Functional Results in Patients with Coloanal Pouch after Low Anterior Resection of the Rectum

Marco Sailer, Eike Sebastian Debus, Karl-Hermann Fuchs, Arnulf Thiede[1]

Abstract:

Functional results after low anterior resection of the rectum and straight end-to-end coloanal anastomosis are often poor. Patients are frequently troubled by the so called „anterior resection syndrome“ which comprises fecal incontinence, urge, frequency and fragmentation. To investigate the potential functional benefit of a coloanal pouch reconstruction we conducted a prospective study.

Some 42 patients (23 men; median age 65 years [30 to 85]) underwent low anterior resection of the rectum followed by coloanal J-pouch reconstruction. Pouch size was 5 to 7 cm, a temporary stoma was fashioned in 32 patients. Indications for the operation were: 1. rectal cancer n = 38,2. recurrent adenoma n = 2, 3. recto-vaginal fistula n = 1 and 4. severe non-specific proctitis n = 1.

We observed 5 anastomotic leakages of which 2 patients required reoperation. A pelvic abscess was encountered in 3 patients as well as 1 pelvic hematoma. Micturition was impaired in 4 patients. To date 35 patients have completed 12 months follow-up after reversal of the ileostomy. Patients were seen at 3-monthly intervals. Mean stool frequency/day was 3.9 after 3 and 2.2 after 12 months. After 3 months 24 patients (69%) reported complete continence which increased to 86% at 1 year. Nine patients (26%) complained of urge defecation initially, which decreased to 9% after 1 year. Fragmentation was observed in 40% and 20% at 3 and 12 months, respectively.

In conclusion, our initial experience with colonic J-pouch reconstruction shows good functional results.

Key Words: Coloanal J-pouch · Rectal cancer · Functional results

[1] Chirurgische Klinik und Poliklinik (Direktor: Prof. Dr. A. Thiede) der Universität Würzburg, Germany.

Annahme des Manuskripts: 17. 1. 2000

Funktionelle Ergebnisse bei Patienten mit tiefer anteriorer Rektumresektion

Zusammenfassung:

Die funktionellen Resultate nach tiefer anteriorer Rektumresektion sind häufig unbefriedigend. Die betroffenen Patienten klagen über ein mehr oder weniger ausgeprägtes Syndrom, das eine Vielzahl von Symptomen, wie Inkontinenz, imperativen Stuhldrang, Stuhlfragmentation, erhöhte Frequenz u. a., beinhalten kann. Ziel dieser prospektiven Untersuchung war die Evaluierung des koloanalen J-Pouches als Rekonstruktionsmethode nach Rektumresektion.

Bei 42 Patienten (23 männlich, 19 weiblich, Durchschnittsalter 65 [30 bis 85] Jahre) wurden das Rektum tief anterior reseziert und ein koloanaler J-Pouch angelegt. Die Pouch-Größe betrug 5 bis 7 cm, ein temporäres Ileostoma wurde bei 32 Patienten angelegt. Die Indikationen zur Operation waren: 1. Rektumkarzinom n = 38, 2. rezidivierende Adenome n = 2, 3. rektovaginale Fistel n = 1 und 4. schwere nicht spezifische Proktitis n = 1.

Postoperativ beobachteten wir fünf Anastomoseninsuffizienzen, die bei zwei Patienten revidiert werden mußten. Bei drei Patienten kam es zu Abszedierung im kleinen Becken, in einem Fall zu einem pelvinen Hämatom. Blasenentleerungsstörungen traten bei vier Patienten auf. Bei 35 Patienten konnte eine komplette zwölfmonatige Nachbeobachtung nach Ileostomarückverlagerung durchgeführt werden, wobei alle Patienten vierteljährlich evaluiert wurden. Die durchschnittliche Stuhlfrequenz/Tag betrug 3,9 nach drei und 2,2 nach zwölf Monaten. Nach drei Monaten berichteten 24 Patienten (69%) über eine vollständige Kontinenz, was nach einem Jahr auf 86% gestiegen war. Initial klagten neun Patienten (26%) über einen imperativen Stuhldrang, nach einem Jahr waren es lediglich 9%. Stuhlfragmentation beobachteten wir in 40% der Fälle nach drei Monaten und 20% nach zwölf Monaten.

Zusammenfassend zeigten sich mit der Pouch-Rekonstruktion nach tiefer anteriorer Rektumresektion gute funktionelle Ergebnisse.

Schlüsselwörter: Koloanaler J-Pouch · Rektumkarzinom · Funktionelles Resultat

Sphincter saving procedures have become the standard treatment in the surgical approach of cancers situated in the lower and middle third of the rectum. However, functional results following low anterior resection with straight coloanal reconstruction have been disappointing. The so called „anterior resection syndrome" comprises a variety of symptoms, e. g. fecal incontinence, increased stool frequency, stool fragmentation („stooling sessions"), urgency to defecate, perianal skin irritation, and the requirement of specific medication (loperamide etc.). Depending on the severity of the complaints, this often interferes with the daily life of the patients resulting in a reduction of their quality of life. The incidence of early postoperative functional disorders is reported to be as high as 80 to 87% [3].

To compensate for the loss of the rectal reservoir Lazorthes et al. [19] as well as Parc et al. [25] introduced the J-coloanal pouch in 1986. Meanwhile, randomized trials have shown its functional superiority especially within the first months after surgery [8, 24, 26]. In order to investigate postoperative function of the J-pouch

	n	%
Anastomotic leakage	5	12
Pelvic abscess	3	7
Pelvic hematoma	1	2
Urinary retention (> 7 days)	4	10
Cardiopulmonary	3	7
Mortality*	1	2
Total	17	40

*due to myocardial infarction.

Table 1. Postoperative complications.

following low anterior resection of the rectum, we conducted a prospective study.

Patients and Method

Fourty-two patients (23 men, 19 women; median age 65 [30 to 85] years) underwent low anterior resection of the rectum with total mesorectal excision followed by coloanal J-pouch reconstruction. The reservoir was fashioned with a stapling device (GIA 90®, Autosuture, Tönisvorst) resulting in a 5 to 7 cm pouch size. The pouch-anal anastomosis was performed using either a circular stapler (CEEA®, Autosuture, Tönisvorst) (n = 34) or a transanal hand-suture (n = 8) with an absorbable, monofilament thread (4/0 Maxon®, Braun-Dexon, Spangenberg). A temporary ileostomy was fashioned in 32 patients which was reversed after a median of 86 (41 to 152) days.

Indications for the operation were: 1. rectal cancer n = 38, 2. recurrent adenoma with severe dysplasia n = 2, 3. rectovaginal fistula following radiation of a gynecologic tumur n = 1, and 4. severe non-specific proctitis refractory to conservative treatment n = 1. Seven patients (17%) received postoperative radio-/chemotherapy due to advanced disease.

Thirty-five patients completed 12 months of follow-up after the operation or after the reversal of the ileostomy, respectively. Patients were seen at 3-monthly intervals, and the results recorded using a thorough history and a standardized anorectal function scoring system [13].

Results

There were no technical problems related to pouch construction. Early postoperative complications were encountered in 40% and are listed in Table 1. One patient died of myocardial infarction leading to a mortality of 2%.

Mean stool frequency/day was 3.9 after 3 and 2.2 after 12 months, respectively (Figure 1). After 3 months, 24 patients (69%) reported complete continence which gradually increased to 86% at 1 year (Figure 2). Five patients (12%), of which 3 had received adjuvant treatment, continued to complain of partial incontinence to flatus and occasionally to liquid stool after 1 year of follow-up. One female patient was deemed completely incontinent after thorough evaluation (clinical examination, anal endosonography, anorectal manometry, defecography), so that her ileostomy was never reversed. 26% of the patients (n = 9) complained of urgency initially, which decreased to 9% 1 year after surgery (Figure 3). Stool fragmentation was observed in 40% and 20% at 3 and 12 months, respectively. While 12 patients used bulking agents regularly, only 1 patient required the regular use of enemas to assist evacuation.

Discussion

The surgical approach to tumors situated in the middle and lower rectum has changed considerably in the past decade. Several authors were able to demonstrate that, from an oncologic point of view, a resection margin of 2 cm distal to the tumor is sufficient to achieve local control [1, 16, 27, 30]. As rectal cancers tend to spread laterally rather than distally, total mesorectal resection as propagated by Heald et al. [9] is of paramount importance in the surgical treatment of cancers situated in the middle and lower third. Therefore, many rectal malignancies that used to be approached by abdominoperineal resection in previous years are nowadays treated using a sphincter preserving technique. However, preservation of the sphincter complex cannot be automatically equated with preservation of anorectal continence. The loss of the rectal reservoir, intraoperative manipulation of the sphincter apparatus (e. g. by the use of stapling devices) and injury to the complex neuromuscular integrity of the anorectal structures can lead to substantial functional dysfunctions.

While it is well known that postoperative radiation has a negative effect on functional outcome [6, 11, 22], recent data from Sweden indicate that this is also the case if radiotherapy is applied preoperatively [5]. In fact, 3 of our 5 partially incontinent patients had undergone adjuvant therapy.

Evidently, there is a strong correlation between the extent of rectal excision and functional changes. Karanjia et al. [14] as well as Lewis et al. [21] found, that patients with a rectal remnant of at least 4 cm fare much better compared with individuals in whom a total resection at or near to the dentate line had been performed. Severity and duration of symptoms after low anterior resection vary widely in the literature and seem to depend on the population studied, the height of the anastomosis, the time interval between operation and follow-up examination, the observer bias and the criteria used to define symptoms. Continence may be altered in 6 [28] to 87% [29] , defecatory urgency is reported ranging from 8 [17] to 87% [29] and increased bowel movements (> 3/day) in up to 75% [29] in these patients.

While there is general agreement that functional disorders diminish with time, a considerable proportion of patients continue to experience changes of their bowel habits. Ortiz et al. [23] found an altered continence in 52% of patients 1 year after surgery compared to 8% in age-matched controls.

In an attempt to improve functional outcome following rectal resection, Lazothes et al. [19] and Parc et al. [25] have described the incorporation of a colonic double loop reservoir anastomosed directly to the anal canal. Although some investigators could not demonstrate any substantial functional benefit [6], several trials were able to show better results of the J-pouch with regard to early postoperative anorectal physiology and function compared with straight coloanal anastomosis (Table 2). According to a recent report, this functional superiority is sustained even after a follow-up period of 2 years [18]. In the largest prospective trial so far, Hallböök et al. [8] found a mean stool frequency of 1.6/day in the pouch group compared to 3.6/day in the straight coloanal group 1 year after the operation. Incontinence and urgency were also significantly reduced in pouch patients.

On the other hand, some authors have described considerable evacuation difficulties in up to 70% of

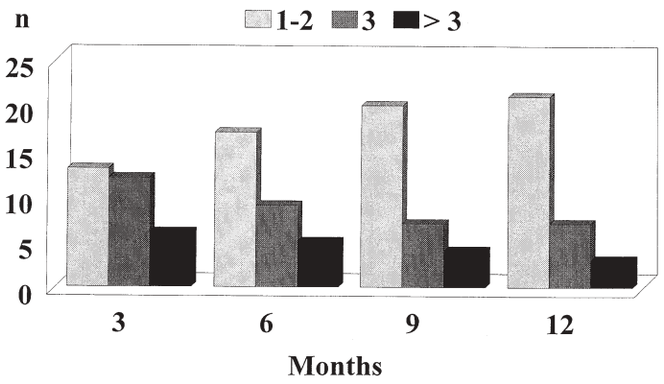

Figure 1. Mean stool frequency per day.

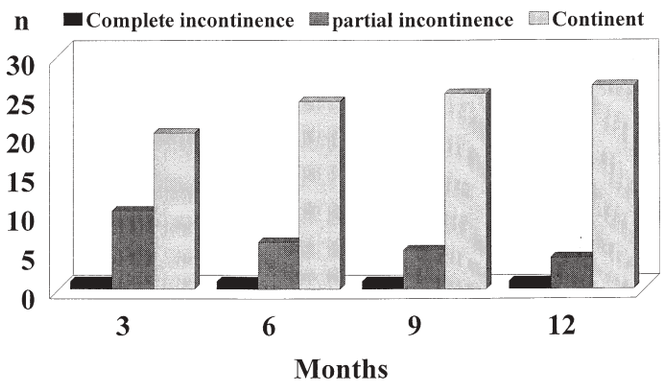

Figure 2. Anorectal continence.

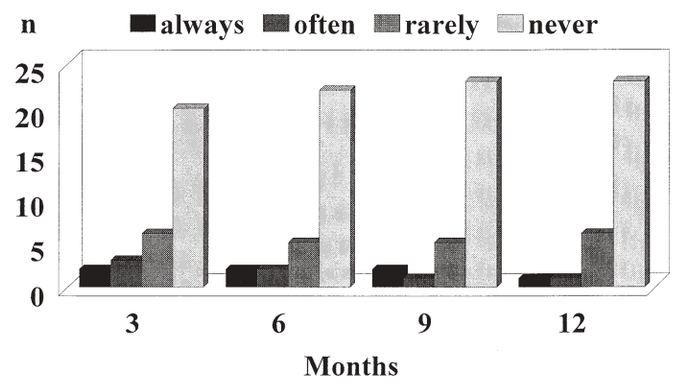

Figure 3. Urgency to defaecate.

patients with a large J-pouch [15]. In a large series by Berger et al. [4], reporting on the functional outcome of 162 patients with a coloanal pouch, an increase over time was noted with regard to defecatory problems. While 85% of the patients had spontaneous evacuation 1 month after surgery, this declined

Author	n	Months postop.	Continence I	II	III	IV	Stools > 3/dayå	Urge	Fragmentation	Enema	Anti-diarrhoe
Lazorthes et al. [19]	P 20	7	60	20	20	0	40*	10	0	10	–
	S 42	7	43	24	26	7	67*	24	19	19	–
Gross et al. [7]	P 10	5	90	–	–	–	–	–	–	–	–
	S 11	5	18	–	64	18	–	–	–	–	–
Joo et al. [12]	P 44	6	2.0[a]*				4.7[b]*	7*	–	–	–
	S 39	6	5.3[a]*				6.5[b]*	41*	–	–	–
Randomized studies											
Hallböök et al. [8]	P 43	2	1.5[c]*				–	21*	–	–	7*
	S 50	2	7.0[c]*				–	70*	–	–	42
Lazorthes et al. [18]	P 18	3	–	–	–	6	11*	22*	–	6	–
	S 19	3	–	–	–	26	63*	63*	–	0	–

Tabelle 2. Functional results comparing coloanal J-pouch reconstruction (P) with straight coloanal anastomosis (S) in the early postoperative course (3 to 7 months). Values are given as percent. (Continence I: normal continence; II:incontinence to gas; III: liquid stool; IV: complete incontinence. [a] Jorge and Wexner-score ranging from 0 [normal continence] to 20 [complete incontinence]; [b] mean bowel movements/day; [c] Millner-score ranging from 0 (normal continence) to 18 [complete incontinence]; *p < 0.05.)

to 75% after 1 year. Furthermore, 21% suffered from fragmented bowel movements. Progressive deterioration of stool evacuation was also seen in the randomized trial conducted by Hallböök et al. [8].

It was soon hypothesized that pouch size and/or the part of the colon used for pouch construction (sigmoid versus descending colon) are the major contributing factors to poor pouch function [10]. A variety of sizes ranging from 6 [7] to 12 cm [19] have been proposed. Although a recent mathematic model by Banerjee et al. [2] predicted an ideal limb length for pouch construction of 8 to 10 cm, this was not confirmed in a randomized trial conducted by Hida et al. [10] who demonstrated that a 5-cm pouch conferred adequate reservoir function without compromising evacuation as opposed to a 10-cm pouch design. Lazorthes et al. [20] performed a similar study randomizing 47 patients to either 6 cm or 10 cm pouches. They did not find any statistical difference with regard to defecation frequency, urgency, and fecal continence between the 2 groups. However, at 2 years 40% of patients with a large reservoir compared with 10% of patients in the small-pouch group required laxatives and/or enemas to assist bowel evacuation. The authors concluded that a small pouch is preferred to avoid evacuation inconveniences. Furthermore, complete rectal resection is of great importance, as a rectal stump exceeding 3 to 4 cm seems to also interfere with proper pouch evacuation. Using a small reservoir of 5 to 7 cm we observed only 1 patient who required enemas to assist evacuation.

In conclusion, our initial experience with colonic J-pouch reconstruction shows good functional results. A small pouch size of 5 to 7 cm adequately restores anorectal function without compromising evacuation. Pouch construction is usually easy to perform and does not lead to an increased rate of perioper-ative complications. Whether this leads to a better quality of life needs to be investigated in a randomized trial which is currently being conducted at our institution.

References

1. Andreola S, Leo E, Belli F, et al. Distal intramural spread in adenocarcinoma of the lower third of the rectum treated with total rectal resection and coloanal anastomosis. Dis Colon Rectum 1997;40:25–9.
2. Banerjee AK, Parc R. Prediction of optimum dimensions of colonic pouch reservoir. Dis Colon Rectum 1996;39:1293–5.

3. Batignani G, Monaci I, Ficari F, et al. What affects continence after anterior resection of the rectum? Dis Colon Rectum 1991;34:329–35.
4. Berger A, Tiret E, Parc R, et al. Excision of the rectum with colonic J-pouch-anal anastomosis for adenocarcinoma of the low and mid rectum. World J Surg 1992;16:470–7.
5. Dahlberg M, Glimelius B, Graf W, et al. Preoperative irradiation affects functional results after surgery for rectal cancer. Results from a randomized study. Dis Colon Rectum 1998;41:543–51.
6. Graf E, Ekström K, Glimelius B, et al. A pilot study of factors influencing function after colorectal anastomosis. Dis Colon Rectum 1996;39:744–9.
7. Gross E, Amir-Kabirian H. Koloanaler Pouch nach totaler Rektumresektion. Zentralbl Chir 1994;119:878–85.
8. Hallböök O, Pahlmann L, Krog M, et al. Randomized comparison of straight and colonic J-pouch anastomosis after low anterior resection. Ann Surg 1996;224:58–65.
9. Heald RJ, Ryall RDH. Recurrence and survival after total mesorectal excision for rectal cancer. Lancet 1986;1:1479–82.
10. Hida J, Yastutomi M, Fujimoto K, et al. Functional outcome after low anterior resection with low anastomosis for rectal cancer using the colonic J-pouch: prospective randomized study for determination of optimum pouch size. Dis Colon Rectum 1996;39:986–91.
11. Iwamoto T, Nakahara S, Mibu R, et al. Effect of radiotherapy on anorectal function in patients with cervical cancer. Dis Colon Rectum 1997;40:693–7.
12. Joo JS, Latulippe JF, Alabaz O, et al. Long-term functional evalution of straight coloanal anastomosis and colonic J-pouch: is the functional superiority of colonic J-pouch sustained? Dis Colon Rectum 1998;41:740–6.
13. Jostarndt L. Die anale Kontinenz und ihre Störung. Hannover: Kali-Chemie, 1986.
14. Karanjia ND, Schache DJ, Heald RJ. Function of the distal rectum after low anterior resection for carcinoma. Br J Surg 1992;79:114–6.
15. Kusunoki M, Yanagi H, Shoji Y, et al. Abdominal rectal resection and colonic J-pouch-anal anastomosis: 10 year´s experience. Br J Surg 1997;84:1277–80.
16. Kwok SPY, Lau WY, Leung KL, et al. Prospective analysis of the distal margin of clearance in anterior resection for rectal carcinoma. Br J Surg 1996;83:969–72.
17. Lane RH, Parks AG. Function of the anal sphincter following colo-anal anastomosis. Br J Surg 1977;64:596–9.
18. Lazorthes F, Chiotasso P, Gamagami RA, et al. Late clinical outcome in a randomized prospective comparison of colonic J-pouch and straight coloanal anastomosis. Br J Surg 1997;84:1449–51.
19. Lazorthes F, Fages P, Chiotasso P, et al. Resection of the rectum with construction of a colonic reservoir and colo-anal anastomosis for carcinoma of the rectum. Br J Surg 1986;73:136–8.
20. Lazorthes F, Gamagami R, Chiotasso P, et al. Prospective randomized study comparing clinical results between small and large colonic J-pouch following coloanal anastomosis. Dis Colon Rectum 1997;40:1409–13.
21. Lewis WG, Holdsworth PJ, Stephenson BM, et al. Role of the rectum in the physiological and clinical results of coloanal and colorectal anastomosis after anterior resection for rectal carcinoma. Br J Surg 1992;79:1082–6.
22. Lewis WG, Williamson MER, Kuzu A, et al. Potential disadvantages of post-operative adjuvant radiotherapy after anterior resection for rectal cancer: a pilot study of sphincter function, rectal capacity and clinical outcome. Int J Colorect Dis 1995;10:133–7.
23. Ortiz H, Armendariz P. Anterior resection: do the patients perceive any clinical benefit? Int J Colorect Dis 1996;11:191–5.
24. Ortiz H, De Miguel M, Armendariz P, et al. Coloanal anastomosis: are functional results better with a pouch? Dis Colon Rectum 1995;38:375–7.
25. Parc R, Tiret E, Frileux P, et al. Resection and colo-anal anastomosis with colonic reservoir for rectal carcinoma. Br J Surg 1986;73:139–41.
26. Seow-Choen F, Goh HS. Prospective randomized trial comparing J-pouch anastomosis and straight coloanal reconstruction. Br J Surg 1995;82:608–10.
27. Shirouzu K, Isomoto H, Kakegawa T. Distal spread of rectal cancer and optimal distal margin of resection for sphincter preserving surgery. Cancer 1995;86:388–92.
28. Suzuki H, Matsumoto K, Amano S, et al. Anorectal pressure and rectal compliance after low anterior resection. Br J Surg 1980;67:655–7.
29. Varma JS, Smith AN. Anorectal function following colo-anal sleeve anastomosis for chronic radiation injury to the rectum. Br J Surg 1986;73:285–9.
30. Williams NS, Durdey P, Johnston D. The outcome following sphincter saving resection and abdominal-perineal resection for low rectal cancer. Br J Surg 1985;72:595–8.

Address for Correspondence:
PD Dr. Marco Sailer, Chirurgische Klinik,
Josef-Schneider-Straße 2,
D-97080 Würzburg, Germany,
Phone (+49/931) 201-1, Fax -3483.