



Understanding the role of mechanical bowel preparation and oral antibiotics prior to elective colorectal surgery

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Over the past four decades, there has been significant debate as to whether mechanical bowel preparation (MBP) and oral antibiotics (OAB) should be prescribed preoperatively prior to elective colorectal surgery. With the widespread implementation of enhanced recovery after surgery (ERAS) protocols as well as the findings of the Cochrane review in 2011 (n=5,805) concluding that MBP did not provide any statistically significant benefit (1), there was a paradigm shift away from mechanical bowel preparation.

The ERAS society recently recommended ‘no/selective bowel preparation’ prior to elective colorectal surgery in their 2013 ERAS society guidelines. The authors concluded that MBP was not associated with any benefit and that it was associated with dehydration and change in electrolyte balance and should not be used in pelvic surgery except when a diverting ileostomy is planned (2).

However, as ERAS gained widespread popularity and support in colorectal units around the world, so did the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database, which has since grown strength by strength. Herein was a major dilemma, as the ERAS guidelines and the studies reporting on ACS-NSQIP provided dichotomous viewpoints and stance on MBP with OAB prior to elective colorectal surgery.

ACS-NSQIP studies such as those by Kiran *et al.*

and Klinger *et al.* showed that MBP and OAB reduced surgical site infections (3,4). The study by Garfinkle *et al.* recommended OAB alone, with MBP providing no additional benefit (5). In any case, all three ACS-NSQIP studies showed that either MBP+OAB or OAB alone was better than MBP alone or no preparation. As such, there was a strong move back to MBP and OAB with the American Society for Enhanced Recovery recommending ‘routine use of combined isosmotic MBP and OAB before elective colorectal surgery’ (6).

However, internationally, there has been no consensus. In contrast to the US guidelines, the Australian guidelines (7), Canadian Guidelines (8) and the European guidelines (2) have recommended omission of MBP.

Dellinger’s recent invited commentary entitled ‘When Will the Surgical Community Acknowledge the Evidence Regarding Prophylaxis With Oral Antibiotics for Scheduled Colorectal Operations?’ (9) suggested that the reason for the conflicting guidelines is the substantial time lag between the dissemination of evidence base and its adoption into widespread clinical practice.

Another reason may be potential side effects. With MBP, adverse effects include dehydration and electrolyte imbalance and its sequelae. With OAB, potential side effects may include *Clostridium difficile*, acute renal injury, nausea, vomiting, diarrhoea, ototoxicity and

vestibulotoxicity (aminoglycoside class effect i.e., neomycin) and hypersensitivity as well as development of multi-drug resistant colonies.

With such debate and controversy on this topic, and a resurgence of interest but no consensus, our group recently performed both an ACS-NSQIP database study (10) and a Network Meta-analysis of Randomised Controlled Trials (11) on the topic of MBP and OAB prior to elective colorectal surgery.

Our ACS-NSQIP study (n=5,729) focused on the use of MBP and OAB prior to left-sided elective colorectal surgery. This study showed that MBP and OAB was associated with reduction in SSI rate and anastomotic leak without any increase in *C. difficile* occurrences with the use of OAB (10). Our Network Metanalysis (n=8,458; 38 RCTs) included both right and left colonic and rectal surgery. This was the first Network Metanalysis comparing all four strategies (MBP + OAB, MBP alone, OAB alone and no preparation). The study showed that MBP with OAB was associated with the lowest risk of SSI, with the OAB alone strategy ranked second best. The study was unable to demonstrate a statistically significant difference in anastomotic leak rates between the four approaches. A significant limitation of this study was that there were only 3 studies comparing MBP with OAB *vs.* OAB alone.

Since these studies, of note, a large multicentre RCT on the role of MBP with OAB for left-sided colectomies (SELECT trial) (n=485) has been published by Abis *et al.* (12) This study, with a superiority design, was not able to show a statistically significant difference in anastomotic leak but on multivariate analysis was able to show that MBP with OAB was associated with a reduction in infectious complications (OR 0.47; 0.29–0.76). On microbial analysis, there was a reduced load of Proteobacteria, Enterobacteriaceae and *E. coli* on microbial analysis. MBP with OAB was not associated with an increase in multidrug-resistant organisms nor *C. difficile* infection.

Are definitive, large scale, well-designed RCTs comparing all four groups (MBP with OAB, MBP alone, OAB alone, no preparation) or large well-designed RCTs comparing MBP with OAB *vs.* OAB alone required to change routine clinical practice? Or have we reached equipoise on this topic? So far, the evidence from 'big data' database studies and from RCTs have definitively shown that MBP with OAB reduces infectious complications associated with colorectal surgery.

The debate continues, as will the growth of the evidence base, as we head into the future. For now, what we do know

is that the long-standing practice of either MBP alone and no preparation needs to be revisited urgently by governing bodies responsible for drafting consensus guidelines nationally and internationally, as well as locally by colorectal units deciding on implementation and adherence of hospital-based guidelines to ensure that current practice reflects the growing body of evidence.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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