ROLE OF ORAL ANTIBIOTICS IN ELECTIVE COLORECTAL SURGERY

Dr. Amit Ramesh Churi
Assistant Professor Dept. of General Surgery Vedanta Institute of Medical Sciences Dahanu, Palghar, Maharashtra

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Corresponding author: Dr. Amit Ramesh Churi
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Abstract:
Introduction: Surgical site infection (SSI) is a major burden for patients who are posted for elective colorectal surgery, also there is significant increase to the cost of health care. It is a major cause of morbidity after surgery and is associated with increased hospital stay, readmissions, costs, and sometimes mortality. Surgical site infections are very high in colorectal surgery and are estimated to vary from 15% to 30% of patients undergoing colorectal surgery. For colorectal surgeries, orally administered antibiotics can be used in addition to the intravenous antibiotic prophylaxis.

Material and Methods: A total of 46 patients were included in the study who were posted for elective colorectal surgery. Patients who start with the 3-day intervention period but for whom surgery is cancelled or postponed for more than 7 days, will not be evaluable for analysis. After enrolment, patients were randomly assigned to one of two treatment arms in a 1:1 ratio. Patients were blinded into two groups, group 1 (medication group) and group 2 (placebo group). Patients are instructed to take the medication four times daily, during the last 3 days prior to surgery.

Results: There were 16 (69.6%) male and 7 (30.4%) in medication group while in placebo group male were 15 (65.2%) and female were 8 (34.8%). Mean age in medication group was 46.2 ± 15.24 and in placebo group was 48.2 ± 14.55. BMI (Body mass index) in medication group was 29.44 ± 3.74 and in placebo group was 28.76 ± 2.96. Operative time in group medication was 6.4 ± 2.12 and in placebo group was 6.23 ± 1.96. This was not significant. Surgical site infection (SSI) in medication group was 3 (13%) and in placebo group was 8 (39%). Mean Hospital stay (days) in medication group was 13.11 ± 2.45 and in placebo group was 16.2 ± 3.87, this was statistically significant. No. of antibiotics required postoperatively in medication group was 2 ± 1.4 and in placebo group was 6.4 ± 2.4.

Conclusion: Administration of oral antibiotics 3 days prior to colorectal surgery can significantly reduce the surgical site infection and mean hospital stay thereby reducing the morbidity.

Keywords: antibiotics, colorectal surgery, SSI, MBP and BMI

Introduction
Surgical site infection (SSI) is a major burden for patients who are posted for elective colorectal surgery, also there is significant increase to the cost of health care. It is a major cause of morbidity after surgery and is associated with increased hospital stay, readmissions, costs, and sometimes mortality.

Administration of preoperative bowel preparation has been shown to reduce the incidence of SSI in the hospitals. The role of mechanical bowel preparation (MBP) with polyethylene glycol or sodium phosphate has been studied in randomized controlled trials (RCTs), with perceived benefits including ease of manipulation of the bowel, reduced spillage and resultant contamination, reduced luminal pressure, and reduce bacterial load. Surgical site infections are very high in colorectal surgery and are estimated to vary from 15% to 30% of patients undergoing colorectal surgery.

Even after taking extensive efforts for improving infection control practice, the incidence of SSI after colorectal surgery remains unaffectedly high, whereas in other surgical specialties the incidence appears to have declined.

It is important to understand the pathogenesis of SSI to establish infection prevention measures. There is microbial contamination of the surgical site and development of the infection. One of the important measure to check the risk of postoperative infections is to intravenously administer perioperative prophylactic antibiotics. For colorectal surgeries, orally administered antibiotics can be used in addition to the intravenous antibiotic prophylaxis. This contains non-absorbable antibiotics, like neomycin which is combined with erythromycin or...
metronidazole, that are administered 1 to 2 days prior to the surgical procedure. The non-absorbable nature of these antibiotics implies almost complete absence of systemic uptake after oral intake. These antibiotics, have low risks of side effects also exert local activity in the gastrointestinal tract and also reduce the colonic bacterial contamination levels directly at the surgical site, whereas systemic antibiotics are can be used as a safeguard by establishing effective antibiotic concentrations in the soft tissues to minimize the risk of infection. But because of large variability in the antibiotic regimen it is very difficult to choose the correct antibiotics.

Material and Methods

Present study was carried out in the Department of Surgery at Vedanta Institute of Medical Sciences and Hospital.

Patient included were adult patients undergoing elective colorectal surgery. Patients were excluded if age is less than 18 years, Patients with a documented allergy to colistin or aminoglycoside antibiotics, Patients diagnosed with myasthenia gravis, Patients with a pre-existent stoma, Patients who have an inability to take medication orally and patients who refused to participate in the present study. Written informed consent was obtained from all the participants.

A total of 46 patients were included in the study who were posted for elective colorectal surgery. Patients who start with the 3-day intervention period but for whom surgery is cancelled or postponed for more than 7 days, will not be evaluable for analysis. After enrolment, patients were randomly assigned to one of two treatment arms in a 1:1 ratio. Patients were blinded into two groups, group 1 (medication group) and group 2 (placebo group). Patients are instructed to take the medication four times daily, during the last 3 days prior to surgery.

Primary endpoint was measured as deep SSI and/or mortality within 30 days of surgery. Superficial and deep SSIs was diagnosed according to the CDC criteria for surgical site infectionsix. Blood culture were taken for any bacterial infection and identification. Patients were followed up until 6 months after surgery to evaluate the development of primary and secondary outcomes.

The difference in the primary outcome between Pre-OP and placebo will be estimated with a Z-test for proportions or by logistic regression, correcting for the stratification variable (study site). Multivariable logistic regression will be used and measured confounders will be fitted in the model as covariates. Secondary outcomes will be analyzed using the chi-square test, Fisher’s exact test, logistic regression, time-to-event analysis, t test or Mann–Whitney U test, when appropriate.

Observations and Results

A total of 46 patients were included in the study and were divided in 2 groups: group 1 (medication group) and group 2 (placebo group) of 23 each.

Table 1: Demographic variable

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group 1 (medication group)</th>
<th>Group 2 (placebo group)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean ± SD)</td>
<td>46.2 ±15.24</td>
<td>48.2 ± 14.55</td>
<td>NS</td>
</tr>
<tr>
<td>Male</td>
<td>16 (69.6%)</td>
<td>15 (65.2%)</td>
<td>NS</td>
</tr>
<tr>
<td>Female</td>
<td>7 (30.4%)</td>
<td>8 (34.8%)</td>
<td>NS</td>
</tr>
<tr>
<td>BMI</td>
<td>29.44 ± 3.74</td>
<td>28.76 ± 2.96</td>
<td>NS</td>
</tr>
</tbody>
</table>

NS: Not significant, BMI: Body mass index.

Demographic variables in both the groups were not significant. There were 16 (69.6%) male and 7 (30.4%) in medication group while in placebo group male were15 (65.2%) and female were 8 (34.8%). Mean age in medication group was 46.2 ±15.24 and in placebo group was 48.2 ± 14.55. BMI (Body mass index) in medication group was 29.44 ± 3.74 and in placebo group was 28.76 ± 2.96.

Table 2: Comparison of groups

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Group 1 (medication group)</th>
<th>Group 2 (placebo group)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postoperative time (hours)</td>
<td>6.4±2.12</td>
<td>6.23 ± 1.96</td>
<td>P = 0.7790, NS</td>
</tr>
<tr>
<td>SSI (n, %)</td>
<td>3(13%)</td>
<td>8(39%)</td>
<td>P = 0.0468</td>
</tr>
<tr>
<td>MeanHospital stay (days)</td>
<td>13.11± 2.45</td>
<td>16.2±3.87</td>
<td>P = 0.0023</td>
</tr>
<tr>
<td>No. of postoperative antibiotics required</td>
<td>4.2± 1.4</td>
<td>6.4±2.4</td>
<td>P = 0.0004</td>
</tr>
</tbody>
</table>

SSI: Surgical site infection
Operative time in group medication was 6.4±2.12 and in placebo group was 6.23 ± 1.96. This was not significant. Surgical site infection (SSI) in medication group was 3(13%)and in placebo group was 8(39%). Mean Hospital stay (days) in medication group was 13.11± 2.45and in placebo group was 16.2±3.87, this was statistically significant. No. of antibiotics required postoperatively in medication group was .2± 1.4 and in placebo group was 6.4±2.4.

Discussion
Complications such as SSI after colorectal surgeries are associated with significant morbidity, therefore, there is an important need to reduce preventable complications and improve quality of care. In our study there was a significant reduction in SSI in medication group compared with no preparation at all. Similar results were observed by Ohman et al in their study that patients who received both oral antibiotics and mechanical bowel preparation had a significantly lower rate of SSI compared with no preparation at all.

In our study it was observed that Mean Hospital stay (days) in medication group was 13.11± 2.45 and in placebo group was 16.2±3.87, this was statistically significant. No. of antibiotics required postoperatively in medication group was .2± 1.4 and in placebo group was 6.4±2.4. These values were statistically significant. We administered antibiotics 3 days prior to surgery, thus prophylaxis in our study is restricted to the preoperative period. In a study by et al it was observed that the treatment period of 3 days will be sufficient since the decontamination will last for several days. Continuation of the prophylaxis in the postoperative period is not necessary as there is a risk of developing antibiotic resistance or opportunistic infections postoperatively.

Conclusion
Administration of oral antibiotics 3 days prior to colorectal surgery can significantly reduce the surgical site infection and mean hospital stay thereby reducing the morbidity.

References