Bowel Preparation for Elective Colorectal Surgery: Helpful or Harmful?

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History of Colon Surgery

- Early 20th Century *mortality* rates for colorectal surgery >20%, morbidity >50%
- Mechanical bowel preparation (MBP) with oral Abx became standard to decrease infectious complications*
- Current controversy whether MBP is necessary

*Condon RE, Annals Surg, 1977*
Common Bowel Prep Options

- Fleet’s Phosphosoda
- Fleet’s Phosphosoda + Erythro & Neo/Flagyl
- PEG + Oral Abs

***No Commonly Accepted Standard***
Current Practices

- Most surgeons use MBP (NaP>P EG), most use oral Abx.
- However, in perforated diverticulitis, acceptable practice to perform 1° anastomosis.
- Routine in trauma to primarily repair fresh colon injuries.

Reasons To Perform Bowel Prep

- Decrease of fecal flora burden
- More attractive to surgical team
- Easier to palpate/visualize intraluminal tumors
- Decrease proximal fecal load
- Reduce risk of septic complications and anastomotic leaks
Reasons To Not Perform Bowel Prep

- Poorly tolerated by some patients
- Electrolyte imbalances
- Increased translocation
- Reduce intraoperative fecal spillage
- More physiologic for colonocytes
- Recent studies show increased complications
Comparison Fleet’s vs. PEG

- In pts who have done both regimens, 80% favor the phosphosoda.

- In blinded studies, gastroenterologists found 2 doses NaP clearly superior to 1 dose or PEG.

Law WL, Asian J of Surg, 2004
Enteral Antibiotics

- Erythromycin base
- Neomycin
- Metronidazole (Flagyl)
Erythromycin

- Macrolide
- GI pain, anorexia, diarrhea, N/V
- C. difficile
- Urticaria
- Ototoxicity
- Arrhythmias
Neomycin

- Aminoglycoside
- Common side effects
  - Diarrhea
  - N/V
Metronidazole

- Headache 5%
- Dizziness 2%
- GI pain 7%
- N/V 4%
- C. diff, candidiasis, disulfiram rxn
Parenteral Antibiotics

- Patients are given broad spectrum antibiotics just prior to incision
- Regimen varies from country to country and hospital to hospital
- Many now give single-drug therapy
- Ertapenem may be optimal
Evidence Regarding MBP

Basic science

- MBP- no reduction in contamination nor alteration in flora cultured. Fa-Si-Oen, Clin Micro & Infxn, 2005

- MBP may induce spontaneous bacterial translocation. Poole, South Med J, 1991

- Bursting strength may be higher
Evidence Regarding MBP

Clinical Outcomes

- Multiple recent RCT’s comparing MBP to no MBP show no difference, possibly fewer problems in no MBP group

- Santos JCM, Br J Surg, 1994  n=149  MBP, ↑wound infxn
- Burke P, Br J Surg 1994  n=169  No difference
- Miettinen R, DC & R, 2000  n=267  No difference
- Zmora O, Ann Surg, 2003  n=380  No difference
- Ram E, Arch Surg, 2005  n=329  No difference
Evidence Regarding MBP

Clinical Outcomes

- All the aforementioned RCT’s were seriously underpowered, thus leading to the inevitable Meta-Analysis
- All studies also had significant methodologic flaws…
Evidence Regarding MBP

- Meta-Analyses show trend toward better outcome with no MBP
  - Bucher P, Arch Surg, 2004 (n=1297)
  - Slim K, Br J Surg, 2004 (n=1454)
  - Wille-Jorgensen P, Colorectal Disease, 2005 (n=1592) (also published as Cochrane Review)
Anastomotic leak rate

- Suggests, almost to a statistically significant level, that leak rates are lower without MBP

<table>
<thead>
<tr>
<th>Study</th>
<th>MBP Better</th>
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</tr>
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<tbody>
<tr>
<td>Brownson et al.13</td>
<td>8/86 vs 1/93</td>
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<td>Bucher et al.14</td>
<td>4/47 vs 1/46</td>
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<tr>
<td>Global</td>
<td>36/642 vs 18/665</td>
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</tbody>
</table>

- Global Fixed
- Global Random
- Global Fixed Without Brownson et al.13
- Global Random Without Brownson et al.13
Wound Infection Rate

- Trend is also toward a lower wound infection rate

<table>
<thead>
<tr>
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<th>No. of Patients Who Received MBP vs No. of Patients Who Received No MBP</th>
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<td>4/62 vs 3/67</td>
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Graph showing odds ratios and trend towards lower wound infection rates.
General Complication Rates

- No difference in general complication rates

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<td>Miettinen et al(^{17})</td>
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Global

- 72/372 vs 65/368
No difference in mortality rates

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Conclusions

- Meta-analyses show no difference in those pts receiving MBP vs. not and MBP may actually have negative effects.

- “Prophylactic MBP before colorectal surgery has not been proven valuable for patients. Controversially it seems that the preparation might lead to more anastomotic leakage and thus the procedure should be omitted.”

Conclusions

- “The main finding was that bowel preparation may be detrimental by increasing the risk of anastomotic leakage”*
- “There is no evidence to support the use of MBP in patients undergoing elective colorectal surgery. Available data tend to suggest that MBP could be harmful with respect to the incidence of anastomotic leak and does not reduce the incidence of septic complications”**

Conclusions

- “The results of this systematic review show the necessity of completing more trials... of MBP compared with no preparation...”

- “Collaborative (properly designed) randomised clinical trials that involve a large representative number of individuals... should be planned”

Wille-Jorgensen, et al  Cochrane Systematic Review 2005
Further Studies on MBP

Two recent large RCT’s have been completed and published. Both are multi-center efforts and well conducted.

- **Swedish study enrolled 1343 patients** (Jung, et al)
- **Netherlands study enrolled 1431 patients** (Contant, et al)

Further Studies on MBP

- Swedish study-21 hospitals
- 686 MBP, 657 no prep
- No difference in length of stay, CV complications or SSI
- “MBP does not lower the complication rate and can be omitted before elective colonic resection”

Further Studies on MBP

- Netherlands study-13 hospitals
- 707 MBP, 724 no prep
- Colon and rectal resections included
- No difference in length of stay, overall complications, or leaks
- “The conclusion that elective colorectal surgery can be safely done without MBP is justified”

Further Studies on MBP

- Is the “final chapter” written? Should we abandon MBP as much of Europe has?
- If a patient develops a leak or other major infectious complication following colon resection without (or with) MBP, will there be medicolegal consequences?
Further Studies on MBP

- Not so fast…let’s look at the hard data…

- Swedish trial-
  - Leak rate 1.9% with MBP vs 2.6% w/out MBP (p=0.6)
  - Abscess rate 0.7% with MBP vs 1.7% w/out MBP (p=0.11)

- Netherlands trial
  - Leak rate 4.8% with MBP vs 5.4% w/out MBP (p=0.69)
  - Abscess rate 2.2% with MBP vs 4.7% w/out MBP (p=0.02)
## Further Studies on MBP

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<tr>
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<tr>
<td>Leaks</td>
<td>13(1.9%)</td>
<td>17(2.6%)</td>
<td>0.596</td>
</tr>
<tr>
<td>Abscesses</td>
<td>5(0.7%)</td>
<td>11(1.7%)</td>
<td>0.110</td>
</tr>
<tr>
<td><strong>Contant et al</strong></td>
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<td></td>
</tr>
<tr>
<td>Leaks</td>
<td>32(4.8%)</td>
<td>37(5.4%)</td>
<td>0.69</td>
</tr>
<tr>
<td>Abscesses</td>
<td>15(2.2%)</td>
<td>32(4.7%)</td>
<td>0.020</td>
</tr>
<tr>
<td><strong>Combined data</strong></td>
<td></td>
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</tr>
<tr>
<td>Leaks</td>
<td>45(3.3%)</td>
<td>54(4.0%)</td>
<td>0.437</td>
</tr>
<tr>
<td>Abscesses</td>
<td>20(1.5%)</td>
<td>43(3.2%)</td>
<td>0.003</td>
</tr>
<tr>
<td>Leaks + abscesses</td>
<td>65(4.8%)</td>
<td>97(7.2%)</td>
<td>0.027</td>
</tr>
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</table>

Platell C, Hall J Lancet 2007
Strong Indications to Use MBP

- Laparoscopy
  - Decompressed bowel easier to handle
- Small or difficult to palpate lesion
  - May consider tattooing of lesion
- High likelihood of intraoperative colonoscopy
- Rectal cancer-Inadequate data in this patient population
Conclusions

- Recommend the continued use of MBP except in select patients.

- In those patients that get MBP, Fleet’s phosphosoda (2 doses) should probably be used if the patient can tolerate it.

- All patients should receive appropriate prophylactic IV Abx.