

The Impact of Mechanical Bowel Preparation on Postoperative Complications for Patients Undergoing Cystectomy and Urinary Diversion

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Purpose: The benefit of routine mechanical bowel preparation for patients undergoing radical cystectomy is not well established. We compared postoperative complications in patients who did or did not undergo mechanical bowel preparation before radical cystectomy.

Materials and Methods: In 2008 a single surgeon (GDS) performed open radical cystectomy with an ileal conduit or orthotopic neobladder in 105 consecutive patients with preoperative mechanical bowel preparation consisting of 4 l GoLYTELY®. In 2009 radical cystectomy with an ileal conduit or orthotopic neobladder was performed in 75 consecutive patients without mechanical bowel preparation. A comprehensive database provided clinical, pathological and outcome data.

Results: All patients had complete perioperative data available. The 2 groups were similar in age, Charlson comorbidity score, diversion type, receipt of neo-adjuvant radiation or chemotherapy, blood loss, hospital stay, time to diet and pathological stage. Postoperative urinary tract infection, wound dehiscence and perioperative death rates were similar in the 2 groups. Clostridium difficile infection developed within 30 days of surgery in 11 of 105 vs 2 of 75 patients with vs without mechanical bowel preparation ($p = 0.08$). When adjusted for the annual hospital-wide C. difficile rate, the difference remained insignificant ($p = 0.21$). Clavien grade 3 or greater abdominal and gastrointestinal complications, including fascial dehiscence, abdominal abscess, small bowel obstruction, bowel leak and entero-diversion fistula, developed in 7 of 105 patients with (6.7%) vs 11 of 75 without (14.7%) mechanical bowel preparation ($p = 0.08$).

Conclusions: The use of mechanical bowel preparation for patients undergoing radical cystectomy with an ileal conduit or orthotopic neobladder does not seem to impact the rates of perioperative infectious, wound and bowel complications. Larger series with multiple surgeons are necessary to confirm these findings.

Key Words: urinary diversion, cystectomy, Clostridium difficile, postoperative complications, cathartics

HISTORICALLY, preoperative MBP has been considered the standard of care for patients undergoing RC with ileal diversion.^{1,2} Different iterations of MBP can be used, including various oral lax-

atives, retrograde enemas and dietary restriction before surgery. MBP has routinely been used before RC for 40 years with the goal of decreasing perioperative morbidity, specifically enteric

Abbreviations and Acronyms

IC = ileal conduit

MBP = mechanical bowel preparation

RC = radical cystectomy

UTI = urinary tract infection

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anastomotic leaks, wound complications and intra-abdominal infections.³ Concerns regarding MBP include patient compliance and discomfort, preoperative dehydration, electrolyte imbalance, bacterial translocation and subsequent increased susceptibility to enterocolitis.⁴

Recent evidence in the urological and colorectal surgical literature has challenged the routine use of MBP by demonstrating no significant differences in postoperative outcomes between patients who do or do not receive MBP.⁴⁻⁹ Furthermore, several prospective studies have shown an increased incidence of infection related postoperative complications in patients who received MBP and underwent elective colonic surgery.^{10,11} MBP has not demonstrated any advantage specifically regarding RC and urinary diversion, and MBP may prolong hospital stay following RC.¹²

Based on previously published evidence, at our institution the routine use of MBP was stopped for patients undergoing RC and ileal diversion. We compared outcomes of this contemporary nonMBP patient cohort with the previous MBP cohort. We hypothesized that there would be no difference in infectious, gastrointestinal or wound complications between the 2 groups.

MATERIALS AND METHODS

With the approval of our institutional review board and in compliance with Health Insurance Portability and Accountability Act guidelines, a prospective database was reviewed for consecutive patients undergoing open RC, as performed by a single surgeon (GDS) from January 2008 to December 2009. All 105 patients treated with RC from January to December 2008 received MBP preoperatively (group 1), consisting of 4 l GoLYTELY ingested the day before surgery. In January 2009 we abandoned our routine practice of MBP for all patients undergoing RC. Group 2 consisted of all 75 patients treated with RC between January and December 2009 without MBP. Patients who underwent extirpation by a single surgeon (GDS) with reconstruction by a second surgeon were excluded from analysis since their preferences for bowel preparation varied.

The groups were restricted to a liquid diet 24 hours before surgery with no oral intake 8 hours before surgery. All patients showered preoperatively with antibacterial soap at home. Within 1 hour of incision all patients received cefoxitin (or vancomycin if allergic to penicillin), which was continued for 24 hours. Hair was removed with electric clippers and all patients were prepared using 10% povidone-iodine scrub and paint.

Open RC with bilateral standard pelvic lymph node dissection was performed in all patients. Urinary diversion consisted of an IC or a modified Hautmann orthotopic neobladder with a chimney modification.¹³ We excluded patients with an Indiana pouch diversion¹⁴ from the study since we continued MBP in this group for technical purposes. In 2008 a single patient was excluded from analysis

because no urinary diversion was performed due to end stage renal disease. Three patients in 2009 were also excluded since cystectomy was done for indications other than urothelial cell carcinoma.

Intraoperative and perioperative management of the 2 groups was similar. During ileal diversion creation, the bowel loop was towed off from the remaining operative field to minimize contamination. The conduit was irrigated with normal saline until clear of succus. An Endo GIA™ stapled, side-to-side ileal anastomosis was used in all patients. The intraoperative nasogastric tubes were removed before extubation.

Postoperatively the patients were maintained on no oral intake and patient controlled analgesia until flatus, at which point they transitioned to oral narcotics and clear liquids. No promotility agents were administered. Closed suction drains and ureteral stents were removed on postoperative day 7 in the absence of a urinary leak before hospital discharge.

Our primary study end points were postoperative abdominal and gastrointestinal complications, including *Clostridium difficile* colitis, UTI, fascial dehiscence, superficial wound dehiscence, abdominal abscess, small bowel obstruction or leak and fistula formation. The hospital-wide incidence of *C. difficile* for each study year was obtained from the department of infectious disease. Patient age, gender, diversion type, pathological stage, preoperative and postoperative therapies (radiation or chemotherapy), estimated blood loss, hospital stay, day of regular diet and pathological stage were analyzed. Rehospitalizations, reoperations and complications were recorded prospectively. The online Social Security Death Index was used when necessary. Complications were graded according to the Clavien classification system.¹⁵

Statistical analysis, including the chi-square test to compare percents, the Student *t* test to compare means and the Fisher exact test for 2 × 2 analyses, were performed using SPSS®, version 17.0. To study whether there was any significant effect after normalizing the post-RC urology rates for hospital-wide rates, we used a logistic regression model with year (2008 and 2009), site (post-RC urology and hospital wide) and interaction of year by site as predictors of the *C. difficile* incidence. All *p* values were 2 sided and *p* < 0.05 was considered significant.

RESULTS

Complete clinical, pathological and perioperative data were available on all 180 patients. For the MBP group of 105 patients and the nonMBP group of 75 median age was 71.2 (IQR 60.4, 76.5) and 70.0 years (IQR 57.7, 76.9), respectively (*p* = 0.4, see table). Of the MBP group 79% of the patients were male vs 77% in the nonMBP group (*p* = 0.9). Mean age adjusted Charlson comorbidity scores were 2.38 and 2.59, respectively (*p* = 0.5). The 2 groups did not significantly differ in diversion type with an approximately 3:2 predominance of IC to orthotopic neobladder each year. Median hospital stay (8 days, IQR 7, 10 vs 9 days, IQR 7, 11, *p* = 0.4), median estimated blood loss (1,000 cc, IQR 700, 1,100 vs

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