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Patient-reported recovery after enhanced colorectal cancer surgery: A longitudinal six-month follow-up study

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Abstract

Purpose. The concept of *enhanced recovery after surgery* (ERAS) is a modern regime of care, and numerous studies have proved its beneficial impact on recovery after colorectal surgery. However, little is known about patients' continuing recovery after discharge. Therefore, the purpose of this study was to describe patient-reported recovery after colorectal cancer surgery in the context of ERAS from the day of discharge until one month and six months after surgery.

Method. Assessments were made at discharge, at one month, and at six months after surgery using the questionnaire Postoperative Recovery Profile (PRP). In all, 119 patients recovering from abdominoperineal resection, rectal resection, or colonic resection completed all three assessments.

Results. The global score of recovery showed that no patient experienced being fully recovered at discharge. After rectal resection, patients frequently reported being not at all recovered. One month after surgery, patients recovering from colonic resection reported significant improvements regarding 11 of 17 questionnaire items, whereas abdominoperineal resection patients reported no significant improvements regarding any item. Instead, significantly higher levels of problems were reported in the items *fatigue*, *muscle weakness*, and *feeling down*. Rectal resection patients reported significant improvements between one and six months after surgery regarding 7 of 19 items. However, the item *gastrointestinal function* distinguished, as patients reported significant deterioration towards higher levels of problems six months after surgery.

Conclusion. This study elucidates the difference between groups of colorectal patients and the diverse patterns of their recovery, implying different needs in terms of prolonged support after discharge.

Keywords: postoperative recovery, PRP, colorectal surgery, ERAS

Introduction

Enhanced recovery after surgery (ERAS) has been a successful approach to modern perioperative care, and numerous studies have shown a beneficial impact on early recovery, especially for colorectal surgery [1]. Most research has focused on physiological factors, and there is limited knowledge about patient-reported postoperative recovery at home from a longitudinal perspective. Furthermore, most knowledge of the postdischarge period is based on studies focusing on quality of life after colorectal cancer surgery using instruments developed for that purpose. However, consciousness about the meaning of the concept investigated is important. *Quality of life* is not synonymous with postoperative recovery, which has been described as "an energy requiring process to return to a state of normality and wholeness. It is characterized by regaining control over physical, psychological, social and habitual functions resulting in a return to preoperative level of independency/dependency in activities of daily living and regaining one's optimum level of wellbeing" [2, p. 557].

Early postoperative recovery is affected by a number of factors, such as the patient's age, the type and extent of surgery, and the patient's preoperative habitus [3]. A relatively young age, in combination with a low grade on the American Society of Anesthesiologists (ASA) physical status classification system [4], is associated with fewer complications after surgery [5, 6]. Further, pain is a factor with considerable negative effects on recovery, given that it can cause immobilization, paralytic ileus, nausea, vomiting, and (in the long run) cardiopulmonary complications [7, 8].

The ERAS concept was developed after identification of physiological factors affecting postoperative recovery [9]. Interventions such as preoperative patient counselling, optimizing the patient's preoperative habitus and conducting minimally invasive surgery, along with adapted anaesthesia, optimal pain treatment, early oral intake, and early intense mobilization, resulted in a quick return of physiological functions and thus a shorter hospital stay [10].

Studies show both positive and negative experiences of ERAS interventions and early discharge. Preoperative patient counselling and information have resulted in feelings of security, making admission and surgery less frightening, contributing to realistic expectations, and empowering patients to take personal responsibility for their recovery after major colorectal surgery [11, 12]. However, a need for additional information about dealing with bowel symptoms, nutrition, medication, skin care, physical activities, and emotional difficulties after

discharge has been reported [13]. Early discharge has been experienced as a challenge in that patients must reflect on and cope with unfamiliar bodily reactions. Moreover, discomfort created a conflict between living an active life and listening to a body calling for rest [14]. On the other hand, early discharge after colorectal surgery has also been experienced as positive as patients felt their recovery enhanced by their being at home because they had the opportunity to eat, drink, and rest without the disturbance of hospital routines. However, some patients with minor complications expressed difficulties gaining access to specialist care and expert advice after discharge, leading to a feeling of vulnerability [15].

Postdischarge vulnerability and a need for an accessible source of specialized support were also highlighted by patients in the study by Taylor and Burch [12]. Areas of concern in the postoperative period involve the surgical wound, the bowels, the stoma, a lack of energy, and pain [16]. Minor pain has been reported, peaking one week after surgery and disappearing after five weeks. Problems with nausea, vomiting, defecation, and most dominantly fatigue were also reported one to two weeks postoperatively. Five weeks after surgery, fatigue was still the most disturbing symptom, whereas the other symptoms had decreased or even disappeared [17].

Given that the greater part of recovery in the era of enhanced recovery takes place outside of the hospital, there is a need for knowledge about postoperative symptoms and the pattern of recovery over the long term. Therefore, the aim of this study was to describe patient-reported recovery after colorectal cancer surgery in the context of ERAS from the day of discharge until one month and six months after surgery.

Patients and methods

A descriptive, longitudinal questionnaire study was carried out at a university hospital in southern Sweden. Approximately 270 patients with cancer of the colon or rectum annually undergo surgery at the hospital and are cared for according to the ERAS concept, which was implemented at the unit in 2005. Patients were eligible for inclusion if they had been diagnosed with colorectal cancer, were undergoing an elective surgical procedure involving the colon or rectum and were considered for perioperative care according to the ERAS concept. Further criteria were the ability to understand and complete questionnaires in Swedish. Patient recruitment lasted from October 2011 until February 2013. During this period, 232 patients were available for inclusion, and 225 patients were asked to participate (figure 1). Approval was gained from the Regional Ethics Board, Lund, Sweden (Dnr 2011/451).

Data collection

Postoperative recovery was measured by the Postoperative Recovery Profile (PRP), a Swedish questionnaire developed for the self-assessment of general postoperative recovery [18]. The questionnaire consists of 19 items formulated as statements (e.g., “Right now I experience *pain* that is...”). A four-point descriptive scale of *none*, *mild*, *moderate*, and *severe* is used. Results from the answers in the questionnaire can be transformed into a global score of recovery (GSR) based on the number of items in the questionnaire answered with *none* (indicator sum) [19].

The PRP questionnaire is produced in two versions, one comprising 17 items, considered for assessment during hospitalization, and the other comprising 19 items, used for measurement after discharge. Items not represented in the 17-item version are *re-establishing everyday life* and *sexual activity*.

Data regarding demographic variables such as age, gender, ASA classification, type of cancer, surgical procedure, and compliance with the ERAS concept were collected from the patients' medical records.

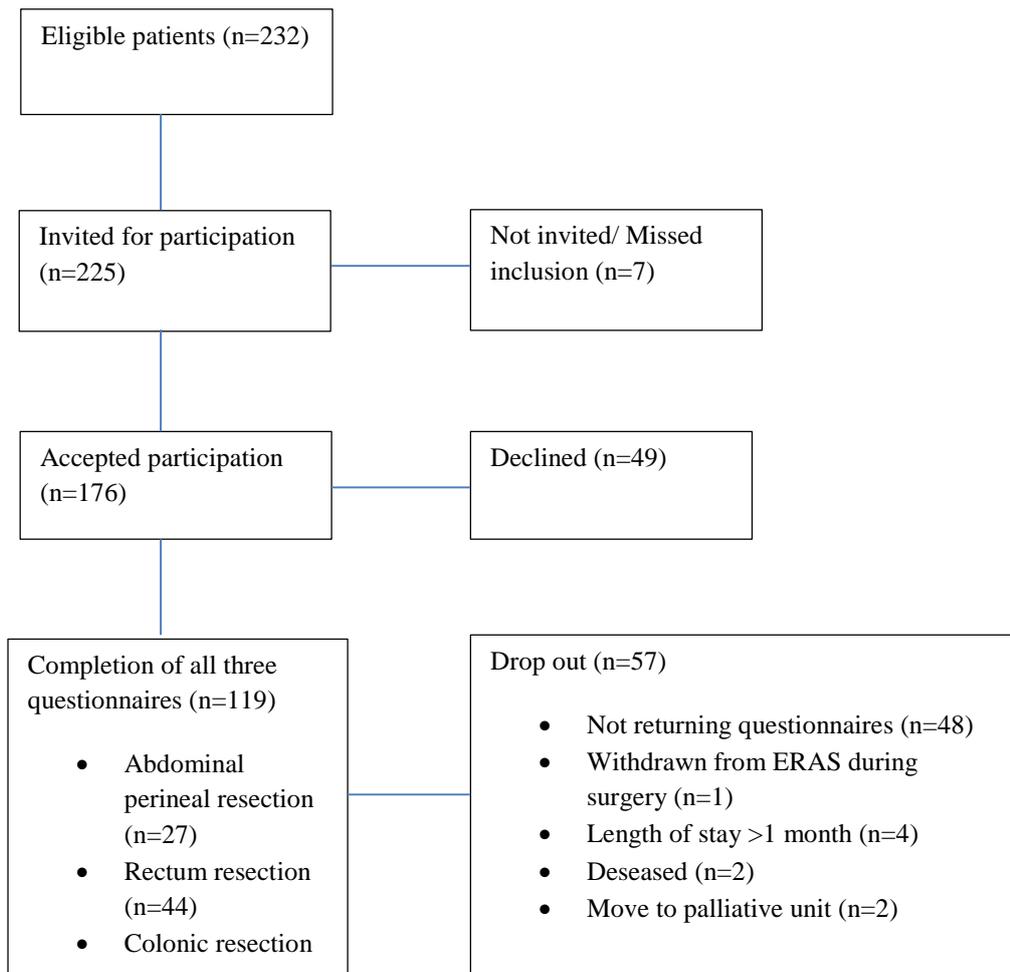
Procedure

Patients were recruited consecutively. Written information about the study was sent out together with the notice of appointment for the preoperative visit at the surgical outpatient clinic one week prior to surgery. Additional oral information was given during the preoperative visit by a colorectal nurse specialist, and written informed consent was obtained regarding study participation.

After surgery, patients received the first 17-item questionnaire from the ward nurse on the day of discharge. The questionnaire was to be filled in and returned to the ward nurse before each patient left the hospital. One month and six months after surgery, each patient received the 19-item questionnaire by mail, along with a prepaid envelope. Non-responders received two reminders.

Statistical analysis

Fig. 1 Data collection process



Patients were divided into three groups based on type of surgical procedure: abdominoperineal resections (APR), rectal resections, and colonic resections.

PRP analysis

Values from the PRP assessments at discharge, at one month, and at six months after surgery were analysed using statistical software for evaluating paired, ordered data [20]. This allows the calculation of the pattern of changes for patients as a group and as individuals, a pattern displayed by frequency distributions of every pair of assessment in a cross tabulation. The pairs of data that does not change between the two assessments are referred to as the *proportion of unchanged assessments* (PA) and expressed in percentage and number. The measurement for a systematic shift (i.e., the group is shifting homogeneously towards a lower or higher rate of disturbance on the second measurement) is referred to as the *relative position* (RP). In the cross tabulation, a lower rate of disturbance can be visualized as a greater proportion of paired assessments on the right side of the diagonal. The RP value calculates the difference between the probabilities of an increased or decreased level of disturbance between assessments. Possible values of RP range between -1 and 1. A large negative RP value indicates a high probability of a shift towards a lower level of disturbance on the second assessment. For example, if the RP value is -0.16, there is a 16% greater probability of improvements rather than deteriorations at the second assessment. The uncertainty of this statement is calculated by a 95% confidence interval (CI).

The individual difference from the systematic pattern of changes is mentioned as the *relative rank variance* (RV). It manifests if the individual changes are part of the homogenous group change or an individual divergence. The RV value could be up to 1. An RV value approaching 1, with 95% CI that does not cover the zero value, indicates that the individual variations must be taken into account when interpreting the results. Missing data are excluded pairwise [21].

Global score of recovery

The global score of recovery (GSR) was calculated for each individual patient and assessment displaying the level of recovery. The number of items in each questionnaire answered with *none* was counted, leaving an indicator sum ranging from 0 to 19 depending on the number of *none* responses from each individual patient. The criterion for *fully recovered* was all items answered with *none*—that is, an indicator sum of 19. Further, an indicator sum of 15–18 corresponds to *almost fully recovered*, 8–14 to *partly recovered*, 7 to *slightly recovered*, and less than 7 to *not at all recovered*. The GSR was calculated only for questionnaires with no missing data.

Demographics

Demographic variables were calculated and described by frequency distributions in number, percentages, mean, median, and standard deviation (SD). The distribution of normality was calculated using the Kolmogorov-Smirnov test. Significant differences between the three groups were calculated using a one-way ANOVA and the Kruskal-Wallis test when appropriate. For significant differences detected, independent-samples T-Test and the Mann-Whitney U-test were used to further evaluate the differences [22]. A *p* value < 0.05 was considered significant. Calculations were made using the Statistical Package for the Social Sciences (SPSS version 21, IBM, New York, USA).

Results

Of the 225 patients invited to participate in this study, 49 patients declined (recruitment rate 78%). A total of 176 patients gave their written consent; of those, 119 patients completed the questionnaire on all three occasions (figure 1). There were 57 patients lost at follow-up, of which 48 patients did not return their questionnaires (30 men and 18 women, mean age 73.2). One patient was withdrawn from ERAS owing to complications during surgery (APR), four patients were still hospitalized one month after surgery, thus missing the one-month assessments (three rectal resections and one APR), two patients died during hospitalization (both rectal resections), and two patients were moved to a palliative unit and did not receive any questionnaires (both rectal resections).

The three groups of patients differed significantly in age, preoperative treatment, duration of surgery, blood loss, occurrence of ostomy, day of first defecation, and length of stay (LoS), as displayed in table 1. Patients who underwent colonic resections were significantly older than those who had rectal resections but not older than APR patients. Furthermore, patients who had colonic resections underwent significantly less preoperative adjuvant treatment and experienced shorter duration of surgery, less blood loss, shorter time before first defecation, and shorter LoS than both APR patients and rectal-resection patients. Differences between APR

patients and rectal-resection patients were only significant regarding the duration of the surgery; APR patients experienced the longest procedures.

At discharge, a majority of APR patients were considered *partly recovered* (59.3%), a distribution that remained one month after surgery (57.1%). Further, 4.0% reached a level of *almost fully recovered* at discharge, increasing to 9.5% after one month and to 27.3% after six months. One month and six months after discharge, 4.8% and 9.1%, respectively, were considered *fully recovered*. The patients who were *not at all recovered* decreased from 37.0% at discharge to 18.2% after six months (figure 2). However, as for the proportions of changes in recovery, no significant improvements could be seen in any item between the day of discharge and one month after surgery (table 2). Instead, significantly higher levels of problems were reported in the items *fatigue* (RP 0.23), *muscle weakness* (RP 0.30), and *feeling down* (RP 0.25) one month after surgery, without individual variations. When looking at the cross tabulation for the item with the greatest deterioration, *muscle weakness*, it can be seen that 13 patients (PA 48%) reported no change, and in total five patients deteriorated from experiencing *mild* muscle weakness at discharge to experiencing *moderate* (n = 4) or *severe* (n = 1) weakness one month postoperatively (table 3a). For several items, individual variations imply that change in recovery was heterogenic. Between one month and six months after surgery, significant improvements were reported in the responses to 10 of 19 items, with only a few individual variations.

On the day of discharge, 4.9% of patients who had undergone rectal resections reached a level of *almost fully recovered*; the percentage increased after one month (11.1%) and again after six months (15.8%). After one month, 2.8% were considered *fully recovered*, and after six months 5.3%. After six months, there was a reduction in patients who were *not at all recovered* (31.6%) relative to the percentage one month after surgery (33.3%) (figure 2). Patients recovering from rectal resection showed significant improvements in four of 17 items between the day of discharge and one month after surgery (table 2). The greatest improvements were reported regarding *appetite change* (RP -0.31); however, there were some individual variations (RV 0.40), meaning that change in this item was common for the group with additional individual variations. Patients reported significantly higher levels of problem one month after surgery regarding *feeling down* (RP 0.18), with negligible individual variations (RV 0.06). In 16 items, individual variations were negligible, meaning that the group of patients recovering from rectal resection could be considered homogenous. Proportions of changes between one month after surgery and six months after surgery indicated significant improvements in 7 of the 19 items, with no individual variations (table 4). However, the item *gastrointestinal function* distinguished, as it manifest significant deterioration towards a higher level of problems six months after surgery (RP 0.26), with individual variations (RV 0.25). Cross tabulation shows that 19 patients reported the level of disturbance as *none* one month after surgery, but after six months 13 of those patients reported *mild* (n = 8), *moderate* (n = 3), or *severe* (n = 2) levels of disturbance (table 3b). On the other hand, four patients reported *moderate* and two patients reported *severe* levels of disturbance one month after surgery, but this improved to a *mild* level at six months- a phenomenon indicating the individuality of this item.

The GSR showed that no patient in the colonic resection group had *fully recovered* or *almost fully recovered* on day of discharge. Instead, 41.4% were *not at all recovered*. After one month, 5.4% and 16.2% had reached the levels of *fully recovered* and *almost fully recovered*, respectively. The majority of patients (54.1%) were considered *partly recovered*. Further improvements were seen at six months: 12.1% were considered *fully recovered*, and 24.2% were *almost fully recovered* (figure 2). The proportion of changes in recovery from the day of discharge to one month after surgery showed significant improvements in 11 of 17 items on a group level (variance RP -0.17 to -0.34), with negligible individual variations except for the item *social activities* (RV 0.31) (table 2). This shows that the pattern for recovery in this group and period was homogenous and moving towards lower levels of disturbance.

The greatest improvements were reported for *dependence on others* (RP -0.34) and *pain* (RP -0.33). For the item *pain*, the percentage of agreement (PA) showed that 41% (n = 18) reported no changes between the two assessments, and 48% (n = 21) assessed their level of pain as lower one month after surgery. However, the cross tabulation demonstrates that most patients (n = 26) reported pain as *mild* at discharge (table 3c). The proportion of changes in recovery from one month to six months after surgery shows that patients significantly improved regarding 2 of the 19 items: *appetite change* and *dependence on others* (RP -0.35 and RP -0.18, respectively) (table 4). Individual variations were countable only in *re-establishing everyday life*, implying that the group was homogenous except for this item.

Discussion

In the study, it became apparent that the three groups of patients with colorectal cancer differed in their recovery processes. Most patients recovering from APR were considered partly recovered at discharge, according to the

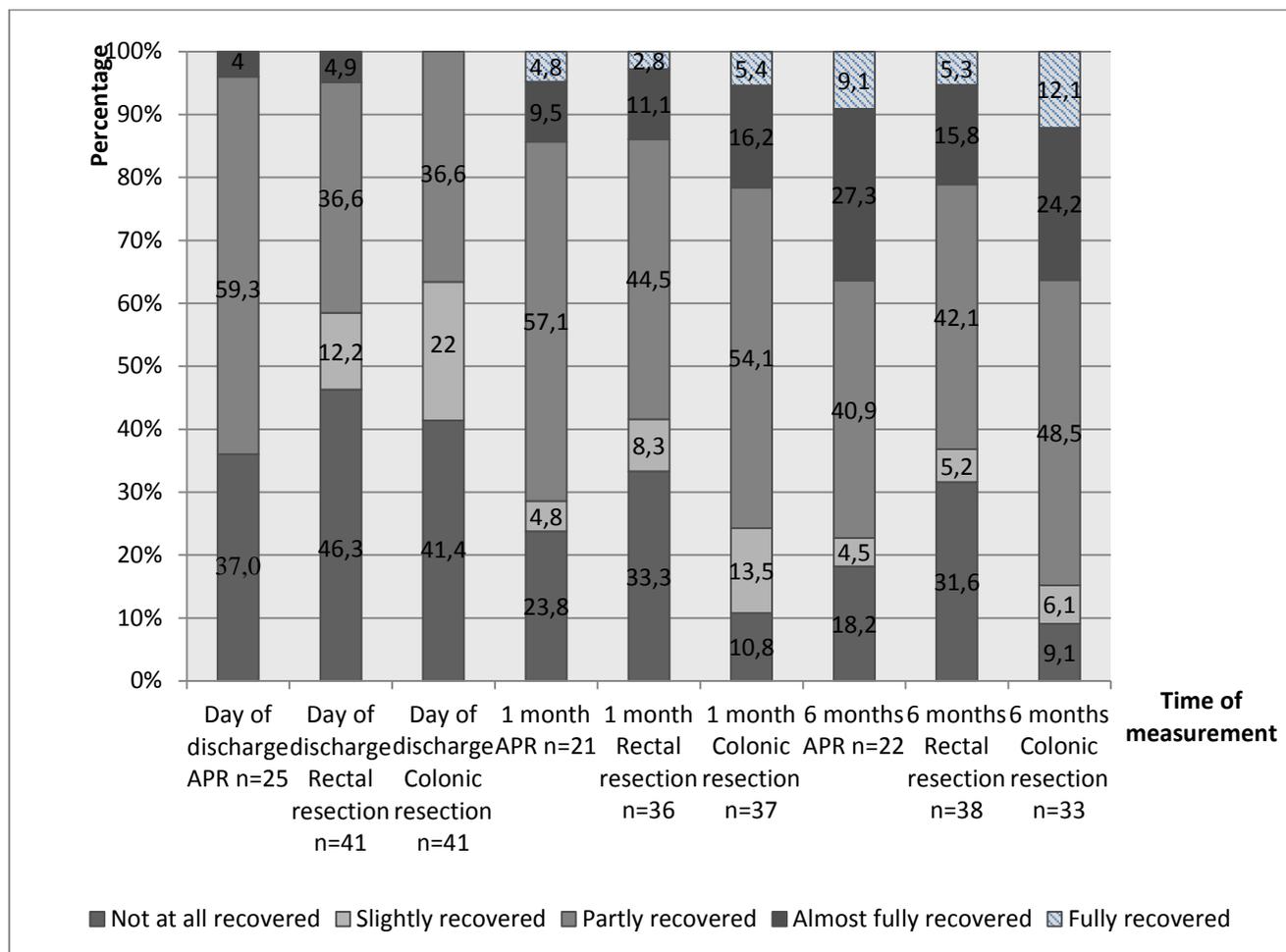
Table 1 Demographics

	Abdominoperineal resection (APR) (n= 27)	Rectal resection (RR) (n=44)	Colonic resection (CR) (n=48)	p-value
Age, mean (SD)	67,5 (10,1)	64,4 (11,4) ^{b****}	71,9 (10,1)	0,003
Sex, n (%)				
Male	13 (48,1)	25 (56,8)	18 (37,5)	0,180
Female	14 (51,9)	19 (42,2)	30 (62,5)	
ASA classification, md	2,00	2,00	2,00	0,291
Type of cancer	Sigmoid 1 (3,7) Rectum 25 (92,6) Colon and rectum 1 (3,7)	Colon 1 (2,3) Sigmoid 2 (4,5) Rectum 37 (84,1) Colon and rectum 1 (2,3) Recto-sigmoid 3 (6,8)	Colon 20 (41,7) Sigmoid 16 (33,3) Caecal 10 (20,8) Recto-sigmoid 2 (4,2)	
Preoperative treatment, n (%)	14 (51,8) ^{a****}	14 (31,8) ^{b****}	1 (2,1)	<0,001
Length of surgery, minutes				
Mean (SD)	367 (89,2) ^{a** c**}	295 (100,4) ^{b****}	220 (96,1)	<0,001
Blood loss, milliliters				
Mean (SD)	527,9 (390,1) ^{a**}	651,2 (388,0) ^{b****}	319,4 (316,3)	<0,001
Ostomy, n (%)	27 (100,0) ^{a****}	38 (86,4) ^{b****}	5 (10,4)	<0,001
Mobilization , postoperative day				
Mean (SD)	1,1 (0,42)	1,02 (0,56)	0,92 (0,40)	0,257
Oral intake, postoperative day				
Mean (SD)	0,93 (0,96)	0,52 (0,59)	0,67 (0,98)	0,107
Defecation, postoperative day				
Mean (SD)	3,37 (2,44) ^{a*}	3,1 (2,68) ^{b**}	4,88 (2,59)	<0,001
Length of stay, days				
Mean (SD)	10,6 (3,9) ^{a*}	11,0 (4,5) ^{b*}	9,0 (4,7)	0,005
Postoperative treatment, n (%)	10 (37,0)	17 (38,6)	17 (35,4)	0,986

SD Standard Deviation ASA American Society of Anesthesiologists *p<0,05 **p<0,01 ***p<0,001

^a significant difference between APR and CR ^b significant difference between RR and CR ^c significant difference between APR and RR

Fig. 2. Individual global score of recovery on Day of discharge, 1 month and 6 months after surgery.



GSR; however, one month after surgery, deterioration was seen in pain, fatigue, weakness, immobilization, and a feeling of sadness. Those items are probably naturally correlated to each other. Persistent pain after APR may be caused by several factors, such as wound-healing problems and tumour recurrence. The excision can also induce phantom-rectum syndrome (PRS) [23, 24]. The prevalence of PRS has been reported for up to 68% of APR patients, ranging from non-painful sensations, such as feelings of an existing rectum with faeces or the need to pass flatus, to painful sensations. But six months after surgery, the APR group of patients had recovered considerably. This implies that health-care professionals should pay attention to the symptoms mentioned above in patients recovering from APR, at least during the first month after surgery and probably for some time after that.

For patients who had undergone rectal resection, the item *gastrointestinal function* was characterized by deterioration at six months, with individual variations. It is a well-known fact that surgical procedures with low rectal or anal end-to-end anastomosis can induce considerable problems in terms of bowel dysfunction. Low-anterior resection syndrome (LARS), which entails problems with clustering, urgency, frequent bowel movements, and incontinence of both faeces and flatus, has been reported to affect up to 90% of patients [25, 26]. Emmertsen and Laurberg [27] demonstrated a high rate of such bowel symptoms 3 and 12 months after colorectal surgery. At 12 months, the prevalence of symptoms had decreased. Gastrointestinal symptoms can also appear after stoma reversal, and this has been described as the principle matter of concern for patients [28, 29]. The deterioration in *gastrointestinal function* reported in the present study after six months could be a sign of LARS, whether patients had an end-to-end anastomosis or a stoma that had been reversed. Insecurity owing to disturbed gastrointestinal function could affect other items, such as social activities, and even though no significant deteriorations were reported regarding other items, it could well be that the affected items were answered with responses other than *none*, thereby resulting in a low indicator sum in the GSR.

Patients in the colonic resection group were discharged after a mean of nine days. When discharged, a majority reported themselves to be not at all recovered, according to the GSR. There was, however, rapid improvement in reported recovery within the first month- again, as seen in the GSR. The proportions of changes also indicated that the patients generally improved significantly in most items. In the study by Wennström et al. [17], patients recovering from sigmoid resection or from a right hemicolectomy reported minor problems with pain one week postoperatively. The first and second weeks, problems were also reported with nausea, vomiting, defecation, and fatigue. Patients in the present study were discharged within this time frame, and their level of recovery at discharge corresponds with the results of Wennström et al. Further, the improvements in recovery after one month were comparable to those reported in the study by Wennström et al.: after five weeks, patients reported only fatigue to be a problem. In the present study, the colon-resection group exhibited a homogenous pattern of recovery from the day of discharge to one month after surgery. Only the item *social activities* showed individual but not negligible variations. There could be several explanations for this individuality, and it is not possible to say whether the variation resulted from the surgery or from the recovery process or whether individual diversity existed even before the surgery. Proportions of changes in recovery from one month after surgery to six months after surgery showed further improvements, with individual variations accounted for only in the item *re-establishing everyday life*. Thus, it can be demonstrated that patients recovering after a colorectal resection experience a rather quickly progressing recovery.

The process of recovery after a colorectal surgical intervention is a long-term procedure which does not depend only on the type of surgery, preoperative habitus, comorbidities, age, or perioperative strategy. A great many colorectal surgical patients are also recovering from a life-threatening disease. To our knowledge, the interventions within the ERAS concept are concentrated to the period before and during surgery and hospitalization. However, patients who are discharged early go through the greatest part of their recovery at home, on their own. As the present study has shown, patients with a need for prolonged support from specialist health-care professionals can be identified, and with this knowledge it is possible to provide individualized postoperative support. Predischarge information preparing the patients for the recovery period at home, coupled with sufficient support after discharge, may render even troublesome postoperative symptoms easier to handle and prevent.

Methodological considerations

To describe patient-reported postoperative recovery, the PRP questionnaire was used. There are other instruments for assessing postoperative recovery in different respects; however, they are designed to evaluate recovery after anaesthesia, early postoperative phases, recovery during hospitalization, or recovery at home after ambulatory surgery [30, 31]. The PRP questionnaire is a validated instrument which assesses self-reported, postoperative symptoms [2, 32]. Using the statistical method used for evaluating the pattern of change in recovery, it is possible to show changes that are individual or common within a group. This opportunity could

be of great value for evaluating a treatment or, as in the present study, for gaining more detailed knowledge about the changes in a specific recovery process.

This study has some limitations. When reporting the proportions of changes, focus is on items that exhibit change. However, we do not know the exact baseline values unless we also study the cross tabulations. For example, a great significant improvement could falsely be interpreted as indicating that the group of patients reported a high level of disturbance on the first assessment. Conversely, some items may be neglected because significant changes are absent. If that is the case, the absence of change could be interpreted as indicating that there is no problem, even though the patients reported high levels of problems on both the first and the second assessment. Furthermore, the GSR is a hard-lined scale, as the criteria for the different levels of recovery are based on the number of items answered with *none*. To indicate full recovery, a patient must answer all the items with *none*. This means, for instance, that a patient who responded to 11 of 17 items with *mild* and to the other six items with *none* is considered *not at all recovered* even though the patient actually feels quite well. As patients today are not meant to be hospitalized until they are fully recovered, it should not be possible to have obtained full recovery according to the GSR at discharge. If the GSR indicates that a patient is fully recovered when leaving hospital, it could be argued that he or she should have been discharged earlier.

Conclusion

In conclusion, this study shows that patients recovering from different types of colorectal surgical interventions differ in their patterns of recovery and that postoperative recovery is a process that reaches far beyond discharge. This suggests that there is a need to individualize follow-up routines for patients and to identify patients with problems in order to provide sufficient support. Further research focusing on the postoperative recovery process and factors affecting postoperative recovery is needed. This knowledge can be used to better prepare patients for discharge and to develop strategies for supporting patients throughout the recovery process.

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Reference

1. Lassen K, Soap M, Nygren J, Cox BW, Hendry PO, Spies C,...Dejong CHC (2011) Consensus review of optimal perioperative care in colorectal surgery. *Arch Surg* 144: 961-969
2. Allvin R, Berg K, Idvall E, Nilsson U (2007) Postoperative recovery: a concept analysis. *Journal of Advanced Nursing* 57: 552-558
3. Kehlet H (2008) Fast-track colorectal surgery. *Lancet* 371: 791-793
4. American Society of Anesthesiologists <http://www.asahq.org/clinical/physicalstatus.htm> [2013-11-22]
5. Hendry PO, Hausel J, Nygren J, Lassen K, Dejong CH, Ljungqvist O, Enhanced Recovery After Surgery Study Group (2009) Determinants of outcome after colorectal resection within an enhanced recovery programme. *Br J Surg* 96: 197-205. doi: 10.1002/bjs.6445
6. Smith JJ, Lee J, Burke C, Contractor KB, Dawson PM (2002) Major colorectal cancer resection should not be denied to the elderly. *Eur J Surg Oncol* 28: 661-666
7. Schwenk W, Neudecker J, Raue W, Haase O, Muller JM (2006) "Fast track" rehabilitation after rectal cancer resection. *Int J Color Dis*, 21(6), 547-553
8. Fearon KC, Luff R (2003) The nutritional management of surgical patients: enhanced recovery after surgery. *Proc Nutr Soc* 62: 807-811
9. Wilmore DW, Kehlet H (2001) Management of patients in fast track surgery. *BMJ* 322: 473-476
10. Basse L, Raskov HH, Hjort Jakobsen D, Sonne E, Billesbolle P, Hendel H et al. (2002) Accelerated postoperative recovery program after colonic resection improves physical performance, pulmonary function and body composition. *Br J Surg* 89: 446-453
11. Aasa A, Hovbäck M, Berterö CM (2013) The importance of preoperative information for patient participation in colorectal surgery care. *J Clin Nurs* 22: 1604-1612
12. Taylor C, Burch J (2011) Feedback on an enhanced recovery programme for colorectal surgery. *Br J Nurs* 20: 286-290
13. Lithner M, Johansson J, Andersson E, Jakobsson U, Palmquist I, Klefsgard R (2012) Perceived information after surgery for colorectal cancer- an explorative study. *Color Dis* 14: 1340-1350
14. Norlyk A, Harder I (2011) Recovering at home: participating in a fast-track colon cancer surgery programme. *Nurs Inq* 18: 165-173

15. Blazeby JM, Soulsby M, Winstone K, King PM, Bulley S, Kennady RH (2009) A qualitative evaluation of patients' experiences of an enhanced recovery programme for colorectal cancer. *Color Dis* 12: e236-e242
16. Burch J (2012) Enhanced recovery and nurse-led telephone follow-up post surgery. *Br J Nurs* 21: 24-29
17. Wennström B, Warrén Stomberg M, Modin M, Skullman S (2010) Patient symptoms after colonic surgery in the era of enhanced recovery- a long-term follow-up. *J Clin Nurs* 19: 666-672
18. Allvin R, Ehnfors M, Rawal N, Svensson E, Idvall E (2009) Development of a questionnaire to measure patient-reported postoperative recovery: content validity and intra-patient reliability. *J Eval Clin Pract* 15: 411-419
19. Allvin R, Svensson E, Rawal N, Ehnfors M, Kling AM, Idvall E (2011) The Postoperative Recovery Profile (PRP)- a multidimensional questionnaire for evaluation of recovery profiles. *J Eval Clin Pract* 17: 236-243
20. Avdic A, Svensson E. Svenssons method 1.1 ed. Örebro 2010 Interactive software supporting Svenssons method. Accessed from http://www.oru.se/hh/Elisabeth-Svensson/Svenssons_metod_2013-05-08.
21. Svensson E (1998) Ordinal invariant measures for individual and group changes in ordered categorical data. *Stat Med* 17: 2923-2936
22. Field A (2013) *Discovering statistics using IBM SPSS statistics*. Sage publications Ltd, London
23. Fingren J, Lindholm E, Carlsson E (2013) Perceptions of phantom rectum syndrome and health-related quality of life in patients following abdominoperineal resection for rectal cancer. *J Wound Ostomy Continence Nurs* 40: 280-286
24. Ovesen P, Kroner K, Ornholt J, Bach K (1991) Phantom-related phenomena after rectal amputation: prevalence and clinical characteristics. *Pain* 44: 289-291
25. Desnoo L, Faithfull S (2006) A qualitative study of anterior resection syndrome: the experiences of cancer survivors who have undergone resection surgery. *European Journal of Cancer Care* 15: 244-251
26. Karanjia N, Schache D, Heald R (1992) Function of the distal rectum after low anterior resection for carcinoma. *Br J Surg* 79:114-116
27. Emmertsen KJ, Laurberg S (2013) Impact of bowel dysfunction on quality of life after sphincter-preserving resection for rectal cancer. *Br J Surg* 100: 1377-1387
28. Siassi M, Hohenberger W, Losel F, Weiss M (2008) Quality of life and patient's expectations after closure of a temporary stoma. *Int J Colorect Dis* 23: 1207-1212
29. O'Leary DP, Fide CJ, Foy C, Lucarotti ME (2001) Quality of life after low anterior resection with total mesorectal excision and temporary loop ileostomy for rectal carcinoma. *Br J Surg* 88: 1216-1220
30. Kleinbeck SV (2000) Self-reported at-home postoperative recovery. *Res Nurs Health*, 23: 461-472
31. Myles PS, Weitkamp B, Jones K, Melick J, Hensen S (2000) Validity and reliability of a postoperative quality of recovery score: the QoR-40. *Br J Anaesth* 84: 11-15
32. Allvin R, Ehnfors M, Rawal N, Idvall E (2008) Experiences of the postoperative recovery process: An interview study. *Open Nurs J* 2: 1-7