

The Use of Castor Oil for Bowel Preparation for Colon Capsule Endoscopy

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Abstract

Colon capsule endoscopy was approved for reimbursement under the national health insurance system of Japan in 2014. At our hospital, specialized mainly in renal, hepatic, and diabetic diseases, we have been performing colon capsule endoscopy since December 2014. Dialysis patients are potentially susceptible to bleeding because of the fragile intestine, impaired platelet function, or oral administration of nonsteroidal anti-inflammatory drugs (NSAIDs) or anticoagulants. For this reason, detailed examination by capsule endoscopy appears to be useful. However, the capsule excretion rate after recommended bowel preparation reportedly ranges from 70% to 90%, and administration of boosters is also necessary. For dialysis patients, liquid loading is a problem. In this study, we evaluated the efficacy of bowel preparation with castor oil for improving the capsule excretion rate. In all 20 patients (including four dialysis patients), both capsule transit time and duration of capsule endoscopy were shortened. The results are presented and briefly discussed in this report.

Keywords

Colon Capsule Endoscopy, Dialysis Patients, Castor Oil

1. Introduction

Colon capsule endoscopy [1] was approved for reimbursement under the national health insurance system of Japan in 2014. For this reason, detailed examination by capsule endoscopy appears to be useful. However, the capsule excretion rate after recommended bowel preparation reportedly ranges from 70% to 90%, and administration of boosters is also necessary. For dialysis patients [2] [3], liquid loading is a problem [4]-[9]. At my hospital, the capsule excretion rate after recommended bowel preparation was 53.3% in dialysis patients. In this study, we evaluated the efficacy of bowel preparation with castor oil for improving the capsule excretion rate. In all 20 patients

(including four dialysis patients), both capsule transit time and duration of capsule endoscopy were shortened. The results are presented and briefly discussed in this report.

2. Methods and Patients

Subjects and methods: This study included 20 patients who underwent colon capsule endoscopy at Masuko Memorial Hospital since March 2016 (15 men and 5 women with mean age of 62.7 years, including 4 dialysis patients and 4 patients after kidney transplantation). Colon capsule endoscopy was performed with PillCam COLON Capsule (Medtronic, Minneapolis, MN, USA). The recommended protocol of bowel preparation was modified (with administration of castor oil (Himashi Oil: Yoshida Pharmaceutical, Japan), and success rates of completing entire colon observation were compared. The modified regimen is shown in **Table 1**. The changes from the original regimen were as follows: Castor oil was administered immediately after capsule ingestion and as a booster at one and two hours later. The dose of castor oil was 30 mL at each time point. This study was approved by the ethics committee of my hospital, while we obtained written consent from the participants after providing a thorough explanation of the contents and methods of this study.

3. Statistical Analysis

Mann-Whitney U test was performed for comparison between the castor oil-treated and castor oil-untreated groups. A P value of <0.05 was considered significant.

4. Results

The success rate of completing entire colon observation was 73 patients were included: 46 (63%) in the castor oil-untreated group at our hospital (patient characteristics: 73 men and 29 women with mean age of 60 years, including 30 dialysis patients and 57 non-dialysis patients). The success rates were 43 patients included 30 (69.8%) in the non-dialysis patients and 53.3% in the dialysis patients. On the other hand, the success rate in the castor oil-treated group was 100% (20/20). It was also 100% in both non-dialysis patients (16/16) and dialysis patients (4/4) in this group. Statistically significant differences were observed between patients receiving bowel preparation with and without castor oil ($P = 0.001$) (**Figure 1**).

5. Discussion

In Japan, colon capsule endoscopy was approved for reimbursement under the national health insurance system in 2014 and is currently performed at many institutions. At my hospital, many dialysis patients are treated on an outpatient basis. Dialysis patients are potentially susceptible to bleeding because of the fragile intestine, impaired platelet function, or oral administration of NSAIDs or anticoagulants. For this reason, detailed examination by capsule endoscopy appears to be useful. Because of the restriction of water intake in dialysis patients, we wanted to reduce the booster dosage as much as possible. Then, we evaluated bowel preparation with castor oil, which is hydrolyzed

Table 1. Bowel preparation regimen.

Day before endoscopy				
Time	Procedure	Regimen	Liquid volume	
Morning, noon, and evening	Low-residue diet	Enimaclin		
21:00	Bowel cleansing	Picosulfate sodium: 1 packet Sennoside: 2 tablets		
After 21:00		Fasting		
Day of endoscopy				
Time	Procedure	Regimen	Liquid volume	Total
9:00-11:00	Bowel cleansing	Moviprep (containing Gascon Drop): 1.5 L + water (or tea): 0.75 L	2.25 L	2.25 L
	Capsule ingestion	Ingest a capsule endoscope with Gascon: 4 mL + Water: 0.1 L	-	2.25
	Immediately after capsule ingestion	Castor oil: 30 mL, intramuscular injection of metoclopramide	-	-
	After the capsule reaches the small intestine	Confirming the arrival Enhancing peristalsis No water intake but hard candy and gum is allowed until the capsule endoscope reaches the small intestine. Oral administration of mosapride: 4 tablets. Moviprep: 0.25 L + water (or tea): 0.25 L	0.5 L	2.75 L
	1 hour later	Booster Castor oil: 30 mL, Teleminsoft suppository, Moviprep: 0.25 L + water (or tea): 0.25 L	0.5 L	3.25 L
	2 hours later	Booster Mosapride: 6 tablets, Magcorol P: 1 package + water: 0.45 L. *Dialysis patients: Oral administration of castor oil: 30 mL. Glycerol enema at 15:30	0.45 L	3.7 L

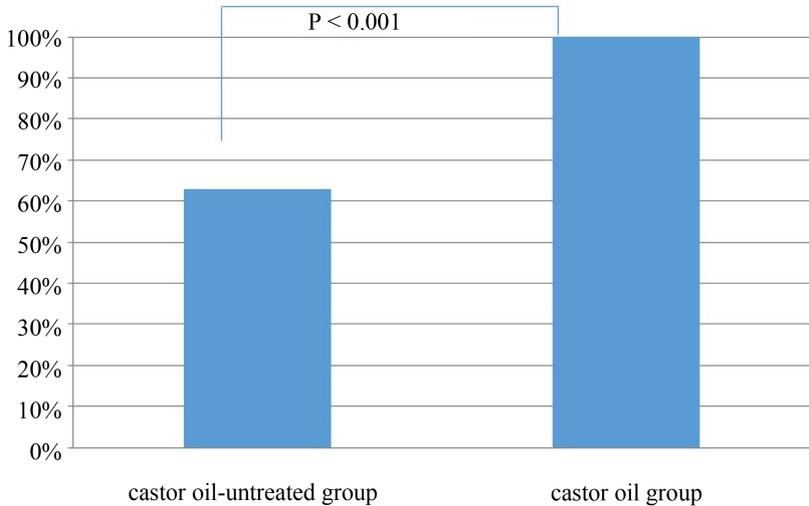


Figure 1. Statistically significant differences were observed between patients receiving bowel preparation with and without castor oil ($P < 0.001$).

into glycerol and ricinoleic acid by lipase in the small intestine. Ricinoleic acid causes catharsis by stimulating the small intestine. Although the use of Gastrografin [10] has been reported, we used castor oil because it is inexpensive and is covered by the national health insurance system of Japan. The capsule excretion rate was 53.3% in dialysis patients treated according to the original protocol of bowel preparation. However, capsule endoscopes were excreted in all patients in the castor oil-treated group, which included only four dialysis patients. The capsule endoscope was excreted even in one of these dialysis patients who was using a wheelchair and was unable to walk. The capsule transit time after bowel preparation with castor oil was shortened, and the booster dosage was also reduced. Thus, the modified protocol of bowel preparation appears to be beneficial for not only dialysis patients, but also many other patients.

6. Conclusion

Although the number of patients receiving bowel preparation with castor oil was small, entire colon observation was successful even in dialysis patients. Thus, castor oil appears to be useful for bowel preparation for colon capsule endoscopy.

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