

# Acceptable results of early closure of loop ileostomy to protect low rectal anastomosis

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## ABSTRACT

**INTRODUCTION:** This was a pilot project performed prior to full implementation of early loop ileostomy closure (within two weeks) following low anterior resection of the rectum in a group of patients selected according to previously recommended criteria for safe, early ileostomy closure.

**MATERIAL AND METHODS:** Retrospective review of medical records. Patients undergoing loop ileostomy closure between December 2009 and October 2010 were analyzed. Data were collected on demographics, tumour characteristics, information about the perioperative period, operative details, postoperative complications, closure operation, the postoperative closure period and follow-up.

**RESULTS:** Eleven patients were included (men, n = 4) with a median age of 58 years (range 47-79 years). Ileostomy closure was performed at a median of ten days (range 8-13 days) following rectum resection. The median hospital stay was 16 days (range 14-24 days). No re-laparotomies were performed. One patient developed a pelvic pus collection ten days post closure and was treated conservatively. One patient died 32 days after closure for reasons not related to surgery.

**CONCLUSIONS:** The results of this small retrospective study show morbidity rates associated with early loop ileostomy closure that are probably acceptable. Safety, feasibility, timing and selection criteria should be clarified in large randomized studies.

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Low rectal anastomosis is associated with a significant risk of leakage [1]. This is a serious complication associated with high morbidity and mortality from peritonitis and sepsis [2], and it is negatively associated with long-term survival [3]. Creating a temporary defunctioning loop ileostomy reduces the septic complications of and the rate of clinically relevant anastomotic leakages requiring laparotomy [4-6].

However, a stoma involves more patient morbidity because of its complications, like sepsis from wound infection, and because of intestinal obstruction and reduced quality of life [7]. Laparotomy rates increase due to the need for stoma closure or treatment of par-

astomal hernias or intestinal obstruction. Additionally, the longer the stoma persists, the more minor complications occur, including retraction, parastomal hernia, leakage around the stoma bag, fistula and skin excoriation [8-11].

Ileostomy closure is traditionally done 2-3 months after the primary operation (delayed closure) to allow for recovery. This period is long enough for the patient to experience morbidity and discomfort associated with the above-mentioned complications [12, 13]. The administration of adjuvant chemotherapy can further delay closure [14]. Higher rates of morbidity associated with closure were reported in patients who had received adjuvant chemotherapy than in patients who had received no adjuvant chemotherapy [15].

There is evidence that early loop ileostomy closure – when done in selected patients – is feasible and that the rate of postoperative complications is reduced compared with delayed closure [16]. The procedure was recommended in a recent literature review [17]. Early and delayed closures are probably associated with the same levels of mortality and re-laparotomy and with the same duration of total hospital stay and duration of surgery [18]. Early closure can be performed during the same hospital admission as the primary operation, which will reduce the patient's physical and psychological discomfort. The present study reports the experience with early loop ileostomy closure from a single surgical centre. We introduced the procedure at our Department and selected patients in conformity with the criteria that are applied in the literature [16].

## MATERIAL AND METHODS

This is a retrospective study. Medical records of patients undergoing early (within two weeks) loop ileostomy closure were reviewed and the following data were collected: demographics, tumour information, perioperative data, postoperative complications, closure operation and postoperative period, re-admissions. Data on past hospital contacts were recorded as well as symptoms or clinical signs related to any of the two operations were concerned.

Following rectum resection, a loop ileostomy was fashioned if the anastomosis was five centimeters or

## ORIGINAL ARTICLE

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less from the anal verge or if total mesorectal excision was performed. Patients were booked for early stoma closure if the following criteria were fulfilled: absence of local or systemic infection, uneventful recovery from the primary operation, presence of normal bowel function through the stoma, and when the anastomotic integrity at around the 7th postoperative day was verified by radiological examination using water-soluble contrast media. This was done rectally by carefully inserting a Foley's catheter to a position just below the anastomotic line and without insufflating the catheter balloon. A colorectal surgeon was always present during this manoeuvre.

 TABLE 1

Patient characteristics.

Male:female, n	4:7
Age, years, median (range)	58 (47-79)
Body mass index, kg/m <sup>2</sup> , median (range)	26 (21-38)
<i>ASA score, n</i>	
1	6
2	4
3	1
Smoking, n	2
Alcohol <sup>a</sup> , n	1
Preoperative radiochemotherapy, n	2
Tumor distance from anal verge, cm, median (range)	11 (7-15)
<i>TNM classification, n</i>	
T2	6
T3	3
T4	2
N0	6
N1	2
N2	3
M0	11

ASA = American Society of Anesthesiologists Physical Status;  
TNM = tumour, lymph nodes, metastasis.

a) Weekly consumption above the maximum weekly consumption (up to 14 units of alcohol for women and up to 21 units alcohol for men) recommended by the Danish Board of Health.

 TABLE 2

Perioperative characteristics.

<i>Rectum resection</i>	
Blood loss, ml, median (range)	50 (50-500)
Anastomosis, end-end:side-end, n	4:7
Anastomotic height, cm, median (range)	5 (4-5)
Operating time, min, median (range)	210 (120-27)
Open:laparoscopic, n	3:8
<i>Closure operation</i>	
Operating time, min, median (range)	60 (25-85)
Anastomosis, n	
end-end, hand sewn, one layer	3
side-side, linear stapler	7
end-end, hand sewn, two layers	1

Antero-posterior and lateral images were obtained. Patients who had radiological signs of leakage were excluded from early closure. Patients could be temporarily discharged (leave) while waiting for closure surgery if their general condition allowed it. All closures were done in general anaesthesia. Perioperative broad-spectrum antibiotic prophylaxis was administered to all patients in connection with anaesthesia induction. Bowel continuity was re-established by using either a side-side stapler device or a hand-sewn technique, using an absorbable suture. The wound was closed in two layers. Patients were discharged after their bowel function had returned and when no signs of immediate complications were found.

*Trial registration:* not relevant.

## RESULTS

From December 2009 to October 2010, a total of 57 patients were operated for cancer of the rectum. In 20 patients, a low anastomosis (less than five centimeters from the anal verge) was performed and a protective loop ileostomy was fashioned. Nine patients were excluded from early ileostomy closure for the following reasons: Anastomotic leakage in six patients demonstrated during radiological examination at around the 7th postoperative day (the leakage was subclinical; all were treated conservatively), prolonged paralytic ileus in two patients and acute renal failure in one patient. Eleven patients underwent early stoma closure. Demographic data are shown in **Table 1**. The perioperative characteristics for both the primary and the closure operations are shown in **Table 2**.

Preoperative radiochemotherapy was administered in two patients, both with T4 mid-rectal cancer.

Anastomotic integrity was checked radiologically at a median of seven days (range 6-11) after the primary operation. Closure was performed at a median of ten days (range 8-13) after the primary operation (a median of three days from the contrast examination, range 1-4). Ten closures were done by surgical consultants (90%) and one by a surgical resident under supervision of a consultant.

Bowel function returned at a median of three days (range 1-9 days) after closure; patients were discharged after a median of four days (range 2-12 days). The median total hospital stay from the primary operation to discharge after closure was 16 days (range 14-24 days). All patients followed fast track surgery, although patients remained at the hospital, usually for practical reasons, between the two operations despite of being ready for discharge before the closure operation. The patient with the longest admission period (24 days) was discharged 12 days after the closure operation because

of paralytic ileus. One patient went home for a leave between the two operations.

No major complications occurred following the primary operation. No patients were re-operated for complications after either procedure.

Six patients received adjuvant chemotherapy: stage III (5), poorly differentiated adenocarcinoma stage II (1). Adjuvant chemotherapy started at a median of 18 days after discharge (range 8-36 days).

One patient was re-admitted ten days after discharge from the hospital because of a fever. A pelvic collection of pus was verified by computerized tomography and was drained transrectally. This patient had received preoperative radiochemotherapy. The other patient in this series, who also had received preoperative radiochemotherapy, had an uneventful recovery with no early postoperative complications.

The median follow up time was 169 days (range 2-324 days). One patient died five days after the initiation of adjuvant chemotherapy (32 days after closure operation) for reasons unrelated to surgery or adjuvant chemotherapy.

## DISCUSSION

A literature review recently showed that there is some evidence in support of early closure of loop ileostomy (within two weeks) following resection of the rectum [17]. The review bases its conclusion on a single randomized trial and a number of retrospective studies which included a small number of patients. Patients in the present study were selected according to recommendations made in the literature.

The total hospital stay in the present study was long, but probably no longer than the sum of the two separate hospital admission periods seen in standard delayed closure. It is possible, that the hospital stay may be shortened by subtracting the period of leave in those cases where a leave was allowed. The length of hospital stay in the present study does, however, match that reported in other studies [16]. At our department, patients were booked for closure operation on the acute operations schedule. This delayed the closure operation, sometimes by several days due to weekends or to a busy acute schedule. This is obvious from the length of time between the radiological contrast examination and closure operation, as the decision of closure was taken as soon as the anastomotic integrity had been verified. Patients in this series were discharged after full bowel function had been restored, which delayed discharge after the closure operation. Admission length could have been reduced by discharging patients 24 hours after closure and by not waiting for bowel function to be restored; this would have probably not have resulted in re-admissions [19].



Loop ileostomy.

Closure was planned as soon as possible after the anastomotic integrity had been verified. Several factors determine the timing of the radiological examination and closure operation (around 7th postoperative day and around 10th-14th postoperative days, respectively): First, it is necessary to await the return of normal bowel function through the ileostomy, as the anastomosis of the small bowel will otherwise be performed on a dilated bowel which involves an increased risk of leakage. Second, the rectal anastomosis should be allowed to heal. Third, closure should preferably be performed no later than after two weeks because of the risk of formation of thick adhesions.

In patients who received adjuvant chemotherapy, treatment was started within a relatively short period after their discharge following the closure operation. These patients would otherwise have suffered additional morbidity of having a stoma while receiving adjuvant chemotherapy and closure would probably have been delayed for several months. No complications occurred in this subgroup of patients. Complications, on the other hand, would have delayed initiation of the adjuvant chemotherapy (which might then have been without the desired effect). At our institution, selection of potential candidates for adjuvant chemotherapy was not possible before closure because pathology reports are usually not available until about 14 days after primary surgery at which time closure had already been performed. The principle of early closure in patients requiring adjuvant chemotherapy needs to be clarified and the benefits need to be weighed against the risks of complications.

The administration of preoperative radiochemotherapy is a risk factor for anastomotic leakage [20]. One patient in this series, who had received preoperative radiochemotherapy, suffered an anastomotic leakage even if it could not be demonstrated radiologically

at the pre-closure contrast examination. The safety of early closure in this patient category needs to be assessed further.

Early loop ileostomy closure could not be done in nine patients because of complications following resection of the rectum. However, patients who developed anastomotic leakage had no clinical signs and leakage was diagnosed radiologically. This is interesting considering that in many cases the leakage would have went unnoticed if no routine radiological examination had been performed. Our technique for performing the contrast examination involved a more gentle instrumentation, although, theoretically, performing the examination could be traumatic. Some authors have recommended that the contrast examination be done through the efferent loop of the ileostomy [16].

The limitations of this study relate mainly to the small number of patients and the retrospective nature of the study. The results of our study should therefore be interpreted with caution. Nevertheless, this study confirms previous evidence in the sense that the rate of morbidity associated with early loop ileostomy closure lies within a range that may be considered acceptable. We have not analyzed the group of patients in whom leakage could be demonstrated radiologically, but no clinical or biochemical signs of leakage were present. Such analysis could have yielded some information about the sensitivity and reliability of the contrast examination. Nor have we analyzed closure in this group (delayed closure), which could have given us a control group concerning the perioperative complications. Patients booked for early stoma closure should be selected. They should have normal stoma function, no signs of local or systemic infection, and preferably not be on steroids. The anastomotic integrity should be confirmed by a water-soluble contrast media around the 7th postoperative day. To overcome the logistics of scheduling the closure operation, it should probably be scheduled at the time of the primary operation.

## CONCLUSIONS

This retrospective study of a small number of patients shows that the morbidity associated with early loop ileostomy closure is probably acceptable. Caution is needed in patients who have received preoperative radiochemotherapy. Large prospective trials are needed to clarify the selection criteria, timing of early closure, safety, feasibility and advantages of early over delayed closure.

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**CONFLICTS OF INTEREST:** none

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