



# Preoperative Bowel Preparation with Oral Antibiotics Might Increase Wound Infection in Elective Colorectal Resections

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## Abstract

Preoperative bowel preparation was previously strictly done for all patient undergoing colorectal surgeries. With advances in the surgical techniques and patient care, the role of bowel preparation in surgical complications is questioned. In this study we describe a non-randomized retrospective analysis of 193 patients who underwent left colon and rectal resections in two different hospitals, the preoperative bowel preparation regimens were different in two hospitals. Both regimens contain mechanical preparation with polyethylene glycol, however, one hospital administered erythromycin and neomycin and the other hospital did not. From 74 patients receiving oral antibiotic eight (10.8%) one developed wound infection and from 119 patients who did not receive oral antibiotic three (2.5%) patient developed wound infection. This difference was statistically significant. Regarding literature review, it is suggested to omit oral antibiotic from preoperative bowel preparation regimens elective colorectal resections.

**Keywords:** Neomycin, Erythromycin, Colectomy, Infection

## 1. Background

It is thought that reducing the microorganism load of colon is associated with reduced infective complication of colorectal resections. An addition of oral antibiotics to the regular mechanical bowel preparation is done with the presumption of reducing this load. Due to poor GI tolerance of oral antibiotics, it may interfere with regular mechanical bowel preparation. Therefore, some surgeons prefer to omit oral antibiotics while some reports recommend them in order to reduce infection (1).

Two recent studies that randomized prospective or retrospective highly suggest oral antibiotics as adjunct to the regular bowel preparation and consider oral antibiotics to cause reduced surgical infection and anastomotic leakage (2, 3). Another large-scale study, with sample size of 17518 patients suggest oral antibiotics for reducing anastomotic leakage (4). Animal studies also showed enhanced anastomosis healing in ischemic colon by bowel preparation and oral antibiotic therapy (5).

American survey, which enrolled 471 board certified colorectal surgeons, report that 77% of them use perioperative oral neomycin and erythromycin and all of them used mechanical bowel preparation (6).

In this report, the role of oral antibiotics in addition to the regular bowel preparation in postoperative surgical infection is investigated retrospectively.

## 2. Methods

In this study, the database of two different hospitals in Kerman city were investigated and patient's charts who underwent elective colorectal resections were extracted. All of the resections were due to colorectal malignancies. The preoperative bowel preparation regimen was different in the hospitals, one was used mechanical bowel preparation with polyethylene glycol and the other hospital used 1gr neomycin and 1gr erythromycin in three doses as adjunct to the mechanical preparation with polyethylene glycol. Patients in both hospitals receive prophylactic parenteral ceftriaxone and metronidazole. The surgical infection was charted by the surgeon and was extracted from the patient's chart.

The gathered data were analyzed using SPSS software and rate of complication was compared using Ki-square test.

## 3. Results

After reviewing two hospital charts it was revealed that 74 patient received bowel preparation with oral antibiotics and 119 patients were prepared without oral antibiotics. The rate of wound infection was 10.8% in oral antibiotic groups and 2.5% in groups who received only mechanical

bowel preparation. The Ki-square analysis demonstrated statistically significant difference between two groups. The age and sex distribution was similar in two groups and all of the surgeries were done by one surgeon. As noticed, before all of the patients underwent surgery due to colorectal malignancies.

#### 4. Discussion

Reviewing hospital charts showed increased level of wound infection despite receiving preoperative oral antibiotic in addition to regular mechanical bowel preparation. Lots of strategies were suggested for reducing infective complications of colorectal surgeries, some authors proposed povidone-iodine enema (7), which is not applicable today.

Reviewing the literature demonstrates an increasing number of studies who report safe colorectal surgeries without bowel preparation (8, 9), in addition, there are studies that demonstrate increased rate of complication with preoperative bowel preparation (10, 11). Trials have been reported to describe the possible cause of increased complication with oral antibiotics one of the possible explanations is higher rate of clostridium difficile colitis in patients who received oral preoperative antibiotic (12). Another possible explanation for our observation is possible GI upset after oral antibiotics intake and inadequate mechanical bowel preparation.

Although we report significant increased infection rate with preoperative oral antibiotics, our results are based on a retrospective non-randomized study and prospective randomized study is necessary to suggest oral antibiotic omission in routine clinical practice.

#### References

1. Brunicaardi F, Andersen D, Billiar T, Dunn D, Hunter J, Matthews J, et al. *Schwartz's principles of surgery*. 10th ed. McGraw-hill; 2014.
2. Anjum N, Ren J, Wang G, Li G, Wu X, Dong H, et al. A randomized control trial of preoperative oral antibiotics as adjunct therapy to systemic antibiotics for preventing surgical site infection in clean contaminated, contaminated, and dirty type of colorectal surgeries. *Dis Colon Rectum*. 2017;**60**(12):1291-8. doi: [10.1097/DCR.0000000000000927](https://doi.org/10.1097/DCR.0000000000000927). [PubMed: [29112565](https://pubmed.ncbi.nlm.nih.gov/29112565/)].
3. Klinger AL, Green H, Monlezun DJ, Beck D, Kann B, Vargas HD, et al. The role of bowel preparation in colorectal surgery: Results of the 2012-2015 ACS-NSQIP data. *Ann Surg*. 2017. doi: [10.1097/SLA.0000000000002568](https://doi.org/10.1097/SLA.0000000000002568). [PubMed: [29064902](https://pubmed.ncbi.nlm.nih.gov/29064902/)].
4. Parthasarathy M, Greensmith M, Bowers D, Groot-Wassink T. Risk factors for anastomotic leakage after colorectal resection: A retrospective analysis of 17 518 patients. *Colorectal Dis*. 2017;**19**(3):288-98. doi: [10.1111/codi.13476](https://doi.org/10.1111/codi.13476). [PubMed: [27474844](https://pubmed.ncbi.nlm.nih.gov/27474844/)].
5. Cohen SR, Cornell CN, Collins MH, Sell JE, Blanc WA, Altman RP. Healing of ischemic colonic anastomoses in the rat: Role of antibiotic preparation. *Surgery*. 1985;**97**(4):443-6. [PubMed: [3983820](https://pubmed.ncbi.nlm.nih.gov/3983820/)].
6. Nichols RL, Smith JW, Garcia RY, Waterman RS, Holmes JW. Current practices of preoperative bowel preparation among North American colorectal surgeons. *Clin Infect Dis*. 1997;**24**(4):609-19. doi: [10.1093/clind/24.4.609](https://doi.org/10.1093/clind/24.4.609). [PubMed: [9145734](https://pubmed.ncbi.nlm.nih.gov/9145734/)].
7. Hay JM, Boussougant Y, Roverselli D, Regnard JF, Meyrignac P, Lacaine F. The use of povidone-iodine enema as pre-operative preparation for colorectal surgery: Bacteriological study. *J Hosp Infect*. 1985;**6 Suppl A**:115-6. doi: [10.1016/S0195-6701\(85\)80055-4](https://doi.org/10.1016/S0195-6701(85)80055-4). [PubMed: [2860154](https://pubmed.ncbi.nlm.nih.gov/2860154/)].
8. Zmora O, Mahajna A, Bar-Zakai B, Rosin D, Hershko D, Shabtai M, et al. Colon and rectal surgery without mechanical bowel preparation: A randomized prospective trial. *Ann Surg*. 2003;**237**(3):363-7. doi: [10.1097/01.SLA.0000055222.90581.59](https://doi.org/10.1097/01.SLA.0000055222.90581.59). [PubMed: [12616120](https://pubmed.ncbi.nlm.nih.gov/12616120/)]. [PubMed Central: [PMC1514315](https://pubmed.ncbi.nlm.nih.gov/PMC1514315/)].
9. Ahmad M, Abbas S, Asghar MI. Is mechanical bowel preparation really necessary in colorectal surgery? *J Coll Physicians Surg Pak*. 2003;**13**(11):637-9. [PubMed: [14700490](https://pubmed.ncbi.nlm.nih.gov/14700490/)].
10. Young Tabusso F, Celis Zapata J, Berrospi Espinoza F, Payet Meza E, Ruiz Figueroa E. [Mechanical preparation in elective colorectal surgery, a usual practice or a necessity?]. *Rev Gastroenterol Peru*. 2002;**22**(2):152-8. Spanish. [PubMed: [12098743](https://pubmed.ncbi.nlm.nih.gov/12098743/)].
11. Bucher P, Mermillod B, Morel P, Soravia C. Does mechanical bowel preparation have a role in preventing postoperative complications in elective colorectal surgery? *Swiss Med Wkly*. 2004;**134**(5-6):69-74. [PubMed: [15113054](https://pubmed.ncbi.nlm.nih.gov/15113054/)].
12. Wren SM, Ahmed N, Jamal A, Safadi BY. Preoperative oral antibiotics in colorectal surgery increase the rate of Clostridium difficile colitis. *Arch Surg*. 2005;**140**(8):752-6. doi: [10.1001/archsurg.140.8.752](https://doi.org/10.1001/archsurg.140.8.752). [PubMed: [16103284](https://pubmed.ncbi.nlm.nih.gov/16103284/)].