

CADTH RAPID RESPONSE REPORT: SUMMARY OF ABSTRACTS

Mechanical Bowel Preparation with Antibiotic Prophylaxis: Clinical Effectiveness, Cost- Effectiveness, and Guidelines

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Research Questions

1. What is the clinical effectiveness of mechanical bowel preparation combined with oral neomycin as part of preparation for elective colorectal surgery?
2. What is the clinical effectiveness of mechanical bowel preparation combined with oral ciprofloxacin as part of preparation for elective colorectal surgery?
3. What is the cost-effectiveness of mechanical bowel preparation combined with oral neomycin as part of preparation for elective colorectal surgery?
4. What is the cost-effectiveness of mechanical bowel preparation combined with oral ciprofloxacin as part of preparation for elective colorectal surgery?
5. What are the evidence-based guidelines informing the use of mechanical bowel preparation combined with oral neomycin or oral ciprofloxacin as part of preparation for elective colorectal surgery?

Key Findings

Two non-randomized studies (one which included a cost effectiveness analysis) were identified regarding the clinical and cost-effectiveness of mechanical bowel preparation combined with oral neomycin as part of preparation for elective colorectal surgery. One evidence-based guideline was identified regarding the use of mechanical bowel preparation combined with oral neomycin as part of preparation for elective colorectal surgery.

Methods

A limited literature search was conducted by an information specialist on key resources including Medline via OVID, EMBASE, the Cochrane Library, the University of York Centre for Reviews and Dissemination (CRD) databases, the websites of Canadian and major international health technology agencies, as well as a focused Internet search. The search strategy was comprised of both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. The main search concepts were bowel preparation and antibiotic prophylaxis. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2015 and January 20, 2020. Internet links were provided, where available.

Selection Criteria

One reviewer screened citations and selected studies based on the inclusion criteria presented in Table 1.

Table 1: Selection Criteria

Population	Patients preparing to undergo elective colorectal surgery (e.g., planned procedures such as hemicolectomy, sigmoid colectomy, anterior resection)
Intervention	Q1,3,5: Mechanical bowel preparation and oral neomycin alone or in combination with metronidazole (Flagyl) Q2,4,5: Oral ciprofloxacin (Cipro) alone or in combination with metronidazole (Flagyl)
Comparator	Q1-4: Mechanical bowel preparation alone (no prophylaxis); Q1,3: Oral ciprofloxacin (Cipro) alone or in combination with metronidazole (Flagyl) Q5: Not applicable
Outcomes	Q1,2: Clinical effectiveness (e.g., infection rates, pain, adverse events) Q3,4: Cost effectiveness (e.g., quality-adjusted life years) Q5: Guidelines
Study Designs	Health technology assessments, systematic reviews, randomized control trials, non-randomized studies, economic evaluations, evidence-based guidelines.

Results

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, and systematic reviews are presented first. These are followed by randomized controlled trials, non-randomized studies, economic evaluations, and evidence-based guidelines.

Two non-randomized studies^{1,2} (one which included a cost effectiveness analysis)¹ were identified regarding the clinical and cost-effectiveness of mechanical bowel preparation combined with oral neomycin as part of preparation for elective colorectal surgery. One evidence-based guideline³ was identified regarding the use of mechanical bowel preparation combined with oral neomycin as part of preparation for elective colorectal surgery. No relevant health technology assessments, systematic reviews, randomized controlled trials or economic evaluations were identified. In addition, no relevant information regarding oral ciprofloxacin as part of preparation for elective colorectal surgery was identified.

Additional references of potential interest are provided in the appendix.

Overall Summary of Findings

Two non-randomized studies^{1,2} were identified regarding mechanical bowel preparation (MBP) combined with oral neomycin as part of preparation for elective colorectal surgery. The authors of the first study¹ assessed surgical site infection rates following an oral antibiotic bowel preparation protocol and included a cost-effectiveness analysis. This study assessed neomycin in combination with metronidazole and MBP compared with MBP alone.¹ The authors found that there was a significant reduction in surgical site infection rates, mean length of stay, anastomotic leak, and mortality rates associated with oral antibiotic bowel preparation.¹ Furthermore, the authors estimated a cost savings of £239.13 per patient, and £37,065 institutional savings over a one-year period in favor of oral antibiotics with mechanical bowel preparation.¹ The authors of the second study² investigated a bowel regimen of oral antibiotics and MBP compared with MBP alone for preventing surgical site infections. The bowel regimen included neomycin, metronidazole,

and magnesium citrate.² The authors found that the overall surgical site infection rates were significantly lower for patients who received oral antibiotics and MBP compared with MBP alone, and concluded that the combination of oral antibiotics and MBP should be considered for patients undergoing elective colorectal surgery.² One evidence-based guideline was identified by the University of Toronto's Best Practice in Surgery and recommends that oral antibiotics should be given if a patient has an MBP.³ This recommendation also states that metronidazole and neomycin should be prescribed and taken at 1 PM, 3 PM and 8 PM on the day before surgery.³

References Summarized

Health Technology Assessments

No literature identified.

Systematic Reviews and Meta-analyses

No literature identified.

Randomized Controlled Trials

No literature identified.

Non-Randomized Studies

1. Vadhvana B, Pouzi A, Surjus Kaneta G, et al. Preoperative oral antibiotic bowel preparation in elective resectional colorectal surgery reduces rates of surgical site infections: a single-centre experience with a cost-effectiveness analysis. *Ann R Coll Surg Engl.* 2019;11:1-8.
[PubMed: PM31508999](#)
2. Vo E, Massarweh NN, Chai CY, et al. Association of the addition of oral antibiotics to mechanical bowel preparation for left colon and rectal cancer resections with reduction of surgical site infections. *JAMA Surg.* 2018;153(2):114-121.
[PubMed: PM29049477](#)

Economic Evaluations

No literature identified.

Guidelines and Recommendations

3. Eskicioglu C, Kennedy E, Aarts M-A, et al. Mechanical bowel preparation: a clinical practice guideline developed by the University of Toronto's Best Practice in Surgery. Toronto (ON): Surgery University of Toronto; 2018: <http://bestpracticeinsurgery.ca/wp-content/uploads/2018/11/MBP-FINAL.pdf>. Accessed 2020 Jan 31.
See: Section 2. Guideline recommendations - 3. Recommendations for oral antibiotics prior to surgery (3.1.1) (page 4).

Appendix — Further Information

Previous CADTH Reports

4. Bowel preparation for colorectal procedures: a review of clinical effectiveness, cost effectiveness and guidelines. (*CADTH Rapid response report: summary with critical appraisal*). Ottawa (ON): CADTH; 2018:
<https://www.cadth.ca/sites/default/files/pdf/htis/2018/RC0978%20Preparation%20for%20Colorectal%20Procedures%20Final.pdf>. Accessed 2020 Jan 31.
5. Oral neomycin in preparation for colorectal procedures: clinical effectiveness, cost-effectiveness and guidelines. (*CADTH Rapid response report: reference list*). Ottawa (ON): CADTH; 2018:
<https://www.cadth.ca/sites/default/files/pdf/htis/2018/RA0949%20Oral%20Neomycin%20for%20Colorectal%20Procedures%20Final.pdf>. Accessed 2020 Jan 31.

Randomized Controlled Trial

Alternative Comparator – No Bowel Preparation

6. Koskenvuo L, Lehtonen T, Koskensalo S, et al. Mechanical and oral antibiotic bowel preparation versus no bowel preparation for elective colectomy (MOBILE): a multicentre, randomised, parallel, single-blinded trial. *Lancet*. 2019;394(10201):840-848.
[PubMed: PM31402112](#)

Additional References - Survey

7. McChesney SL, Zelhart MD, Green RL, Nichols RL. Current U.S. Pre-operative bowel preparation trends: a 2018 survey of the American Society of Colon and Rectal Surgeons Members. *Surg Infect (Larchmt)*. 2020;21(1):1-8.
[PubMed: PM31361586](#)
8. Feng C, Sidhwa F, Anandalwar S, et al. Contemporary practice among pediatric surgeons in the use of bowel preparation for elective colorectal surgery: a survey of the American Pediatric Surgical Association. *J Pediatr Surg*. 2015;50(10):1636-1640.
[PubMed: PM26054862](#)