



HOSPITAL  
QUALITY  
INITIATIVE

# Surgical Care Improvement Project (SCIP) Selected Annotated Bibliography

Beginning October 2007, the SCIP-Inf 2 antibiotic recommendations have removed the use of oral antibiotic prophylaxis alone for elective colorectal surgery. Currently, there is no literature supporting the use of mechanical colon preparation to reduce the risk of infection. In recently published articles, randomized trials from Europe and Israel have shown that the use of mechanical bowel preparation tended to increase surgical complications. The following selected references illustrate that the absence of bowel preparation before surgery (references 1 thru 4) does not present a reason to continue antibiotics post-operatively and that oral prophylaxis not be used prior to surgery (references 5 thru 6).

## References:

1. Guenaga KF, Matos D, Castro AA, Atallah AN, Wille-Jørgensen P. Mechanical bowel preparation for elective colorectal surgery. *Cochrane Database of Systematic Reviews (Online)*. 2003;(2):CD001544.

**Background:** For more than a century, the presence of bowel content during surgery has been related to anastomotic leakage. Mechanical bowel preparation has been considered an efficient agent against leakage and infection complications. This dogma is not based on solid evidence, but more on observational data and expert opinions.

**Objectives:** To determine the effectiveness and safety of prophylactic mechanical bowel preparation for morbidity and mortality rates in elective colorectal surgery.

**Search Strategy:** All publications describing mechanical bowel preparation before elective colorectal surgery was sought through computerized searches of EMBASE, LILACS, MEDLINE, and Cochrane Library; by hand-searching in relevant medical journals, from major gastroenterological congresses, without limitation for date and language, using the search strategy described by the Colorectal Cancer Review Group. In addition, randomised clinical trials will be searched through personal communication with colleagues and from conference proceedings.

**Selection Criteria:** Randomised, clinical trials that compared any strategy in mechanical bowel preparation with no mechanical bowel preparation.

**Data Collection and Analysis:** Data were independently extracted by the reviewers and cross-checked. The same reviewers assessed the methodological quality of each trial. Details of the randomisation (generation and concealment), blinding, whether an intention-to-treat analysis was done, and the number of patients lost to follow-up was recorded. For analysis the Peto odds ratio (OR) was used as defaults.

---

Guenaga KF, Matos D, Castro AA, Atallah AN, Wille-Jørgensen P. Mechanical bowel preparation for elective colorectal surgery. *Cochrane Database of Systematic Reviews (Online)*. 2003;(2):CD001544 (cont'd).

**Main Results:** Of the 1592 patients (9 trials), 789 were allocated to mechanical bowel preparation (Group A) and 803 to no preparation (Group B) before elective colorectal surgery. For anastomotic leakage (main outcome) the results were: - Low anterior resection: 9.8% (11 of 112 patients in Group A) compared with 7.5% (9 of 119 patients in Group B); Peto OR 1.45, 95% confidence interval (CI): 0.57 to 3.67 (non-significant); - Colonic surgery: 2.9% (Group A) compared with 1.6% (Group B); Peto OR 1.80, 95% CI: 0.68 to 4.75 (non-significant); Overall anastomotic leakage: 6.2% (Group A) compared with 3.2% (Group B); Peto OR 2.03, 95% CI: 1.276 to 3.26 (p=0.003). For the secondary outcome of wound infection the result was: 7.4% (Group A) compared with 5.4% (Group B); Peto OR 1.46, 95% CI: 0.97 - to 2.18 (p=0.07); Sensitivity analyses excluding studies with dubious randomisation, studies published as abstracts only, and studies involving children did not change the overall conclusions.

**Author's Conclusions:** There is no convincing evidence that mechanical bowel preparation is associated with reduced rates of anastomotic leakage after elective colorectal surgery. On the contrary, there is evidence that this intervention may be associated with an increased rate of anastomotic leakage and wound complications. It is not possible to be conclusion on the latter issue because of the clinical heterogeneity of trial inclusion criteria, methodological inadequacies in trial (in particular, poor reporting of concealment and allocation), potential performance biases, and failure of intention-to-treat analyses. Nevertheless, the dogma that mechanical bowel preparation is necessary before elective colorectal surgery should be reconsidered.

2. Zmora O, Mahajna A, Bar-Zakai B, Hershko D, Shabtai M, Krausz MM, Ayalon A. Is mechanical bowel preparation mandatory for left-sided colonic anastomosis? Results of a prospective randomised trial. *Techniques in Coloproctology*. 2006 Jul;10(2):131-5. Epub 2006 Jun 19.

**Background:** Preoperative mechanical bowel preparation is aimed to reduce the risk of infectious complications, and its utility is a dogma in left-sided large bowel anastomosis. The aim of this study was to specifically assess whether colocolonic and colorectal anastomoses may be safely performed without preoperative mechanical bowel preparation.

**Methods:** Patients undergoing elective colon and rectal surgery with primary colocolonic or colorectal anastomosis were prospectively randomised into two groups. The "prep" group had mechanical bowel preparation prior to surgery, while the "non-prep" group had surgery without pre-operative mechanical bowel preparation.

**Results:** Two hundred forty-nine patients were included in the study, 120 in the prep group and 129 in the nonprep group. Demographic characteristics, indications for surgery, and type of surgical procedure did not significantly differ between the two groups. There was no difference in the rate of surgical infectious complications between the two groups. Overall infectious complication rate was 12.5% in the prep group and 13.2% in the non-prep group. Wound infection, anastomotic leak, and intra-abdominal abscess occurred in 6.6%, 4.2%, and 1.6% of patients in the prep group and in 10.0%, 2.3%, and 0.7% of patients in the nonprep group, respectively (p=NS).

**Conclusions:** These results suggest that elective left-sided anastomosis may be safely performed without mechanical preparation. Multicenter studies to test the reproducibility of these results are required, to support a change in this time-honored practice.

- 
3. Zmora O, Mahajna A, Bar-Zakai B, Rosin D, Hershko D, Shabtai M, Krausz MM, Ayalon A. Colon and rectal surgery without mechanical bowel preparation: a randomised prospective trial. *Annals of Surgery*. 2003 Mar;237(3):363-367. Available from: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?tool=pubmed&pubmedid=12616120>

**Objective:** To assess whether elective colon and rectal surgery can be safely performed without preoperative mechanical bowel preparation.

**Summary Background Data:** Mechanical bowel preparation is routinely done before colon and rectal surgery, aimed at reducing the risk of postoperative infectious complications. However, in cases of penetrating colon trauma, primary colonic anastomosis has proven to be safe even though the bowel is not prepared.

**Methods:** Patients undergoing elective colon and rectal resections with primary anastomosis were prospectively randomised into two groups. Group A had mechanical bowel preparation with polyethylene glycol before surgery, and group B had their surgery without preoperative mechanical bowel preparation. Patients were followed up for 30 days for wound, anastomotic, and intra-abdominal infectious complications.

**Results:** Three hundred eighty patients were included in the study, 187 in group A and 193 in group B. Demographic characteristics, indications for surgery, and type of surgical procedure did not significantly differ between the two groups. Colo-colonic or colorectal anastomosis was performed in 63% of the patients in group A and 66% in group B. There was no difference in the rate of surgical infectious complications between the two groups. The overall infectious complications rate was 10.2% in group A and 8.8% in group B. Wound infection, anastomotic leak, and intra-abdominal abscess occurred in 6.4%, 3.7%, and 1.1% versus 5.7%, 2.1%, and 1%, respectively.

**Conclusions:** These results suggest that elective colon and rectal surgery may be safely performed without mechanical preparation.

4. Bucher P, Gervaz P, Soravia C, Mermillod B, Erne M, Morel P. Randomised clinical trial of mechanical bowel preparation versus no preparation before elective left-sided colorectal surgery. *The British Journal of Surgery*. 2005 Apr;92(4):409-414.

**Background:** Mechanical bowel preparation (MBP) is performed routinely before colorectal surgery to reduce the risk of postoperative infectious complications. The aim of this randomised clinical trial was to compare the outcome of patients who underwent elective left-sided colorectal surgery with or without MBP.

**Methods:** Patients scheduled for elective left-sided colorectal resection with primary anastomosis were randomised to preoperative MBP (3 litres of polyethylene glycol) (group 1) or surgery without MBP (group 2). Postoperative abdominal infectious complications and extra-abdominal morbidity were recorded prospectively.

**Results:** One hundred and fifty-three patients were included in the study, 78 in group 1 and 75 in group 2. Demographic, clinical and treatment characteristics did not differ significantly between the two groups. The overall rate of abdominal infectious complications (anastomotic leak, intra-abdominal abscess, peritonitis and wound infection) was 22 percent in group 1 and 8 percent in group 2 ( $P = 0.028$ ). Anastomotic leak occurred in five patients (6 percent) in group 1 and one (1 percent) in group 2 ( $P = 0.210$ ) [corrected] Extra-abdominal morbidity rates were 24 and 11 percent respectively ( $P = 0.034$ ). Hospital stay was longer for patients who had MBP (mean(s.d.) 14.9(13.1) versus 9.9(3.8) days;  $P = 0.024$ ).

**Conclusion:** Elective left-sided colorectal surgery without MBP is safe and is associated with reduced postoperative morbidity.

- Espin-Basany E, Sanchez-Garcia JL, Lopez-Cano M, Lozoya-Trujillo R, Medarde-Ferrer M, Armadans-Gil L, Alemany-Vilches L, Armengol-Carrasco M. Prospective, randomised study on antibiotic prophylaxis in colorectal surgery. Is it really necessary to use oral antibiotics? *International Journal of Colorectal Disease*. 2005 Nov;20(6):542-546.

**Background and Aims:** The use of prophylactic antibiotics in addition to mechanical cleansing is the current standard of care prior to colonic surgery. The question of whether the antibiotics should be administered intravenously or orally, or by both routes, remains controversial. Our aim was to compare three methods of prophylactic antibiotic administration in elective colorectal surgery.

**Methods:** Three hundred consecutive elective colorectal resections were studied. All patients had preoperative mechanical colon cleansing with oral sodium phosphate and intravenous antibiotic prophylaxis with cefoxitin (one dose before skin incision and two postoperative doses). Patients were randomised to one of the following three groups: group A: three doses of oral antibiotic (neomycin and metronidazole) at the time of mechanical colon cleansing; group B: one dose of oral antibiotic; group C: no oral antibiotics. All patients were followed during their hospital stay and at 7, 14 and 30 days post-surgery.

**Results:** Vomiting occurred in 31%, 11% and 9% of the studied patients (groups A, B and C, respectively) ( $p < 0.001$ ). Nausea was present in 44%, 18% and 13% of patients ( $p < 0.001$ ). Abdominal pain was recorded in 13%, 10% and 4% of patients ( $p = 0.077$ ). Wound infection was present in 7%, 8% and 6% and suture dehiscence occurred in 2%, 2% and 3% of the patients in the three groups (no differences among them). Neither were differences found among the three groups in terms of urinary infections, pneumonia, postoperative ileus or intra-abdominal abscess.

**Conclusion:** The addition of three doses of oral antibiotics to intravenous antibiotic prophylaxis is associated with lower patient tolerance in terms of increased nausea, vomiting and abdominal pain, and has shown no advantages in the prevention of postoperative septic complications. Therefore, we recommend that oral antibiotics should not be used prior to colorectal surgery.

- Wren SM, Ahmed N, Jamal A, Safadi BY. Preoperative oral antibiotics in colorectal surgery increase the rate of *Clostridium difficile* colitis. *Archives of Surgery*. 2005 Aug;140(8):752-756.

**Hypothesis:** Bowel preparation traditionally consists of cathartics, oral antibiotics, and intravenous antibiotics. We hypothesize that the use of oral antibiotics in bowel preparation results in a higher rate of postoperative *Clostridium difficile* colitis.

**Design:** Retrospective case-controlled study of elective colon surgery patients; January 1997 to June 2003.

**Setting:** Tertiary care veterans administration hospital.

**Patients:** Records of patients who underwent elective colorectal surgery ( $n = 304$ ) were reviewed. Patients with bowel obstruction or emergent operation were excluded.

**Main Outcome Measure:** Detection of *C difficile* toxin A/B by enzyme-linked immunosorbent assay in a stool specimen within 30 days of surgery.

**Results:** All 304 patients received both cathartics and intravenous antibiotics. Of 304 patients, 107 (35.1%) received oral antibiotics. The rate of postoperative *C difficile* colitis was 4.2% in the entire study population. The rate of *C difficile* infection was higher in patients who received oral antibiotics (7.4%) compared with patients who did not receive oral antibiotics (2.6%;  $P = .03$ ). There were no *C difficile*-related mortalities.

**Conclusion:** Oral nonabsorbable antibiotics in bowel preparation resulted in a higher rate of *C difficile* infection. This may be due to the additional effect of oral antibiotics on normal bowel flora. We recommend that oral nonabsorbable antibiotics not be used in preoperative bowel preparation regimens since postoperative *C difficile* infection can lead to additional morbidity, length of stay, and hospital costs.