Background: Bowel preparation prior to colonic surgery usually includes antibiotic therapy together with mechanical bowel preparation (MBP). Mechanical bowel preparation may cause discomfort to the patient, prolonged hospitalization, and water and electrolyte imbalance. It was assumed that with the improvement in surgical technique together with the use of more effective prophylactic antibiotics, it was possible that MBP would no longer be necessary.

Hypothesis: There is no statistical difference in the postoperative results of patients who undergo elective colon resection with MBP as compared with those who have no MBP.

Design and Patients: The study includes all patients who had elective large bowel resection at Campus Golda between April 1, 1999, and March 31, 2002. Emergency operations were not included. The patients were randomly assigned to the 2 study groups (with or without MBP) according to identification numbers. All patients were treated with intravenous and oral antibiotics prior to surgery. The patients in the MBP group received Sofodex for bowel preparation.

Results: A total of 329 patients participated in the study, 165 without MBP and 164 with MBP. The 2 groups were similar in age, sex, and type of surgical procedure. Two hundred sixty-eight patients (81.5%) underwent surgery owing to colorectal cancer and 61 patients (18.5%) owing to benign disease. The hospitalization period was longer in the bowel-prepared group (mean ± SD, 8.2 ± 3.1 days) as compared with the non-prepared group (mean ± SD, 8.0 ± 2.7 days). However, this difference was not statistically significant. The time until the first bowel movement was similar between the 2 groups: a mean ± SD of 4.2 ± 1.3 days in the non-prepared group as compared with a mean ± SD of 4.3 ± 1.1 days in the prepared group (P = NS). Four patients (1.2%) died in the postoperative course owing to acute myocardial infarction and pulmonary embolism. Sixty-two patients (37.6%) of the non-MBP group suffered from postoperative complications as compared with 77 patients (46.9%) of the MBP group.

Conclusion: Our results suggest that no advantage is gained by preoperative MBP in elective colorectal surgery.


THE VALUE OF MECHANICAL bowel preparation (MBP) for elective colorectal surgery is debatable. Mechanical bowel preparation aims to rid the colon and rectum of solid stool and fecal contents, to lower bacterial load, and to reduce the incidence of postoperative anastomotic and infectious complications. The majority of colorectal surgeons consider MBP a prerequisite for the prevention of complications of colorectal surgery. Despite recent studies that contradict this view, the majority of colorectal surgeons still continue to emphasize the importance of MBP.

This article describes the results of a prospective randomized clinical trial designed to compare MBP and non-MBP in patients undergoing elective colorectal surgery.

STUDY PROTOCOL

The study population comprised adult patients admitted for elective colorectal surgery in the Division of General Surgery at the Rabin Medical Center, Tel Aviv, Israel, between April 1, 1999, and March 31, 2002. All patients gave their informed consent, and the study was approved by the hospital ethics committee. Patients were allocated to the 2 study groups according to their identification numbers. Patients with even numbers received MBP (group 1), and patients with odd numbers did not receive MBP (group 2).
before induction we used 500 mg of metronidazole intrave-
the morning of surgery. For prophylaxis in all patients, 1 hour
received a low-residue diet. Parenteral hydration was given on
excluded.
low rectal anastomosis or surgery for polypoid lesion were also
6 days prior to surgery. Patients undergoing proctectomy with
excluded if they had bowel preparation for colonoscopy within
randomized to group 2 were
between the 2 groups. Significance tests were 2-tailed with
between the 2 groups, such as mean age, hospital stay, and
time to first defecation, and χ² test or Fisher exact test was
used to calculate the differences in various complications
between the 2 groups. Significance tests were 2-tailed with
95% confidence intervals, and a P value <.05 was consid-
ered significant.

Unpaired t test was used to compare various parameters
between the 2 groups, and time to first defecation, and χ² test or Fisher exact test was
used to calculate the differences in various complications
between the 2 groups. Significance tests were 2-tailed with
95% confidence intervals, and a P value <.05 was consid-
ered significant.

Between April 1, 1999, and March 31, 2002, 329 con-
secutive patients underwent elective colorectal proce-
dures for nonobstructive large bowel pathologic fea-
tures (Table 1). One hundred sixty-four patients (99
men, 65 women) underwent surgery with MBP, while
165 (102 men, 63 women) did not have MBP. Table 2
summarizes general parameters. There were more men
than women in both groups (no statistical difference
between the 2 groups, P = .79). The patients in each
group were similar in age. Preoperatively, 27 patients
(MBP, 17; non-MBP, 10) who had hemoglobin levels
lower than 9.5 g/dL received preoperative blood trans-
fusion (P = .15). Sixty-two patients (MBP, 41; non-MBP,
21) received blood transfusion in the postoperative pe-
period (P < .005). The average hospital stay for patients
in both groups was similar. Pathological examination of the
resected specimens revealed that 268 patients (81.5%)
had malignant disease, whereas 61 patients (18.5%)
had benign disease such as irritable bowel dis-
tease or diverticulosis (no statistical differences between
the 2 groups). The majority of operations were per-
formed by residents. The majority of anastomoses were
colocolonic, colorectal, or coloanal; in only 42 patients
(12.8%) was the anastomosis ileocolic. No statistical
difference was found between the 2 groups. In most
cases, the anastomosis was performed by stapler tech-
nique. Time to first defecation was similar in both
groups.

Postoperative complications are given in Table 3. The
incidence of wound infection was higher in patients with
MBP: 16 (9.8%) as compared with 10 (6.1%) in the non-

<table>
<thead>
<tr>
<th>Type of Operation</th>
<th>Mechanical Bowel Preparation (n = 164)</th>
<th>No Mechanical Bowel Preparation (n = 165)</th>
<th>Total (N = 329)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herniectomy, right</td>
<td>18</td>
<td>24</td>
<td>42 (12.8)</td>
</tr>
<tr>
<td>Herniectomy, left</td>
<td>38</td>
<td>36</td>
<td>74 (22.5)</td>
</tr>
<tr>
<td>Sigmoidectomy</td>
<td>40</td>
<td>46</td>
<td>86 (26.1)</td>
</tr>
<tr>
<td>Subtotal colectomy</td>
<td>7</td>
<td>4</td>
<td>11 (3.3)</td>
</tr>
<tr>
<td>Abdominoperineal resection</td>
<td>18</td>
<td>16</td>
<td>34 (10.3)</td>
</tr>
<tr>
<td>Transverse colectomy</td>
<td>1</td>
<td>2</td>
<td>3 (0.9)</td>
</tr>
<tr>
<td>Anterior resection</td>
<td>30</td>
<td>20</td>
<td>50 (15.3)</td>
</tr>
<tr>
<td>Low anterior resection</td>
<td>12</td>
<td>17</td>
<td>29 (8.8)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mortality and Morbidity</th>
<th>Mechanical Bowel Preparation (n = 164)</th>
<th>No Mechanical Bowel Preparation (n = 165)</th>
<th>Total (N = 329)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td>2 (1.2)</td>
<td>2 (1.2)</td>
<td>2 (1.2)</td>
</tr>
<tr>
<td>Wound dehiscence</td>
<td>3 (1.8)</td>
<td>2 (1.2)</td>
<td>5 (1.5)</td>
</tr>
<tr>
<td>Wound infection</td>
<td>16 (9.8)</td>
<td>10 (6.1)</td>
<td>26 (8.3)</td>
</tr>
<tr>
<td>Anastomotic breakdown</td>
<td>1 (0.6)</td>
<td>2 (1.2)</td>
<td>3 (0.9)</td>
</tr>
<tr>
<td>Anastomotic bleeding</td>
<td>NA</td>
<td>2 (1.2)</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>Abdominal/pelvic collection</td>
<td>1</td>
<td>0</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>7 (4.3)</td>
<td>5 (3.0)</td>
<td>12 (3.6)</td>
</tr>
<tr>
<td>Pulmonary complications</td>
<td>16 (9.8)</td>
<td>9 (5.5)</td>
<td>25 (7.6)</td>
</tr>
<tr>
<td>Thrombophlebitis</td>
<td>15 (9.1)</td>
<td>16 (9.7)</td>
<td>31 (9.5)</td>
</tr>
<tr>
<td>Ileus</td>
<td>14 (8.5)</td>
<td>11 (6.7)</td>
<td>25 (7.6)</td>
</tr>
<tr>
<td>Relaparotomy</td>
<td>2 (1.2)</td>
<td>2 (1.2)</td>
<td>4 (1.2)</td>
</tr>
</tbody>
</table>

Abbreviation: NA, not available.
*Data are presented as number (percentage). P values were not significant.
Most surgeons use MBP for elective colorectal surgery. However, the use of MBP in elective colorectal surgery is a controversial issue. The aim of MBP is to rid the colon of solid stool, thus reducing the bacterial load and minimizing the risk of infection and anastomotic complications. It also enables the surgeon to perform intraoperative colonoscopy and facilitates palpation of the entire colon during surgery. The disadvantages of MBP are electrolyte imbalance, dehydration, abdominal pain, bloating, fatigue, and the risk of perforation with enteric gas, especially in the elderly population.6-12

Mechanical bowel preparation has been justified by Smith et al13 in their experimental model suggesting that the passage of a large fecal load can disrupt the healing anastomosis as compared with those individuals with an empty colon. On the other hand, Schein et al14 failed to find a difference in anastomotic healing between groups of animals with or without bowel preparation. Various prospective randomized studies,6,7,14-16 comparing patients with and without MBP, failed to show the benefit of MBP in reducing the rate of complications.

There is no doubt that prophylactic antibiotic therapy plays a very important role in colorectal surgery. Keighley et al17 found that the combination of MBP and systemic antibiotics provided the most effective protection against wound infection. The role of MBP and prophylactic antibiotic therapy in preventing anastomotic dehiscence is unclear, despite some studies that describe a low incidence of anastomotic dehiscence.5,18 LeVeen et al19 and Cohen et al20 have also shown the advantage of prophylactic antibiotics for colorectal anastomotic healing in the presence of fecal loading. Some studies21,22 show that anastomotic dehiscence occurs mainly after low anterior resection; in our study also, the 3 cases of anastomotic leak occurred after this procedure.

Our study failed to show any increase in the rate of anastomotic breakdown in patients without MBP; only 2 patients (1.2%) from this group had anastomotic breakdown. However, the rate of wound infection was higher in the group that received MBP, but this was not statistically significant when compared with those who did not receive it. Despite these results, we strongly emphasize the need for MBP in 2 instances: patients who need low or very low anterior resection and when surgery is performed for polypoïd lesion where palpation and sometimes intra-operative colonoscopy is necessary. On the other hand, we recommend extreme caution regarding the use of MBP in patients with a tumor almost occluding the lumen. Mechanical bowel preparation in these patients may cause large bowel obstruction necessitating emergency operation that frequently requires stoma formation.

To our knowledge, this is the second prospective randomized study of its type that includes more than 300 patients. Both studies failed to show any superiority of MBP. This prospective randomized study suggests that MBP is unnecessary for safe elective colonic and colorectal surgery, although it is recommended in selected cases where palpation of the entire colon during surgery or intraoperative colonoscopy might be required.

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REFERENCES


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