Original Article

Canadian Association of Gastroenterology (CAG) Position Statement on the Use of Hyoscine-\textit{n}-butylbromide (Buscopan) During Gastrointestinal Endoscopy

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ABSTRACT

Hyoscine butylbromide, also known as hyoscyamine or scopolamine, and sold under the trade name Buscopan, is an antimuscarinic agent commonly used to induce smooth muscle relaxation and reduce spasmodic activity of the gastrointestinal (GI) tract during endoscopic procedures. However, the balance between desirable and undesirable (adverse) effects is not clear when used during GI endoscopy. The Clinical Affairs Committee of the Canadian Association of Gastroenterology (CAG) conducted systematic reviews and applied the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach to develop recommendations for the use of Buscopan during GI endoscopy. To summarize, we recommend against the use of Buscopan before or during colonoscopy (strong recommendation, high certainty of evidence). We suggest against the use of Buscopan before or during gastros-copy (conditional recommendation, very low certainty of evidence). We suggest the use of Buscopan before or during ERCP (conditional recommendation, very low certainty of evidence). More research is needed to determine whether patients undergoing advanced procedures such as endoscopic mucosal resection or endoscopic submucosal dissection benefit from its use. Buscopan should be used with caution in patients with cardiac comorbidities. According to its product monograph, Buscopan is contraindicated in patients with tachycardia, angina, and cardiac failure. Thus, Buscopan should be used very cautiously in patients with these conditions, and only when the potential benefits of its use outweigh the potential risks in a particular case. Such patients require careful cardiac monitoring in an environment where resuscitation equipment and appropriately trained staff to use it are readily available. According to its product monograph, Buscopan is contraindicated in patients with tachycardia, angina, and cardiac failure. Thus, Buscopan should be used very cautiously in patients with these conditions, and only when the potential benefits of its use outweigh the potential risks in a particular case. Obtaining a preprocedural history of glaucoma is unlikely to be of value when considering Buscopan use. However, in cases where Buscopan has been used, patients should be counselled postprocedurally and told to present to an emergency facility should they experience eye pain, redness, decreased vision, nausea and vomiting or headache.

Keywords: Adverse events; Buscopan; Endoscopy; Quality
Introduction

Hyoscine butylbromide, also known as hyoscyamine or scopolamine, and sold under the trade name Buscopan, is an antimuscarinic agent commonly used to induce smooth muscle relaxation and reduce spasmodic activity of the gastrointestinal (GI) tract. As such, its use is prevalent in GI endoscopy, and colonoscopy in particular, where quality of the procedure is largely driven by metrics such as adenoma detection rate (ADR) (1) that are related to optimizing mucosal visualization. This is evidenced by a survey from the United Kingdom indicating that over 85% of gastroenterologists endorse using it at least occasionally during colonoscopy (2). In advanced procedures such as endoscopic retrograde cholangiopancreatography (ERCP), Buscopan and other antispasmodics are frequently employed to reduce small bowel spasm, thus allowing for more facile cannulation of the papilla(e) (3) and reducing adverse event (AE) rates (4).

Though generally well-tolerated, the use of Buscopan is accompanied by rare but potentially serious AEs. Due to its anticholinergic properties, Buscopan can precipitate acute angle closure glaucoma, an ophthalmologic emergency (5), though this risk does not appear to exist for patients with open angle glaucoma. The Canadian Glaucoma Society (CGS) issued a recent position statement on the use of Buscopan in endoscopic procedures (6). They concluded that the practice of inquiring about a medical history of glaucoma is of limited value, given that those at risk are either asymptomatic and unaware, or would have already been treated (6). The CGS and others have therefore proposed that patients should instead be counseled appropriately after Buscopan use regarding possible eye pain, redness, decreased vision, nausea and vomiting, or headache (6,7). However, other AEs have also been reported with Buscopan use, including tachycardia and/or hypotension (8), along with other features of the anticholinergic toxidrome. Therefore, its use in patients with cardiac conditions (including but not limited to coronary artery disease, congestive heart failure and arrhythmia) or tachycardia at the time of endoscopy is also not advised by some organizations (9).

Inconsistent results regarding the use of Buscopan in colonoscopy have been reported from several observational (10–12) and randomized controlled trials (RCTs) (13,14) as well as multiple meta-analyses (15–17). Given an unclear risk-benefit profile for this commonly employed medication in the context of endoscopy, we performed our own systematic review and meta-analysis of RCTs assessing the impact of Buscopan use (versus placebo) on endoscopic outcomes in order to inform the current Canadian Association of Gastroenterology (CAG) position statement. An overview of our methodology is provided in the Supplementary Materials. Our results are summarized herein according to endoscopic procedure types.

**COLONOSCOPY**

Outcomes of primary interest to us for colonoscopy were polyp detection rate (PDR), cecal intubation rate (CIR), cecal intubation time (CIT) and AEs. PDR and AEs were rated as critical for decision-making, whereas CIR was rated as important but not critical, and CIT was rated as an outcome of limited importance for decision-making. However, given that CIT might nevertheless be important to some patients, endoscopists and/or endoscopy units, this outcome was retained for analysis. Thirteen RCTs were included, in which the risk of bias was low overall (Figure 1). Results of meta-analyses for non-adverse event outcomes are presented in forest plots in Figure 2. Overall, there was no benefit of Buscopan on PDR, with a rate ratio (RR) of 1.03 (95% confidence intervals [CI] 0.95 to 1.10) based on...
pooled data from 10 RCTs representing 2,884 colonoscopies. Similarly, no improvement in CIR was observed (RR 1.00, 95% CI 0.97 to 1.03). There was also no impact on CIT, with a mean difference of 0.58 minutes less (95% CI 1.23 minutes less to 0.08 minutes more) with Buscopan based on pooled data from 9 RCTs. Heterogeneity for these analyses was absent ($I^2 = 0\%$), moderate ($I^2 = 39\%$) and substantial ($I^2 = 65\%$), respectively (18). Based on this meta-analysis, the Grading of Recommendations Assessment, Development and Evaluation (GRADE) framework (19) was employed to arrive at a final recommendation with regard to Buscopan use in screening-related colonoscopy, provided in the “Recommendations” section. An additional RCT comparing Buscopan to glucagon showed no differences in clinical outcomes including CIT, but significantly higher rates of tachycardia with Buscopan (20). From our review, no study has specifically assessed Buscopan use in endoscopic mucosal resection (EMR) or endoscopic submucosal dissection (ESD).

A)  

| Study or Subgroup | Buscopan | Placebo | Risk Ratio |
|-------------------|----------|---------|------------|
| Saunders 1996     | 8        | 29      | 1.86       |
| Mui 2004          | 20       | 60      | 0.87       |
| Byun 2009         | 47       | 103     | 1.29       |
| Lee 2010          | 20       | 58      | 1.33       |
| Corte 2012        | 130      | 303     | 1.19       |
| de Brouwer 2012   | 190      | 340     | 0.93       |
| Rondonotti 2013   | 78       | 202     | 1.04       |
| Dint 2016         | 17       | 60      | 0.96       |
| Ristikankare 2016 | 45       | 74      | 0.99       |
| Dos Santos 2017   | 145      | 220     | 1.02       |

Total (95% CI)      | 1449     | 1435    | 1.03

Heterogeneity: $\tau^2 = 0.00$; $\chi^2 = 8.92$, df = 9 ($P = 0.44$); $I^2 = 0\%$
Test for overall effect: $Z = 0.70$ ($P = 0.48$)

B)  

| Study or Subgroup | Buscopan | Placebo | Risk Ratio |
|-------------------|----------|---------|------------|
| Marshall 1999     | 54       | 56      | 1.03       |
| Young 2004        | 59       | 61      | 1.11       |
| Mui 2004          | 55       | 60      | 0.98       |
| Chaptini 2008     | 50       | 50      | 1.00       |
| de Brouwer 2012   | 322      | 340     | 0.96       |
| Ristikankare 2016 | 74       | 74      | 1.01       |
| Dint 2016         | 69       | 75      | 1.00       |

Total (95% CI)      | 716      | 708     | 1.00

Heterogeneity: $\tau^2 = 0.00$; $\chi^2 = 9.85$, df = 6 ($P = 0.13$); $I^2 = 39\%$
Test for overall effect: $Z = 0.00$ ($P = 1.00$)

C)  

| Study or Subgroup | Mean | SD   | Total | Mean | SD   | Total | Mean Difference |
|-------------------|------|------|-------|------|------|-------|------------------|
| Saunders 1996     | 13   | 4.25 | 29    | 17.5 | 6.5  | 27    | -4.50 [-7.40, -1.60] | 1996 |
| Marshall 1999     | 11.6 | 8.1  | 57    | 15.1 | 10.4 | 59    | -3.50 [-6.89, -0.11] | 1999 |
| Mui 2004          | 12.2 | 6.96 | 60    | 9.74 | 5.6  | 60    | 2.46 [0.20, 4.72]    | 2004 |
| Young 2004        | 9.7  | 6.125| 61    | 8.3  | 7.95 | 56    | 5.00 [-1.19, 3.99]   | 2004 |
| Chaptini 2008     | 5.7  | 2.5  | 50    | 5.9  | 2.8  | 50    | 0.60 [-1.24, 0.84]   | 2008 |
| Corte 2012        | 9.5  | 6.96 | 303   | 10    | 6.74 | 298   | 14.11 [8.50, -6.06]  | 2012 |
| Rondonotti 2013   | 5.9  | 3.8  | 202   | 6.3  | 4.3  | 200   | 17.44 [-6.40, -1.19] | 2013 |
| Ristikankare 2016 | 9.3  | 0.7  | 74    | 10.2 | 0.6  | 75    | -0.09 [-1.11, -0.09] | 2016 |
| Dint 2016         | 10   | 3    | 60    | 11    | 4    | 61    | 12.55 [-2.26, 2.26]  | 2016 |

Total (95% CI)      | 896    | 886   | 100.0%| -0.58 [-1.23, 0.08]|

Heterogeneity: $\tau^2 = 0.48$; $\chi^2 = 22.92$, df = 8 ($P = 0.003$); $I^2 = 65\%$
Test for overall effect: $Z = 1.73$ ($P = 0.08$)

Figure 2. Forest plot comparing use of Buscopan versus placebo in terms of (A) polyp detection rate (PDR), (B) cecal intubation rate (CIR), and (C) cecal intubation time (CIT) in minutes, using data from randomized controlled studies in patients undergoing colonoscopy. $I^2 = 0\%$ (95% CI = 0% to 61%).
ERCP

Far fewer studies are available regarding the use of Buscopan in ERCP. Our review revealed a 2017 RCT comparing Buscopan to the combination of glucagon and nitroglycerin during ERCP in 455 patients. The Buscopan group experienced significantly lower cannulation success, higher cannulation times and higher rates of post-ERCP pancreatitis (PEP), but this study was limited by the lack of a placebo arm, and therefore, it is difficult to draw conclusions regarding the efficacy of Buscopan compared to no intervention (21). A 2007 RCT assessed whether the addition of preprocedural sublingual Buscopan (versus placebo) reduced the amount of ‘rescue’ glucagon required to reduce peristalsis during the procedure. No significant differences were observed between groups in the amount of glucagon required, success rates or AE rates (22); however, it is again difficult to draw conclusions regarding Buscopan’s efficacy based on the study design that utilized ‘rescue’ glucagon, especially given that parametric statistical tests were incorrectly used to compare the amount of ‘rescue’ glucagon for a strongly skewed distribution due to a large proportion of patients receiving zero amount (evident from the fact that the standard deviation was larger than the mean value). A 1997 RCT comparing Buscopan directly to glucagon found no significant differences in procedural difficulty between groups, with significantly lower costs associated with Buscopan (23).

Table 1. Incidence of tachycardia from studies comparing Buscopan to placebo

| Author, year  | Buscopan | Placebo | Definition of tachycardia |
|---------------|----------|---------|---------------------------|
|               | Events/number of participants | Mean HR before→after | Events/number of participants | Mean HR before→after |
| Saunders 1996 * | 0/29 | 0/27 | Not defined |
| Mui 2004 | 33/60 | 2/60 | HR > 100 for any duration |
| Byun 2009 | HR increased, ‘P = 0.000’ (n = 103) | Implied that HR was not increased (n = 102) |
| Corte 2012 | 1/303 | 0/298 | Not defined |
| Rondonotti 2013 | 6/202 | 1/200 | HR > 140 for more than 30 sec |
| De Brouwer 2012 | 0/340 | 0/334 | HR > 120 for any duration |
| Dinc 2016 | 76 → 100 (n = 60) | 82 → 81 (n = 61) | N/A |
| Ristikankare 2016 | 13/74 | 0/75 | HR > 120, duration undefined |
| Dos Santos 2017 | 3/220 | 0/220 | HR > 140 for any duration |
| Marshall 1999 | 10/37 | 1/33 | HR > 100 for any duration |
| Yoong 2004 * | 0/61 | 0/56 | Not defined |
| Chaptini 2008 | 77→81, ‘nonsignificant’ n = 50 | 79→83 n = 50 | N/A |
| Misra 2007 | 86→93, ‘P < 0.01’ n = 100 | 86→87 n = 100 | N/A |
| Total events (unweighted) | 66/1326 | 4/1303 | |

HR, heart rate; N/A, not applicable.
*Two studies did not clearly set out to measure AEs a priori—simply mentioned ‘no AEs’ in the text.
other RCTs have also reported similar performances between Buscopan and glucagon for ERCP (3,24). Of note, meta-analysis was not performed of these latter three studies given significant differences in study designs and outcome measures.

Overall, the evidence for the efficacy of Buscopan compared to placebo in ERCP was not sufficient to inform the direction of a recommendation. However, there is low to moderate certainty of evidence that Buscopan and glucagon have comparable efficacy in ERCP. By way of a post hoc decision, we utilized a nonquantitative network approach to obtain indirect evidence. We performed a supplementary literature search in PubMed for RCTs comparing glucagon to placebo in ERCP on August 15, 2021. We identified one RCT (published in abstract form) that compared two different glucagon dosing methods (drip infusion during the procedure or single dose of 1 mg at the time of scope insertion) to placebo and found significantly higher cannulation success rates without the need for additional glucagon dosing in the glucagon groups (98% in the drip infusion group, 92% in the single dose group and 38% in the placebo group) (25). Therefore, there is direct evidence of superior performance of glucagon compared to placebo, and direct evidence of similar performances between Buscopan and glucagon. Through a non-quantitative network approach and the assumption of transitivity, this constitutes indirect evidence that Buscopan is likely superior to placebo for the outcomes of reduced peristalsis and cannulation success during ERCP.

It should be noted that currently, Buscopan is commonly used during ERCP when peristalsis is interfering with successful cannulation, given that cannulation-related adverse events are well-established (26,27). Thus, most conservative and relatively low-cost interventions are frequently employed if there is direct or indirect evidence they can serve to mitigate these AEs. The collective (unpublished) experience of the panel members who perform ERCP (N.F., M.B., FT) confirm that Buscopan appears to inhibit duodenal motility and improve the view of the papilla during ERCP.

**GASTROSCOPY**

Based on our review, scarce evidence exists assessing Buscopan’s impact on upper endoscopic procedures, which is understandable given the relatively short associated procedure time combined with a lack of need for prolonged close mucosal inspection or fine endoscope and/or instrument control. In a recent large propensity-matched observational study, Buscopan use during upper endoscopy was not associated with improved detection of esophageal, gastric or duodenal neoplasia, adenoma or cancer (28). Furthermore, an observational study

![Relative risk meta-analysis plot (random effects)](image)

**Figure 3.** Forest plot comparing use of Buscopan versus placebo in terms of tachycardia, using data from randomized controlled studies in patients undergoing colonoscopy.
from 1998 demonstrated that Buscopan use was not associated with improved patient comfort during upper endoscopy (29).

### ADVERSE EVENTS

We systematically extracted data on AEs from the included RCTs that assessed Buscopan in patients undergoing colonoscopy. None of the studies reported any cases of acute glaucoma; 0/1579, 95% CI calculated with the rule of 3/n for zero events 0% to 0.2% (30). With regard to the other reported AEs, most of them were of questionable clinical importance. Furthermore, the definitions of AEs differed among studies and many of them excluded patients with cardiac comorbidities (i.e., the patients who would be more likely to suffer clinical consequences in case of an AE). The AE that was most consistently reported was tachycardia (Table 1). Buscopan use increased the heart rate and caused tachycardia more frequently than placebo. Meta-analysis of the results of the RCTs that reported event rates for tachycardia is presented in forest plot in Figure 3: RR 10.65, 95% CI 4.49 to 25.28 without heterogeneity ($I^2 = 0\%$).

Given the paucity of reported data on other adverse events in the studies that assessed Buscopan in patients undergoing endoscopic procedures, we conducted a supplementary search for systematic reviews that reported adverse events associated with Buscopan use in other populations (Supplementary Materials). We identified eight review articles, and these are summarized in Table 2. Given the indirectness of the populations and the intervention (oral dose and repeated dosing for several weeks in most studies), the only consistent AE was tachycardia. However, AEs have not been systematically assessed and reported in most studies.

We also conducted a search of the post-marketing surveillance programs in the United Kingdom, the United States, and Canada for serious adverse events associated with the use of

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**Table 2.** Summary of review articles reporting adverse events associated with Buscopan use in other populations

| Author, year | Systematic or narrative review | Population | Indirectness of the population | Additional contributors to indirectness | AEs studied |
|--------------|-------------------------------|------------|-------------------------------|----------------------------------------|-------------|
| Aboshama 2020 | SR | Women of childbearing age undergoing hysterosalpingography for infertility | Not serious | - | nausea/vomiting, dizziness |
| Mohaghegh 2020 | SR | Women in active phase of labor | Serious | - | Tachycardia, dry mouth |
| Rohwer 2013 | SR | Women in active phase of labor | Serious | - | Tachycardia |
| Martinez-Vazquez 2012 | SR | IBS patients | Not serious | Oral route; daily administration for several weeks | All AEs reported together (not separated) (one study only) |
| Ford 2008 | SR | IBS patients | Not serious | Oral route; daily administration for several weeks | Not pooled (too few) |
| Tytgat 2008 | Narrative | Abdominal spasm and peri-procedural | Not serious | - | Visual disturbance, tachycardia |
| Tytgat 2007 | Semi-narrative (combines two RCTs for AEs) | Abdominal pain/cramping | Not serious | Oral route; daily administration for 3–4 weeks | Extensive list based on combined AEs from two RCTs |
| Dyde 2008 | Narrative | Radiologic procedures | Not serious | - | Arrhythmia, cardiac events, visual disturbance, glaucoma, urinary retention, myaesthenia |

AE, adverse event; IBS, irritable bowel syndrome; RCT, randomized controlled trial; SR, systematic review.

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Table 3. GRADE summary of findings table (19) for randomized trials comparing Buscopan versus placebo for colonoscopy

| Certainty assessment | Number of events/patients | Effect | Certainty | Importance |
|----------------------|---------------------------|--------|-----------|------------|
|                      | Buscopan | Placebo | Relative (95% CI) | Absolute (95% CI) |          |
| Polyp detection rate (PDR) | 10 Randomized trials | Not serious | Not serious | Not serious | None |
|                       | 700/1449 (48.3%) | 665/1435 (46.3%) | RR 1.03 (0.95 to 1.10) | 14 more per 1,000 (from 23 fewer to 46 more) |
| Cecal intubation rate (CIR) | 7 Randomized trials | Not serious | Not serious | Not serious | None |
|                       | 683/716 (95.4%) | 680/708 (96.0%) | RR 1.00 (0.97 to 1.03) | 0 fewer per 1,000 (from 29 fewer to 29 more) |
| Cecal intubation time (CIT) | 9 Randomized trials | Not serious | Serious | Not serious | None |
|                       | Number of patients: 896 | Number of patients: 886 | MD 0.58 minutes lower (1.23 lower to 0.08 higher) | N/A |
| Tachycardia | 9 Randomized trials | Not serious | Not serious | Serious | Not serious | None |
|                       | 66/1326 (5.0%) | 4/1303 (0.3%) | RR 10.65 (4.49 to 25.28) | 29 more per 1,000 (from 10 more to 73 more) |

CI, confidence interval; MD, mean difference; N/A, not applicable; RR, rate ratio.

‘Use of Buscopan may lead to unblinding of endoscopists due to tachycardia – however, it is unclear which direction in which this potential bias would influence the result, and therefore we did not downgrade for risk of bias.

‘We did not downgrade for imprecision, because the tight 95% CI is compatible with no effect or negligible effects. The decision threshold for these recommendation is a clinically important difference, rather than ‘no difference’.

‘Clearly beneficial and clearly detrimental studies both exist, and there is substantial heterogeneity (I² = 65%). The studies reported tachycardia defined by heart rate, which is a surrogate for serious clinical outcomes. The studies did not report the number of patients with tachycardia requiring treatment, compromising the quality of the colonoscopy, or leading to serious clinical outcomes.
Buscopan. The Drug Safety Update issued by the Medicines and Healthcare products Regulatory Agency (MHRA) in the United Kingdom reported eight deaths after receiving intravenous or intramuscular injection of Buscopan. In most of these cases, the fatal adverse events were reported as acute myocardial infarction or cardiac arrest. The Drug Safety Update emphasizes that the adverse effects of tachycardia, hypotension, and anaphylaxis can be more serious in patients with underlying cardiac disease such as heart failure, coronary heart disease, cardiac arrhythmia, or hypertension. Therefore, it is advised that Buscopan be used with caution in patients with cardiac disease (9). Pharmacovigilance data of Buscopan are not available in the United States as it does not have Food and Drug Administration (FDA) approval. A search of the Canada Vigilance Adverse Reaction Online Database did not reveal any cardiac events or deaths after the use of Buscopan. Literature search revealed a case report of buscopan-induced hypotension and myocardial ischemia during a colonoscopy (8).

RECOMMENDATIONS

CAG’s recommendations regarding Buscopan use are summarized below:

1) Colonoscopy: CAG recommends against the use of Buscopan before or during colonoscopy (strong recommendation, high certainty of evidence). The Summary of Findings Table per GRADE approach (19) is shown in Table 3.

2) Gastroscopy: CAG suggests against the use of Buscopan before or during gastroscopy (conditional recommendation, very low certainty of evidence). Limited evidence from two observational studies did not show any beneficial effects, while the AE profile would be similar to patients receiving Buscopan for colonoscopy (Table 3).

3) ERCP: CAG suggests the use of Buscopan before or during ERCP (conditional recommendation, very low certainty of evidence). This was based on indirect evidence of superior performance of Buscopan compared to placebo in reducing small bowel peristalsis and optimizing the view of the papilla during ERCP since the stakes in achieving cannulation and biliary drainage are high.

As per the GRADE framework, a strong recommendation means that the panel is very confident that the benefits of following the recommendation clearly outweigh the harms (or vice versa), so the course of action should apply to most patients. A conditional recommendation is one for which the panel concludes that the desirable effects of adherence to a recommendation probably outweigh the undesirable effects (or vice versa), but the panel is not confident about these tradeoffs due to low or very low certainty of evidence, uncertainty regarding the balance of benefits and harms, uncertainty or variability in patients’ values and preferences, and/or questionable cost-effectiveness (see Table 4 for a summary of this rationale as it applies to various stakeholders). We do not have evidence to help us define the circumstances under which ‘as needed’ buscopan may be of benefit. Further research will help clarify what these circumstances are, but it is conceivable that buscopan may be of benefit in the setting of strong and persistent peristalsis to improve mucosal visualization and safety of therapeutic interventions.

More research is needed to determine whether patients undergoing advanced procedures such as EMR and/or ESD benefit from the use of Buscopan. Buscopan should be used with caution in patients with cardiac comorbidities. According to its product monograph, Buscopan is contraindicated in patients with tachycardia, angina and cardiac failure (31). Thus, Buscopan should be used very cautiously in patients with these conditions, and only when the potential benefits of its use outweigh the potential risks in a particular case (e.g., in a patient with acute cholangitis requiring urgent biliary decompression). Such patients require careful cardiac monitoring in an environment where resuscitation equipment and appropriately trained staff to use it are readily available. According to its product monograph, Buscopan is also contraindicated in patients with prostatic hypertrophy with urinary retention (31), and therefore, should be used very cautiously in such patients as well, and only when the potential benefits of its use outweigh the potential risks in a particular case.

Obtaining a preprocedural history of glaucoma is unlikely to be of value when considering Buscopan use. However, in cases where Buscopan has been used, patients should be counselled

| Implications | Strong recommendation | Conditional recommendation |
|--------------|-----------------------|---------------------------|
| For patients | Most individuals in this situation would want the recommended course of action and only a small proportion would not. | Most individuals in this situation would want the suggested course of action, but many would not. |
| For clinicians | Most individuals should receive the recommended course of action. | Different choices will be appropriate for different individuals consistent with the patient’s values and preferences. Use shared-decision making. |
| For policy makers | The recommendation can be adopted as policy in most situations. | Policy-making will require substantial debate and involvement of various stakeholders. |

Table 4. Implications of strong and conditional recommendations according to the GRADE framework (19)
postprocedurally and told to present to an emergency facility should they experience eye pain, redness, decreased vision, nausea and vomiting, or headache.

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AUTHOR CONTRIBUTIONS
Conception and design: FT, M.B., N.F.; Analysis and interpretation of the data: all authors; Drafting of the article: N.F., FT, G.I.L.; Critical revision of the article for important intellectual content: all authors; Final approval of the article: all authors.

CONFLICT OF INTEREST
None declared.

References
1. Rex DK, Schoenfeld PS, Cohen J, et al. Quality indicators for colonoscopy. Am J Gastroenterol 2015;110(1):72–90.
2. Bedford MR, Reuser T, Wilson P, et al. Administration of hyoscine-N-butylbromide during colonoscopy: A survey of current UK practice. Frontline Gastroenterol 2012;3(4):238–41.
3. Hannigun BF, Axon AT, Avery S, et al. Buscopan or glucagon for endoscopic cannulation of ampulla of vater? J R Soc Med 1982;75(1):21–2.
4. Chandrasekhara V, Khashab MA, Muthusamy VR, et al. Adverse events associated with ERCP. Gastrointest Endosc 2014;80(6):1103–12.e2.
5. Toki M, Yamaguchi M, Ota H, et al. The effectiveness and strategy of glucagon for the pre-treatment of ERCP-related procedures. Am J Gastroenterol 2015;110:S65.S.
6. Forbes N, Koury HF, Bass S, et al. Characteristics and outcomes of ERCP at a Canadian Tertiary Centre: Initial results from a prospective high-fidelity binary endoscopy registry. J Can Assoc Gastroenterol 2021;4(2):74–83.
7. Chandrasekhara V, Khashab MA, Muthusamy VR, et al. Adverse events associated with ERCP. Gastrointest Endosc 2017;85:32–47.
8. Chen GL, Hsu WH. Hyoscine-N-butyl-bromide-induced hypotension and myocardial ischemia. Case Rep Crit Care 2013;2013:414856.
9. Hyoscine butylbromide (Buscopan) injection: risk of serious adverse effects in patients with underlying cardiac disease. 2017. Available at https://www.gov.uk/drug-safety-update/hyoscine-butylbromide-buscopan-injection-risk-of-serious-adverse-effects-in-patients-with-underlying-cardiac-disease).
10. Lee TJ, Rees CJ, Blanks RG, et al. Colonic factors associated with adenoma detection in a national colorectal cancer screening program. Endoscopy 2014;46(3):203–11.
11. Takahashi Y, Tanaka H, Kinjo M, et al. Prospective evaluation of factors predicting difficulty and pain during sedation-free colonoscopy. Dis Colon Rectum 2005;48(6):1295–300.
12. Elphick DA, Donnelly MT, Smith KS, et al. Factors associated with abdominal discomfort during colonoscopy: A prospective analysis. Eur J Gastroenterol Hepatol 2009;21(9):1076–82.
13. de Brouwer EJ, Arbouw ME, van der Zwert WC, et al. Hyoscine N-butylbromide does not improve polyp detection during colonoscopy: A double-blind, randomized, placebo-controlled, clinical trial. Gastrointest Endosc 2012;75(4):835–40.
14. Ristikankare M, Karmen-Manitla H. The role of routinely given hyoscine-N-butylbromide in colonoscopy: A double-blind, randomized, placebo-controlled, clinical trial. Scand J Gastroenterol 2016;51(3):368–73.
15. Khandekar S, Catalano MF, Geenen JE, et al. A prospective, double-blind trial of Buscopan for the inhibition of small intestinal motility during ERCP. Gastrointest Endosc 1997;46(2):139–42.
16. Cochrane Handbook for Systematic Reviews of Interventions. 2011. at http://handbook-5-2.cochrane.org/ chapter 8 _8 assessing risk of bias in included studies.htm.)
17. Rondanotti E, Zolk O, Amato A, et al. The impact of hyoscine-N-butylbromide on adenoma detection during colonoscopy: Meta-analysis of randomized, controlled studies. Gastrointest Endosc 2014;80(6):1103–12.e2.
44. Mohaghegh Z, Abedi P, Faal S, et al. The effect of hyoscine n-butylbromide on labor progress: A systematic review. BMC Pregnancy Childbirth 2020;20(1):291.
45. Rohwer AC, Khondowe O, Young T. Antispasmodics for labour. Cochrane Database Syst Rev 2013;2013:Cd009243.
46. Martínez-Vázquez MA, Vázquez-Elizondo G, González-González JA, et al. Effect of antispasmodic agents, alone or in combination, in the treatment of irritable bowel syndrome: Systematic review and meta-analysis. Rev Gastroenterol Mex 2012;77(2):82–90.
47. Ford AC, Talley NJ, Spiegel BM, et al. Effect of fibre, antispasmodics, and peppermint oil in the treatment of irritable bowel syndrome: Systematic review and meta-analysis. BMJ 2008;337:a2313.
48. Tytgat GN. Hyoscine butylbromide - a review on its parenteral use in acute abdominal spasm and as an aid in abdominal diagnostic and therapeutic procedures. Curr Med Res Opin 2008;24(11):3159–73.
49. Tytgat GN. Hyoscine butylbromide: A review of its use in the treatment of abdominal cramping and pain. Drugs 2007;67(9):1343–57.