

## Efficacy of Domperidone in Improving Bowel Preparation for Colonoscopy

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### ABSTRACT

**Objectives:** Good bowel preparation quality helps gastroenterologists to carry out colonoscopy easier. However, bowel preparation quality for colonoscopy is sometimes not good enough. Moreover, a large volume of fluid needed for bowel preparation is frequently troublesome for the patient. We studied the effect of domperidone in improving bowel preparation quality and in reducing unpleasant symptoms.

**Methods:** We randomly assigned patients into two groups to receive either polyethylene glycol plus domperidone 10 mg three times before meal on the day prior to colonoscopy or polyethylene glycol alone. The primary endpoint was bowel cleansing level at different parts of the colon. The secondary endpoint was occurrence of unpleasant symptoms from bowel preparation.

**Results:** Administration of domperidone prior to colonoscopy significantly led to more acceptable bowel cleansing quality at the caecum (60.1% in the domperidone group vs. 32.1% in the control group,  $p < 0.001$ ), at the transverse colon (85% vs. 58.3%,  $p < 0.001$ ) and at the sigmoid colon (91.3 vs. 83.3%,  $p = 0.026$ ). Unpleasant symptoms from bowel preparation also decreased in the domperidone arm.

**Conclusion:** Addition of domperidone to polyethylene glycol for bowel preparation for colonoscopy can improve bowel cleansing quality and decrease the occurrence of unpleasant symptoms from bowel preparation.

**Key words :** Domperidone, Polyethylene glycol, Colonoscopy, Bowel preparation

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## INTRODUCTION

Colonoscopy is the standard method to evaluate colorectal diseases. The diagnostic accuracy of colonoscopy depends on many factors especially the quality of bowel preparation. The incidence of inadequate bowel preparation varies from 10-75%<sup>(1-3)</sup>. Inadequate bowel preparation decreases the sensitivity of colonoscopy and increases the difficulty of the procedure. Furthermore, bowel preparation is frequently troublesome for patients due to nausea, vomiting, bloating or abdominal pain<sup>(4)</sup>. Thus, modification of bowel preparation methods is required to increase its efficacy and tolerability.

Many attempts to improve bowel preparation quality had been conducted, with unsatisfactory results<sup>(5-8)</sup>. Co-administered prokinetic agents plus oral lavage solution have been evaluated as potential methods. Domperidone, a prokinetics agent, is a selective peripheral dopamine (D<sub>2</sub>) receptor antagonist which induces peristalses in the gastrointestinal tract<sup>(9-10)</sup>. Tasci I. and *et al.* reported the efficacy of domperidone in improving bowel preparation quality when combined with sodium phosphate solution<sup>(11)</sup>. Domperidone also has an antiemetic effect and can decrease abdominal discomfort by increase gastrointestinal motility<sup>(12-13)</sup>. As such, adverse events from bowel preparation may be decreased with this agent.

In this study, we aimed to compare the efficacy and the occurrence of unpleasant symptoms between using polyethylene glycol (PEG) plus domperidone versus standard polyethylene glycol alone for bowel preparation before colonoscopy.

## MATERIALS AND METHODS

We enrolled patients who were scheduled for colonoscopy at the Division of Gastroenterology, Bhumibol Adulyadej Hospital, Bangkok, as from January 2012 to December 2012. Subjects were 18 to 75 years old. Three-hundred-and-forty-one patients were included. The exclusion criteria were as following; pregnancy or lactation, severe illness, intubated patients, history of domperidone allergy, insufficient compliance, contraindication to domperidone, active gastrointestinal bleeding, chronic constipation, massive ascites, history of colonic surgery, and refusal to participate. The study protocol was approved by the Bhumibol Adulyadej Hospital research ethics commit-

tee. Written informed consents were obtained from all participants.

## Study design

### Study protocol

A prospective, randomized, single-blinded, controlled study was performed to compare the efficacy and unpleasant symptoms between polyethylene glycol plus domperidone and standard polyethylene glycol alone in bowel preparation for colonoscopy. Patients enrolled were randomized by using block-of-four into two groups, the domperidone group receiving domperidone 10 mg three times before meal on the day preceding colonoscopy and the control group not receiving domperidone. Polyethylene glycol (Niflec<sup>®</sup>) was chosen as a lavage solution. Patients drank 2,000 ml of water at about 5 pm on the preceding day. Domperidone was described to the patients with a laxative.

### Assessment

Colonoscopy was performed by 4 experienced gastroenterologists. Bowel cleansing level was assessed by the performing gastroenterologist. Bowel cleansing level was graded using the Aronchick scale<sup>(14)</sup> as follow:

Excellent: small volume of clear liquid or greater than 95% of surface seen.

Good: large volume of clear liquid covering 5% to 25% of the surface but greater than 90% of surface seen.

Fair: some semi-solid stool that could be suctioned or washed away but greater than 90% surface seen.

Poor: semi-solid stool that could not be suctioned or washed away and less than 90% of surface seen.

### Inadequate: re-preparation needed.

Excellent and good bowel cleansing levels were defined as acceptable bowel cleansing. Fair, poor and inadequate were defined as unacceptable. Four parts of the colon namely the caecum, the transverse colon, the sigmoid colon and the rectum, were assessed for bowel cleansing level.

Unpleasant symptoms from bowel preparation were evaluated in all patients. These included nausea, vomiting, bloating and abdominal pain. Severity was

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graded as no symptoms, moderate, or severe. Moderate and severe symptoms were defined as present of unpleasant symptoms.

### Study endpoints

The primary endpoint was bowel cleansing level in each specified area of the colon, and was classified as acceptable or unacceptable. Secondary endpoints were unpleasant symptoms which were classified as absent or present.

### Statistical analysis

Patient demographic data were summarized in

frequencies (or percentages) for categorical variables, and as mean  $\pm$  standard deviation for continuous variables. Chi-square test (or Fisher's exact) and student's t-test was used to compare differences between the groups for categorical and continuous variables, respectively. The analysis was done by SPSS software version 19. P-value of less than 0.05 was accepted as statistically significant.

## RESULTS

From January 2012 through December 2012, 341 patients could be recruited into our study. Patients were

**Table 1.** Baseline characteristics of the study population.

Characteristic	Domperidone Group (N = 173)	Control Group (N = 168)	p-value
Age (yrs), (mean $\pm$ SD)	61.0 $\pm$ 9.9	60.3 $\pm$ 10.5	0.54
Age group - N (%)			
18 - 28	1 (0.6)	1 (0.6)	0.873
29 - 40	6 (3.5)	10 (6.0)	
41 - 52	28 (16.2)	28 (16.7)	
53 - 64	58 (33.5)	54 (32.1)	
65 - 75	80 (46.2)	75 (44.6)	
Sex, N (%)			
Male	92 (53.2)	81 (48.2)	0.359
Female	81 (46.8)	87 (51.8)	
Status, N (%)			
Out Patient Department	121 (69.9)	125 (74.4)	0.358
In Patient Department	52 (30.1)	43 (25.6)	
Education, N (%)			
Primary	38 (22.4)	55 (34.0)	0.101
Secondary	74 (43.5)	65 (40.1)	
Bachelor	55 (32.4)	39 (24.1)	
Above bachelor	3 (1.8)	3 (1.9)	
Underlying disease, N (%)			
No	97 (56.1)	87 (51.8)	0.686
Diabetes Mellitus	18 (10.4)	18 (10.7)	
Hypertension	37 (21.4)	45 (26.8)	
Others	21 (12.1)	18 (10.7)	
Indication for colonoscopy, N (%)			
Colon Cancer Surveillance	19 (11.0)	14 (8.3)	0.538
Abnormal CEA	27 (15.7)	23 (13.7)	
Abdominal pain	50 (29.1)	64 (38.1)	
Anemia	27 (15.7)	26 (15.5)	
GI Bleeding	27 (15.7)	25 (14.9)	
Others	23 (13.3)	16 (9.5)	

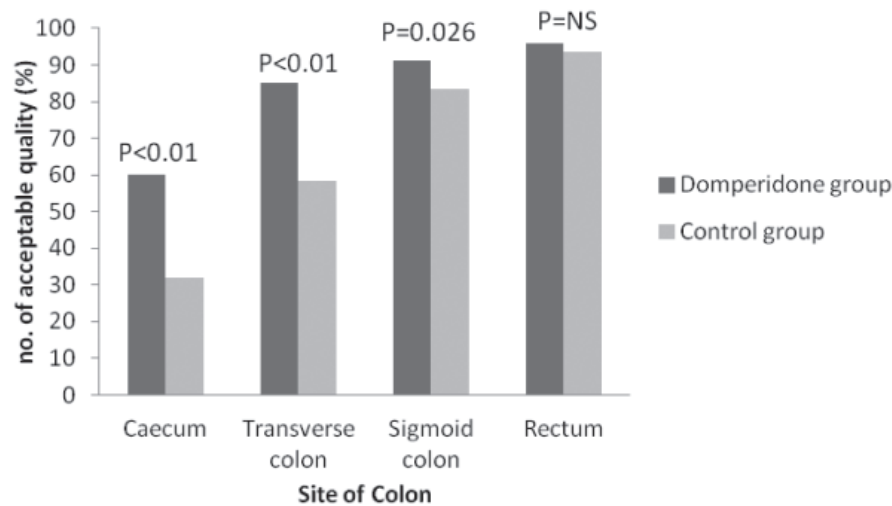


Figure 1. Numbers of patients with acceptable bowel preparation quality.

randomly assigned to the domperidone group (173 patients) and the control group (168 patients). The demographic data of all patients are shown in Table 1. There were no significant differences between the two groups. There were no adverse events related to the medication.

### Bowel cleansing level

The numbers of patients in the two groups who achieved acceptable bowel cleansing level at different colonic parts are shown in Figure 1 and Table 2. Bowel cleansing level in the domperidone group was superior to the control group in the caecum (bowel cleansing rate ratio of 1.87, 95% confidence interval [CI] 1.45 to 2.40), the transverse colon (bowel cleansing rate ratio of 1.46, 95% CI 1.26 to 1.68) and the sigmoid colon (bowel cleansing rate ratio of 1.10, 95% CI 1.01 to 1.19). There were no statistically significant differences in bowel cleansing level between the two groups in the rectum.

### Unpleasant symptoms

Data on unpleasant symptoms from bowel preparation are shown in Table 3. There was statistically significant reduction of unpleasant symptoms, including nausea, vomiting, bloating and abdominal pain, in the domperidone group compared to the control group.

## DISCUSSION

The perfect bowel preparation prior to colonoscopy is essential for an accurate diagnosis and

treatment of colonic lesions. However, none of the available bowel preparation formal is perfect. The requirement of large oral lavage solution volume as high as 2,000 mL often causes unpleasant symptoms and preparation failure due to intolerance to the lavage solution.

In this study, we used domperidone as an additive to the standard polyethylene glycol (PEG) regimen for bowel preparation. Domperidone is a dopamine antagonist that stimulates the gastrointestinal tract and has antiemetic properties. The result showed that PEG plus domperidone was superior to PEG alone in bowel cleansing quality at the caecum, the transverse colon and the sigmoid colon. It seemed to be better than PEG alone at the rectum, but not statistically significant. Moreover, co-administration of domperidone plus PEG decreased the occurrence of unpleasant symptoms. Therefore, domperidone appears to be a good candidate for decreasing unfavorable adverse effects and increasing tolerability during colonoscopy preparation procedures.

There were limitations of this study. Firstly, we could not reach the required number of patients as we designed. This was due to limited study duration. We also could not use polyethylene glycol in all patients due to our limited budget. Secondly, the rate of bowel cleansing level in our control group was lower than others studies<sup>(4,8,11)</sup>. This could be from many reasons, such as patients, education level, out-patient compliance to the bowel preparation regimen, etc. Lastly, we did not use validated questionnaire to evaluated the occurrence of unpleasant symptoms from bowel prepa-

**Table 2.** Bowel preparation quality.

Site of Colon	Domperidone Group	Control Group	Relative Risk (95% CI)	p-value
Caecum, N (%)				
Acceptable	104 (60.1)	54 (32.1)	1.87 (1.45-2.40)	< 0.01
Unacceptable	69 (39.9)	114 (67.9)		
Transverse Colon, N (%)				
Acceptable	147 (85.0)	98 (58.3)	1.46 (1.26-1.68)	< 0.01
Unacceptable	26 (15.0)	70 (41.7)		
Sigmoid Colon, N (%)				
Acceptable	158 (91.3)	140 (83.3)	1.10 (1.01-1.19)	0.026
Unacceptable	15 (8.7)	28 (16.7)		
Rectum, N (%)				
Acceptable	166 (96.0)	157 (93.5)	1.03 (0.98-1.08)	0.302
Unacceptable	7 (4.0)	11 (6.7)		

**Table 3.** Unpleasant Symptoms From Bowel Preparation.

Symptoms	Domperidone Group	Control Group	p-value
Nausea, N (%)			
Absent	173 (100)	162 (96.4)	0.012
Present	0 (0)	6 (3.6)	
Vomiting, N (%)			
Absent	172 (99.4)	151 (89.9)	< 0.001
Present	1 (0.6)	17 (10.1)	
Bloating, N (%)			
Absent	167 (96.5)	99 (58.9)	< 0.001
Present	6 (3.5)	69 (41.1)	
Abdominal pain, N (%)			
Absent	173 (100.0)	148 (88.1)	< 0.001
Present	0 (0.0)	20 (11.9)	

ration. The symptoms were inquired only verbally at the endoscopy unit.

### CONCLUSIONS

Domperidone plus polyethylene glycol was superior to polyethylene glycol alone in improving bowel preparation quality in the caecum, the transverse colon and the sigmoid colon. Domperidone also reduced unpleasant symptoms from bowel preparation.

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