Morbidity and Mortality Associated With Diverting Ileostomy Closures in Rectal Cancer Surgery

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Abstract

Introduction. Derivative ileostomies are frequently performed to protect low anastomosis. The closure of the ileostomy has shown, under some circumstances, high associated mortality/morbidity rates. This study attempts to quantify the morbidity and mortality associated with ileostomy closure in rectal neoplasm patients and to determine if the length of time between the procedure of construction and closure increases the morbidity/mortality.

Material and method. A retrospective study was performed, using the database of the colo-rectal surgical group in the department of general surgery. The subjects were the 62 patients treated between January 1, 2000 and December 31, 2006 who received both a low anterior resection to treat rectal neoplasm and a subsequent ileostomy closure.

Results. The mean patient age was 65 years (38-83) and consisted of 19 women (30.7%) and 43 men (69.3%). The mean time between the construction and closure was 10.48 months (2-56) and the mean hospital stay was 7.8 days (3-32). The overall morbidity/mortality rate was 33.8% and 6.4%. The most frequent surgical complications were postoperative intestinal occlusion (16.9%) and wound infection (11.2%).

Conclusions. The study showed high morbidity/mortality rate for the closure of temporary ileostomy. Patients who received the closure more than 11.65 months after the low anterior resection had significantly higher morbidity/mortality rates.

Key words: Ileostomy. Ileostomy closure. Rectal neoplasm.

MORBILIDAD Y MORTALIDAD EN RELACIÓN CON EL CIERRE DE ILEOSTOMÍAS DERIVATIVAS EN LA CIRUGÍA DEL CANCER DE RECTO

Introducción. El uso de la ileostomía en asa temporal para la protección de anastomosis bajas es frecuente. El cierre de estas ileostomías conlleva morbimortalidad. Este estudio se diseñó con el propósito de cuantificar la morbimortalidad asociada al cierre de las ileostomías en pacientes intervenidos por neoplasia del recto y determinar si el tiempo transcurrido entre la construcción y el cierre de la ileostomía aumenta la morbimortalidad.

Material y método. Se realizó un estudio de tipo retrospectivo, utilizando la base de datos de la Unidad de Coloproctología del Servicio de Cirugía General, para determinar el grupo de pacientes a quienes se les realizó una resección anterior baja por neoplasia del recto y posteriormente el cierre de la ileostomía en el período entre el 1 de enero de 2000 y el 31 de diciembre de 2006.

Resultados. Analizamos a 62 pacientes con cierre de ileostomía realizado en el período descrito. La media de edad de los pacientes fue de 65 (intervalo, 38-83) años; 19 (30,7%) eran mujeres y 43 (69,3%), varones. El tiempo medio transcurrido entre la construcción y el cierre fue de 10,48 (2-56) meses y la estancia hospitalaria, de 7,8 (3-32) días. La morbimortalidad total asociada al cierre de ileostomía fue del 33,8% y la mortalidad, del 6,4%. La infección de herida (11,2%) y la oclusión intestinal postoperatoria (16,9%) fueron las complicaciones quirúrgicas más frecuentes.

Conclusiones. El cierre de la ileostomía temporal se relaciona con gran morbimortalidad. El tiempo entre construcción y cierre mayor a 11,65 meses es un factor de riesgo para morbimortalidad asociada al cierre de las ileostomías.

Introduction

The construction of diverting ileostomies in patients undergoing low anterior resection for rectal neoplasm is a frequent surgical procedure. Diverting ileostomy does not avoid the appearance of postoperative complications; however, it has been shown to help reduce the impact that anastomotic dehiscence has in the postoperative period, reducing the number of reinterventions following surgery.1 3 When studying this benefit, one should consider the morbidity related with the closing of this ostomy; otherwise, the only thing being done would be to delay the surgical morbidity and mortality associated with the first procedure. We have reviewed our own experience with the closing of ileostomies over a 7 year period with the objective of analyzing the factors that determine hospital morbidity and mortality for this procedure and knowing the changes to our unit’s protocols that may help reduce them.

Material and Method

The database at the Coloproctology Unit of the General Surgery Department at the Hospital Universitario Dr Josep Trueta in Girona, Spain, was used to determine the group of patients who underwent low anterior resection for rectal neoplasm and, afterwards, ileostomy closure within the timeframe of January 1, 2000 and December 31, 2006. The patients’ medical histories were reviewed using a predetermined database. Complications were divided into 2 groups: those that required reoperation and those that did not. This division was made using the authors’ criteria. Surgical wound infection, paralytic ileus and anastomotic bleeding were considered surgical complications.

The type of study is retrospective. The factors for associated morbidity reviewed were: age, gender, concomitant diseases (high blood pressure, diabetes mellitus, lung and heart diseases, and steroid use), the indication for the construction of the ileostomy and the surgical procedure used for its closure. The variables studied were morbidity and mortality associated with ileostomy closure in the first 30 days following surgery.

Our unit’s protocol establishes that a protective ileostomy will be constructed in all patients that undergo anterior rectal resection for neoplasia involving the middle or inferior third of the rectum and whose rectal stump is 3 cm or less. A protocol still has not been established with respect to preoperative studies to be performed prior to ileostomy closure. All ileostomy closures are performed with a circumferential incision with the exception of those patients with midline postincisional hernia, for whom a laparotomy incision is used.

Results

Patient Characteristics

The medical histories of 62 consecutive patients were reviewed. Included were 43 (69.3%) males and 19 (30.7%) females, with an average age of 65.12 (range, 38-84) years. The average postoperative stay was 7.8 (range, 3-32) days; 28 (45.1%) patients had 1 or more concomitant diseases: 15 (25%) high blood pressure; 7 (11.2%) diabetes mellitus; 4 (6.4%) lung disease; 4 (6.4%) ischemic heart disease; and 1 (1.6%) used steroids.

Surgical Procedure

Regarding the initial indication for the construction of the diverting ileostomy, 35 (56.4%) ileostomies were to protect a pouch (j-pouch or coloplasty) and 27 (43.5%) were to protect a low end-to-end anastomosis. Prior to closing the ileostomy, 16 (25.9%) patients underwent colonoscopy; 1 (1.7%) underwent a barium enema; and 45 (72.4%) did not undergo any study of anastomotic integrity. Prior to closing the ileostomy, 57 (91.9%) patients received adjuvant chemotherapy, while 5 (8.1%) did not because they had early-stage neoplasias. The average time between construction and closure of the stoma was 10.48 (range, 2-56) months. All closures were intraperitoneal, 59 (95.1%) patients by circumferential incision and 3 (4.9%) patients by midline laparotomy incision. Hundred per cent of anastomoses were performed in a side-to-side manner with mechanical suturing (75 mm GIA and 95 mm TA).

Operative Mortality

Four patients died within the first 30 days, which resulted in a mortality rate of 6.4%; 3 patients suffered postoperative obstruction which led to bronchoaspiration; and death in 2 patients and septic shock and death in another. One patient suffered from postoperative ischemic colitis, which led to septic shock and death.

Surgery-Related Complications

Twenty one patients (33.8%) with surgery-related complications were documented. The 2 most frequent complications were surgical wound infection in 7 (11.2%) patients and intestinal obstruction in 11 (16.9%). Of the 11 patients that had intestinal obstruction, 8 (12.9%) were treated conservatively and were classified as paralytic ileus, while 3 (4.8%) patients required laparotomy; adhesions that led to the obstruction were discovered in all cases. Four (6.4%) patients had anastomotic bleeding that was treated endoscopically; 2 (3.2%) patients had an anastomotic leak; 1 (1.6%) patient had ischemic colitis; and 1 (1.6%) patient had pneumonia. The differences between the patients with and without complications are shown in Tables 1 and 2. High blood pressure ($P=.007$) is the only significant comorbidity factor for complications related with closing the protective ileostomy. The average interval between construction and closure of the stoma in those patients who had complications was 11.65 months, while the average in those who did not suffer complications was 9.87 months. This difference was not statistically significant ($P>.05$).

Discussion

The practice of total mesorectal excision in surgery for rectal cancer has improved oncological results of low anterior resection in such a way that today it is the most used surgery in the treatment of rectal tumors.4 5 There are no clear guidelines in the literature for when a diverting ostomy should be used in low anterior resection for rectal neoplasm since
this does not avoid the appearance of postoperative complications. However, it has been shown to reduce the impact that anastomotic dehiscence has on postoperative morbidity and mortality, which reduces the number of reinterventions following the operation.1-3

The decision to construct a protective ostomy or not continues to rely on the surgeon’s preference in the majority of cases1,2,7 who, in order to make the decision, may consider criteria such as: the appearance of technical problems during surgery, significant medical morbidity, excessive bleeding, narrow pelvis, doubtful anastomotic blood supply, incomplete anastomotic doughnuts, and/or leaks following insufflations of air or liquid.8,9 The construction of diverting stomas has had a big impact on the reduction of morbidity and mortality associated with anterior rectal resection,1,7 which is why morbidity associated with the ostomy closure should be considered when studying this benefit; otherwise, the only thing being accomplished would be delaying the surgical morbidity and mortality associated with the first procedure.

There are few articles in the literature that report complications from the closing of ileostomies, even though these have a high incidence. The studies show that ileostomy closure is associated with a morbidity rate between 11.4% and 17.2%10,11 and a mortality rate between 1.7 and 3%.12,13 In our study, the morbidity was 33.8% and mortality was 6.4%. Among the most frequent complications associated with ileostomy closure are: intestinal obstruction, surgical wound infection, intra-abdominal septic complications, enterocutaneous fistulas, and anastomotic leak.10-13 The most frequent complications in our study were intestinal obstruction (18%) and surgical wound infection (13%).

The optimum time interval between construction and closure of the ostomy still has not been defined by the studies. This takes on relevance in light of the following evidence: intervals greater than 8.5 weeks between the construction and closure of a diverting ileostomy reduce the rate of postoperative complications11; intervals greater than 6 months increase morbidity associated with the procedure.14 Early closure of an ileostomy (10 days after construction) is possible in selected patients15 and immediate ileostomy closure, on admission to hospital, is also possible.16 Lordan et al17 proved that the time between construction and closure of an ileostomy after anterior rectal resection for rectal cancer is significantly delayed due to adjuvant chemotherapy. However, the majority of studies have not taken into account that patients with diverting ileostomies because of low anterior resections for rectal neoplasms in stages II-IV must receive adjuvant chemotherapy, and this is administered between months 2 to 6 following the first intervention, right in the middle of the recommended interval for ileostomy closure. The average interval between construction and closure of the stoma in our study was 10.48 (range, 2-56) months, due to the adjuvant treatment that 91.8% of the patients received and to the waiting lists in our unit; nevertheless, we have seen that the greater the time between construction and closure, the higher the rate of complications (11.65 vs 9.87 months). Thalheimer et al13 showed that the morbidity associated with ileostomy closure in colorectal cancer is higher in patients receiving adjuvant chemotherapy; however, morbidity can be reduced in patients not receiving adjuvant chemotherapy if the ileostomy is closed prior to beginning therapy.

The time period between construction and closure of diverting ileostomies in our study was extended (10.48 months) and the morbidity and mortality was elevated; this data indicates, as has already been shown in other studies,

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**TABLE 1. Patient Risk Factors for Complications Within the First 30 Days Following Diverting Ileostomy Closure Surgery**

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Patients, No.</th>
<th>Without Complications, No. (%)</th>
<th>With Complications, No. (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>58</td>
<td>63.08</td>
<td>69</td>
<td>.04</td>
</tr>
<tr>
<td>Male</td>
<td>43</td>
<td>26 (67.4)</td>
<td>14 (32.5)</td>
<td>.79</td>
</tr>
<tr>
<td>Female</td>
<td>19</td>
<td>12 (63)</td>
<td>7 (37)</td>
<td></td>
</tr>
<tr>
<td>Comorbidities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High blood pressure</td>
<td>15</td>
<td>5 (33.3)</td>
<td>10 (66.6)</td>
<td>.007</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>7</td>
<td>5 (71)</td>
<td>2 (29)</td>
<td>.72</td>
</tr>
<tr>
<td>Heart disease</td>
<td>3</td>
<td>3 (75)</td>
<td>1 (25)</td>
<td>.67</td>
</tr>
<tr>
<td>Lung disease</td>
<td>4</td>
<td>4 (100)</td>
<td>0</td>
<td>.13</td>
</tr>
<tr>
<td>Steroid use</td>
<td>1</td>
<td>1 (100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pouch</td>
<td>35</td>
<td>22 (62.8)</td>
<td>13 (37.2)</td>
<td>.35</td>
</tr>
<tr>
<td>Anastomosis</td>
<td>27</td>
<td>19 (70.3)</td>
<td>8 (39.7)</td>
<td></td>
</tr>
</tbody>
</table>

**TABLE 2. Risk Factors Associated With the Surgical Procedure for Complications Within the First 30 Days Following Diverting Ileostomy Closure Surgery**

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Patients, No.</th>
<th>Without Complications, No. (%)</th>
<th>With Complications, No. (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circumferential incision</td>
<td>59</td>
<td>40 (67.8)</td>
<td>19 (32.2)</td>
<td>.22</td>
</tr>
<tr>
<td>Laparotomy</td>
<td>3</td>
<td>1 (33.3)</td>
<td>2 (66.6)</td>
<td></td>
</tr>
<tr>
<td>Construction to closure time,</td>
<td></td>
<td></td>
<td></td>
<td>.68</td>
</tr>
<tr>
<td>average, a mo</td>
<td></td>
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</tbody>
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*aAverage indicates 10.4 months.
that the longer the time period between construction and closure of the ileostomy, the higher the rate of complications. Therefore, we think it is advisable to define the optimal time interval between construction and closure of diverting ileostomies in patients with rectal neoplasm that will require adjuvant treatment, with the aim of preventing complications caused by this procedure. In our opinion, closure of protective ileostomies should be performed before beginning adjuvant chemotherapy, thus avoiding long time periods between construction and closure and the risks associated with closure during administration of adjuvant chemotherapy.

References