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BOWEL PREP PRIOR TO COLON/RECTAL SURGERY IS STILL VALUABLE
>20% mortality from Infectious complications in the first half of the 20th Century

Today mortality 2-6%

Infectious complications still most common issue
TYPES OF INFECTIOUS COMPLICATIONS

- Wound and surgical site infections
- Intra-abdominal abscesses
- Anastomotic leaks
- Septicemia
INFECTING ORGANISMS

- Bacteroides
- Clostridium
- Escherichia coli
- Klebsiella
- Proteus
- Pseudomonas
- Streptococcus
WHAT IS A COMPLETE BOWEL PREP?

- Mechanical bowel prep
  - Historically: castor oil / senna / bisacodyl / phenolphthalein / Na picosulfate / Mg citrate
  - Enemas: tap water / soap suds / tannic acid
- 1973 Hewitt et. al. introduced whole gut irrigation: isotonic solution via NG
  - Caused electrolyte imbalances, N/V, fluid shifts
WHAT IS A COMPLETE BOWEL PREP?

- Whole gut lavage: Manitol
  - Created an osmotic diarrhea, again causing electrolyte imbalances and fluid shifts

- Current agents
  - PEG introduced in 1980: osmotically balanced
    - Less electrolyte imbalances
    - Requires 4 liters of salty fluid intake in short time span
    - 5-10% non compliance
    - Good clearance/cleansing
WHAT IS A COMPLETE BOWEL PREP?

- Sodium Phosphate
  - 2 small doses of 45 mL
  - Better tolerated
  - Excellent clearance and cleansing
  - Not recommended in renal failure / cirrhotics / CHF
Preoperative IV Antibiotics
- Prevent soft tissue infections
- Given 30 minutes prior to incision
  - Some studies gave 3-4 doses before and after surgery but this has not proven efficacious
- Re-dosed at 4-6 hr intervals depending on the Abx
WHAT IS A COMPLETE BOWEL PREP?

- Oral Antibiotics
  - Given to target the intraluminal concentration of bacteria
  - Regimens differ, all given pre-op day 1:
    - Neomycin 1 gram + Erythromycin 1 gram at 1 pm, 2 pm, and 11 pm
    - Flagyl 500 mg Q6hrs x 3-4 doses + Erythromycin 1 gram as above
    - Ciprofloxacin 500 BID
WHAT IS A COMPLETE BOWEL PREP?

- Low residue or clear liquid diet starting 3 days prior to surgery
- NPO midnight prior to surgery
DIFFERENCES AMONG INSTITUTIONS

- MBP + Oral Abx + IV Abx
- MBP + IV Abx
- MBP + Oral Abx
- Oral + IV Abx only
- IV Abx only
ARE BOWEL PREPS TOLERABLE?

Total 114 Pts, asked to rate prep experience as above
No difference in compliance among 3 groups
Over all, Tolerable

Group 1: CLD + Mg Citrate + Bisocodyl tabs x 2 days
Group 2: NutraPrep low residue diet + same as Group 1
Group 3: PEG + NutraPrep low residue diet
DO DOCTORS STILL USE BOWEL PREPS?

- 1295 members of the American Society of Colon and Rectal Surgery in the US were asked
- 515 responded to the questioner
- What was their response?
DO DOCTORS STILL USE BOWEL PREPS?

MBP

- Helpful: 100%
- Not Helpful: 10%
- Actual Use: 100%
DO DOCTORS STILL USE BOWEL PREPS?

IV Abx

- Helpful
- Doubt helpfulness
- Actual Use
WHY SO MUCH HYPE AGAINST BOWEL PREPS?

- ~10 prospective randomized trials show increased infectious complications and/or anastomotic leaks related to the use of MBP.

- Cochrane review and meta-analysis of these studies totaling ~1600 patients each supported these findings.
LET’S STOP USING BOWEL PREPS!!

Hold on, not so fast!!!
THREE QUICK ISSUES

1. Assuming an infectious complication rate of ~10%
   - Designing a prospective study that can detect a difference of 5% in the infection rate
   - One tailed statistical test (examining if the treatment is better than control but not if it is worse)
   - Alpha level of 0.05
   - To gain a statistical power of 90%

YOU NEED:
770 Pts randomly assigned to each group
Total of 1540 Pts
THREE QUICK ISSUES

1. Cont...
   Where are you going to accrue that many Pts for this kind of study

Option:
   Multicentric studies

Problem:
   Compromise homogeneity of the operative and peri-operative technique (most important factor)
2. Even the Cochrane review published in 2007 showed no statistical difference in infectious complications and used anastomotic leaks as their primary outcome instead.

IN FACT, their analysis reads:
“It is not possible [to conclude there is any difference in wound complications] because of clinical heterogeneity of trial inclusion criteria, methodological inadequacies of particular trials, performance biases, and failure of intention to treat analysis.”
THREE QUICK ISSUES

3. New confounding risk factors have been elucidated that can lead to increased wound complications:

Including:
- Core body temperatures during the procedure
- Tissue oxygenation before / during / after the procedure
SO OUTSIDE OF THESE CONTROVERSIAL ISSUES

DOES BOWEL PREP DO ANYTHING FOR THE

PATIENT AND/OR SURGEON?

- Rids the colon of solid stool
- Eliminates the proximal colonic stool column**
- Creates decreased volume of colonized material**
- Facilitates palpation of bowel and helps locate occult tumors**
- Allows for intra-operative colonoscopy & Bx if necessary
- In laparoscopic surgery, it decreases bowel weight and eases manipulation, thus decreasing bowel injury
A study of 830 patients who underwent colonoscopy

~5.5% developed interval cancer within 5 years

27% of the interval cancers were at previous polypectomy sites

Others were at remote colonic locations

Interval cancers were significantly smaller than the initial sporadic tumor

Interval cancers were found 3x more often in the right colon
ANASTOMOTIC LEAKS

- Cochrane meta-analysis says MBP increases leaks

- Other studies demonstrate increased mucosal and submucosal inflammation likely due to increased bacterial translocation from mild mucosal disruption after MBP that may lead to increased anastomotic failure
Computing proximal colonic stool column prevents disruption of a fresh anastomosis.

Other studies show a significantly higher anastomotic bursting pressure in animals that received a MBP.

Other factors can contribute to poor anastomotic integrity including: adequacy of blood flow (especially after meso-rectal excision), contamination, technique, presence of a drain, tension, obstruction, active Dz, and distance from anal verge.

So this topic is at best controversial.
DECREASED VOLUME OF COLONIZED MATERIAL

- Increased number of bacteria and/or $\geq 4$ different isolates within the operative field lead to increased rates of SSI

- Taking the time and care to decrease the density of colonized material is prudent
DECREASED VOLUME OF COLONIZED MATERIAL

- Largest study on this issue is a prospective, DB, Randomized trial compiled by the 10 largest VA’s in the US
- 3 day MBP was control and oral Abx (neo/Erythro) or look alike placebo administered
- Surg technique was kept as uniform as possible
- Specimens obtained from wound and abdominal irrigation as well as stool at surgery and post-op
- Study was stopped after only 99 Pts because of the high significant difference between the groups
DECREASED VOLUME OF COLONIZED MATERIAL

- Overall
- Intra-abdominal Abscess
- Wound Infection (SSI)
- Septicemia
- Anastomotic Leaks
- Deaths

Colors:
- Orange: Oral Abx
- Brown: Placebo
DO ORAL ANTIBIOTICS LOWER DENSITY OF COLONIZED MATERIAL?

<table>
<thead>
<tr>
<th></th>
<th>Placebo</th>
<th>Antibiotic</th>
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<tbody>
<tr>
<td>Aerobic bacteria</td>
<td>7.0 +/- 0.2</td>
<td>3.2 +/- 0.4</td>
</tr>
<tr>
<td>Anaerobic bacteria</td>
<td>8.8 +/- 0.2</td>
<td>3.7 +/- 0.4</td>
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Expressed as log base 10 CFU/mL +/- 1 SEM
WHAT ABOUT WITH IV ANTIBIOTICS

- Overall Conflicting data
- Addition of IV Abx to oral regimen may be superior
- IV Abx may be superior
- Oral Abx may be superior
- No difference in the two
CONCLUSIONS

- There are conflicting data on certain aspects of the overall bowel prep
- Most clinical trials lack the statistical power to provide convincing evidence
- Meta-analyses lack the homogeneity and themselves admit to poor conclusive evidence to justify the withdrawal of any aspect of bowel prep
- There are confounding factors in the causes of anastomotic leaks
CONCLUSIONS

- Most doctors that do colo-rectal procedures admit they continue to use ALL aspects of the bowel prep despite all the data against it.
- Bowel prep offers other advantages to both the patient and surgeon over those issues that are studied and controversial.
- Bowel prep confers both intuitive and well documented advantages over no prep.


SOURCES


