M (2007):** Role of intravenously administered hyoscine butyl bromide in retrograde terminal ileoscopy: a randomized, double-blinded, placebo-controlled trial. *World J Gastroenterol.*, 2007;13:1820–3.
- Lee TJ, Rutter MD, Blanks RG et al. (2012):** Colonoscopy quality measures: experience from the NHS Bowel Cancer Screening Programme. *Gut*, 2012; 61:1050–7.
- Chang FY, Guo WS, Liao TM et al.(1995):** A randomized study comparing glucagon and hyoscine N-butyl bromide before endoscopic retrograde cholangiopancreatography. *Scand J Gastroenterol* .,30:283–6.
- Saunders BP, Williams CB(1996):** Premedication with intravenous antispasmodic speeds colonoscope insertion. *Gastrointest Endosc* .,43:209–11.
- Bell GD, Quine A(2006):** Cardiopulmonary and sedation-related complications. In: *Complications of gastrointestinal endoscopy.* Society of Gastroenterology 2006. [f.i-md.com/medinfo/material/475/.../4ea7cdb844aebf27f87d9479.pdf](http://f.i-md.com/medinfo/material/475/.../4ea7cdb844aebf27f87d9479.pdf)
- National Institute for Health and Clinical Excellence(2013):** Glaucoma: diagnosis and management of chronic open angle glaucoma and ocular hypertension. Clinical Guideline CG85. <http://www.nice.org.uk/CG85>
- Quigley HA(2011):** Glaucoma. *Lancet* ,377:1367–77.
- Shutt LE, Bowes JB(1979):** Atropine and hyoscine. *Anaesthesia* ,34:476–90.
- Cittadini G, Sardanelli F, De Cicco E et al. (1998):** Compared effect of a genetically engineered glucagon and hyoscine N-butylbromide on double-contrast barium meal study. *Eur Radiol* .,8:449–53.
- Roach SC, Martin OJ, Owen A et al.(2001):** Blood pressure changes during barium enema. *Clin Radiol* .,56:393–6.
- Dyde, Chapman AH, Gale R et al.(2008):** Precautions to be taken by radiologists and radiographers when prescribing hyoscine- N-butylbromide. *Clinical Radiology*, 63:739–743.
- Fink AM, Aylward GW(1995):** Buscopan and glaucoma: a survey of current practice. *Clin Radiol* .,50:160–4.
- Marshall JB, Patel M, Mahajan RJ et al.(1999):** Benefit of intravenous antispasmodic (hyoscyamine sulfate) as premedication for colonoscopy. *Gastrointest Endosc.*, 49:720–6.
- Millan MS, Gross P, Manilich E et al.(2008):** Adenoma detection rate: the real indicator of quality in colonoscopy. *Dis Colon Rectum* ,51:1217–20.
- Lee JM, Cheon JH, Park JJ et al.(2010):** Effects of Hyosine N-butyl bromide on the detection of polyps during colonoscopy. *Hepatogastroenterology* ,57:90–4.
- Yoong KY, Perkin D, Portal J et al.(2004):** Intravenous hyoscine as a premedication for colonoscopy: a randomized double-blind controlled trial. *Endoscopy*, 36:720–2.
- Mui LM, Ng EK, Chan KC et al. (2004):** Randomized, double-blinded, placebo-controlled trial of intravenously administered hyoscine N-butyl bromide in patients undergoing colonoscopy with patient-controlled sedation. *Gastrointest* ., 59:22–7.