

Research Article

Causes For the Delay of Ileostomy Closure in Rectal Cancer Surgery

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Abstract

Rectal cancer represents a challenge for the general surgeon as patients' quality of life after the management of the neoplasm is starting to become more and more important. Our review is focused on loop ileostomies and the reasons why their closure might be delayed. We have tried to gather these reasons all together from our experience and from the literature in order to understand whether there are any aspects that can be improved. After a thorough search through different scientific databases we managed to include a total of 29 articles in our research and the information gathered has led to the conclusions of this narrative review. There are many reasons why the closure of an ileostomy might be delayed. While some of them are related to the patient and cannot be controlled or prevented (age, comorbidities), most of the factors that can interfere are preventable (adjuvant therapy, postoperative complications, patient's wish).

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1. Introduction

A need for balance between oncological safety and quality of life have been more and more brought to practitioner's attention, so, preserving nervous elements while dissecting the mesorectum [1] as well as identifying essential techniques in order to preserve digestive and urogenital functions became a strong desideratum today [2, 3].

The implementation of stomas in order to temporary divert the natural flow of intestinal contents is a relatively new technique in the history of rectal surgery. The first attempts of creating a stoma have taken place before the 1700s [4], but had poor results and high mortality and morbidity rates due to the absence of any asepsis and antisepsis measures. The total lack of anesthesia was also an impediment in developing safer techniques. The first ileostomies were performed at the end of the 19th century mostly for patients with obstructing lesions in the colon. Unfortunately, the attempts were again not very successful and had high morbidity and mortality rates. The early procedure consisted of bringing several centimeters of intestine through the incision and securing them outside the abdominal cavity using a metal clamp in the hope of orchestrating

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a “self-maturation” process [5]. There are two main types of ileostomies depending on whether reattachment of the loop to the remaining portion of the intestine is intended or not: the loop ileostomy and the end ileostomy. A loop ileostomy is used to protect a distal anastomosis in order to reduce the risk of an anastomotic leakage due to stool pressing on the two stumps of the bowel. This type of ileostomy is a temporary one as it can and will be reversed at a later date, usually after a period of 3 to 6 months. A meta-analysis showed a big variability of the number of days since the moment of admission until the moment of the ileostomy’s closure, with an interval between 10 and 1830 days [6]. For various reasons, in 4 out of 5 patients the ileostomy is closed after a longer period of time than first intended [7], and in approximately 1 out of 5 patients to whom the stoma was planned as temporary it becomes permanent in the end [6–8].

The importance of this problem of closure moment of an ileostomy is currently addressed in the multicenter study CLOSE-IT, which intends to identify the optimal moment as well as the causes that might delay it [10].

Suggestions that a delay in the closure of an ileostomy can increase the incidence of LARS (low anterior resection syndrome) have also been made in the last years. This idea came up as more and more patients who underwent a low anterior resection for rectal cancer have reported suffering a poor bowel function after the surgical closure of a loop ileostomy. LARS is a well-known factor that can reduce the quality of life. A recent study reported that a delay of more than 6 months in the closure of an ileostomy was associated with a 3.7x increased risk of major bowel dysfunction afterwards [10].

Our review is focused on loop ileostomies and the reasons why their closure might be delayed. We have tried to gather these reasons all together from the literature in order to understand whether there are any aspects which can be improved. Identifying, understanding and successfully solving any problems that can cause a delay in the restoration of bowel continuity will lead to a better outcome and, consequently, a better quality of life for patients.

2. Methods

A thorough search through different scientific databases – Scopus, PubMed, Web of Science, using the following keywords formula: (*“ileostomy” OR “temporary stoma”*) AND (*“rectal cancer” OR “low anterior resection”*) was performed. After careful consideration, articles that were most relevant to the subject of our review – reasons for a delayed closure of an ileostomy - were included. In the end we managed to include a total of 29 articles in our research and the information gathered has led to the

conclusions of this narrative review. We considered a delay in closure of the ileostomy, postponing this procedure relative to the time initially proposed. The limitation of the study is that there is little data available regarding the factors that could lead to a delay of ileostomy closure. Those few studies that have underlined their existence have been criticized for analyzing heterogeneous patient populations, benign as well as malignant diseases, elective or emergent procedures, including different types of stomas in the same study, as well as other reasons [11].

3. Results

By analyzing the identified articles, we could systematize some of the most common causes that could represent grounds for further research and a better understanding of the management of loop ileostomies:

3.1. Patients' age

The analysis by Taylor et. al. [12] indicates a delay in the closure of the ileostomy for patients older than 70, as well as a high rate of becoming permanent for patients in the same age group. Most results show a slight increase of the period for ileostomy closure and a bigger percent of permanent stomas in elderly patients, without statistical significance [9], [12]–[14] but Kye et. al. conclude in their study that the closure of diverting stoma may be shortened even in elderly patients [15].

3.2. Adjuvant chemotherapy

Diverting loop ileostomies are hard to manage for both the patient and the medical system as they can increase the complication rates of adjuvant chemotherapy. For this reason, most centers choose to restore the continuity of the gastrointestinal tract after more than one month following the end of the adjuvant chemotherapy, thus increasing the time until the closure. Adjusting both chemotherapy timings and dosages, as well as the adequate moments for surgical interventions because of the ileostomy is burdensome for both the patient (increasing mortality and morbidity and decreasing the quality of life) and the health system (the longer the patient is hospitalized, the costlier it will be for the health system) [16]. In their study, Waterland P. et al. had 22 out of 63 (35%) patients to whom they needed to postpone the closure of their ileostomy (by more than 6 months) due to adjuvant chemotherapy [17]. In a study by Brown S. R.

et al., the authors compared the outcomes after closing the ileostomy either before or after adjuvant chemotherapy. Their results showed that the overall survival was slightly lower in group of patients with ileostomy closure after chemotherapy versus the group with closure before chemotherapy, but, without statistical significance. [18].

Flooden et al. show that for 10% of patients in whom the ileostomy was closed later than initially planned, it was because of reasons related to post-operative chemotherapy [7]. Also, David et al. have identified chemotherapy as the factor with the highest correlation with a delay in the restorations of digestive continuation, having an almost double growth rate of this interval[19]. In the research of Vallribera et. al., the closure of the ileostomy was also delayed due to the need for adjuvant treatment [20].

3.3. Postoperative complications linked to the ileostomy

Complication rates specific to loop ileostomies vary between 5.7% to 41% and some of them lead to a need of reoperation, thus delaying the final closure of the stoma. In his article from 2008, Brian RK has described early postoperative complications that can occur and influence not only the morbidity and mortality of the patient, but also the time between the implementation and closure of a stoma. He analyzed both colostomies and ileostomies stating that the data regarding individual complication rates is conflicting. The factors described in his article are: improper stoma site selection, vascular compromise, retraction, peristomal skin irritation, peristomal infection, abscess and fistula formation, acute parastomal hernia/bowel obstruction and technical errors (such as maturation of the wrong limb of intestine or improper maturation techniques) [21]. Vijayraj et al. report complications such as peristomal skin irritations, necrosis, retraction and wound infections in patients with loop ileostomies [22].

3.4. Postsurgical complications in other places than the ileostomy site

The EARLY (Early Closure of a Temporary Ileostomy in Patients With Rectal Cancer) study compared morbidity and mortality associated with early closure (8-13 days) versus standard procedure of closing the stoma after more than 12 weeks since its implementation. Only patients who did not have any postoperative complications (such as infections or anastomotic leakage) were included in the study. Out of 418 patients assessed for eligibility, 37 (8.85%) patients were excluded due to a suspected anastomotic leakage, thus cancelling the chance for them to have an early closure of their ileostomy [23].

Waterlandet al reported that for 21 out of 63 patients (21%) they needed to postpone the closure of their ileostomy due to an anastomotic leak following the initial operation [17]. Another study by Haksal M. et al. stated that an anastomotic leak was the most common reason for the failure of stoma takedown in their series. Other relevant postoperative complications in their study were surgical site infection and evisceration [11]. Matthiessen et al. reported that for 10.3% of all patients who had a lower anterior resection and a protective ileostomy, the presence of an anastomotic fistula has delayed the reestablishment of the intestinal continuation with up to 50 months [24].

The fear of anastomotic complications, especially for patients with a low anterior resection, is still an important factor taken into account when the decision to postpone the closure of the ileostomy is taken, even in the absence of any clinical and radiological signs[25].

3.5. Other medical/surgical interventions

The same study by Haksal M. et al. stated that three of their patients had additional urinary problems (fistula, nephrostomy and/or urinary incontinence) that needed to be addressed before the closure of the ileostomy due to advanced (clinical T4) initial disease. The closure of their ileostomies was postponed due to a potential need of further medical or surgical treatments [11].

3.6. Comorbidities

David et al. show a statistically significant difference between patients with multiple comorbidities (evaluated using Charlson's Comorbidity Index) and patients without any other associated problems related to the moment of the ileostomy's closure as well as the percentage of ileostomies that remained definitive. Thus, for patients suffering from other comorbidities the percentage of permanenced ileostomies was bigger by 10%, while the average interval before the ileostomy closure grew by 50 days [19].

3.7. Patients' wishes

Sometimes patients (mostly older ones) refuse to return to the hospital for the closure of their ileostomies or postpone the intervention. This is actually mentioned in some studies with a frequency that ranges between 5 and 42% of cases [6, 8].

4. Discussions

A standard period for the closure of an ileostomy of 3 to 6 months is agreed upon by most surgeons who perform ileostomies on a regularly basis. There are no clear indications towards an optimal time of reversal, but recent evidence suggests that an early reversal (as early as two weeks) may be more beneficial for the patient [26]. Despite this, there are cases where it is impossible to rapidly reverse the ileostomy because of different factors that can intervene.

The closure of the ileostomy itself, usually considered an easy procedure, is sometimes problematic as it may be accompanied by high morbidity and mortality rates in an important number of cases. Different closure techniques, manual/mechanical, with or without resection have been utilized without a statistically significant difference identified related to the complication rate for each one [20]. The only less frequent complication in the case of a closure by resection followed by a mechanical latero-lateral anastomosis, compared to manual anastomosis, was ileus [27]. A prospective study published in 2016 showed that patient associated comorbidities – anemia and obesity – represent risk factors for serious complications that need reoperation, while technique related factors do not have a decisive role [28].

In what concerns the quality of life, a study by Zhen et al. did not find any statistically significant differences between the group of patients who had an early ileostomy closure versus the one that had a delayed one [14].

Regarding the risk of having post-operative complications: gastrointestinal (ileus, wound infections, rectal bleeding, pseudomembranous colitis, intestinal obstructions, anastomotic leaks, intestinal necrosis), renal (urinary tract infections, acute renal failure), respiratory (pneumonia) and general (thromboembolisms, sepsis, evisceration, abscesses), some studies show a higher incidence in patients that had a late closure of their ileostomies [16,28–30], while others show a lower incidence in the same situation [29].

5. Conclusions

There are many reasons why the closure of an ileostomy might be delayed. While some of them are related to the patient and cannot be controlled or prevented (age, comorbidities), most of the factors than can interfere are preventable (adjuvant therapy, postoperative complications, patient's wish). One of the easiest ways to prevent complications is making sure that the conditions for creating an ileostomy are fulfilled

as much as possible: asepsis to reduce the rate of contamination, a good technique and choosing the best spot for the stoma on the patient's abdomen. Reestablishing bowel continuity as soon as after two weeks since the implementation of the stoma is feasible and has been proven advantageous for the patient. Further research is needed and encouraged as ileostomies are used on a large scale worldwide in order to offer patients optimal management with best oncological and functional outcomes.

References

- [1] Ion, D., Stoian, R. V., Păduraru, D. N., et al. (2012). Certitudes and controversy regarding neural elements preservation in total mesorectal excision technique (ETM). *Chirurgia*, vol. 107, pp. 231–236.
- [2] Derakhshani, S., Hoseini, S. V., Asadi, R., et al. (2012). A new technique for pouch making to reduce the chance of leakage and low anterior resection syndrome. *Journal of Medical Hypotheses and Ideas*, vol. 6, no. 1, pp. 16–18.
- [3] Bolocan, A., Stoian, R.V., Ion, D., et al. (2012). Peculiarities of diagnosis and treatment in the polyp-cancer sequence. *Chirurgia*, vol. 107, pp. 231–236.
- [4] Pine, J. and Stevenson, L. (2017). Intestinal stomas. *Surgery*, vol. 35, no. 3, pp. 165–170.
- [5] Doughty, D. B. and Beginning, I. (2008). History of ostomy surgery. *Journal of Wound Ostomy & Continence Nursing*, vol. 35, no. February, pp. 34–38.
- [6] Chow, A., Tilney, H. S., Paraskeva, P., et al. (2009). The morbidity surrounding reversal of defunctioning ileostomies: A systematic review of 48 studies including 6,107 cases. *International Journal of Colorectal Disease*, vol. 24, no. 6, pp. 711–723.
- [7] Floodeen, H., Lindgren, R., and Matthiessen, P. (2013). When are defunctioning stomas in rectal cancer surgery really reversed? Results from a population-based single center experience. *Scandinavian Journal of Surgery*, vol. 102, no. 4, pp. 246–250.
- [8] den Dulk, M., Smit, M., Peeters, K. C., et al. (2007). Articles A multivariate analysis of limiting factors for stoma reversal in patients with rectal cancer entered into the total mesorectal excision (TME) trial: A retrospective study. *Lancet Oncology*, vol. 8, no. 4, pp. 297–303.
- [9] Sier, M. F., Van Gelder, L., Ubbink, D. T., et al. (2015). Factors affecting timing of closure and non-reversal of temporary ileostomies. *International Journal of Colorectal Disease*, vol. 30, pp. 1185–1192.

- [10] Vaughan-Shaw, P., Gash, K., Adams, K., et al. (2018). Protocol for a multicentre, dual prospective and retrospective cohort study investigating timing of ileostomy closure after anterior resection for rectal cancer: The CLOSurE of Ileostomy Timing (CLOSE-IT) study. *BMJ Open*, vol. 8, p. 23305.
- [11] Haksal, M., Okkabaz, N., Atici, A. E., et al. (2017). Fortune of temporary ileostomies in patients treated with laparoscopic low anterior resection for rectal cancer. *Annals of Surgical Treatment and Research*, vol. 92, pp. 35–41.
- [12] Taylor, C. and Varma, S. (2012). Factors affecting closure of a temporary stoma. *Journal of Wound Ostomy & Continence Nursing*, vol. 39, no. 1, pp. 51–57.
- [13] Lindgren, R., Hallböök, O., Rutegård, J., et al. (2011). What is the risk for a permanent stoma after low anterior resection of the rectum for cancer? A six-year follow-up of a multicenter trial. *Diseases of the Colon & Rectum*, vol. 54, no. 1, pp. 41–47.
- [14] Zhen, L., Wang, Y., Zhang, Z., et al. (2017). Effectiveness between early and late temporary ileostomy closure in patients with rectal cancer: A prospective study. *Current Problems in Cancer*, vol. 41, no. 3, pp. 231–240.
- [15] Kye, B.-H., Kim, H.-J., Kim, J.-G., et al. (2014). Is it safe the reversal of a diverting stoma during adjuvant chemotherapy in elderly rectal cancer patients? *International Journal of Surgery*, vol. 12, pp. 1337–1341.
- [16] Kłęk, S., Pisarska, M., Milian-ciesielska, K., et al. (2018). Early closure of the protective ileostomy after rectal resection should become part of the Enhanced Recovery After Surgery (ERAS) protocol: A randomized, prospective, two-center clinical trial. *Wideochir Inne Tech Maloinwazyjne*, vol. 13, no. 4, pp. 435–441. DOI: 10.5114/wiitm.2018.79574
- [17] Waterland, P., Goonetilleke, K., Naumann, D. N., et al. (2015). Defunctioning ileostomy reversal rates and reasons for delayed reversal: Does delay impact on complications of ileostomy reversal? A study of 170 defunctioning ileostomies. *Clinical Medicine & Research*, vol. 7, no. 9, pp. 685–689.
- [18] Brown, S. R., Khan, B., Green, H. J., et al. (2017). Overall survival associated with ileostomy closure in patients with rectal cancer before and after adjuvant therapy. *Ochsner Journal*; vol. 17, no. 4, pp. 328–330.
- [19] David, G. G., Slavin, J. P., Willmott, S., et al. (2010). Loop ileostomy following anterior resection: Is it really temporary? *Colorectal Disease*, vol. 12, no. 5, pp. 428–432.
- [20] Vallribera Valls, F., Villanueva Figueredo, B., Jiménez Gómez, L. M., et al. (2014). Ileostomy closure in a colorectal surgery unit. Comparative Analysis of Different Techniques. *Cirugía Española*, vol. 92, no. 3, pp. 182–187.

- [21] Kann, B. R. (2008). Early stomal complications. *Clinics in Colon and Rectal Surgery*, vol. 21, no. 1, pp. 23–30.
- [22] Patil, V., Vijayakumar, A., and Ajitha, M. B. (2012). Comparison between tube ileostomy and loop ileostomy as a diversion procedure. *ISRN Surgery*, vol. 2012, Article ID 547523.
- [23] Danielsen, A., Park, J., Jansen, J., et al. (2017). Early closure of a temporary ileostomy in patients with rectal cancer. *Annals of Surgery*, vol. 265, no. 2, pp. 284–290.
- [24] Matthiessen, P., Hallböök, O., Rutegård, J., et al. (2007). Defunctioning stoma reduces symptomatic anastomotic leakage after low anterior resection of the rectum for cancer a randomized multicenter trial. *Annals of Surgery*, vol. 246, no. 2, pp. 207–214.
- [25] Li, W. and Ozuner, G. (2017). Does the timing of loop ileostomy closure affect outcome: A case-matched study. *International Journal of Surgery*, vol. 43, pp. 52–55.
- [26] Lee, K. H., Kim, H. O., Kim, J. S., et al. (2018). Prospective study on the safety and feasibility of early ileostomy closure 2 weeks after lower anterior resection for rectal cancer. *Annals of Surgical Treatment and Research*, vol. 96, no. 1, pp. 41–46.
- [27] Luglio, G. (2011). Loop ileostomy reversal after colon and rectal surgery. *The Archives of Surgery*, vol. 146, no. 10, p. 1191.
- [28] Schneider, V., Lee, L. D., Stroux, A., et al. (2016). Risk factors for reoperation after ileostomy reversal - Results from a prospective cohort study. *International Journal of Surgery*, vol. 36, pp. 233–239.
- [29] Rubio-Perez, I., Leon, M., Pastor, D., et al. (2014). Increased postoperative complications after protective ileostomy closure delay: An institutional study. *World Journal of Gastrointestinal Surgery*, vol. 6, no. 9, pp. 169–174.
- [30] Poskus, E., Kildusis, E., Smolskas, E., et al. (2014). Complications after loop ileostomy closure: a retrospective analysis of 132 patients. *Viszeralmedizin*, vol. 30, no. 4, pp. 276–280.
- [31] Nakamura, T., Sato, T., Naito, M., et al. (2017). Risk factors for complications after diverting ileostomy closure in patients who have undergone rectal cancer surgery. *Surgery Today*, vol. 47, no. 10, pp. 1238–1242.