Clinical results of loop ileostomy closures in rectal cancer surgical patients. Effect of chemotherapy in the waiting period

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ABSTRACT

Introduction: The introduction of sphincter preservation surgery in rectal cancer has led to an increase in the number of low resections protected with a loop ileostomy. This requires subsequent closure of the stoma, a surgical procedure which is not devoid of morbidity or mortality. The aims of the study were to analyse the clinical results of the passage reconstruction surgery and to find out the interval between both surgeries, as well as the role chemotherapy plays in this.

Patients and method: The prospective data of patients previously operated on for rectal cancer were used retrospectively with those whose ileostomy was closed between May 2004 and September 2008. Data associated to chemotherapy indication, interval between surgeries and complications were collected and analysed.

Results: A total of 54 consecutive patients with a mean age of 66 years were analysed. The mean interval between surgeries was 178 days, being significantly less in the patient group that did not receive chemotherapy (P=.008). The post-operative stay was 6.3 days (SD=4.1). Mortality due to respiratory failure was 1.8% and the morbidity was 22.2%, with 7.4% requiring further surgery.

Conclusions: The mortality and morbidity of ileostomy closures are not inconsiderable, although its advantages in the protection of the stoma justify its use. The ileostomy construction interval appears to be significantly affected by post-operative chemotherapy.

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Resultados clínicos del cierre de ileostomías en asa en pacientes intervenidos de cáncer de recto. Efecto de la quimioterapia en el tiempo de espera

Palabras clave:
Ileostomías en asa

Introducción: La implantación de la cirugía de preservación esfinteriana en el cáncer de recto ha hecho incrementar el número de resecciones bajas protegidas con una ileostomía en
Introduction

Total mesorectum excision as the treatment of choice for surgery of rectal cancer, as well as the increased preservation of the sphincter, has meant that the number of resections with low, ultra-low, and coloanal anastomoses has risen.\(^1\) The percentage of anastomotic dehiscence in rectal resections varies greatly according to study, ranging between 3% and 30%.\(^2\) This is the most severe complication following a rectal resection, associated with an elevated morbidity and mortality, and the incidence increases in anastomoses performed close to the anal margin.\(^2\) The protective effect of derivative stoma is well-documented, not so much in the prevention of dehiscence, but rather in reducing its severity, avoiding reinterventions, and facilitating the viability of protected rectal anastomoses.\(^3\)\(^-\)\(^6\) Disagreement exists in the literature regarding the preference between a colostomy or lateral ileostomy, as there are several opinions in spite of the recent meta-analysis that appears to confirm a greater benefit from ileostomy.\(^7\)\(^,\)\(^8\)

When evaluating the benefits of protective ostomy, one must keep in mind that posterior closing of the stoma increases morbidity, and sometimes mortality, which must be added to the rates of the initial procedure, and be considered in order to understand the role played by derivative stoma in this type of operation.

In the absence of complications, the ileostomy is normally closed between two and three months after the initial surgery.\(^9\) However, in those patients in which postoperative chemotherapy is required, closing of the ileostomy tends to be delayed until finishing the treatment.\(^9\) This reconstruction interval is another point of discussion, and opinions appear with growing frequency calling for an early closure during the same hospitalisation period, which can be a feasible option in select cases.\(^10\)\(^-\)\(^12\)

This study aims to analyse the clinical results for closing loop ileostomies at a Colorectal Surgical Unit over the last four years, and to gain an understanding of the repercussions of chemotherapy between the construction and ileostomy closure.

Patients and methods

We performed a retrospective analysis on a prospective database maintained by the Coloproctology Unit at the Hospital Universitari del Mar. We analysed data regarding patients previously operated on for rectal cancer, who then underwent a loop ileostomy between May 2004 and September 2008.

For the purpose of this study, we have defined rectal cancer as any malignant tumour that was found between zero and thirteen centimetres from the anal margin, measured using a rigid rectoscope.

After performing endorectal ultrasound and/or nuclear magnetic resonance, neoadjuvant therapy was administered to patients with stage II-III rectal neoplasia, in compliance with the treatment protocol for rectal cancer at our hospital. The patients also received 5-fluorouracil at 225 mg/m\(^2\)/day through a central venous catheter administered by 24-hour continuous infusion, during the 5-week radiotherapy treatment period. All patients that underwent neoadjuvant therapy received postoperative chemotherapy, except those with stage II that had grade 3-4 tumour regression (isolated tumour cells or no tumour).

Partial mesorectum excision with a 4 cm distal margin was performed for upper rectal cancers, and a total mesorectum excision for middle and lower rectal cancers. The anastomosis was protected when situated at least 6cm from the anal margin. Mechanical preparation of the colon was performed for cases that needed a protective ileostomy.

We excluded ileostomies that had been constructed for other reasons such as dehiscences, emergency surgery, or any other circumstance. We decided whether patients
who were to undergo postoperative chemotherapy were to require ileostomy reconstruction as soon as rectal surgery was complete so that chemotherapy was not delayed. Patients that did not need postoperative chemotherapy had their ileostomy closed after 12 weeks. A gastrografin enema through the ileostomy was performed on all patients before reconstruction surgery to ensure that there were no complications in the anastomosis.

**Surgical technique**

The ileostomy was closed in all cases through a perileostomy incision. The anastomosis was created through a stoma resection with a manual end-to-end anastomosis or mechanical functional end-to-end anastomosis using GIA 75 and TA 90 staplers, to the surgeon’s discretion. No intra-abdominal drains were performed. All incisions were closed after having cleaned the subcutaneous cellular tissue with 500 ml of saline solution. All patients received intravenous antibiotic prophylaxis with 240 mg of gentamicin and 1 g of metronidazole.

**Complications**

The patients followed a multimodal rehabilitation programme at our hospital. They started to ingest water between 6 and 8 hours after the procedure, and progressed intake depending on tolerance.

Postoperative ileus was considered when the patient was intolerant to food, causing hospital discharge to be delayed until after the seventh day, due to diet being delayed or interrupted for over 48 h, or when a nasogastric tube was required.

Infection in the surgical site was defined according to the criteria accepted by the NNIS (National Nosocomial Infections Surveillance System), and complications were classified according to the Clavien grading system.

**Statistical analysis**

Results are presented as a mean (standard deviation) and percentages. We used the student’s t test to compare normal quantitative variables, we used the Student’s t test. Variables that did not follow a normal distribution were analysed using the Mann-Whitney U test. We used the chi-square test to compare qualitative variables. P values less than .05 were considered as statistically significant.

**Results**

We analysed the results obtained from 54 consecutive patients included in the study, whose demographical and clinical characteristics are summarised in Table 1.

The ileostomy protected a direct anastomosis in 39 cases, and a colonic-J reservoir in 15 cases.

Neoadjuvant therapy was indicated for 39 patients. Of these, 33 received the complete neoadjuvant treatment, while for six cases the tumour regression grade allowed them to be left out of the postoperative cycles. Neoadjuvant therapy was not indicated for 15 patients. A total of 21 patients did not receive postoperative chemotherapy (Table 1).

The gastrografin enema performed before closing the ileostomy did not find any problems that would delay the procedure.

The mean interval between the initial surgery and the ileostomy closure was 178 (95) days. However, this interval was significantly lower for patients that did not receive chemotherapy after the initial surgery, for which the mean time was 145 (99) days, compared with those that did receive postoperative chemotherapy, with a mean time of 198 (84) days (P=.008) (Table 1).

Four patients required additional procedures. Two needed surgery for liver metastases, and two ventral hernia repair with mesh.

All patients were operated on under general anaesthesia. The perileostomy incision did not have to be modified in any of the cases. Cases requiring liver surgery also entailed a subcostal incision. In the case of hernia, the normal technique of placing a reinforcing polypropylene mesh was used. A parastral hernia was clinically evident in one patient, which was treated using a reinforcing mesh over the ileostomy closure. No median laparotomies were performed.

Manual end-to-end anastomosis was performed outside the mucosa with loose 3/0 silk sutures in 27 cases. The other 27 patients underwent a functional end-to-end anastomosis. The cutaneous closing of the incision was always primary, and subcutaneous aspiration drains were placed in only two cases. The mean postoperative hospitalisation period was 6.3 (4.1) days.

**Complications**

The complications that arose during the study are summarised in Table 2, representing a morbidity rate of 22.2%. Of the 12

<table>
<thead>
<tr>
<th>Table 1 – Demographical and clinical characteristics of the patients</th>
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<tbody>
<tr>
<td>Patients</td>
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<tr>
<td>---</td>
</tr>
<tr>
<td>Men</td>
</tr>
<tr>
<td>Women</td>
</tr>
<tr>
<td>Age, years</td>
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<tr>
<td>Neoadjuvant therapy</td>
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<tr>
<td>Pre and postoperative</td>
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<tr>
<td>Only preoperative</td>
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<tr>
<td>No neoadjuvant therapy</td>
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<tr>
<td>Mean time between initial surgery and ileostomy closure, days</td>
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<tr>
<td>Group of patients that did not receive chemotherapy after initial surgery, days</td>
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<tr>
<td>Group of patients that received chemotherapy after initial surgery, days</td>
</tr>
<tr>
<td><strong>P</strong>=0.008**</td>
</tr>
</tbody>
</table>

SD indicates standard deviation. *Includes all patients. **Statistically significant difference between the total group of patients and the group that did not receive postoperative chemotherapy.
Complications, 4 (7.4%) required reinterventions (Clavien grade IIb): one anastomotic dehiscence, one intestinal lesion that went unnoticed, one linear suture haemorrhage from a mechanical anastomosis, and one patient required drainage of an abdominal collection which could not be operated percutaneously. In another case, an intestinal-cutaneous fistula was clinically suspected, requiring readmission ten days after the surgery, as the patient's dressing was stained. No quantifiable leakage was detected and the patient was discharged after seven days.

We found no correlation between age and complications, nor did we encounter significant differences based on the type of anastomosis (manual or mechanical). We also found no significant differences in complications produced between patients that had received chemotherapy and those that had not (Table 1).

One patient died (1.8%) due to sepsis of a respiratory origin, secondary to pneumonia, which caused readmission to the hospital five days after being discharged following the ileostomy closure. The patient died 24 h after admission.

Discussion

In spite of the reduced mortality and morbidity presented by rectal surgery since the progressive development of colorectal surgery units,16 complications continue to be severe, with anastomosis dehiscence being associated with the highest rate of mortality. Among the preventative measures that have been adopted, only protective ostomies have been shown to be effective, implying that the absence of a derivative ileostomy is a risk factor for the appearance of symptomatic dehiscence following a total mesorectal excision in rectal cancer patients.17

Although studies have been performed on cost-effectiveness, in which an economic benefit can be seen only after dehiscence incidences of 16.5%,18 it appears evident that the reduced number of reinterventions and increased percentage of preserved anastomoses justifies the use of this technique. Even so, the inconveniences inherent to ileostomy must be taken into account, since it does not only entail the need for a new intervention to close the ostomy, but also reduces quality of life for the patient in the meantime.19,20

For most rectal cancer cases, the interval until ileostomy closure depends on the need for chemotherapy cycles to be finished or radio-chemotherapy started if not administered before surgery. In most cases, this determines whether or not closing must be delayed until after the treatment has finished.

In our study, we observed that patients who did not require postoperative chemotherapy had their ileostomies closed much earlier than patients that did receive this treatment. Since finishing chemotherapy treatment tends to be the priority in these cases, the only possibility for shortening the waiting period is an early closure, even during the same hospitalisation period. In a study by Alves et al,21 this treatment was made possible for 75% of cases, with slightly better results than in delayed closure except for surgical wound infection values. This appears to be a very feasible option, although it could aggravate symptoms of low anterior resection syndrome.

However, in spite of the delay caused by postoperative chemotherapy, we also believe that those patients that did not receive this treatment have an excessively long mean waiting period at 145 (99) days, attributable to the delay in performing tests and the difficulties in programming the surgery. Finding a solution to these issues should take the highest priority.

In our patients, before the stoma was closed, a systematic gastrografin enema was performed from the distal end of the ileostomy, which did not indicate any abnormalities that would postpone the operation. In the literature, the majority opinion is that enemas applied before closing an ileostomy are of little value, and thus their use would not be entirely

<table>
<thead>
<tr>
<th>Complication category</th>
<th>Type of complication</th>
<th>Number (%)</th>
<th>Clavien grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technique</td>
<td>Anastomosis dehiscence</td>
<td>1 (1.8)</td>
<td>III b</td>
</tr>
<tr>
<td></td>
<td>Unnoticed iatrogenic injury</td>
<td>1 (1.8)</td>
<td>III b</td>
</tr>
<tr>
<td></td>
<td>Anastomosis haemorrhage</td>
<td>1 (1.8)</td>
<td>III b</td>
</tr>
<tr>
<td></td>
<td>Enterocutaneous fistula</td>
<td>1 (1.8)</td>
<td>II</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>Inflammatory bowel disease thrombophlebitis</td>
<td>1 (1.8)</td>
<td>II</td>
</tr>
<tr>
<td>Respiratory</td>
<td>Pneumonia</td>
<td>1 (1.8)</td>
<td>V</td>
</tr>
<tr>
<td>Infection</td>
<td>Skin wound infection</td>
<td>3 (5.5)</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>Topical cure by primary care doctor</td>
<td>2 (3.6)</td>
<td>II</td>
</tr>
<tr>
<td></td>
<td>Antibiotics</td>
<td>1 (1.8)</td>
<td>III b</td>
</tr>
<tr>
<td></td>
<td>Infection of the organ/space</td>
<td>1 (1.8)</td>
<td>II</td>
</tr>
<tr>
<td>G.I. transit</td>
<td>Paralytic ileus</td>
<td>1 (1.8)</td>
<td>II</td>
</tr>
<tr>
<td></td>
<td>Mechanical ileus</td>
<td>1 (1.8)</td>
<td>II</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>12 (22.2)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 – Complications. Clavien grading system.15
necessary, since in those cases in which previous problems in rectal surgery have not arisen, the possibility of later encountering unknown abnormalities is very scarce.22

Another point of conflict in these procedures occurs when hepatic metastases are present, which must be excised after the primary tumour surgery. On two occasions, we have combined hepatic metastases surgery with the ileostomy closing without causing an increase in complications. However, these were minor resections, since we believed as other authors have mentioned23 that the association of major hepatic resections along with ileostomy closing could lead to increased morbidity and a prolonged hospital stay.

Even though some studies have indicated that this procedure is possible under local anaesthesia,24 we have always opted for general anaesthesia, as we subscribe to its use in outpatients as has been suggested by other groups.24,25

No differences between manual and mechanical anastomoses were observed in our patients in terms of postoperative ileus, as has been indicated in other studies,26 nor were there differences in terms of complications and duration of hospital stay. The similarity in our results coincides with most information available on suture types,26,27 although shorter operation times seem standard when using mechanical sutures.26,27

The mortality in our study was a single case (1.8%). In the literature, a wide range of indices can be found, varying between 0.06% and 6.4%,28,29

Complications arose in 22.2% of cases, falling within the standard for this type of surgery,26,28 with a percentage of reinterventions needed (7.4%) also similar to other studies.19,21,29

In general, dehiscence in this type of surgery can be treated by resection and a new anastomosis, as was performed in the single case that arose in our study. As such, patients that receive this procedure can be discharged from hospital with adequate intestinal transit reconstruction.

Haemorrhage of the anastomosis is a complication that appears to be more frequent in mechanical anastomoses.26,27,29 We believe that it is due to the everted suture line that is produced, and that the practice of a invaginated seroserous suture could reduce this problem.

In our study, the remaining complications inherent to this procedure, such as medical complications and abnormalities in gastrointestinal transit, did not vary from the results found in the literature, and were to be expected for this type of surgery.

Considering the published data, we believe that the complications produced by this procedure are significant, and must be taken into account by patients and surgeons alike in order to give this surgery its due consideration with regard to the importance of the previous rectal resection.

Occasionally, the waiting period can be long and the need for postoperative chemotherapy determines whether or not there will be a delay in transit reconstruction. We believe that ileostomy closing should be performed as early as possible in order to improve patient quality of life.

Conflict of interest

The authors affirm that they have no conflicts of interest.

REFERENCES


