

Retrospective Cohort Study

Is a split-dose regimen of 2 L polyethylene glycol plus ascorbic acid tolerable for colonoscopy in an early morning visit to a comprehensive medical check-up?

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Abstract

AIM

To evaluate the effectiveness and tolerability of a split-dose 2 L polyethylene glycol (PEG)/ascorbic acid (AA) regimen for healthy examinees who visited for comprehensive medical check-up in the early morning.

METHODS

From February 2015 to March 2015, examinees of average risk who were scheduled for a colonoscopy in the morning were retrospectively enrolled.

RESULTS

The 189 examinees were divided into split-dose and non-split-dose groups. The adequacy of bowel preparation for the split-dose group *vs* the non-split-dose group was 96.8% *vs* 85.2%, respectively, $P < 0.001$, and the compliance of the last meal restriction

was 74.6% vs 58.2%, respectively, $P < 0.001$. The sleep disturbance ($P < 0.001$) was more prevalent in the split-dose group, however the willingness to repeat the same preparation method ($P = 0.243$) was not different in both groups. The split-dose regimen was the most important factor influencing adequate bowel preparation in multivariate analysis (HR = 10.89, 95%CI: 6.53-18.17, $P < 0.001$).

CONCLUSION

A split-dose regimen of 2 L PEG/AA for an early morning colonoscopy was more effective and showed better compliance for diet restriction without any difference in satisfaction and discomfort. Introducing a split-dose regimen of 2 L PEG/AA to morning colonoscopy examinees is effective and tolerable in a comprehensive medical check-up setting.

Key words: Compliance; Early morning colonoscopy; Effectiveness; Split-dose regimen; Tolerability

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Core tip: A split-dose regimen of 2 L polyethylene glycol plus ascorbic acid is not widely used in comprehensive medical check-up, because this is considered intolerable for an early morning visit. We performed a retrospective cohort study to evaluate the effectiveness and tolerability of split-dose regimen for early morning visitors. A split-dose regimen for an early morning colonoscopy was more effective in bowel cleansing and showed better compliance for diet restriction compared with non-split-dose regimen without any difference in satisfaction and discomfort. Therefore, introducing a split-dose regimen to morning colonoscopy examinees is effective and tolerable even in comprehensive medical check-up settings.

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INTRODUCTION

Bowel preparation is one of the most important factors for a complete colonoscopy. When bowel cleanliness is adequate, the adenoma detection rate increases^[1-3], and the possibility of missed lesions decreases^[4,5]. The polyethylene glycol (PEG) solution, an isosmotic non-absorbable polymer, is generally used for bowel preparation^[6]. Recently, a low volume (2 L) of PEG with ascorbic acid (AA) was found to be preferred in Korea because 2 L PEG with AA (PEG/AA) was not inferior

to 4 L PEG in bowel cleansing, despite the smaller volume^[7-10]. High dose AA is not absorbed in intestine and promotes osmotic diarrhea. So the addition of high dose AA to PEG reduces the solution volume and improves taste^[8].

It has already been reported that a split-dose regimen is more effective than a non-split-dose regimen for various drug preparations^[11-13]. However, the compliance and tolerability of a split-dose regimen has always been a matter of concern^[12,14]. In a split-dose regimen, it is uncomfortable to wake up at dawn to prepare for the colonoscopy scheduled in the early morning because patients should finish the laxative at least 2 h prior to the colonoscopy.

In case of comprehensive medical check-up in Korea, the colonoscopy appointment varied according to other examinations that were scheduled, but all patients visited the center early in the morning from 7 am to 9 am. Therefore, their bowel preparation had to be completed before 5 am to 7 am. We can easily imagine that this leads to poor compliance and dissatisfaction. Nevertheless, no study has directly compared the effectiveness of split-dose cleansing and non-split-dose cleansing using 2 L PEG/AA. Is a split-dose regimen still effective and tolerable in these healthy examinees?

This study aimed to compare the effectiveness, compliance and satisfaction of a split-dose regimen vs a non-split-dose regimen in healthy examinees who visited a health check-up center in the early morning.

MATERIALS AND METHODS

Study population and ethical considerations

Examinees were retrospectively enrolled in the Seoul National University Hospital (SNUH) Healthcare System Gangnam Center from February 2015 to March 2015. Healthy examinees of average risk who visited our center from 7 am to 9 am and received a colonoscopy in the morning (8 am to 12 pm) were enrolled. The exclusion criteria for patients were as follows: younger than 18 years of age, had inflammatory bowel diseases or familial adenomatous polyposis, had previously received colorectal resection, did not receive a complete colonoscopy, or refused to participate. This study was approved by the Ethical Committee at SNUH (IRB No. H-1601-007-729).

Bowel preparation regimen

A non-split-dose regimen with 2 L PEG/AA has been used in the Gangnam Center because of the concern of patients' poor compliance and dissatisfaction with the split-dose regimen. According to the recent bowel cleansing guidelines^[6,15] as part of a quality assurance program for colonoscopies, the split-dose regimen was introduced in March 2015. In this regimen, patients had to ingest 2 liters of PEG/AA solution (Coolprep[®], Taejoon Pharm, Seoul, Korea) and 1 liter of water. Detailed regimens for 2 L PEG/AA in

Table 1 Bowel-cleansing regimens applied in this study

	Non-split-dose regimen	Split-dose regimen
Low-residue diet	3 d	3 d
Type of last meal	Rice porridge	Rice porridge
Time of last meal	Lunch (12:00 pm)	Dinner (6:00 pm)
Bowel cleansing product (day before examination)	PEG/AA 1 L + water 0.5 L (6:00 pm-7:30 pm) PEG/AA 1 L + water 0.5 L (8:30 pm-10:00 pm)	PEG/AA 1 L + water 0.5 L (9:00 pm-10:30 pm)
Bowel cleansing product (day of the examination)	-	PEG/AA 1 L + water 0.5 L (4:00 am-5:30 am)

AA: Ascorbic acid; PEG: Polyethylene glycol.

both groups are shown in Table 1. In the non-split-dose group, all of the bowel cleansing product and additional water was administered from 6:00 pm to 10:00 pm on the day before the colonoscopy. In the split-dose group, half of the product was administered the day before the colonoscopy, and the rest of the product was administered in the early morning (4:00 am to 5:30 am) on the day of the colonoscopy.

All patients received written instructions and phone calls from nurses about diet control and the method of bowel cleansing 1 wk prior to the colonoscopy.

Assessment of compliance, tolerability and safety

The compliance of patients was checked by nurses on an individual basis. Patients were questioned how long they had a low-residue diet, what food they ate for the last meal, the time when they had the last meal and the amount of PEG/AA and water they ingested.

The tolerability, dissatisfaction or discomfort experienced by the patients was evaluated using questionnaires before the colonoscopy. In terms of satisfaction, patients checked uncomfortable symptoms they had during bowel cleansing, such as nausea and/or vomiting, bloating, excessive diarrhea, anal pain, abdominal pain and/or discomfort, dizziness, fecal incontinence, sleep disturbance, large amount of fluid to intake, chilling and headache. Discomfort of bowel cleansing was assessed by using a visual analogue scale (on a scale of 1 to 10, with 10 being the worst). The willingness to repeat the same bowel cleansing regimen was also assessed.

For safety purposes, serious side effects that needed medical management such as dehydration and allergic reaction were monitored.

Colonoscopy and scoring of the bowel preparation

All procedures were performed by 17 expert endoscopists who had each performed more than 2000 colonoscopies. The effectiveness of bowel preparation was graded according to the Aronchick Bowel Preparation Scale^[16]. The cleanliness of the total bowel was scored as one of five grades as follows: excellent, good, fair, poor, inadequate. In some patients, the colonoscopy was withdrawn before complete intubation because of huge amounts of solid materials in the left colon. The bowel preparation in these patients was also graded

“inadequate”. Degrees of bowel preparation that were deemed fair or better (fair, good and excellent) were considered ‘adequate bowel preparation’ in this study.

Statistical analysis

Continuous variables were expressed as the mean \pm SD. Differences of continuous variables were analyzed by the independent-samples *t*-test. Categorical variables were expressed as a number (percent). These variables were analyzed using the χ^2 test and Fisher’s exact test. The associations of the interval between when the bowel preparation was completed and the start of the colonoscopy and the quality of the bowel preparation were calculated according to linear regression and one-way analysis of variance. To evaluate the important factors associated with adequate bowel preparation, the logistic regression method was used. Variables with *P* values less than 0.05 in the univariate analysis were included in the multivariate analysis. *P* values < 0.05 were considered statistically significant. Statistical analyses for this study were conducted using SPSS for Windows 12.0 (SPSS Inc., Chicago, IL, United States).

RESULTS

Clinical characteristics of patients

The number of patients enrolled in this study was 378. Among them, 189 patients were in the non-split-dose group, and the other 189 patients were in the split-dose group. Demographics and clinical characteristics of the patients are shown in Table 2. No differences were observed in the proportion of males (58.7% in the non-split-dose group vs 60.3% in the split-dose group, *P* = 0.753), the mean age of participants (53.4 \pm 10.9 vs 51.8 \pm 9.3, respectively, *P* = 0.110) and the proportion of patients receiving the colonoscopy for screening purposes (22.8% vs 25.4%, respectively, *P* = 0.547). The mean frequency of bowel movements per week and the proportion of patients who were taking drugs for constipation were not different between the two groups.

Effectiveness of the bowel preparation method

The effectiveness of the bowel preparation according to the different regimens is displayed in Table 3. A

Table 2 Demographics and clinical characteristics of patients *n* (%)

	Non-split-dose regimen <i>n</i> = 189	Split-dose regimen <i>n</i> = 189	<i>P</i> value
Gender			0.753
Male	111 (58.7)	114 (60.3)	
Female	78 (41.3)	75 (39.7)	
Age (yr)	53.4 ± 10.9	51.8 ± 9.3	0.110
Previous examination			0.547
Screening	43 (22.8)	48 (25.4)	
Surveillance	146 (77.2)	141 (74.6)	
Bowel movement (wk ⁻¹)	7.1 ± 3.3	7.1 ± 3.5	0.738
Medications for constipation			0.869
Yes	5 (2.6)	4 (2.1)	
No	169 (89.4)	172 (91.0)	

Table 3 Difference of bowel preparation score between two groups *n* (%)

	Non-split-dose regimen <i>n</i> = 189	Split-dose regimen <i>n</i> = 189	<i>P</i> value
			< 0.001
Adequate			
Score 1 (Excellent)	7 (3.7)	33 (17.5)	
Score 2 (Good)	47 (24.9)	119 (63.0)	
Score 3 (Fair)	107 (56.6)	31 (16.4)	
Inadequate			
Score 4 (Poor)	20 (10.6)	5 (2.6)	
Score 5 (Inadequate)	8 (4.2)	1 (0.5)	

change in the bowel preparation regimen showed drastic improvement in bowel cleanliness ($P < 0.001$). When we numerically calculated the score of the bowel preparation, the mean score of the bowel preparation was 2.8 ± 0.8 in the non-split-dose group and 2.0 ± 0.7 in the split-dose group ($P < 0.001$). Adequate bowel preparation (excellent, good and fair) reached significance in the split-dose regimen group (85.2% in the non-split-dose group vs 96.8% in the split-dose group, $P < 0.001$). Only 1 patient experienced inadequate bowel preparation (received a score of 5) in the split-dose group. Only 1 (0.5%) patient in the split-dose group and 4 (2.1%) patients in the non-split-dose group received the additional bowel preparation method for the repeated colonoscopy.

Compliance of patients

The compliance of patients according to different preparation regimens was analyzed based on the nurses' medical records of the patients (Table 4). To achieve good compliance for bowel preparation, written instructions and phone calls were offered. Most examinees carefully read the instructions (97.4% in the non-split-dose group vs 98.9% in the split-dose group, $P = 0.429$), and the patients also received explanations from phone calls (87.8% vs 89.4%, respectively, $P = 0.134$). As a result, most patients

Table 4 Compliance of bowel preparation according to different preparation regimens

	Non-split-dose regimen <i>n</i> = 189	Split-dose regimen <i>n</i> = 189	<i>P</i> value
Low-residue diet			0.542
< 3 d	54 (28.6%)	49 (25.9%)	
≥ 3 d	134 (70.9%)	140 (74.1%)	
Type of last meal			< 0.001
Rice porridge	110 (58.2%)	141 (74.6%)	
Other low residue diet ¹	48 (25.4%)	25 (13.2%)	
Normal or high residue diet	19 (10.1%)	4 (2.1%)	
Time of last meal			< 0.001
As recommended or earlier	138 (73.0%)	176 (93.1%)	
After recommendation	50 (26.5%)	11 (5.8%)	
Dose of PEG/AA intake			0.736
2 L	185 (97.9%)	184 (97.4%)	
< 2 L	4 (2.1%)	5 (2.6%)	
Dose of water intake			0.081
≥ 1 L	185 (97.9%)	189 (100%)	
< 1 L	3 (1.6%)	0 (0%)	

¹Other low residue diet includes fish, egg, bread, potato, *etc.* AA: Ascorbic acid; PEG: Polyethylene glycol.

understood the significance of bowel cleansing prior to a complete colonoscopy (97.9% vs 94.2%, respectively, $P = 0.131$).

When we divided the bowel preparation into a "diet control" part and an ingesting "PEG/AA" part, the compliance of the ingestion of PEG/AA and water was higher than 97% in both groups. However, the compliance of the "diet control" part was not satisfactory. Patients who ingested a low-residue diet for more than 3 d had a compliance of only 70.9% and 74.1% in the non-split-dose group and split-dose group, respectively, $P = 0.542$. More patients in the split-dose group followed the restriction of the last meal. The percentage of patients who had rice porridge was much higher in the split-dose group compared to the non-split-dose group (74.6% vs 58.2%, respectively, $P < 0.001$). Only 73.0% followed the time limit of the last meal in the non-split-dose group compared to 93.1% in the split-dose group.

Tolerability and safety of the patients

The data relating to satisfaction and discomfort of the patients were collected and analyzed from questionnaire surveys (Table 5). According to the visual analogue scale of the discomfort index, no significant difference in discomfort between the two groups (5.2 ± 2.7 vs 4.8 ± 2.8 , $P = 0.257$) was observed. Regardless of their discomfort, most patients in both groups answered that they were inclined to repeat the same regimen the next time (69.8% vs 70.4%, $P = 0.243$). In terms of adverse events, the most common causes of discomfort during bowel preparation were poor taste, nausea and/or vomiting and bloating. For the split-dose group, sleep disturbance was the 2nd most common complaint (40.9%), which was higher

Table 5 Subjective discomfort of patients according to different preparation regimens *n* (%)

	Non-split-dose regimen <i>n</i> = 189	Split-dose regimen <i>n</i> = 189	<i>P</i> value
Discomfort score (0-10) ¹	5.2 ± 2.7	4.8 ± 2.8	0.257
Willingness to repeat same regimen			
Yes	132 (69.8)	133 (70.4)	0.243
No	47 (24.9)	52 (27.5)	
Adverse events			
Poor taste	53 (50.5)	74 (54.0)	0.585
Nausea/vomiting	39 (37.1)	53 (38.7)	0.806
Bloating	38 (36.2)	54 (39.4)	0.608
Excessive diarrhea	27 (25.7)	27 (19.7)	0.266
Anal pain	20 (19.0)	14 (10.2)	0.050
Abdominal pain/discomfort	13 (12.4)	20 (14.6)	0.618
Dizziness	9 (8.6)	9 (6.6)	0.556
Fecal incontinence	8 (7.6)	7 (5.1)	0.422
Sleep disturbance	6 (5.7)	56 (40.9)	< 0.001
Bulky fluid	4 (3.8)	0 (0)	0.021
Chilling	3 (2.9)	1 (0.7)	0.198
Headache	1 (1.0)	0 (0)	0.252

¹Patients graded subjective discomfort from 0 (tolerable) to 10 (extremely distressed).

Table 6 Factors associated with adequate bowel preparation

	Univariate analysis		Multivariate analysis	
	HR (95%CI)	<i>P</i> value	HR (95%CI)	<i>P</i> value
Age	0.99 (0.97-1.01)	0.524		
Gender (female)	1.26 (0.83-1.91)	0.273		
Bowel movement (wk ⁻¹)	1.00 (0.94-1.06)	0.989		
Low-residue diet (≥ 3 d)	1.55 (1.00-2.39)	0.048	1.49 (0.88-2.53)	0.139
Time of last meal ¹	3.47 (1.92-6.29)	< 0.001	1.61 (0.78-3.30)	0.195
Type of last meal				
Normal or high residue	1.00 (reference)		1.00 (reference)	
Rice porridge only	5.09 (1.83-14.12)	0.002	2.26 (0.70-7.30)	0.174
Other low residue ²	2.86 (0.94-8.69)	0.064	2.53 (0.72-8.93)	0.150
Preparation regimen (split-dose)	10.63 (6.57-17.19)	< 0.001	10.89 (6.53-18.17)	< 0.001
Intake of PEG/AA (dose)	2.08 (0.20-22.06)	0.543		
Intake of water (dose)	0.036 (0.00-12.36)	0.265		

¹Whether patients followed recommendations; lunch for non-split-dose regimen, dinner for split-dose regimen; ²Other low residue diet includes fish, egg, bread, potato, *etc.* AA: Ascorbic acid; PEG: Polyethylene glycol.

than the non-split-dose group (5.7%, $P < 0.001$). Additionally, the complaint of the bulky fluid was more common in the non-split-dose group than the split-dose group (3.8% vs 0%, respectively, $P = 0.021$).

During bowel preparation, none of the patients experienced serious side effects. Only one case of urticaria was reported in the non-split-dose regimen group. The patient was a 75-year-old female who had generalized urticaria after ingesting half of the PEG/AA solution. She was fully recovered after receiving an oral antihistamine.

Factors associated with adequate bowel preparation

Important factors leading to adequate bowel preparation are shown in Table 6. In the univariate analysis, the factors that were significantly related to adequate bowel preparation were as follows: ≥ 3 d of a low residue diet ($P = 0.048$), time of the last meal was as instructed ($P < 0.001$), rice porridge for the last meal (P

$= 0.002$), and split-dose regimen ($P < 0.001$). Using these factors in the multivariate analysis, the split-dose regimen was the only significant factor related to adequate bowel preparation (adjusted HR = 10.89, 95%CI, 6.53-18.17, $P < 0.001$).

In the split-dose regimen group, the interval between the completion of the bowel preparation and the colonoscopy was shorter than that of the non-split-dose regimen group. The average intervals were 728.3 ± 91.0 min for the non-split-dose regimen group and 291.5 ± 65.0 min for the split-dose regimen group ($P < 0.001$). The linear regression of the continuous variables demonstrated that the quality of bowel preparation improved when the interval decreased between the completion of the bowel preparation and the start of the colonoscopy ($\beta = 0.002$, $r = 0.462$, $P < 0.001$). When we divided patients into their bowel preparation scores, we observed a meaningful difference in the interval time between

Table 7 Correlation of bowel cleanliness and interval between finishing bowel preparation and colonoscopy

Bowel preparation score	Inadequate <i>n</i> = 4	Poor <i>n</i> = 25	Fair <i>n</i> = 138	Good <i>n</i> = 165	Excellent <i>n</i> = 40	<i>P</i> value
Interval ¹	661.3 ± 91.3	667.3 ± 205.6	631.0 ± 201.3	413.7 ± 210.2	364.5 ± 167.8	< 0.001
T ²	a	a	a	b	b	TukeyB

¹Interval between finish of bowel preparation and start of colonoscopy (min). Statistical significances were tested by One-way analysis of variances among groups; ²The same letters indicate non-significant difference between groups based on Tukey's multiple comparison test.

the patients who received good/excellent scores and the patients who received fair/poor/inadequate scores (one-way analysis of variance, *P* < 0.001; Table 7).

DISCUSSION

In this study, we observed that the effectiveness of bowel cleansing was markedly improved in the split-dose regimen group as previously described^[6]. We also analyzed the importance of the time interval between the completion of the bowel preparation and the starting time of the colonoscopy. Patients who had a time interval less than 7 h showed a better outcome than that of patients with more than a 7-h interval. This result is in accordance with previous reports that bowel cleansing was better when the colonoscopy was performed within 8 h after ingesting the last fluid than after 8 h of the final ingestion^[11] and that the degree of bowel preparation worsens with time^[17].

Our results showed that the compliance of diet control was much better in the split-dose group than the non-split-dose group, particularly in regard to the type and time of the last meal. This result could be interpreted to mean that having an early dinner before the day of the colonoscopy was acceptable and tolerable in the split-dose regimen group. Additionally, it would be difficult to restrict food at lunch during working hours in the non-split-dose group, and having a low residue diet for dinner would be much easier. This study is the first of its kind that showed better compliance of diet control in the split-dose group compared to that of the non-split-dose group; the diet control regimen for the split-dose group was more tolerable and effective for bowel preparation.

However, keeping a low-residue diet for 3 d was not followed well in both groups; therefore, the proper number of days for diet restriction has not yet been determined. Some studies have focused on a liberal diet for better compliance, but the results were not satisfactory^[18-20]. Various high-residue foods such as kimchi are a considerable part of the Korean diet, and these fiber materials are difficult to remove during a colonoscopy. Nevertheless, even though our patients knew the necessity of bowel preparation and conformed to ingesting whole PEG/AA, their compliance to a low-residue diet was still very poor. The usefulness of education about bowel preparation has been already reported^[21,22]. Continuous education and promotion of diet control will be important, and further studies are

required to reduce the days of diet control.

When we reviewed the patients who received an additional bowel preparation regimen during the study period, the only patient who failed the bowel preparation in the split-dose group was a 45-year-old man. He did not follow the diet control as instructed; he had high-residue side dishes for the last meal the day before the colonoscopy and a low-residue diet for only 1 d. When he followed the instructions of the split-dose regimen completely for the repeat colonoscopy, his bowel preparation was excellent. Furthermore, 4 patients needed additional bowel preparation in the non-split-dose group. In spite of ingesting additional PEG solution or perfectly following instructions of the non-split-dose regimen, the best score they received for the repeat colonoscopy was fair.

Despite the concerns of complaints in the split-dose group, no differences in tolerability and satisfaction were observed between the two groups. However, a significant difference in the details of complaints was observed. Examinees of the split-dose group experienced more sleep disturbance than the non-split-dose group. In contrast, examinees of the non-split-dose group complained about the bulky fluid because they had to ingest a large amount of fluid within a few hours. Interpreting our data, very little difference was observed in general satisfaction according to the type of regimen, and only in the different subtype of discomfort.

This study has inevitable limitations because of its non-randomized design and retrospective nature. The examinees who completed the survey during the study period were enrolled in this study, and the possibility of selection bias was present. Despite its shortcomings, the strength of this study is related to the following advantages: (1) this is the first study that compared effectiveness, compliance and tolerability of split-dose and non-split-dose regimens using low volume PEG for early morning visitors to a comprehensive medical check-up. Therefore, this study required a special condition that all examinees should complete their bowel preparation before their visit for the comprehensive medical check-up; (2) we presented the compliance of the bowel cleansing regimens step-by-step and detailed the complaints and practical dissatisfaction of the examinees; and (3) finally, we demonstrated that diet control in the split-dose group was more tolerable than the non-split-dose group.

In conclusion, a split-dose-regimen of 2 L PEG/AA

for an early morning colonoscopy was more effective and showed better compliance for diet restriction without any differences in satisfaction and discomfort. Therefore, it is reasonable to introduce a split-dose regimen for the early morning colonoscopy examinees undergoing comprehensive medical check-up considering its remarkable effectiveness and compliance.

COMMENTS

Background

Bowel preparation is one of the most important factors for a complete colonoscopy. It has already been reported that a split-dose regimen is more effective than a non-split-dose regimen for various drug preparations. However, a split-dose regimen of 2 L polyethylene glycol (PEG) plus ascorbic acid (AA) is not widely used in comprehensive medical check-up in Korea because the split-dose regimen is considered intolerable for an early morning visit.

Research frontiers

In a split-dose regimen, it is uncomfortable to wake up at dawn to prepare for the colonoscopy scheduled in the early morning because patients should finish the laxative at least 2 h prior to the colonoscopy. This study aimed to evaluate the effectiveness and tolerability of a split-dose 2 L PEG/AA regimen for healthy examinees who visited for comprehensive medical check-up in the early morning.

Innovations and breakthroughs

In this study, the authors found that effectiveness of bowel cleansing was markedly improved in the split-dose regimen group. Compliance of diet control was much better in the split-dose group than the non-split-dose group, particularly in regard to the type and time of the last meal. Despite the concerns of complaints in the split-dose group, no differences in tolerability and satisfaction were observed between the two groups. However, a significant difference in the details of complaints was observed. Examinees of the split-dose group experienced more sleep disturbance than the non-split-dose group. In contrast, examinees of the non-split-dose group complained about the bulky fluid because they had to ingest a large amount of fluid within a few hours.

Applications

It is reasonable to introduce a split-dose regimen for the early morning colonoscopy examinees undergoing comprehensive medical check-up considering its remarkable effectiveness and compliance.

Terminology

Split-dose regimen is a method of bowel preparation for colonoscopy that examinees take half of bowel cleansing dose at night on the day before the colonoscopy and the other half in the early morning on the day of colonoscopy.

Peer-review

This is a good study in which the authors analyzed the effectiveness and compliance of split-dose regimen of 2L PEG/AA for an early morning colonoscopy. This result is an important ground to introduce a split-dose regimen to morning colonoscopy examinees in a comprehensive medical check-up.

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