Advantages of mechanical bowel preparation for elective colorectal surgery

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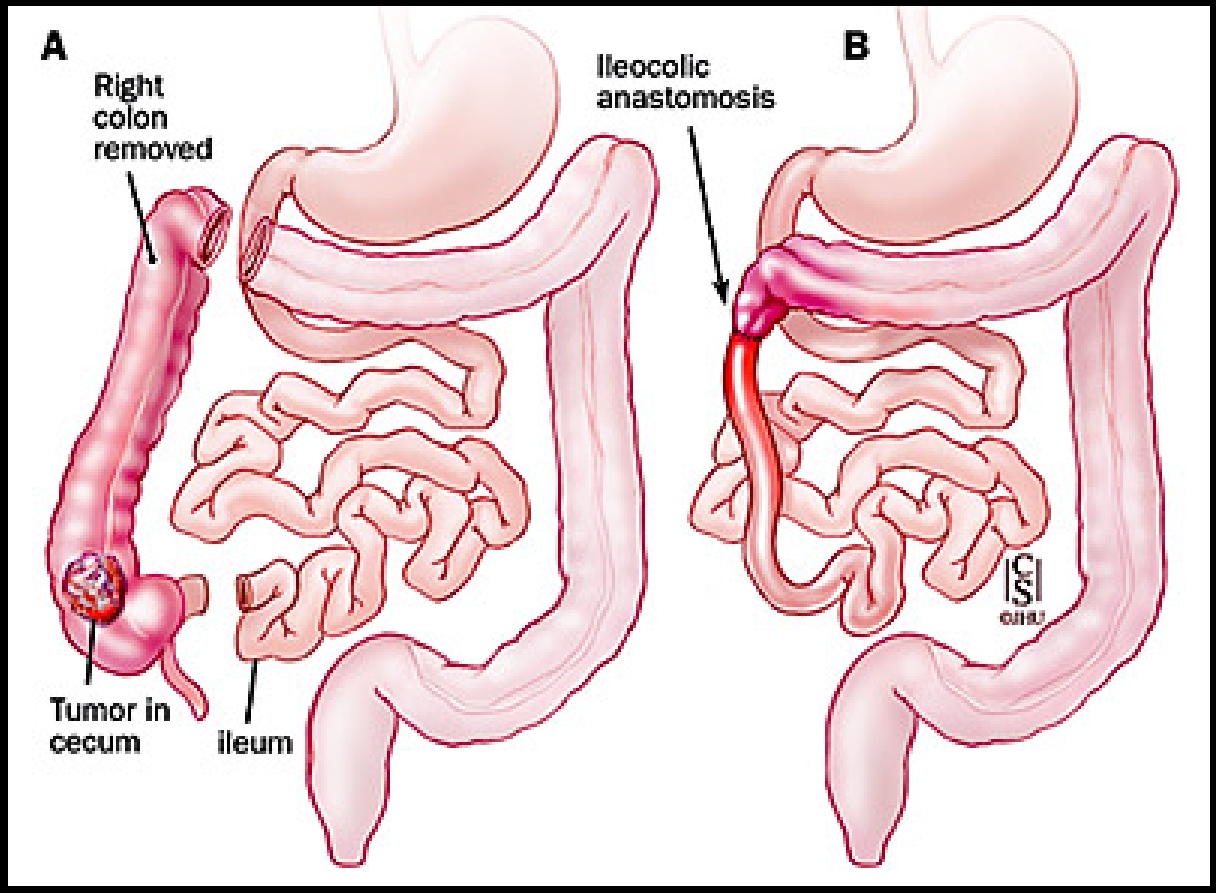
Outline

- Types of colon resection
- Mechanical Bowel Preparation (MBP) types
- Rationale for MBP
- Outcomes
- Conclusions
- Further studies

Types of Colon Resection

Right hemicolectomy



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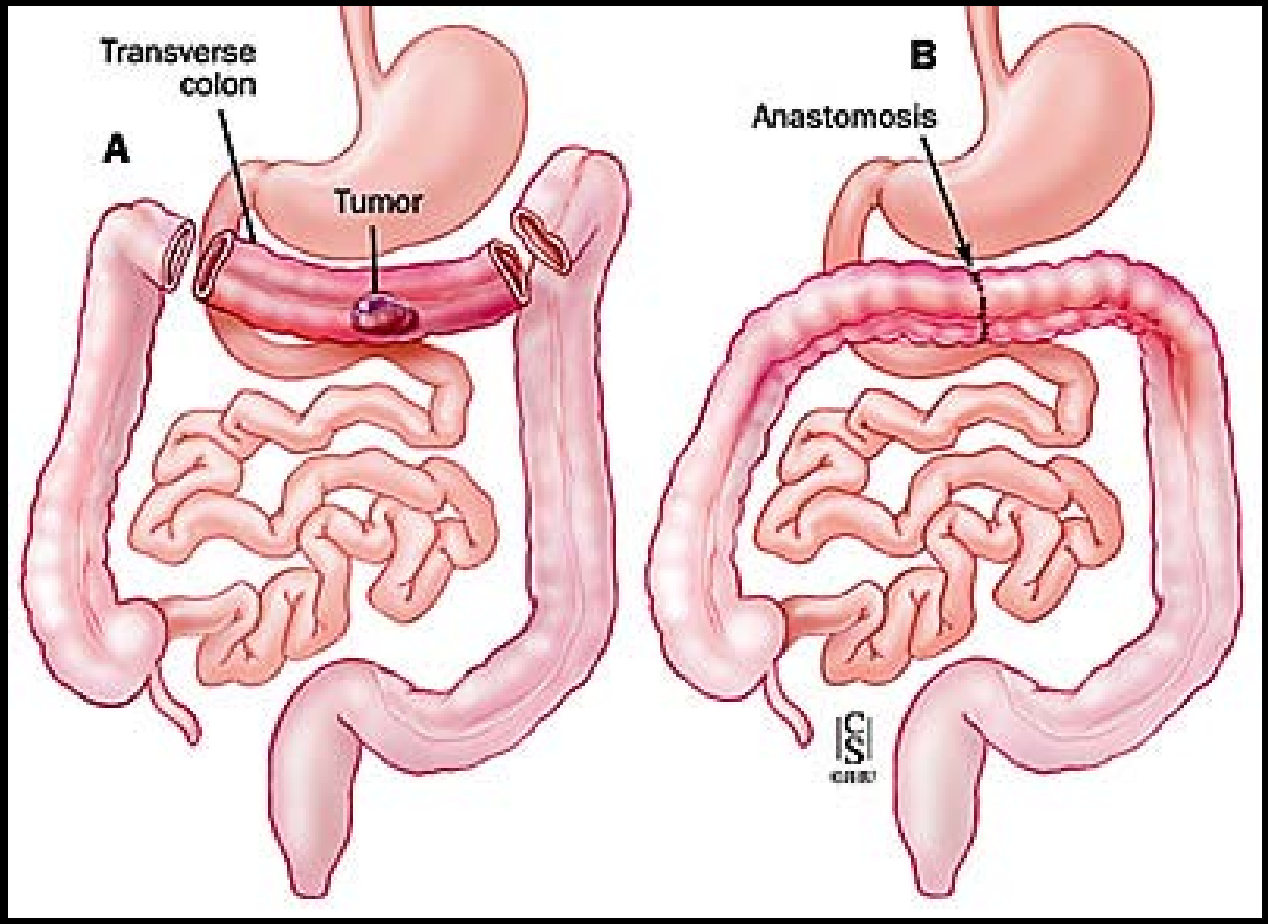
Types of Colon Resection

Transverse colectomy



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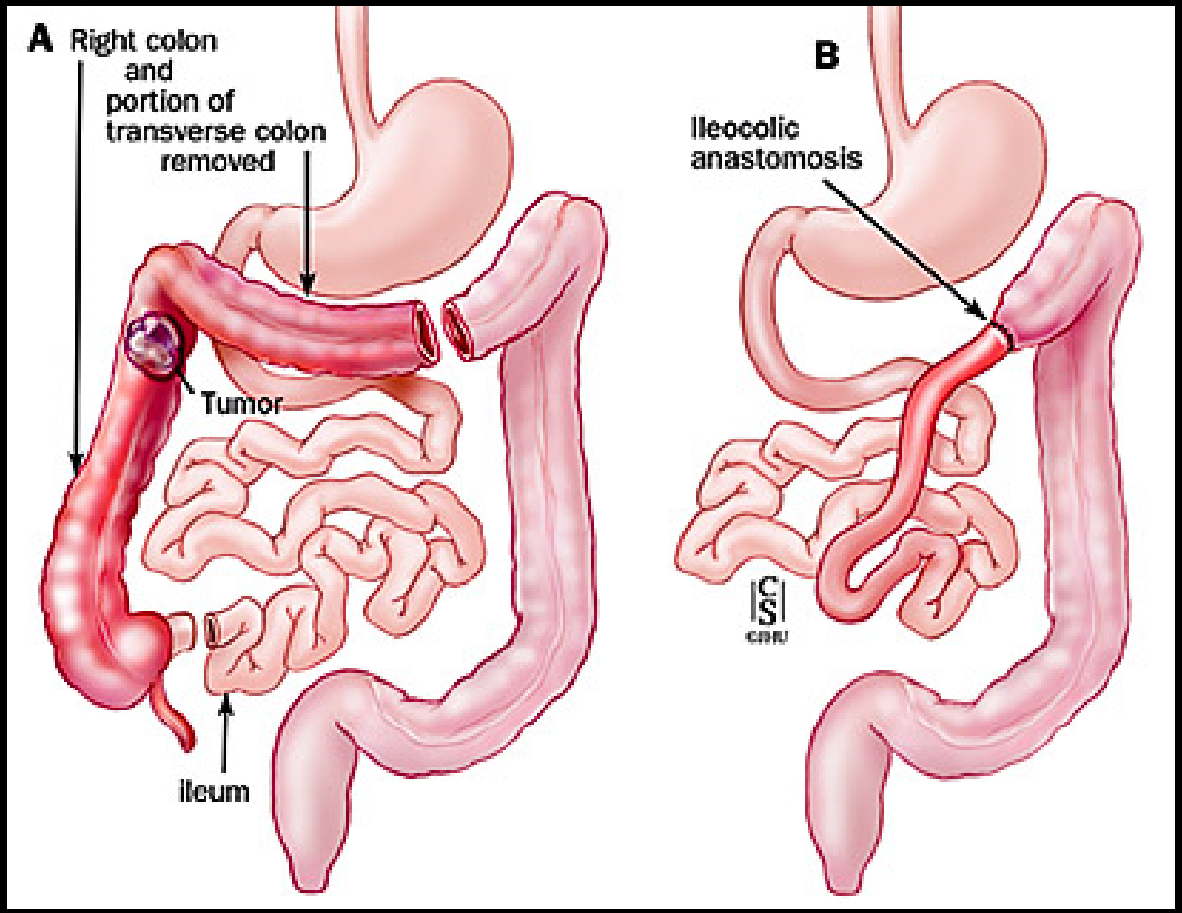
Types of Colon Resection

Extended right colectomy



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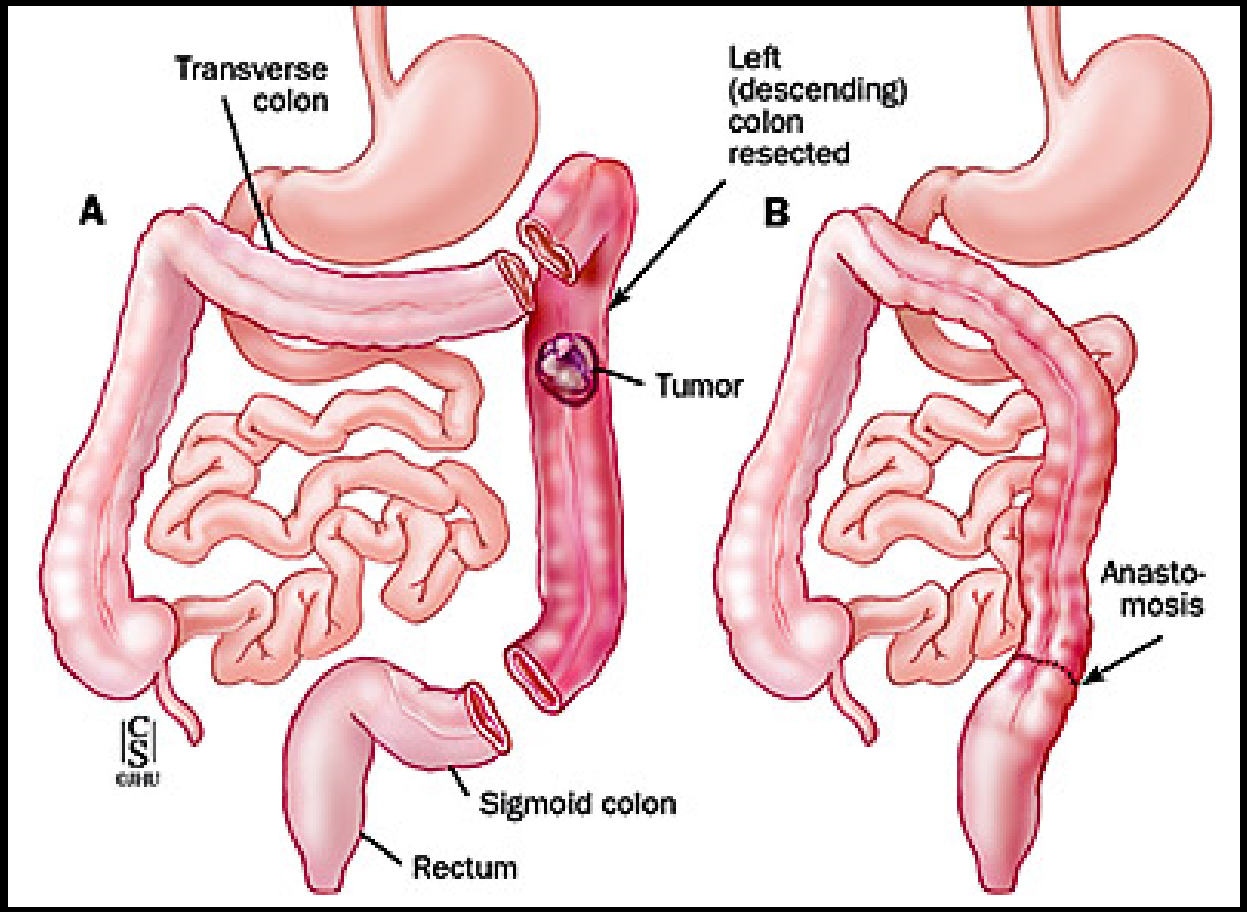
Types of Colon Resection

Left Hemicolectomy



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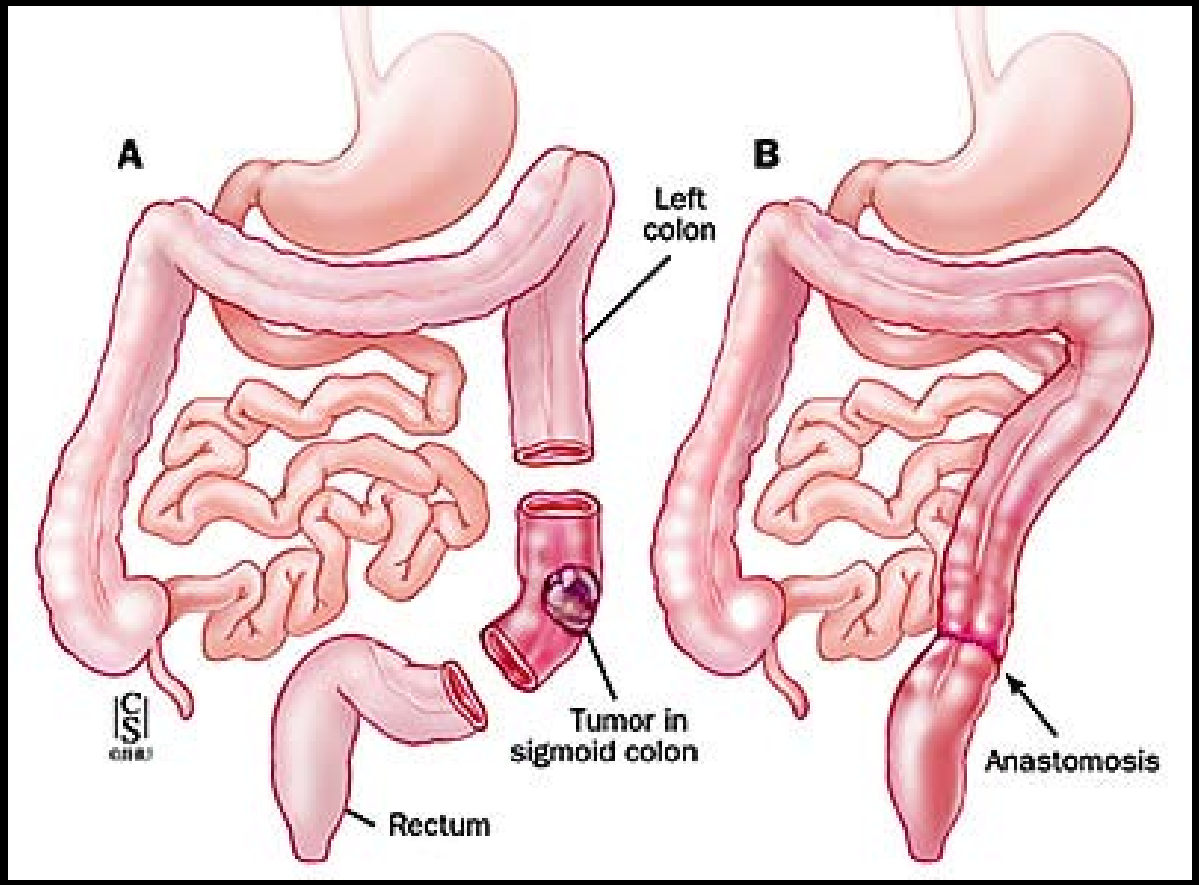
Types of Colon Resection

Sigmoid colectomy



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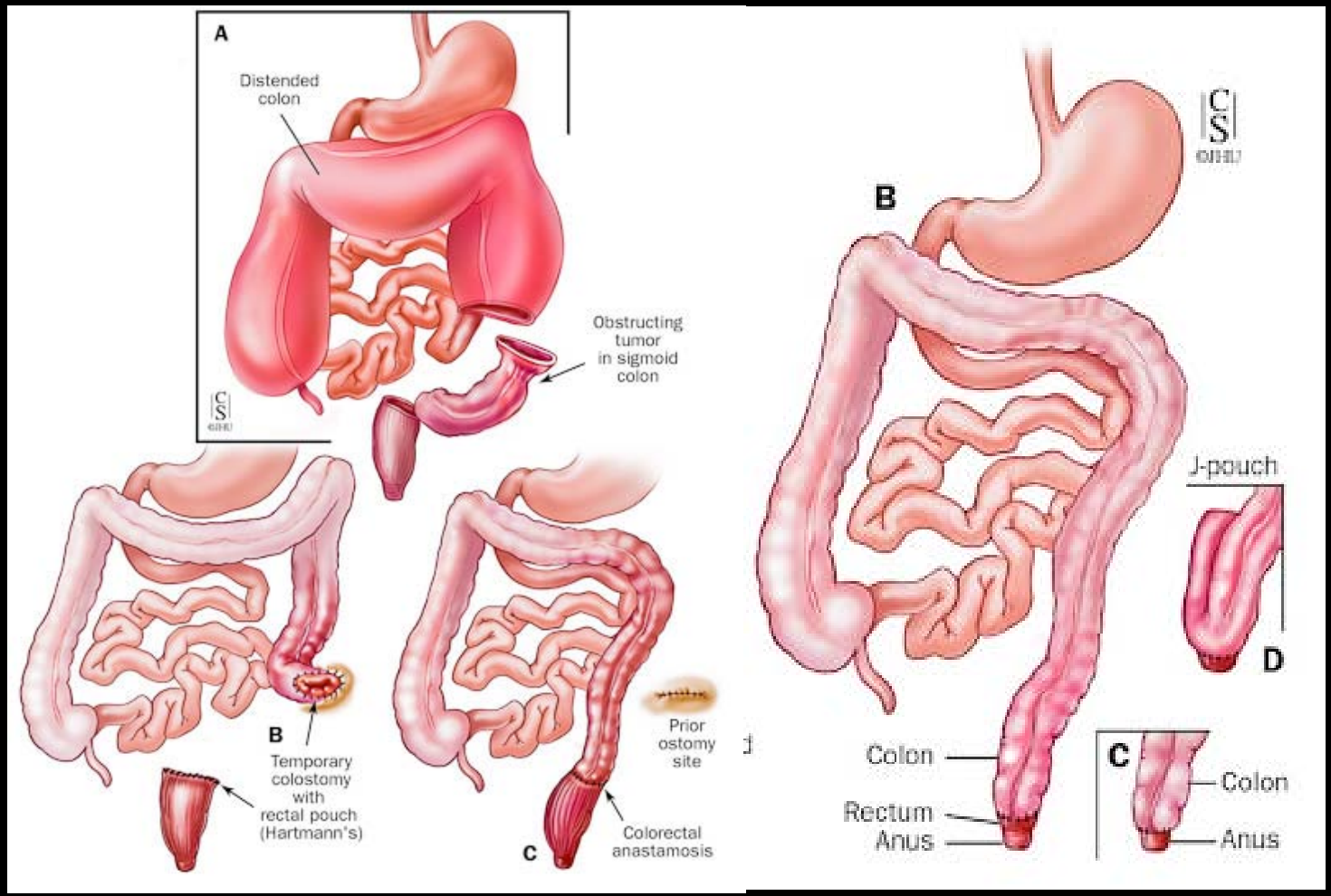
Types of Colorectal Resection

Low anterior resection



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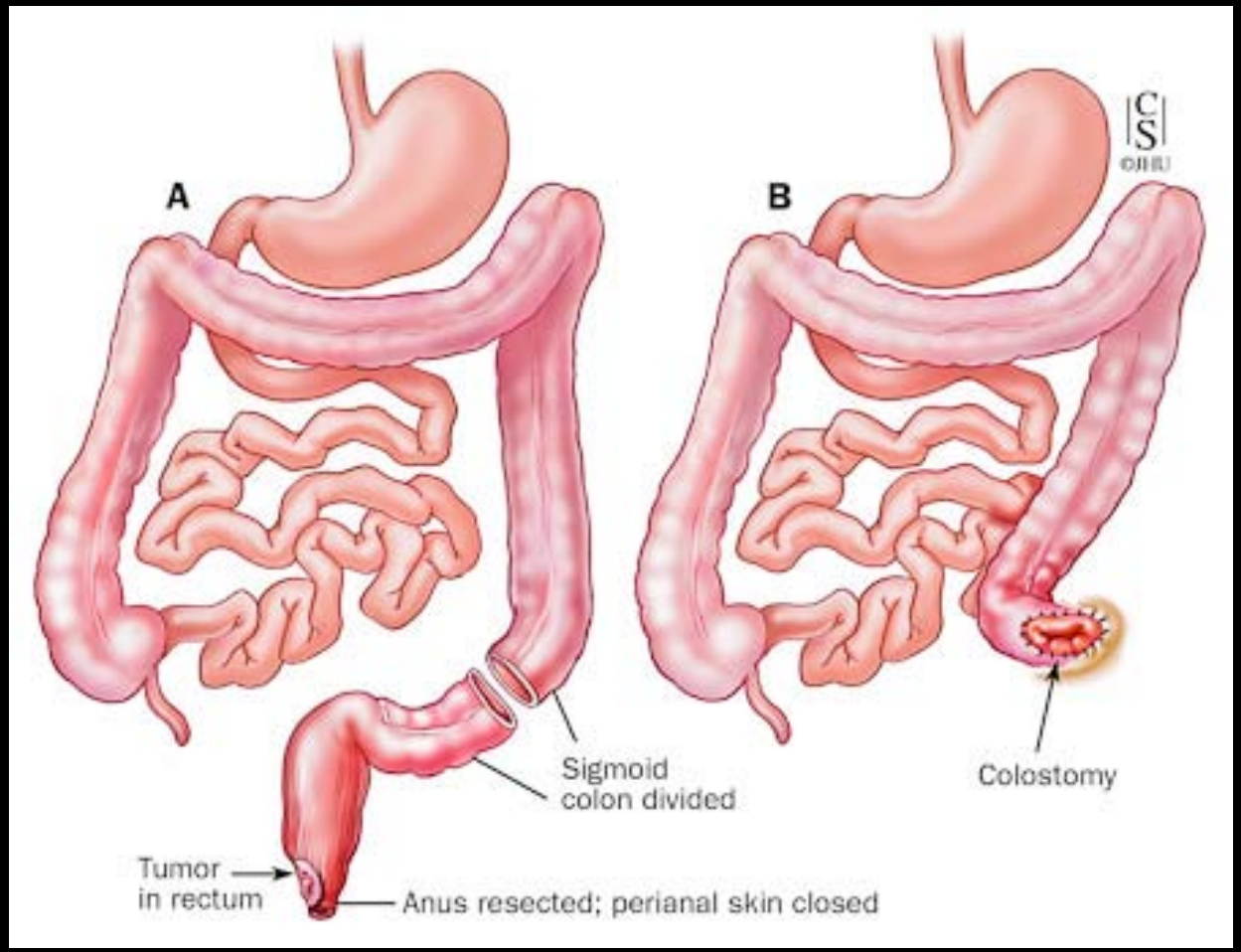
Types of Colorectal Resection

Abdominal perineal resection



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Types of mechanical bowel preparation

- Past regimens
  - 4-5 days of clear liquid diet, elemental diet
  - Laxatives – senna, castor oil, bisacodyl,
  - Repeated enemas
  - Large volume saline/mannitol irrigations using NGT
    - Requires hospitalization prior to surgery

Duncan, Clinics in Colon and Rectal surgery, 2009

Types of mechanical bowel preparation

- Polyethylene Glycol (PEG)
  - Isoosmotic, nonabsorbable, minimal fluid shifts/electrolyte derangements
  - Induces catharsis by osmotic effects
  - 2 – 4 liter oral consumption
  - Large volume leads to pt discomfort, adjunct with others
  - Mucosal changes

Duncan, Clinics in Colon and Rectal surgery, 2009

Types of mechanical bowel preparation

- Sodium Phosphate
  - Saline laxative, hyperosmotic, causes some fluid shifts and electrolyte imbalances
  - Induces catharsis by osmotic effects
  - 45 mL oral consumption – improved compliance
  - May substitute with tablets (~40)
  - New research reveals that enema may be an improved form of MBP with this solution
  - Mucosal changes

Duncan, Clinics in Colon and Rectal surgery, 2009

Rationale for MBP

- Evacuation of stool leads to improved visualization of lumen and smaller tumors
- Reduction in fecal flora
- Easier manipulation of bowel with decreased fecal content
- Easier insertion of stapling devices
- Potential for intraoperative colonoscopy to locate smaller tumors
- Remaining column of stool in LAR with diverting ostomy without MBP-> potential anastamotic leak

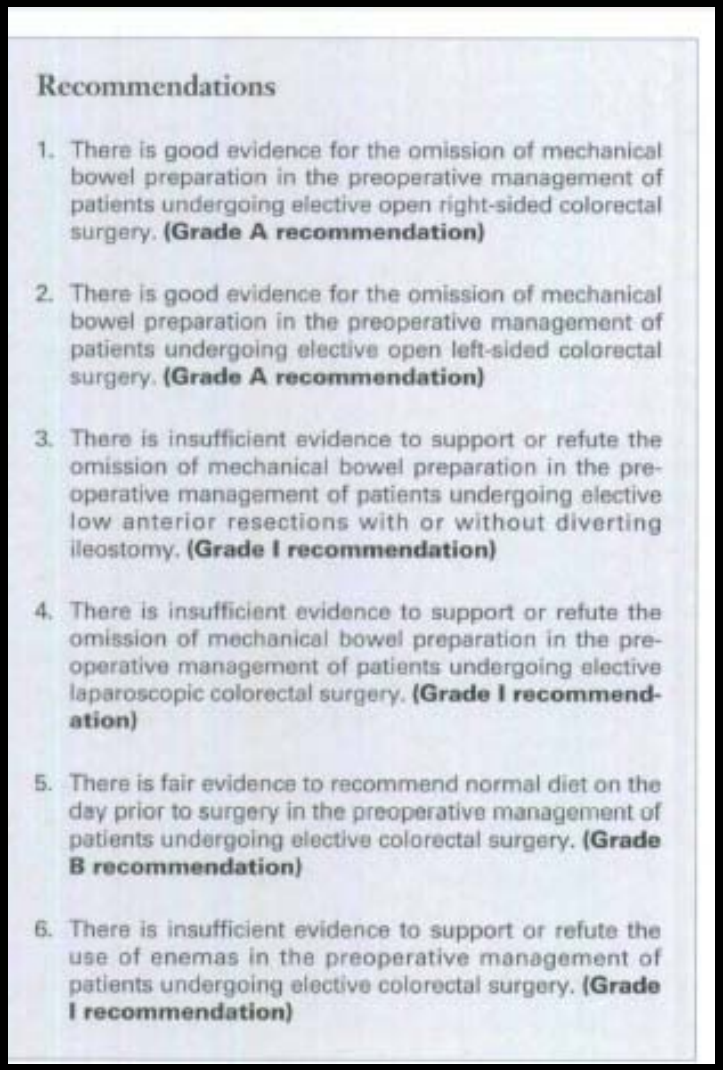
Eskicioglu, Canadian Journal of Surgery, 2010
Platell, British Journal of Surgery, 2006

Outcomes

- Many studies looking at anastamotic leak, superficial surgical site infection, peritonitis and reoperation
- Most studies with varying results based on type of surgery
- Many small studies unable to declare significant results due to being underpowered

Outcomes

- Review of 14 randomized control trials (N=5026)
- Methods of the USPSTF to grade study quality and level of evidence
- Made following recommendations:



Recommendations

1. There is good evidence for the omission of mechanical bowel preparation in the preoperative management of patients undergoing elective open right-sided colorectal surgery. **(Grade A recommendation)**
2. There is good evidence for the omission of mechanical bowel preparation in the preoperative management of patients undergoing elective open left-sided colorectal surgery. **(Grade A recommendation)**
3. There is insufficient evidence to support or refute the omission of mechanical bowel preparation in the preoperative management of patients undergoing elective low anterior resections with or without diverting ileostomy. **(Grade I recommendation)**
4. There is insufficient evidence to support or refute the omission of mechanical bowel preparation in the preoperative management of patients undergoing elective laparoscopic colorectal surgery. **(Grade I recommendation)**
5. There is fair evidence to recommend normal diet on the day prior to surgery in the preoperative management of patients undergoing elective colorectal surgery. **(Grade B recommendation)**
6. There is insufficient evidence to support or refute the use of enemas in the preoperative management of patients undergoing elective colorectal surgery. **(Grade I recommendation)**

Eskicioglu, Canadian Journal of Surgery, 2010

Outcomes

- Latest Cochrane Review (9/2011): 18 trials (N= 5805) comparing MBP vs no MBP
  - "there is no statistically significant evidence that patients benefit from mechanical bowel preparation, nor the use of rectal enemas"
  - Odds ratio < 1 favor MBP
  - results do show improved odds ratios in favor of MBP

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Anastomosis leakage stratified for colonic or rectal surgery	11		Peto Odds Ratio (Peto, Fixed, 95% CI)	Subtotals only
1.1 Leakage after low anterior resection	7	846	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.88 [0.55, 1.40]
1.2 Leakage after colonic surgery	8	3147	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.85 [0.58, 1.26]
2 Overall anastomotic leakage for colorectal surgery	13	4533	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.99 [0.74, 1.31]
3 Mortality	11	4166	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.93 [0.58, 1.47]
4 Peritonitis	10	3983	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.74 [0.50, 1.08]
5 Reoperation	11	4319	Peto Odds Ratio (Peto, Fixed, 95% CI)	1.04 [0.81, 1.34]
6 Wound infection	13	4595	Peto Odds Ratio (Peto, Fixed, 95% CI)	1.16 [0.95, 1.42]

Güenaga KF, The Cochrane Library 2011

Outcomes

- Latest Cochrane Review (9/2011): 5 trials (N=1210) comparing MBP vs rectal enema only
  - Odds ratio > 1 favor rectal enema
  - results do show improved odds ratios in favor of rectal enema

Comparison 2. Mechanical bowel preparation versus rectal enema

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Anastomotic leakage for colorectal surgery	3	763	Odds Ratio (M-H, Fixed, 95% CI)	1.43 [0.71, 2.87]
1.1 Leakage after rectal surgery	3	195	Odds Ratio (M-H, Fixed, 95% CI)	0.93 [0.34, 2.52]
1.2 Leakage after colonic surgery	3	568	Odds Ratio (M-H, Fixed, 95% CI)	2.15 [0.79, 5.84]
2 Overall anastomotic leakage	5	1210	Odds Ratio (M-H, Fixed, 95% CI)	1.32 [0.74, 2.36]
3 Mortality	5	1210	Odds Ratio (M-H, Fixed, 95% CI)	1.47 [0.56, 3.90]
4 Peritonitis / Abscess	5	1210	Odds Ratio (M-H, Fixed, 95% CI)	1.37 [0.64, 2.93]
5 Reoperation	2	447	Odds Ratio (M-H, Fixed, 95% CI)	0.86 [0.32, 2.33]
6 Wound infection	5	1210	Odds Ratio (M-H, Fixed, 95% CI)	1.26 [0.85, 1.88]

Güenaga KF, The Cochrane Library 2011

Conclusions

- Review of multiple meta-analyses reveal no statistical significance to MBP for elective colorectal procedures
- Trends mostly show improved outcomes with MBP
- Must consider pt discomfort, dehydration, electrolyte imbalance, comorbidities
- Surgeon's discretion based on:
  - Pathology
    - Inflammatory
    - Tumor burden/size
  - Location
  - Comorbidities
  - Approach – Laparoscopic vs Open

Future Research

- Dehydration induced by MBP – improved outcomes with preoperative rehydration?
- Stratification of rectal surgeries
  - Based on level, higher risk of leak with ultra-low vs low anterior resection
  - Presence of diverting ostomy
- Further studies evaluating laparoscopic techniques

- Thank you for your time
- Questions/comments?