

POINT OF VIEW

# Preparation for colonoscopy: types of scales and cleaning products

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## ABSTRACT

Adequate bowel preparation is essential before a colonoscopy, allowing us to make a proper examination of the entire mucosa. The ideal method of colon cleansing should be fast, safe, and get a proper cleaning with minimal discomfort for the patient. Today we have a wide variety of colon cleansing products, information sometimes becomes confused. A good colon preparation depends partly on correct choice of the same, but also upon dietary restriction. Knowledge of all these products, with their advantages and limitations, we can make a better selection for each patient, and although the efficacy is comparable, is the experience of the browser, patient preferences, and the degree of compliance with the instructions preparation, which greatly influence the results.

**Key words:** Colonoscopy. Colon preparation. Types of scales. Cleaning products.

## INTRODUCTION

Colonoscopy is the primary method for evaluating the colon, but effective diagnostic and treatment depends on the quality of the technique. The defining characteristics of high-quality colonoscopy is the examination of the entire colon, optimal cleaning of the colon and endoscope withdrawal time of 6-10 min from cecum to rectum (1-3). In this regard, insufficient preparation reduces the quality of the procedure, increases the risk of complications, decreases the rate of detection of adenomas, extends the exploration and induces a new application for endoscopy in a shorter time than recommended in the guidelines clinical practice (4).

## METHODS FOR CLEANING

The ideal method of colon cleansing should be fast, safe, and get a proper cleaning with minimal discomfort for the patient (5,6). It should be easy to perform to allow carrying out both inpatient and outpatient (7).

Adequate colon preparation depends partly on a correct choice of cleaning product, but also upon dietary restriction (8). Knowledge of all these products, with their advantages and limitations, permits a better selection for each patient (9,10). Although its efficacy is comparable, the browser experience, patient preferences, and the degree of compliance with the directions, greatly influence the results. Therefore, we must be very careful with the explanations given to patients and should be advised to maintain proper hydration. Also, they should provide a permanent telephone number where the patient can solve all questions that are asked (11).

Currently we have several options for preparing patients for colonoscopy. Products for colon cleansing can be classified into two groups: Osmotic agents and stimulants (12,13).

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## Osmotic agents

These products exert their action by increasing water retention in the colon or to stimulate its secretion (5,14). Of these, the solutions based on polyethylene glycol (PEG) are the most used. They are metabolically inert substances no absorbable (PEG) or hyperosmolar salt (sodium phosphate, magnesium citrate, lactulose, and mannitol).

### PEG-based solutions

In 1980, Davis and colleagues developed a solution for cleaning the intestines not carries with it the absorption or secretion of water and salts (15). This isosmotic solution was composed of 125 mmol/L sodium, 40 mmol/L  $\text{SO}_4$ , 35 mmol/L of chlorine, 20 mmol/L bicarbonate, 10 mmol/L potassium and PEG, a no absorbable polymer with high molecular weight. Sodium is absorbed in the digestive tract actively when accompanied by the chlorine anion. But the active absorption is reduced when sodium sulphate is substituted by chlorine and sulphate itself is not absorbed. Sodium gradient occurs very little: a small passive sodium secretion is counteracted by an active absorption of the same, so that the net movement of sodium is almost nil. The movement of potassium in the gastrointestinal tract is passive in response to chemical and electrical gradient. cleansing with PEG solution intake need 3- in a three or four hours, with a minimum exchange of fluids and electrolytes (7).

These solutions are better tolerated and more effective and safer than other osmotic agents (16). The main disadvantage of these products is the large amount of volume () that patients should ingest and taste salty because sodium sulphate. Typically recommended intake of 250 ml every 15 minutes to complete the or until clear fluid is expelled. They are available with the following trade names:

- Solución evacuante Bohm®, Casenglicol®. With these solutions 85 to 95% of patients achieve a good cleaning of the colon (17). It is a safe cleaning method in patients with electrolyte problems (kidney failure, heart failure, or liver failure with ascites), being the method of choice in children. The main side effects (nausea, bloating, and vomiting) are secondary to the volume ingested. They are very safe and inexpensive, but 5-15% of patients do not complete the preparation for its salty taste and/or volume (17). To improve tolerability flavoured solutions have been developed (without sulphate) and other low volume (4 liters) (18,19). PEG solutions, which have been removed sulphate in an attempt to improve its taste salty, are available with different flavours (cherry, lemon, orange and pineapple), but are not marketed in our country.
- Moviprep® is a hypertonic solution resulting from the combination of PEG and ascorbic acid, which has been developed to improve tolerance and acceptance of conventional solutions of , achieving the same efficiency with a smaller volume (2 liters). Ascorbic acid

acts as a flavouring and exerts a synergistic osmotic action to PEG, thereby enabling it is needed a smaller volume of solution. In this regard, studies have shown that smaller volume preparations are more effective and better tolerated by patients (20).

### Osmotic solutions hyperosmolar

Osmotic laxatives are mainly based on sodium phosphate (Fosfosoda Fleet®). In the 90's began to use the sodium phosphate solution (21,22). Sodium phosphate is a saline laxative, which has the advantage of small volume required (2 vials of 45 mL) to achieve a proper colon cleansing, be as effective as and better tolerated by patients than PEG solution (23). As with the other methods used to prepare the colon, sodium phosphate is not without side effects, can cause electrolyte problems (hyperphosphatemia, hypocalcaemia, hypokalemia, plasma hyperosmolality, hyponatremia and hypernatremia) (5,24). Therefore, in patients with impaired renal function, dehydration, hypercalcemia, or hypertension requiring drug inhibitors of angiotensin converting enzyme (ACE) inhibitors, their use is discouraged, since they have experienced phosphate nephropathy, related with age and the dose of the drug (25). Moreover aphthoid lesions have been described in the colon after administration, so its usefulness is diminished in patients with inflammatory bowel disease.

Other options include the use of magnesium citrate, which is not marketed in as monotherapy, although not recommended for use in patients with impaired renal function (26).

## Stimulating agents

Cathartics products or stimulants produce a contraction of the colonic wall that stimulates the evacuation thereof. Today we have a combination of sodium picosulfate magnesium oxide and citric acid (CitraFleet®) (26,27) and bisacodyl (Dulcolaxo®) (28,29). Its effectiveness lies in 70-80% of patients, but may be associated with electrolyte problems and dehydration.

Sodium picosulfate acts locally as a stimulating agent after biotransformation by colonic bacteria in an active compound, while the magnesium oxide as osmotic laxative does, retaining fluid in the colon. Since exclusively the kidney eliminates magnesium, it must take special care of patients with renal insufficiency. The preparation with CitraFleet® is accomplished by administering two envelopes dissolved in 250 mL of water each, together with a subsequent water intake not less than 2 litres.

Bisacodyl presents a therapeutic action as a laxative, which increases intestinal motility by stimulating the nerve endings in the intestinal wall. Inhibits absorption and increases secretion of water and electrolytes, which reduces the consistency and increases fecal volume. The appropriate dose of bisacodyl may be different for each patient, but usually given 5 to 10 mg (1 or 2 tablets) administered


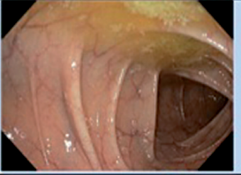
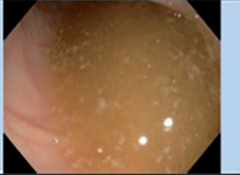

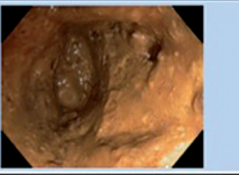
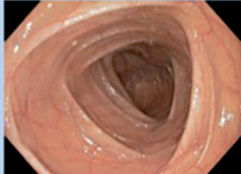
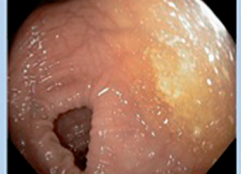
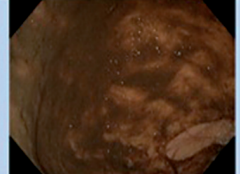

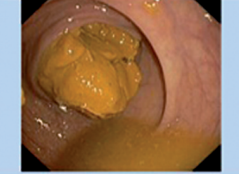
Excellent (1)	Good (2)	Fair (3)	Poor (4)	Inadequate (5)
				
				
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Fig. 1. Aronchick bowel preparation scale (ABPS).

preferably before bedtime. Bisacodyl regimens usually require administration of at least 2 days, and combine them with enemas and dietary restrictions.

### EVALUATION OF PREPARATION: CLEANING SCALES

In all colonoscopies should comprise the preparation quality of the colon. The quality criterion is to achieve a preparation good or very good in 95% of scans (1-3). The preparation of the colon must be notified in the endoscopy report using validated assessment scales. Poor preparation is the biggest impediment to an adequate examination, reducing the ability to detect polyps, lengthens the procedure time and worsens the cost-effectiveness to induce a decrease in the interval between scans (2). Preparation is considered good or very good one in which you have the impression of having been observed, with acceptable accuracy, the existence of polyps equal or greater size of 5mm.

To date, have proposed various validated assessment scales: Aronchick (30), Ottawa (31) and Boston (32).

#### Aronchick Bowel Preparation Scale (ABPS)

The ABPS is the oldest of the three, and perhaps the simplest, albeit with a large interobserver variability. Is a scoring scale of 1 to 5 points on the entire colon (30) (Fig. 1).

- *Excellent (1 point)*: Small volume of clear liquid or greater than 95% of surface seen.
- *Good (2 points)*: Large volume of clear liquid covering 5 to 25% of the surface but greater than 90% of surface seen.

- *Fair (3 points)*: Some semisolid stool that could be suctioned or washed away but greater than 90% of surface seen.
- *Poor (4 points)*: Semisolid stool that could not be suctioned or washed away and less than 90% of surface seen.
- *Inadequate (5 points)*: Solid stool that impede the vision. Repeat preparation and colonoscopy is needed.

#### Ottawa Bowel Preparation Scale (OBPS)

The OBPS was developed and validated in order to allow evaluation of the colon segments. Is a scale score of 0 to 14 points, published in *Gastrointestinal Endoscopy* in 2004 (31). In its construction takes into account two aspects summations: degree of cleaning segment of the colon (left colon, transverse colon and right colon) and amount of fluid in the entire colon (Fig. 2).

*Score of 0 to 4 points per segment:*

- *Excellent (0 points)*: Mucosa clearly visible. Minimum liquid remains.
  - *Good (1 point)*: Some liquid remains. Good view of the mucosa.
  - *Fair (2 points)*: Blow liquid or semisolid. No precise wash. Reasonable view of the mucosa.
  - *Poor (3 points)*: Blow sucks needing wash. Low vision of the mucosa.
  - *Inadequate (4 points)*: Blow solids that impede vision.
- Amount of liquid in the entire colon, from 0 to 2 points:*
- *Low (0 points)*.
  - *Moderate (1 point)*.
  - *Large (2 points)*.





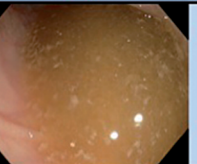
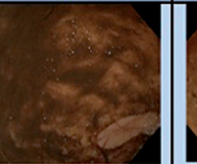
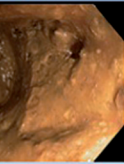
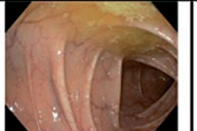
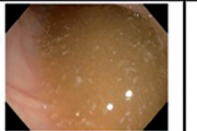
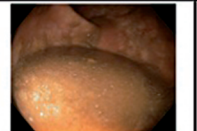
OBPS (A)		0	1	2	3	4
0=Excellent 1=Good 2=Fair 3=Poor 4=Inadequate						
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TC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OBPS (B)		0	1	2		
<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
OBPS (A+B) = <input type="checkbox"/>						

Fig. 2. Ottawa bowel preparation scale (OBPS). LC: Left colon. TC: Transverse colon. RC: Right colon.

### Boston Bowel Preparation Scale (BBPS)

The BBPS was developed by the section of gastroenterology at Boston Medical Center (BMC) to provide a much-needed standard for rating the quality of bowel preparation for colonoscopy. This tool, published in October 2010 in the journal *Gastrointestinal Endoscopy* (32) shows the level of accuracy and could become a standard tool for cleaning international index colon during colonoscopy (33) (Fig. 3).

Three segments of the colon (left, transverse, right) are ranked based on your cleaning

- 0 points: Segment unprepared colon with mucosa not visualized by the presence of solid stool.
- 1 point: Areas colon segment seen by the presence of fecal liquid and semisolid.
- 2 points: Low fecal fluid content allows good visualization of the mucosa.
- 3 points: Excellent visualization of the mucosa without the presence of liquid remains.

### CLEANING MEASURES TO IMPROVE THE COLON

The inappropriate percentage that has been reflected in several clinical studies, is around 21% (34).

#### Divide the daily dose of PEG solution (splits-dose regimen)

A measure to improve tolerability and adherence to PEG-based solutions is to divide the dose (split-dose regimen).

Thus, patients take a half dose the night before and half in the 4-5 hours before the scan (35,36).

#### Time management

The time of administration of the product is crucial. The protocols must indicate the benefit of that preparation starts between 8 and 12 hours before scanning and close between 4 and 6 hours before to get the best colon cleansing, while it is feasible pseudoanalgesia management with minimal risk (37). A range of 5 to 8 hours between the last dose and colonoscopy provides the best cleaning quality, while a range exceeding 14 hours has poor preparation of the colon (38).

#### Dietary restriction

A low-residue diet in the days before the scan (1-5 days) reduces the amount of feces, albeit insufficient by itself to get a proper cleaning of the colon (8).

#### Cleansing enemas

Enemas act by dilution or irritation, and rarely get effective cleaning alone. His administration is uncomfortable for patients, but is helpful in those patients presenting in the endoscopy unit with inadequate cleaning (39).

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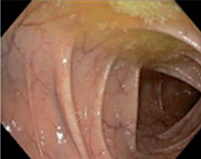

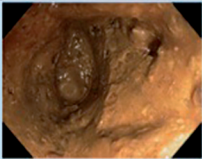
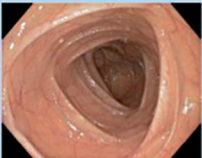
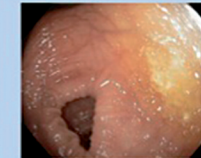




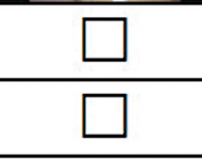

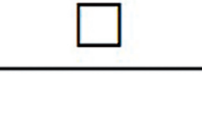
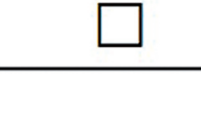
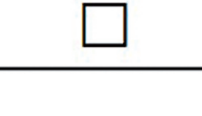

BBPS		3	2	1	0
<b>3=Excellent</b> <b>2=Good</b> <b>1=Poor</b> <b>0=Inadequate</b>					
					
					
					
<b>LC</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<b>RC</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Fig. 3. Boston bowel preparation scale (BBPS). LC: Left colon. TC: Transverse colon. RC: Right colon.

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