

Mechanical Bowel Preparation for Laparoscopic Gynecological Surgery: Controversy Continues

To Prep or not to Prep

Mechanical bowel preparation (MBP) has been used extensively over the years by both general surgeons and gynecologist alike and has remained a controversial practice. It has many purported benefits including decreasing postoperative complications, surgical site infections, and bowel spillage/leakage if an injury were to occur, allowing for repair by primary anastomosis, as well as reported improving visualization and bowel handling. However, there has been a decline in use of MBP recently, mostly attributable to the lack of evidence in the medical literature supporting it. It has been considered a surgical dogma with mostly only observational studies and expert opinion supporting its use.

MBP Defined

MBP is defined as removal of fecal content from the bowel lumen prior to surgery. Preparation of the bowel for elective surgery has been achieved via various routes such as dietary restrictions (clear liquid, low residue, and fasting diets), antibiotic regimens as well as mechanical preparation. Today, MBP is mainly achieved with oral laxatives or enemas. In a survey looking at the practices of bowel preparation in North American colorectal surgeons, 58% use mechanical bowel preparations. The most common regimens were polyethylene glycol 70.9% and sodium phosphate 28.4% [1]. Polyethylene glycol (PEG) is an osmotic laxative that works primarily on the colon to increase fluid retention. It is usually consumed in large volumes (4L) and works within 1-4 hours. Because it is a balanced electrolyte solution, there is little fluid exchange across the mucosa of the colon. No major shifts in electrolytes and fluid imbalances have been reported with its use. Sodium phosphate (NaP) is also an osmotic laxative. However, phosphate preparation have the potential to cause severe electrolyte imbalances, large fluid shifts and, in some cases, death. A study looking at types of solution used for MBP in elective colorectal surgery showed decreased risk in single site infection, 24% vs. 34% in NaP versus PEG, respectively [2]. Another study comparing the two also revealed NaP to have better tolerance among patients and more effective at bowel cleansing than PEG when reviewed by colonoscopist [3].

Use in General Surgery

Historically, MBP had been employed by general surgeons to decrease the amount of fecal load in the colon, therefore decreasing the amount of bacteria and rates of infection [4]. This was disproven by Poth in the 1930s when it was noted that MBP did not decrease the concentration of bacteria in the colon [5]. However, clinical evidence does support use of MBP as an important adjunct to oral antibiotic bowel preparation in preventing surgical site infection (SSI) [1]. In a review by Fry, it was noted that MBP alone did not decrease the rate of surgical site infection. However, the use of oral antibiotics in combination with systemic antibiotics was superior in preventing SSI compared to systemic antibiotics alone. In a survey of members



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of the American Society of Colon and Rectal surgeons 50% felt that prophylactic oral antibiotics were essential in colorectal surgery. Of the surgeons, 75% routinely utilized oral antibiotics and 99% used mechanical bowel preparation (47% used NaP, 32% PEG, and 14% alternated between the two).

It was not until the 1970s that the practice of MBP was called into question by an RCT performed by Hughes ES looking at MBP in elective colorectal surgery. The study demonstrated no benefit regarding peritonitis, wound infection, and death when comparing MBP to no prep [6]. In the following decades, most meta-analyses and RCTs show a clear lack of evidence of the benefit of MBP and some reveal that MBP may actually increase the rate of complications [7]. In a 2008 Cochrane Database Systematic Review, there was not any statistically significant evidence that patients benefited from MBP in elective colorectal surgery [4]. However, most of these studies evaluated MBP in laparotomy (open) and non-gynecologic surgeries and cannot be extrapolated to laparoscopic gynecologic surgery.

Use in Gynecologic Surgery

MBP is a debated practice amongst gynecologic surgeons, especially in that of laparoscopic surgery. Laparoscopy has its own challenges not seen in open pelvic surgery such as the inability to pack away the bowel contributing to poor visualization. The complexity of cases performed by laparoscopy is also increasing. In circumstances such as these, having an empty bowel is thought to allow for better visualization and improved handling especially in surgery of the deep pelvis where bowel is commonly obstructing the surgical view. MBP has been thought to help achieve this goal.

Deficiency of Guidelines

The Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) currently recommend that MBP be used to facilitate manipulation of the bowel during laparoscopic colorectal surgery [8]. There are currently no gynecologic surgical guidelines for MBP. A survey of gynecology oncologist conducted by the Society of Gynecologic Oncologist of Canada (GOC) reported that 71% of their respondents felt that formal recommendations on MBP in gynecology oncology would be helpful [9]. The survey reported the most common reasons that GOCs ordered MBP was to decrease risk of anastomatic leakage (31%) and to improve visualization (36%). MBP was ordered

routinely for both laparotomy (41%) and laparoscopy (28%) and implemented across all cancers [ovarian (52%), endometrial (31%), cervical (26%) and vulvar (8%)]. Also noted in the survey was an overall decline in the use of MBP over the last five years reported by 77% of GOCs. Fifty four percent of the respondents reported that MBP making their patients unwell after receiving it influenced their decision to whether or not to implement MBP.

Limited Studies in Gynecologic Surgery

Recently, there has been a push to exclude MBP from routine benign gynecologic laparoscopic surgery due to its apparent lack of benefits and more harm to the patients (preoperative discomfort, electrolyte imbalances, and renal failure). There have been a total of four small RCTs that have looked at MBP in laparoscopic gynecologic surgery. In these studies they concluded that there was no clinical significance in surgical field, bowel handling, operative difficulty, and operative time when oral MBP was compared to either no prep [10], low fiber diet x 1 week [11], low residue diet, fasting [12] and enema MBP [13]. These studies were limited by sample size, one study had no control group, and two focused primarily on adnexal pathology (where handling of the bowel/visualization is less important).

Muzii et al designed a RCT that compared MBP with sodium phosphate with no bowel preparation [10]. The main outcomes were patient discomfort, surgical difficulty, surgical field, operative times and postoperative complications. Their conclusion was that there was no difference observed regarding surgical difficulty, operative times, surgical fields or postoperative complications between the two groups. Patient discomfort was significantly increased in the MBP group. However, most of the surgeries performed were mainly for diagnostic evaluation or adnexal pathology. There was also a high conversion rate to laparotomy.

Lijoi et al also performed a small RCT looking at MBP with sodium phosphate in comparison to a 1-week low-fiber diet and found more patient discomfort in the MBP group [11]. There was no control group for comparison and investigators excluded patients who had prior surgeries, BMI >30, and stage III-IV endometriosis. This severely limited the external validity of the study and did not evaluate MBP in patients with possible significant pelvic disease where it might prove most useful.

A comparison of different methods of MBP was also studied in a RCT by Yang et al. [13] Sodium phosphate (NaP) oral solution was compared with a single NaP enema and again no difference in surgical field, bowel handling, surgical difficulty, or degree of bowel preparation was noted. Patients who received the oral NaP solution were more prone to side effects such as abdominal bloating, swelling, thirst, nausea, dizziness, fecal incontinence, weakness, and overall discomfort. This study was also limited by no control group and small numbers.

The most recent study authored by H.Won et al is a well designed, single-blinded RCT in laparoscopic gynecologic patients evaluating if MBP improved surgical view and bowel handling in the deep pelvis [12]. Researches compared 2 days of low residue diet, fasting only, and low residue diet for 2 days plus oral MBP. They concluded that MBP combined with a low residue diet was indeed minimally but statistically better compared with the other groups (fasting only; minimal residue diet for 2 days) but not clinically significant. Due to adverse patient

symptoms and discomfort, investigators recommended that fasting only protocol to be considered a reasonable alternative to MBP.

A Standard of Care is Needed

In gynecologic surgery today, the shift continues towards minimally invasive laparoscopic and robotic surgery and the complexity of cases are steadily increasing where risk of bowel injury may be high or there is potential for possible bowel resections (cases of severe endometriosis, previous pelvic surgeries). There may be a role for MBP when complex cases necessitate further handling and manipulation of the bowel [14]. As the role of the gynecologist becomes more diverse, with implementation of new techniques to treat extensive pelvic disease, and as the role of laparoscopy for gynecologic cancer becomes routine, further research and conduction of larger RCTs is needed before conclusions on utilizing MBP can be obtained. The current available data at this time is limited. Studies should focus on operating in the deep pelvis and posterior compartment and ideally should include not only benign but extensive disease as well, as this is where MBP has the potential to be most useful.

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