

Closing a temporary ileostomy within two weeks

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ABSTRACT

Temporary ileostomy is frequently constructed to relieve a rectal anastomosis and avoid peritonitis if the anastomosis is leaking. Ostomy is a burden for both the patient and society and early closure is therefore desirable to counteract increased morbidity. Several prospective studies and a single randomized controlled trial have shown that closure in less than two weeks was associated with lower or equal morbidity compared with later closure. Thus, current data support early closure of temporary ileostomy performed to cover rectal anastomosis in routine clinical practice.

In surgical treatment of rectal cancer, resection of the rectum is most frequently achieved by primary anastomosis. A temporary covering ileostomy is constructed, especially in low rectal anastomoses, to reduce the number of serious anastomotic leakages which are associated with high levels of morbidity and mortality [1-6]. Stoma surgery is associated with high costs for patients and society alike. Patients experience a reduced quality of life, due among others to feelings of physical and mental restrictions and debilitating nuisances [7-13]. Stoma is associated with morbidity in the form of skin irritation, diarrhoea, prolapse, retraction, parastomal hernia, ileus, etc. [2, 9, 14-18], and sometimes increased salt and fluid loss [9, 13, 15, 19, 20]. Ostomies are socio-economically expensive because they require training in ostomy care, multiple hospitalizations and contacts to general practitioners and hospital clinics. In some cases, such procedures also involve costs in connection with sick leave [2, 10]. The literature is in much disarray over the optimal stoma reversal time

[15, 21-23]. The purpose of this article is to review extant literature to identify how early ileostomies may be safely closed (see **Figure 1**).

MATERIAL AND METHODS

This review is based on a Pubmed search on the following terms: *colorectal cancer, ileostomy, closure time, early closure*. In addition to these queries, the references of the relevant articles were studied and relevant articles were read. Only articles on human treatment published between 1966 and 2009 in Danish or English were included.

STOMA-RELATED COMPLICATIONS

Several studies have described stoma-related complications, which are defined as complications occurring while the patient has an ileostomy. The complications described include leakage around the stoma, parastomal hernia, prolapse, retraction, peristomal dermatitis and peristomal fistula [9, 13, 16, 20, 22, 24].

A French prospective randomized study showed a clear predominance of stoma-related complications in patients whose stoma was closed after two months (control group) compared with those whose stoma was closed after only eight days (intervention group). Thus, late closure entailed complications in 12% of the patients, while only 1% of early closure patients experienced complications [22]. A prospective study from 2005 showed that the number of parastomal hernias, prolapses and skin irritations increased from the 10-day-follow-up to the 3-month-follow-up and again to the 2-year-follow-up. The same applied to general ostomy nuisances such as leakages and the need for frequent emptying [13]. The trial included 408 patients who were followed for a period of two years from their primary operation. The trial focused on ostomy-related complications. In another study, 42% of the patients experienced stoma-related complications [2]. The study was a retrospective study in which it was noted how long after construction of the stoma patients developed complications. The study showed that the longer the patients waited, the higher their risk of developing complications. After two weeks, only 6% of the patients had complications, but after eight weeks, 30% had developed complications [2].

Few other studies have described stoma-related

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 FIGURE 1

An ileostomy.



complications and only a few of those have described their development over time. The proportion of patients who develop these complications ranges from 0 to 94% [9, 25]. It would therefore be associated with a high level of uncertainty to conclude anything about the incidence of these types of complications.

COMPLICATIONS AFTER CLOSING THAT REQUIRES REOPERATION

There is much disparity in the literature concerning the proportion of patients who are reoperated following closure of a temporary ileostomy. Some studies report no such cases [2, 20, 26-27], while others report as many as 7-9% [15-16] (Figure 2).

The aforementioned French study, which was a prospective randomized comparison of late closure (66 days) with early closure (eight days), showed that the group whose stoma was closed early counted more patients who developed stenosis requiring reoperation, whereas the group with late closure had other indications for reoperation, such as lesion of the urethra and the intestines [22]. The total number of reoperations in the two groups was the same (8%). A review of the Danish national database for colorectal cancer from 2004, which included patients who had a temporary ileostomy from 1994 to 1999, showed that 52% of those who subsequently developed leakage of the anastomo-

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Lower stoma-related morbidity.

Less postoperative complications.

No difference in the number of reoperations.

No increased mortality.

sis were reoperated [28]. The study did not describe how long the patients had their stomas before they were closed, so we cannot assess the effect of closing time in the present study. In a Danish retrospective study from 2005 with 189 patients, 32 (18%) were reoperated and had a new stoma [31]. Reoperation was typically performed due to anastomosis leakage after the ileostomy had been closed. The study showed that inflammatory bowel disease was a particular risk factor for reoperation with a new ostomy. The median closing time was ten days (range 3-258).

MINOR COMPLICATIONS AFTER CLOSING THE ILEOSTOMY

Minor complications are defined as complications directly related to the anastomosis which occur after the stoma has been closed but do not require reoperation. Many different types of minor complications are described in the literature, and the authors are not unanimous in their distinction between minor complications and the inconveniences that should be expected following an ostomy. In the literature such minor complications include ileus, sepsis and abscess. Almost all studies describe minor complications, but the proportion of patients who have complications in the individual studies varies from 4-5% [32, 33] to 30% [17, 31] (Figure 3). One study described that after two months almost half of the patients (48%) had minor complications after closing of the stoma [22].

The French prospective randomized study showed a significantly larger number of complications when the ostomy was closed after two months (control group) than when it was closed after only eight days (intervention group), 48% and 34%, respectively [22]. Both figures are quite high compared with those reported in other studies, but since it is a prospective study focusing on postoperative complications, the authors probably found more complications than would have been found in retrospective studies. Complications in the form of ileus, wound infection and medical problems stood out as statistically significant frequent complications in the control group (p-values were 0.002, 0.007 and 0.021, respectively).

Another two prospective studies showed that it is

FIGURE 2

Proportion of reoperations compared with closing time in days. Data were collected from retrospective and prospective studies, randomized and non-randomized. Every dot represents a published study.

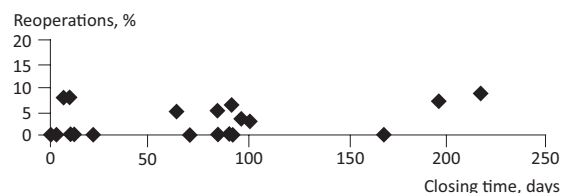
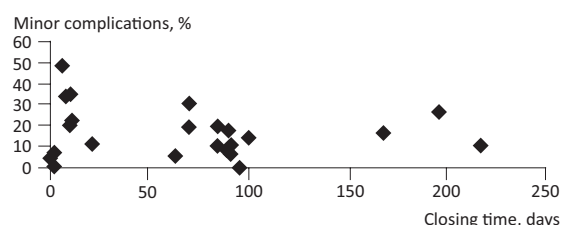


FIGURE 3

Proportion of minor complications compared with closing time in days. Data were collected from retrospective and prospective studies, randomized and non-randomized. Every dot represents a published study.



possible to close the stoma on day ten in selected patients. The criteria for early closure were that the patient was overall in good physical condition, did not receive steroids and had not developed wound infection or sepsis after stoma construction. Furthermore, included patients showed no radiological signs of leakage after radiological examination with aqueous contrast. Neither of these studies showed an increase in morbidity with early closure, except for a few abscesses which responded to conservative treatment [21, 31]. Both studies were small, comprising 14 and 15 patients, respectively, but both were prospective and focused on complications.

A prospective uncontrolled Dutch study considered the possibility of returning the stoma after 11 days [28]. A total of 18 patients had their stoma closed after 7-21 days (the median was 11 days) and 22% of these had complications. A retrospective study from 2006 [23] showed that by returning the stoma after more than 60 days, the risk of complications decreased significantly. The authors explained this by reference to the extra time patients had spent recovering after the primary operation, and the extended period during which post-operative oedema could recede. The authors also noted that protracted waiting raises the risk of complications [23]. The authors' conclusion was based on the average closing time being significantly shorter in patients who had complications than in patients who had no complications. Consequently the article does not reveal if there were patients with early closure who had few or no complications, or if some of those with late closure had many complications.

No prospective controlled trials have shown increased morbidity with early closure compared with later closure. In the studies which have used early closure, i.e. within two weeks, the rates of minor complications vary between 20% and 34% [22, 31]. Studies with a longer closing time report rates of minor complications varying from no complications [25] to 48% among patients with complications [22]. Most studies, however, report rates somewhere in-between [2, 30, 32]. Overall, the risk of developing minor complications is considered not to be higher in early closure than in late closure of the ileostomy (Figure 3).

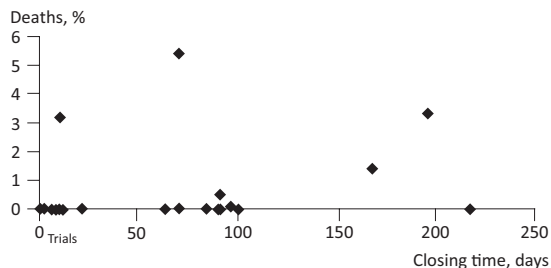
MORTALITY

Very few studies of ostomy closure describe death among their patients. Many of the patients who died after having their stoma closed did not die as a direct consequence of the stoma closure, but because of their primary illness or general weakness. For example, some died due to progression of malignancy or postoperative myocardial infarction [11, 29].

In a study from 1995, the authors retrospectively

 **FIGURE 4**

Proportion of deaths compared with closing time in days. Data were collected from retrospective and prospective studies, randomized and non-randomized. Every dot represents a published study.



investigated long-term survival in patients with colorectal cancer and a temporary stoma. The study showed a shorter survival in patients who had their stoma closed earlier than three months after construction compared with those who had the stoma closed later [33].

Generally, the mortality associated with the closing of temporary ileostomies is low, regardless of closing time. The highest mortality was found in a prospective study from 2005 where the overall mortality associated with the closing of ileostomies was 5%. They reported two deaths, one due to leakage with subsequent peritonitis and the other due to respiratory insufficiency because of lung metastases [9] (Figure 4). Only one of the studies describing closure within two weeks reported deaths. This retrospective study reported a mortality of 3% [29].

TIMING OF THE CLOSURE

In the articles forming the basis of the present review, early closure was performed between 8 and 11 days after construction of the stoma [21, 22, 26, 30]. We have therefore divided the articles into closing before and after two weeks. In practice, early closure will probably be performed after approximately ten days with a window of 2-3 days on each side, to take into account any individual variation, weekends, etc. If the patient is ready for discharge before he/she can be offered closing, he/she may go home on leave. During the leave, the patient is responsible for emptying the bag him- or herself, whereas changing the bag and/or plate can be done at the hospital or by a home nurse.

DISCUSSION

Very few studies have described a link between closing time and morbidity. Only one study is a prospective randomized trial, and it clearly showed a higher incidence of stoma-related morbidity and a higher rate of minor postoperative complications in the group where the stoma was closed after about two months than in the

 TABLE 1

Studies on closing of temporary ileostomies.

Reference	Publica- tion year	Type	Patients, n	Days to closing (average, range)	Stoma- related compli- cations, n (%)	Compli- cations requiring reoperation, n (%)	Minor compli- cations n (%)	Deaths, n (%)	Hospital stay, days (average, range)	Operation time, minutes (average, range)
<i>Early closing (< 14 days)</i>										
<i>Alves et al [22]</i>	2008	Pr, Ra	95	8 (8-10)	1 (1)	8 (8)	32 (34)	0	16 (6-59)	94 (32-142)
<i>Jordi-Galais et al [31]</i>	2003	Pr	15	10 (9-11)		0	3 (20)	0	12 (7-17)	
<i>Menegaux et al [21]</i>	2002	Pr	14	10		0	2 (20)	0	24 (18-29)	
<i>Bakx et al [26]</i>	2003	Pr	18	11 (7-21)		0	4 (22)	0		
<i>Medium/normal closing (14-100 days)</i>										
<i>Tang et al [3]</i>	2003	Pr, Ra	46	21	10 (2)	0	5 (11)	0		33 (10-80)
<i>Moran [25]</i>	1997	Pr	6	42 (minimum)	0	0	0	0	3	74 (65-83)
<i>Lewis et al [30]</i>	1990	Re	40	63 (35-371)		2 (5)	2 (5)	0		
<i>Alves et al [22]</i>	2008	Pr, Ra	91	66 (62-69)	11 (12)	7 (8)	44 (48)	0	18 (9-262)	95 (33-142)
<i>Gooszen et al [9]</i>	1998	Pr, Ra	37	70 (63-84)	30 (94)	0	6 (19)	2 (5)		
<i>Winslet et al [17]</i>	1991	Pr	34	70 (2-154)	14 (41)	0	10 (30)	0		
<i>Jordi-Galais et al [31]</i>	2003	Pr	24	80 (54-106)		0	1 (4)	0	13 (3-23)	
<i>Senapati et al [18]</i>	1993	Re	263	84	17 (6)	14 (5)	51 (19)	0		
<i>Menegaux et al [21]</i>	2002	Pr	22	84 (56-168)		0	2 (10)	0	36 (14-84)	
<i>van de Pavoordt et al [36]</i>	1987	Re	293	90 (14-1800)		0	50 (17)	0		
<i>Walker & Bülow [27]</i>	2008	Pr	178	90 (60-390)		1 (0)	1 (0)	0		
<i>Hallböök et al [15]</i>	2002	Re	214	91 (42-490)		14 (7)	14 (7)	1 (1)		
<i>Rathnayake et al [20]</i>	2008	Pr	115	91 (7-420)	27 (23)	0	12 (10)			
<i>Lahat et al [32]</i>	2005	Pr	40	92 (64-180)		0	6 (7)	0	6 (5-11)	
<i>Late closing (> 100 days)</i>										
<i>Bakx et al [2]</i>	2004	Re	69	168 (14-868)	32 (42)	0	11 (16)	1 (1)	7 (4-51)	59 (35-110)
<i>Carlsen & Bergan [16]</i>	1999	Re	100	217	11 (11)	9 (9)	10 (10)	0	13	

Pr = prospective; Ra = randomized (only the study by *Alves et al [22]* looked specifically at closing time – the rest of the randomized trials had other focuses); Re = retrospective.

group where the stoma was closed after less than two weeks. The study showed no difference in mortality or in the number of complications requiring reoperation [22]. Nor were the total hospital stay and the duration of the closing operation different in the two groups.

The inclusion and exclusion criteria of the four prospective studies of early closure were virtually identical [21, 22, 26, 31]. Patients were not to have symptoms of active infection or organ failure and they had to be in a good physical condition. Furthermore, they were not to show radiological signs of leakage of the anastomosis verified with aqueous contrast examination. In one non-randomized study, patients were also excluded if they received steroids [21].

Other studies of stoma closure have demonstrated other risk factors for postoperative complications, especially leakage. These include, among others, smoking, male gender, and age over 68 years [23, 34, 35].

Based on all the studies describing the time of closure of the ileostomy, including those that provide evidence of a lower class, closure of an ileostomy less than two weeks after construction is not associated with an increased morbidity or mortality. Only one retrospective study reported an increase in morbidity associated

with closing after 10 weeks as compared with 15 weeks [23] (Figures 2, 3 & 4, **Table 1**).

By closing the temporary stoma in less than two weeks, we can potentially construct and close the stoma during the same period of hospitalization. This would yield economic and administrative benefits to the department and also personal benefits for patients. Two-week closure periods would also make it possible for patients to return home on leave until the day of stoma closure, i.e. in cases where their condition allows it.

The present article has focused primarily on temporary loop ileostomies constructed in low anterior resection for rectal cancer. The studies forming the basis of this review have only included open surgery, but the conclusion is probably also valid for laparoscopic rectal resection, although there is no data in the literature to support this.

CONCLUSION

This review recommends closure of a temporary stoma in less than two weeks. The conclusion rests on a large prospective randomized study and several smaller prospective trials. Only a few retrospective studies have recommended the opposite, and these studies were

performed in selected patients, i.e. patients who the authors believe were in a physical condition to withstand early closure. The conclusion is based on a relatively small number of studies, and a large prospective controlled study, preferably a multicenter study, is therefore warranted. If clinicians will adopt early closure of ileostomies on the basis of the literature, inclusion criteria for such a treatment strategy should be established. They could, among others, include absence of infection and previous establishment of non-leaking anastomosis by computed tomography with aqueous rectal contrast medium.

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CONFLICTS OF INTEREST: None

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