The ABCs of Colonoscopy Preps: Attitude Begets Cleanliness

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Suboptimal Bowel Preparation for Colonoscopy

• Results in:
  • Prolonged procedure times
  • Lower rates of cecal intubation
  • Reduced screening intervals
  • Higher screening costs
  • Increased risk for procedure-related complications
  • Missed diagnoses
Suboptimal Bowel Preparation for Colonoscopy (Cont.)

Colonoscopy is more effective in prevention of left-sided vs. right-sided cancers, probably from suboptimal cleansing of the right side and the fact that more right-sided lesions are flat or sessile making them more difficult to detect.
Ideal Colonoscopy Prep

- **Convenient**: Simple instructions, short period of dietary restrictions
- **Tolerable**: palatable taste, small volume, causing minimal, if any, nausea, vomiting, cramps
- **Safe**: few side effects such as fluid shifts causing intravascular volume depletion or electrolyte abnormalities
- **Effective**: detect important lesions and minimize repeat procedures
Available Ideal Colonoscopy Preps
“The most important part of a thorough colonoscopy is the adequacy of the prep.”

-C. Phillip Pattison, M.D.
Dr. P’s **Turd-bits**

According to the Scott Tissue Company, the toilet is flushed more during halftime of the Super Bowl than at any other point during the year: 90 million flushes, using 350 million gallons of water = amount of water that flows over Niagara Falls in seven minutes.
Bowel Preparations

Osmotic Agents

- Increase intraluminal water by promoting passage of extracellular fluid across the bowel wall.
- Examples include sodium phosphate (NaP), Visicol, OsmoPrep, magnesium citrate, and sodium sulfate (SuPrep).
Bowel Preparations (Cont.)

Polyethylene glycol (PEG) - based solutions

- High molecular weight non-absorbable polymer in a dilute electrolyte solution
- Designed to be osmotically balanced, limiting the exchange of fluid and electrolytes across the colonic membrane.
- Examples include GoLYTELY, NuLYTELY, Colyte, HalfLytely, MoviPrep
Bowel Preparations (Cont.)

Stimulant Laxatives

- Increase smooth muscle activity within the wall of the colon
- Examples include senna, bisacodyl, sodium picosulfate
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Relationship Advice

“It is better to have a relationship with someone who cheats on you than someone who does not flush the toilet.”

-Uma Thurman
Polyethylene Glycol

- Variety of lavage regimens
- Differ with respect to volume, electrolyte content, molecular weight of the polymer, requirement for adjunctive laxative, and presence of artificial sweeteners
Polyethylene Glycol (Cont.)

Traditional 4-L Preparations
- GoLYTELY, CoLYTE, NuLYTELY, TriLyte
- Recommended doing 240 ml (8 oz.) every 10 minutes
- 5% to 38% unable to complete because of abdominal fullness, nausea, and vomiting

Newer 2-L preparations
- HalfLytely (includes 2 bisacodyl tablets at noon day before exam), MoviPrep
- Effectiveness = 4-L preparation and NaP
- One study showed MoviPrep superior to HalyLytely for bowel cleansing and adenoma detection
What About MiraLAX/Gatorade?

- Hypotonic solution not FDA-approved
- Safety and efficacy unknown by lack of well-conducted randomized trials
- Serious side effects have been reported
- Typical protocol: 4 bisacodyl tablets at 1 PM on day before procedure, 238 mg MiraLAX plus 64 oz. Gatorade
What About Magnesium Citrate?

- Increases intraluminal fluid volume and stimulates cholecystokinin release, enhancing gut motility.
- Split dose regimen: 300 mL evening before and 3-5 hours before exam - may be used with bisacodyl tablets.
- Should not be used with renal impairment.
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Dance Lessons

“I grew up with six bothers. That’s how I learned to dance - waiting for the bathroom.”

-Bob Hope
Oral Sodium Phosphate

- Use limited by risk of acute phosphate nephropathy
- May result in permanent renal impairment
- Risk factors: increased age, hypovolemia, impaired bowel transit time, active colitis, baseline kidney disease and use of certain medications (diuretics, ACE inhibitors, angiotension receptor blockers, and possibly NSAIDs)
Oral Sodium Phosphate (Cont.)

- May cause fluid shifts, precipitating intravascular volume depletion - should not be used in patients with congestive heart failure, renal failure, decompensated cirrhosis, or baseline electrolyte disorders

- Fleet products recalled after FDA alert in 2008
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Toilet Trouseau

Would you rather have a diamond ring or a toilet? In rural India, many brides choose the latter. In fact, a campaign using the slogan “no toilet, no bride” encourages women to refuse their suitors until they agree to install an indoor toilet. In just four years, toilet ownership went from 5 to 60 percent with government financial assistance.
**Tablet Formulations for NaP**

- **Visicol**
  - 32-40 tablets (40 to 60 gm) taken in 2 doses
  - Insoluble microcrystalline cellulose produced poor visibility of mucosa in some patients

- **OsmoPrep**
  - Residue-free NaP tablet
  - Less change in electrolytes, fewer adverse reactions
  - 20 tablets evening before and 12 tablets 3-5 hours before exam

- Both require prescription, warning information, and use in healthy patient populations

- Efficacy for cleansing equivalent to 4-L and 2-L PEG but studies have shown improved tolerance and compliance with NaP vs. PEG
**Sodium Sulfate**

- Sulfate is poorly absorbed, thus doesn’t produce significant fluid and electrolyte shifts.

- Available as SuPrep, two split doses of 6 oz. each; follow each dose with two 16 oz. glasses of water over the course of an hour.

- Total volume 960 mL.

- Equal in efficacy to 2-L PEG but no clinically significant differences in patient tolerance or laboratory parameters.
Sodium Picosulfate

- Available as Picoprep
- Newest colonoscopy prep
- Small volume
- Effectiveness = NaP but better tolerated
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**A Natural High**

The term “poo-phoria” derives from the euphoria associated with passage of a large volume stool, often accompanied by goose bumps and even a little light-headedness. This may relate to discharge of toxins.
Advantages of PEG-containing Lavages

- Do not damage colonic mucosa
- Produce minimal osmotic fluid shifts
- Useful in patient with active lower gastrointestinal bleeding
- Safer in patients at risk for developing hyperphosphatemia
- Low price for generic 4-L PEG lavage
Disadvantages of PEG Lavages

- Large volume of fluids (but may not need all)
- Unpalatable taste
- Metoclopramide not proven effective to help minimize side effects or improve quality of prep
- Other potential helpmates include chilling solution, flavoring with clear, sugar free powdered flavor enhancers or lemon juice
Low-Flow Toilets

The toilet is the single largest consumer of water in the home, using 30 percent of the daily total. High efficiency, low-flow toilet use only 1.1 gallons per flush, vs. 1.6 in standard models and 3.5 in pre-1994 models, reducing daily flush volume by 60 percent or more.
Practical Considerations for a Quality Prep

- **Clear Liquid Diet**: day before prep may not be necessary; when compared to a fiber free diet the latter had higher mean consumption of PEG, a higher rate of quality preps, and an improved tolerance.

- **Prepackaged Low-Fiber Diet (NutraPrep)**: in combination with magnesium citrate, bisacodyl tablets and a suppository gave improved bowel cleansing and patient tolerability vs. NaP.
Practical Considerations for a Quality Prep (Cont.)

- **Patient Education**: procedure description, possible adverse effects/complications, and preparation instructions; one study showed education program reduced prep failure rate from 26% to 5% in ambulatory patients.

- **Hydration**: may be critical as fluid loss during prep may exceed 2-3 L; decreases in BP (>10 mm Hg) or postural tachycardia (>10 beats) described in 10% to 35% of prep patients - may be worse in certain groups and at least 64 oz. (~2 L) day of prep and 32 oz. over 8 hours after exam.
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Cubicles and Colon Cancer

According to a study done at The University of Western Australia, if you spend more than 10 years at a desk makes you twice as likely to develop a colon tumor. Increased blood sugar levels caused by long hours of sitting are thought to blame. Exercising after hours does nothing to improve your odds.
Ancillary Helpmates

- Low residue diet 2 days before prep
- Clear liquid diet for 24 hours before exam
  - Can be taken up to 2 hours before exam (ASA)
- Difficulty taking prep due to excessive nausea, vomiting, or excessive bloating:
  - Stop prep for 1-2 hours and/or slow rate
  - Eat 2 soda crackers
  - Give Compazine (prochlorperazine)
  - Chill solution
  - Add flavoring (sugar free Crystal Light)
Ancillary Helpmutes (Cont.)

- Reglan
- Split-dose lavage
- Fleet enema for retained material in rectosigmoid
- Gas-X, Mylicon of little benefit
Studies of healthy subjects reveal the accepted range of stool frequency as “normal: is from 3 bowel movements per day to thrice per week.”
Importance of Split-Dosing

- Evening before (1/2) and morning of (1/2) exam
  - Must be through by >2 hours before exam
- Multiple randomized trials and meta-analyses
  - One meta-analysis of 5 trials with 1232 patients found satisfactory preps more likely with split-dosing (odds ratio [OR] 3.70), patients preferred split-dosing (OR 1.76) less likely to discontinue the prep (OR 0.53) and reported less nausea (OR 0.55)
- Another showed adenoma detection rate increased from 27 to 32 percent
Importance of Split-Dosing (Cont.)

If greater than 8 hours has elapsed from end of prep, ileal contents begin to fill the right colon, coating the muscosa with a thin film of chyme that obscures detail.
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Custom Color Your Stools?

Designer foods may help:
- Black - spinach and blueberries
- Red - beets
- Green - blackberries
- Orange - cantaloupe and sweet potatoes
- Yellow - milk

Of course, GI bleeding can have color (and odor) effects, but are not advised.
**Prep Quality**

- Follow your doctor’s directions to ensure your colon is as clean as possible.
- A fair or poor prep can leave the colon dirty—making it difficult for your doctor to spot abnormal growths.

- Flat lesion
- Depressed lesion
- Polyp
- Elevated lesion
Same Day Preps

• Appear to be clearly better than evening before preps throughout colon but:
  • Adenoma detection rate unchanged

• Another study showed better overall cleaning vs. evening before prep with less fecal incontinence and vomiting

• Timing of procedure limits this type of prep

• A recent study showed higher rates of incomplete procedures and lower rates of adequate bowel cleansing in afternoon procedures, thus making a case for same day prep
**Special Populations**

- Those over 65 years comprise at least 20% of colonoscopy patients and may be more difficult to prep
  - Constipation
  - Reduced mobility
  - Difficulty completing the prep

- Diabetes
- Inpatients
- Tricyclic antidepressants
- Males
- History of CVA, dementia, cirrhosis

**Consider:**
- repeat prep with another regimen
- Add magnesium citrate, senna, or bisacodyl
Safety

- NaP
  - Changes in volume, electrolytes
  - May alter mucosa (apthoid erosions)
  - $\uparrow$ PO$_4$ in 40% of healthy patients
  - $\downarrow$ K in 20% of healthy patients
  - $\downarrow$ Ca, Na
  - Seizures
Safety (Cont.)

- PEG
  - Aspiration
  - Mallory-Weiss tear
  - Esophageal perforation
  - Pancreatitis
  - Colitis
  - Cardiac dysrhythmia
  - SIADH

- Visicol
  - Tonic clonic seizures

- MiraLAX
Cost (January 2009)

- Average wholesale price (Amerisource Price Lookup and/or Red Book May 2008 Update):
  - Go-Lytely, CoLyte $14-18.50
  - NuLytely $25.50
  - HalfLytely (kit) $49.00
  - MoviPrep $49.00
  - MiraLAX $22.00
  - OsmoPrep $1.73/tab
    - 32-40 tabs
  - SuPrep $50.00
  - PicoPrep $80-100.00
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There is an inverse relationship between the amount of fiber eaten and the rate of diverticulosis (DV). DV is quite rare in parts of the world where dietary fiber intake is high (e.g. Asia). Asian populations consume over 45 grams of fiber daily vs. only 10 grams for the average American.
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Diverticulosis

Diverticulosis is one of the most common disease in developed countries. Approximately 60 percent of Americans over age 50 have diverticula, due to a lifetime of eating a low-fiber diet. Many believe that popcorn, seeds, or nuts get stuck in the diverticula and cause diverticulitis. However, no studies have confirmed this and at least one has refuted it.
Summary

• Inadequate cleansing in 27 percent

• Right colon polyps often flat and subtle
  • Influence of colonoscopy to decrease risk of right colon cancers less than optimal

• No ideal prep

• Patient education and adherence critical

• Multiple preps offer similar results

• NaP preps require black box warning
Summary (Cont.)

- Split-dosing or same day preps more effective than evening before preps
- Low volume PEG preps currently preps of choice but cost may be a factor
- UpToDate recommends (in healthy patients):
  - Low residue diet 3 days before exam
  - Clear liquid diet day before exam
  - Magnesium citrate 15 oz. 7 p.m. plus three 8 oz. glasses clear liquid over 2 hours
    Repeat 5 hours before exam
Dr. P’s **Turd-bits**

Postoperative ileus patients who chewed gum for 15 minutes TID recovered bowel function and left the hospital sooner than those who did not. Chewing gum may trick the GI tract into “thinking food is on the way,” causing brain-gut signals that jump-start the digestive process.
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Hot Tip

“Never kick a fresh turd on a hot day.”

-Harry S. Truman