A minority of patients discharged within 24 hours after laparoscopic colon resection

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ABSTRACT

INTRODUCTION: Fast-track laparoscopic colon surgery has gained wide acceptance worldwide. Post-operative hospital stays of 2-5 days have typically been reported. However, in our department some of the patients have been discharged within 24 h after surgery. The aim of this study was to describe differences in demographic and perioperative data between those patients discharged within 24 h and those discharged on days 2-4 post-operatively.

MATERIAL AND METHODS: Data were collected retrospectively from August 2008 to May 2012. A total of 24 patients undergoing elective right-sided hemicolectomy or sigmoidectomy for colon cancer were discharged within 24 h. These 24 patients were compared with 209 patients undergoing the same procedures, but discharged on the second to the fourth post-operative day. All patients were operated laparoscopically according to our fast-track regimen. Demographic data and short-term outcomes were compared between the two groups.

RESULTS: We found that the median age (64 years versus 70 years) (p = 0.018) as well as the median operating time (120 min. versus 155 min.) (p = 0.002) were significantly lower for the 24-h stay group. No other significant differences were found between the two groups.

CONCLUSION: This study showed that discharge within the first 24 h after elective laparoscopic fast-track colon surgery was significantly associated with lower age and shorter duration of surgery.

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Fast-track laparoscopic colon surgery has become increasingly widespread over the past 15 years [1-4]. In the context of laparoscopic as well as conventional open colon surgery, fast-track surgery has reduced post-operative hospital stay as well as morbidity [5, 6]. Previous studies have typically described a 2-5-day post-operative hospital stay for both laparoscopic and open colon surgery [1, 3, 6-8].

In August 2008, a fast-track programme including a 2-4-day post-operative hospital stay was introduced as a standard procedure for elective laparoscopic colon surgery in our department. Despite the introduction of the fast-track programme, some of our patients prompted for discharge within the first 24 h. This has also been described by a few other studies [3, 7, 9], but no studies have so far focused on differences between the patients discharged within 24 h and those discharged later.

The aim of the present retrospective study was to describe any differences in patient characteristics and perioperative data between patients discharged within 24 h and those discharged on day 2-4 post-operatively.

MATERIAL AND METHODS

A total of 24 patients undergoing elective laparoscopic right-sided hemicolectomy or sigmoidectomy were discharged within the first post-operative day from August 2008 to May 2012. These 24 patients were compared with 209 patients undergoing the same procedures in the same period, but discharged on the second to fourth post-operative day (our current fast-track regimen aims for discharge on the second to fourth post-operative day). In total, approximately 364 patients had a laparoscopic right-sided hemicolectomy or sigmoidectomy performed at our hospital during this period (elective or acute). Data were collected retrospectively from the medical records and included: age, sex, American Society of Anesthesiologists (ASA) score, body mass index (BMI), presence of co-morbidity, previous abdominal surgery, resection type, mean operative time, operative blood loss, post-operative complications and number of re-admissions to hospital. Co-morbidity was defined as current steroid treatment, pre-surgery chemotherapy, pre-surgery radiotherapy, low albumin, excessive alco-

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hol consumption, heart disease, hypertension, chronic obstructive lung disease, renal disease, previous stroke, diabetes, other endocrinological disorders or another malignant disease.

All patients were evaluated at a preoperative consultation with a surgeon, where they were thoroughly informed about the fast-track surgical care plan and the goal of a 2-4-day post-operative hospital stay.

Patients undergoing sigmoidectomy had preoperative bowel preparation with a rectal enema on the night and morning prior to surgery. Patients undergoing a right-sided hemicolectomy were not given any bowel preparation. On the day of surgery, all patients received 200 ml Provide Xtra (Fresenius Kabi, Austria). All patients were provided with anti-embolism compression stockings and given 5,000 IE dalteparin subcutaneously.

Induction of general anaesthesia was achieved with propofol and fentanyl. The trachea was intubated and the lungs mechanically ventilated. The procedure was then undertaken by a minimum of one senior surgeon experienced in laparoscopic colorectal surgery. A total of six surgeons operated the 233 patients in the period. All procedures were performed using the same laparoscopic technique. Urinary catheters and oral tubes were only used during surgery. No drains were used.

Post-operative pain control was peroral paracetamol 1 g × 4, oral ibuprofen 400 mg × 4 and oral morphine 10 mg, if needed. No epidural catheters were used. All patients were mobilized on the day of surgery and given a general diet. Patients were evaluated by a surgeon each post-operative day.

The discharge criteria were as follows: Completion of a discharge consultation with a surgeon, adequate pain control, consumption of at least one major meal, lack of fever, lack of surgical site infection, patient agreement concerning readiness for and acceptance of discharge, presence of another person in the home during the first 24 h following discharge, planned follow-up evaluation at outpatient clinic after the tenth post-operative day. Bowel function was registered, but it was not a discharge criterion.

Statistics

Non-parametric statistics were used, inclusive the χ^2-test, Fisher's exact test and the Mann-Whitney test. Statistical significance was set at $p < 0.05$.

Trial registration: not relevant.

RESULTS

The 24 patients in the 24-h discharge group and the 209 patients in the 2-4 post-operative day discharge group had the same types of colonic surgery performed; approximately 60% sigmoid resections and 40% right-sided hemicolectomies. The median age was significantly lower for the 24-h group (64 (range 35-81) versus 70 years (range 16-90), p = 0.018). The median operating time was 120 min. (82-220 min.) for the 24-h group and 155 min. (85-350 min.) for the 2-4 post-operative day group (p = 0.002). There was no difference in post-operative tumour staging by tumour-node-metastasis (TNM) classification, which was performed by a pathologist. No other significant differences between the two groups were found (**Table 1**).

None of the 24 patients in the 24-h discharge group were readmitted to hospital within 30 days post-operatively. In the 2-4 post-operative day group, nine patients (4%) were readmitted to hospital.

In total, 6.6% (24 out of 364) of patients were discharged within 24 h after laparoscopic colon surgery.

DISCUSSION

Fast-track surgery has produced markedly reduced post-operative hospital stays over the past decade in open as well as laparoscopic colon surgery [5, 6]. Levy et al described a further reduction of post-operative hospital stay after optimizing treatment with a combined preoperative, anaesthetic and post-operative protocol for laparoscopic colorectal surgery [10]. 25% of a 40-patient series were discharged within 23 h. The only significant difference between these patients and those discharged later was age with an average age of 60 years in the 23-h group and 69 in the normal-pathway patients (p = 0.04).

Our study focused on the differences between patients discharged within 24 h and those discharged on

TABLE 1

Patient characteristics and perioperative data.

	24-h-stay patients (n = 24)	Normal pathway patients (n = 209)	p-value
Age, yrs, median (range)	64 (35-81)	70 (16-90)	0.018
Male/female, n (%)	12/12 (50/50)	106/103 (51/49)	0.558
ASA score, n (%)			0.916
< 3	22 (92)	175 (84)	–
≥ 3	2 (8)	34 (16)	–
BMI, kg/m², median (range)	25 (18-32)	26 (18-46)	0.919
< 30, n (%)	20 (83)	152 (73)	–
≥ 30, n (%)	4 (17)	57 (27)	–
Co-morbidity, n (%)	11 (46)	114 (55)	0.276
Previous abdominal surgery, n (%)	7 (29)	67 (32)	0.692
Laparoscopic sigmoid resection, n (%)	16 (67)	106 (51)	0.957
Laparoscopic right-sided hemicolectomy, n (%)	8 (33)	103 (49)	0.957
Operative time, min., median (range)	120 (82-220)	155 (85-350)	0.002
Blood loss, ml, median (range)	20 (0-100)	10 (0-1,700)	0.498
Post-operative complications, n (%)	0 (0)	20 (10)	0.103
Re-admission to hospital, n (%)	0 (0)	9 (4)	0.369

ASA = American Society of Anesthesiologists; BMI = body mass index.

the second to fourth post-operative day enrolled in the same fast-track regime. In concordance with the study by Levy et al, we found that age significantly differed between the two groups. Furthermore, we found a significant difference in the operating time; 120 min. (patients discharged within 24 h) versus 155 min. (patients discharged on the second to fourth post-operative day), (p = 0.002). Gender, ASA score, BMI, previous abdominal surgery or intraoperative blood loss did not vary between the two groups.

Reduction of surgical stress response has always been the cornerstone of fast-track surgery [5]. Reducing operating time could be one way of accomplishing this [11]. Duration of surgery is multifactorial; including factors such as the experience and skill of the surgeon, tumour pathology and previous abdominal surgery [12]. Surgeons performing laparoscopic surgery should be experienced, but besides this, duration of surgery is hardly modifiable. However, a short duration of uncomplicated surgery may indicate a relatively low surgical stress response, and these patients may therefore be eligible for an accelerated discharge from hospital.

The lack of significant differences in patient characteristics and perioperative data between the two groups suggests that a larger number of patients may be eligible for a one-day post-operative hospital stay, especially younger patients with short operations. This could potentially yield accelerated recovery for patients while reducing costs for the hospital [13]. However, a shortening of post-operative hospital stay would need to be accompanied by optimization of pre-, anaesthetic and post-operative care, including thorough preoperative information, but would constitute a further improvement in fast-track surgery [14].

The patients discharged within 24 h in this study prompted for an early discharge themselves, even though they had been informed preoperatively that they should expect a 2-4-day post-operative hospital stay. A total of 6.6% of our patients were discharged in this way. By giving thorough preoperative information and thereby altering patient expectations, the proportion of early leavers might have been much higher. Surgeon awareness that some patients may be discharged safely within 24 h may also be an important factor.

One limitation to this study is its relatively small size and hence the use of univariate analysis. This could lead to false positive results if the different variables are not independent. Multivariate analysis would, of course, be preferable to ensure independent variables, but this was impossible due to our sample size. However, the most interesting result of this article was the lack of significant differences (besides age and operating time) between the two groups, which indicates that more patients might be discharged within 24 h.

Further prospective studies are warranted in order to examine the feasibility of discharging a larger proportion of patients within the first 24 h. Therefore, such a study has been initiated by our department.

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LITERATURE

1. Bardram L, Funch-Jensen P, Jensen P et al. Recovery after laparoscopic colonic surgery with epidural analgesia, and early oral nutrition and mobilisation. Lancet 1995;345:763-4.
2. Bosio RM, Smith BM, Aybar PS et al. Implementation of laparoscopic colectomy with fast-track care in an academic medical center: benefits of a fully ascended learning curve and specialty expertise. Am J Surg 2007;193:413-5.
3. Dalton SJ, Ghosh A, Greenslade GL et al. Laparoscopic colorectal surgery – why would you not want to have it and, more importantly, not be trained in it? A consecutive series of 500 elective resections with anastomoses. Colorectal Dis 2011;13:144-9.
4. Lassen K, Hannemann P, Ljungqvist O et al. Patterns in current perioperative practice: survey of colorectal surgeons in five northern European countries. BMJ 2005;330:1420-1.
5. Kehlet H, Wilmore DW. Evidence-based surgical care and the evolution of fast-track surgery. Ann Surg 2008;248:189-98.
6. King PM, Blazeby JM, Ewings P et al. Detailed evaluation of functional recovery following laparoscopic or open surgery for colorectal cancer within an enhanced recovery programme. Int J Colorectal Dis 2008;23:795-800.
7. Delaney CP. Outcome of discharge within 24 to 72 hours after laparoscopic colorectal surgery. Dis Colon Rectum 2008;51:181-5.
8. Basse L, Jakobsen DH, Bardram L et al. Functional recovery after open versus laparoscopic colonic resection: a randomized, blinded study. Ann Surg 2005;241:416-23.
9. Patel GN, Rammos CK, Patel JV et al. Further reduction of hospital stay for laparoscopic colon resection by modifications of the fast-track care plan. Am J Surg 2010;199:391-4.
10. Levy BF, Scott MJ, Fawcett WJ et al. 23-hour-stay laparoscopic colectomy. Dis Colon Rectum 2009;52:1239-43.
11. Norman JG, Fink GW. The effects of epidural anesthesia on the neuroendocrine response to major surgical stress: a randomized prospective trial. Am Surg 1997;63:75-80.
12. Miskovic D, Ni M, Wyles SM et al. Learning curve and case selection in laparoscopic colorectal surgery: systematic review and international multicenter analysis of 4852 cases. Dis Colon Rectum 2012;55:1300-10.
13. Stephen AE, Berger DL. Shortened length of stay and hospital cost reduction with implementation of an accelerated clinical care pathway after elective colon resection. Surgery 2003;133:277-82.
14. Kehlet H. Fast-track surgery-an update on physiological care principles to enhance recovery. Langenbecks Arch Surg 2011;396:585-90.