Protective colostomy closure: the hazards of a “minor” operation

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Abstract. A retrospective study of 87 patients, subjected to colostomy closure between 1976 and 1987, was conducted in order to evaluate the role of 8 potential risk factors on morbidity and mortality. Possible risk factors were age >65 years, presence of hypoalbuminaemia (<3.0 gr %), anaemia (Hb < 10 gr %), operative technique, duration of colostomy, site of colostomy, underlying disease and presence of subcutaneous drainage. Apart from hypoalbuminaemia, no clear risk factor was identified, although an interval of more than 90 days between construction and closure of colostomy appears to be safer than shorter intervals. A comparison was also made between two different periods from 1976 to 1982 and from 1983 to 1987 which resulted in important changes in patient management in the second period including: type of antibiotic prophylaxis, type of anastomosis and suture material, site of colostomy and mean duration of colostomy. Four post-operative deaths (4.6%) (two for myocardial insufficiency and two for sepsis), 11 major (13%) and 25 (29%) minor complications were recorded. The analysis of the two different periods showed a strong reduction in both mortality and morbidity in the second period, which could be related to a better management of this type of patient. In conclusion, the incidence of mortality and morbidity in colostomy closure cannot be underestimated and therefore the same skill and meticulous approach are required for this operation as for any major surgical procedure on the colon.

Introduction

The construction of a temporary colostomy is a frequent procedure in colorectal surgery used to reduce post-operative mortality and morbidity. The closure of a colostomy is considered a minor operation and usually performed by junior surgeons in training. However, in the last few years many studies have reported the hazards of this procedure, stressing a high complication rate (from 5.6% to 61%) [1–4], and mortality up to 4.5% [5–7].

As a consequence, the question of whether or not to perform a protective colostomy, and the related problems of the timing of closure, the technique, the use of local and/or systemic antibiotics, have become a matter of debate.

This survey presents an analysis of the clinical records of patients subjected to a protective colostomy closure in our University Surgical Department over a 12 year period, with the aim of evaluating those risk factors which could influence the morbidity and mortality of colostomy closure.

Patients

We have reviewed the clinical records of 87 consecutive unselected patients who underwent closure of a temporary colostomy during 12 years (1976–1987) in our Surgical Department. There were 46 males and 41 females, with a median age of 59.6 years (range 16–86).

The site of colostomy was the caecum in 19 cases, transverse colon in 39 and left colon in 29. Temporary colostomy had been constructed to protect a colorectal anastomosis after anterior resection for rectal cancer in 33 cases, left colostomy for cancer in 20 cases, penetrating colon injury in 5, resection for acute diverticulitis in 7, colovaginal fistulas in 4 and miscellaneous conditions in 6 cases.

Protective cecostomies were performed after left colectomy for diverticulitis (6 cases), cancer of the transverse and left colon (3 and 9 cases, respectively) and for the treatment of a colovaginal fistula.

End colostomies for Hartmann’s procedure were excluded from this study since restoration of bowel continuity by an infra-abdominal anastomosis between colon and rectal stump is considered a major operation.

Methods

Pre-operative barium enema and/or proctosigmoidoscopy was performed in 43% (34/87) of our patients in order to evaluate the patency of anastomosis and the presence of other associated colonic pathologies.
Before the colostomy closure, all patients received a mechanical bowel preparation consisting of two days of oral liquid diet, a cleansing enema and oral cathartics (10% mannitol solution 250 ml/die or other drugs). No oral antibiotics were administered.

Before 1980 antibiotic treatment consisted in cephalosporins plus aminoglycosides started immediately after surgery, whilst a combination of metronidazole or clindamycin plus tobramycin was adopted for short-term prophylaxis for the last 7 years.

The operation was performed after a period ranging from 8 to 300 days from the construction of the colostomy, usually by a junior surgeon in training under the supervision of a senior surgeon. Sixty-one cases had a simple closure, and 26 had a resection with anastomosis.

The mean duration of the operation was 85 min (ranging from 50 to 120) for simple closure and 95 min (range 65 to 150) for resection and anastomosis.

The technique for simple suture and anastomosis was a double layer with catgut and silk in 32 cases (most frequently during the first 5 years) and a single layer with synthetic absorbable suture in 55 cases. No patients had a stapled anastomosis.

The colostomy closure was intraperitoneal in all cases and the skin was never left open: wound drainage (Penrose) was used in 63 cases.

Analysis of the risk factors

Eight potential risk factors were evaluated: (1) Age > 65; (2) Serum albumin less than 30 g/l; (3) Haemoglobin level less than 100 g/l; (4) the interval between construction and closure of colostomy; (5) Site of colostomy; (6) Underlying pathology; (7) Type of anastomosis and suture material used; (8) Use or not of subcutaneous drainage. A comparison has been made between the two periods from 1976 to 1982 and 1983 to 1987 since important changes in patient management occurred in the second period.

A univariate analysis using $\chi^2$ contingency tables with Yates correction and Fisher's exact test was performed to identify the risk factors statistically related to post-operative morbidity and mortality.

Definitions

Post-operative mortality was defined as any death occurring within the first 30 postoperative days or before the discharge of the patients from the hospital, irrespective of whether it was surgically related or not (e.g. death for myocardial infarction or stroke).

Life-threatening complications like general sepsis, intra-abdominal abscesses, fistulae, intestinal obstruction or myocardial infarction were considered major complications, whereas wound infections (with purulent discharge), urinary tract infections (positive culture), wound dehiscence and post-operative ileus (constipation lasting more than 7 days) were considered minor complications and analysed separately.

Minor complications were included in the statistical analysis even when occurring simultaneously with major complications or death.

Results

Four post-operative deaths (4.6%) occurred after colostomy closure, two due to myocardial insufficiency and two for untreatable sepsis.

Major complications occurred in 11 patients (13%, Table 1). There were eight post-operative enterocutaneous fistulae, five of which required further surgical treatment for sepsis, two myocardial infarctions and one intestinal obstruction.

Minor complications occurred in 25 patients (29%) with 21 wound infections, one urinary infection, 2 wound dehiscences and 1 enterocolitis due to antibiotic therapy.

Median postoperative hospital stay was 20 days in patients with complications and 9.7 in those without ($p<0.01$). The incidence and the role of the risk factors correlated with poor outcome are summarised in Table 2.

**Age:** Patients over 65 had a higher mortality rate and more major complications than younger ones (8% vs 2% and 19% vs 8%, respectively), although this was not statistically significant. No differences were found as regards minor complications.

**Albumin:** All deaths occurred among the hypoalbuminaemic patients, and the occurrence of minor and major complications was also significantly higher in this group (41% vs 22.4% and 27.6% vs 5.2%, respectively, $p=0.011$).

**Haemoglobin:** Patients with low haemoglobin levels had a higher mortality (10% vs 1.8%) and major complication rate (20% vs 8.9%). These data are not statistically significant. The incidence of minor complications did not differ in the two groups (30% vs 26.3%).

**Site of colostomy:** Minor and major complication rate, as well as death rate was similar after closure of caecum, transverse and left colostomies (31%, 25%, 31% for minor complications; 15.8%, 12.8%, 10.3% for major complications, and 5%, 2.6% and 6.9% for deaths, respectively).

**Underlying disease:** The most frequent underlying pathology was cancer of the colon and rectum (72%), and all deaths occurred in this group. Two more major complications were recorded among patients operated for colorectal cancer and one in a patient who had an iatrogenic perforation of the sigmoid.

Twenty (32%) of the patients with cancer had minor complications, vs only 2 of the 12 with diverticulitis (16.6%) and 3 (25%) of the others. The difference is not statistically significant.

**Type of anastomosis and suture material:** A two layer suture (catgut + silk) was employed in 32 cases with 3 (9.3%) anastomotic leakages and enterocutaneous fistulae, whereas 5 (9.1%) fistulae occurred among the 55

<table>
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<th>Complications</th>
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<th>Deaths</th>
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<td>2</td>
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<tr>
<td>Intestinal obstruction</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Myocardial insufficiency</td>
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