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The Impact of a Short Hospital Stay on Readmission Rate after Laparoscopic Colorectal Cancer Surgery under the Enhanced Recovery after Surgery Protocol

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Abstract **Original Research Article**

Objective: The aim of this study is to examine the safety of discharge after a one or two day hospital stay following laparoscopic colorectal cancer surgery under the enhanced recovery after surgery protocol. ***Methods:*** This retrospective study was conducted at the colorectal unit in the King Hussein Military Hospital. All patients who underwent laparoscopic resection of colorectal cancer between January 2020 and December 2023 were included and grouped according to their hospital stay: Group A had a short stay of one to two days, and Group B a stay of more than two days. Demographic information, type of surgery performed, postoperative complications, and readmission data were collected from the colorectal unit and hakeem data base. ***Results:*** Two hundred and eighty patients were included in this study: 104 patients in Group A and 176 patients in Group B. The mean age in Group A was 57.7 ± 12.82 years and in Group B 58.42 ± 13.04 years. In Group A, 46.1% were female, compared to 39.2% in Group B. The mean body mass index was similar in both groups. In Group A, 34.6% of patients were smokers, compared to 29% in Group B. The readmission rate was 9.6% in Group A and 11.4% in Group B. ***Conclusion:*** Early discharge of patient within two days following laparoscopic colorectal cancer resection is safe and was not associated with increased rates of readmission.

Keywords: Laparoscopic, colorectal, cancer.

INTRODUCTION

Colorectal surgery is performed to treat a wide range of diseases and results in major remodelling of the gastrointestinal tract. The incidence of colorectal cancer is increasing worldwide [1]. It was the leading cause of cancer-related deaths in Jordan in 2012, when it accounted for 2.2% of all deaths [2]. Colorectal surgery is associated with a 15–20% postoperative morbidity rate; long hospital stays ranging from 6–11 days [3] and readmission rate of 86–17% [4]. This impacts both the health system and patients negatively.

Laparoscopic resection of colorectal cancer has become the standard approach in the colorectal unit of the King Hussein Military Hospital and in many centres worldwide. Enhanced Recovery After Surgery (ERAS) or "Fast-Track" surgery, introduced by Henrik Kehlet in the 1990s, is an evidence-based set of guidelines that include Perioperative protocols to optimise patients' physiological status and improve recovery [5, 6]. Several modified ERAS protocols have been published by the ERAS committee, which is a nonprofit organization that promotes implementation of ERAS and develops continuously updated protocols based on modern evidence such as balancing the administration of fluids, less invasive approaches, changes from preoperative fasting to carbohydrate drinks 2 hours prior to surgery, early mobilisation, and avoidance of drains [7,8].

This is a retrospective study to assess the safety of discharge after a one or two day hospital stay following laparoscopic colorectal cancer surgery under the Enhanced Recovery After Surgery protocol at our Colorectal Unit and its influence on readmission rates and perioperative morbidity and mortality.

MATERIAL AND METHODS

This is a retrospective study that was conducted at a quaternary care centre over a period of 48 months (January 2020 to December 2023). Laparoscopic colorectal cancer resections were performed for 280 adult patients (the study group) at our colorectal surgery unit. These were grouped into Group A (short) who had a one or two day hospital stay (104 patients) and Group B, who stayed for more than two days (176 patients).

Data including demographics, smoking habit, body mass index (BMI), American Society of Anesthesiologists (ASA) grade, type of surgery, presence and type of stoma, primary hospital stay (PHS), readmission rate, and postoperative complications were recorded. Readmission was defined as returning to the hospital within 30 days of discharge. Complications were classified according to the Clavien-Dindo classification of surgical complications. The primary end point was to compare readmission rates in Group A and Group B. The secondary end points includes postoperative morbidity and mortality.

Patients who underwent open or laparoscopic surgery for benign disease and who underwent open or laparoscopic converted to open surgery for malignant disease were excluded. Informed consents was signed by all patients. Approval by our institution ethical committee was obtained for this study. Statistical analysis was performed using an Excel data sheet. Descriptive statistics are displayed as means, frequencies, and percentages. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Over a study period of 48 months, 280 patients underwent laparoscopic colorectal resection for malignant disease at our institute. Of these, 41.8% were female. The age range was 18 to 90 years. The mean age for Group A was 57.67 ± 12.82 years, and for Group B 58.42 ± 13.04 years ($p = 0.3$). A laparoscopic approach and the ERAS protocol were used in the operative and perioperative management of all 280 patients, as shown in Table 1.

Operative data including type of surgery and presence and type of stoma are detailed in Table 2. The primary outcome in the study design was assessment of readmission rate, as shown in Table 3. The readmission rate for Group A was 9.6% compared to 11.4% in Group B, but this was not significantly different ($p = 0.05$). There were significant difference in postoperative overall morbidity, which was 13.4% in Group A and 22.7% in Group B ($p < 0.05$) (Table 3).

Of note, there was an increase in the percentage of patients who were discharged within less than 48 hours in the last two years of the study period (41.5%) compared to the first two years (31.4%), as shown in Table 4.

Table 1: Demographic and clinical data

	A	B	P value
Number	104(37.1%)	176(62.9%)	
Mean Age Range SD	57.67307692 18-88 12.8270363	58.42 19-90 13.043	0.3
Gender (% females)	48(46.1%)	69(39.2%)	
Mean BMI SD	29.06 4.7	28.5 5.3	0.2
Smoking habit (% Smoker)	36(34.6%)	51(29%)	
ASA class (%) 1 II III	 49(47.1%) 48(46.2%) 7(6.7%)	 88(50%) 74(42%) 14(8%)	0.025
Stage of tumor Early stage I and II Late stage III and IV	 66 (63.4%) 38(36.6)	 (53.4%)94 82(46.6%)	0.05

Table 2: Operative data

	ALL	A	B
Elective (%)	280	104	176
Procedure-Number (%) Rectal surgery (%) Anterior resection Low-anterior resection Abdominoperineal resection Pelvic exenteration Total proctocolectomy	 186(66.4%) 78 75 24 4 5	 72(69.2%) 42 26 3 0 1	 114(64.8%) 36 49 21 4 4

	ALL	A	B
Colonic surgery (%)	94(33.6%)	32(30.8%)	62(35.2%)
Right colectomies	60	21	39
Left colectomies	16	6	10
Total & subtotal colectomies	18	5	13
Stoma (%)	106(37.8%)	29(27.9%)	77(43.7%)
End colostomy	29	3	26
Loop Ileostomy	74	26	48
End Ileostomy	3	0	3

Table 3: Studied outcomes

	All	A	B	P value
Readmission rate	30(10.7%)	10(9.6%)	20(11.4%)	0.05
Readmission rate in rectal resection		5(55.5%)	15(75%)	
Readmission rate in colonic resection		4(44.5%)	5(25%)	
Complications Number (%) No complications Clavien grade I Clavien grade II Clavien grade III		14(13.4%) 4(3.8%) 7(6.7%) 3(2.9%)	40(22.7%) 8(4.5%) 25(14.2%) 7(3.9%)	0.05

Table 4: distribution of patients in the period of the study

	all	A	A one day	b
First two year	121	38(31.4%)	2(5%)	83(68.6%)
Last two year	159	66(41.5%)	6(9%)	93(58.5%)

DISCUSSION

ERAS aims to optimise patients' preoperative physiological status to reduce the stress response to surgery and improve recovery, thereby reducing the length of hospital stay and reducing postoperative morbidity and mortality [5,6].

ERAS criteria for discharge include many factors, such as whether the patient can tolerate an oral diet and open their bowels before leaving the hospital. They should also have normal vital signs and laboratory result. We do not wait for the return of patient gastrointestinal function and this not associated with increased readmission rates. Many studies have shown that the main cause of increased length of stay is delays in bowel recovery: in a retrospective study of 497 patients, Stephan *et al.*, [9] reported that early discharge before a patient had opened their bowels was safe and was not associated with more complications. Also, a large multicentric cohort study found that sending patients home before the return of gastrointestinal function was safe [10].

Another important factor that usually delays discharging patients is the patients' fear of going home and experiencing a complication of surgery at home. We manage this by providing counselling before the operation to teach the patients to deal with a stoma. We also keep in contact with the patients by providing them with a leaflet about warning signs, and how to manage these, and when they need to seek help at the emergency department.

The primary outcome in this study was to assess the safety of discharge after a one or two day hospital stay compared with standard discharge in 3–5 days following laparoscopic colorectal cancer surgery under the Enhanced Recovery After Surgery protocol at our colorectal unit. We did this by recording the 30-day readmission rate for both groups, which was lower in Group A (9.6 vs.11.4 %, $p = 0.0588$); and by recording the complication rate, which was lower in Group A than Group B (13.4% vs. 22.7%, $p < 0.05$). Early discharge was therefore not associated with a higher rate of readmission or of post operative complications. In their large study over 26,072 patients who underwent non-emergent right colectomy for colon cancer, Malcom *et al.*, [11] concluded that thirty-day readmission rate for those who underwent early discharge was less than the late discharge group (7% vs. 20%), which is very similar to our result.

By dividing the period of study into first two years and last two years, we found that the rate of early discharge was increased in the last two years from 31.4% to 41.5%, and there were more patients discharge on the first day post-surgery (5% vs. 9%). This may be related to increased confidence of the team regarding the safety of early discharge, and greater awareness of the application of the ERAS protocol.

Both groups were operated on by the same team and were comparable in terms of demographic and medical characteristics, as well as operative details. Many demographic factors may affect the decision to discharge early, including age, gender, smoking habit, as well as the medical condition of the patients. which was

considered by classify the patients according to ASA score. We found that there was no difference in age and BMI despite it being generally believed that obese and elderly patients have more prolonged recoveries and higher rates of postoperative morbidity and mortality. Regarding the physiological state of the patients, which was measured by ASA score, we found a slight increase in the percentage of medically fit patients (93.3% versus 92%) and greater predominance of females in the early discharge group. Clement Tavernier *et al.*, on his study included the criteria for selection of patients who are fit for early discharge and he conclude that the ASA score was higher in the early discharge group with no difference in the BMI, but a lower percentage of females were discharged early [12].

In our study the prevalence of the presence of a stoma was higher in Group B compared to Group A (43.7% vs. 27.9%). A retrospective study by Emmanuel *et al.*, [13] reported that the percentage of presence of stoma was associated with delayed discharge 15% have stoma comparing with 33% of patients in the delay group have stoma and this may be explained by that the patients with stoma may not prefer to discharge home early till they can accept and deal with stoma appropriately. This emphasises the importance of pre-operative and postoperative stoma education in encouraging patients for early discharge. With regard to the pathological stage of tumours, we found in our study that Group A had a higher percentage of patients with an early stage of tumour (63.4% vs. 53.4% in Group B) and this may be related to the operation time.

CONCLUSION

The early discharge of patients within two days of laparoscopic colorectal cancer resection is safe and was not associated with an increased rate of readmission.

REFERENCE

1. Arnold, M., Sierra, M. S., Laversanne, M., Soerjomataram, I., Jemal, A., & Bray, F. (2017). Global patterns and trends in colorectal cancer incidence and mortality. *Gut*, *66*(4), 683-691.
2. JordanWHO statistical profile, WHO. 2015. Available from:
3. http://www.who.int/gho/countries/jor.pdf
4. Rawlinson, A., Kang, P., Evans, J., & Khanna, A. (2011). A systematic review of enhanced recovery protocols in colorectal surgery. *The Annals of The Royal College of Surgeons of England*, *93*(8), 583-588.
5. Doumouras, A. G., Tsao, M. W., Saleh, F., & Hong, D. (2016). A population-based comparison of 30-day readmission after surgery for colon and rectal cancer: How are they different?. *Journal of Surgical Oncology*, *114*(3), 354-360.
6. Scott, M. J., Baldini, G., Fearon, K. C. H., Feldheiser, A., Feldman, L. S., Gan, T. J., ... & Carli, F. (2015). Enhanced Recovery After Surgery (ERAS) for gastrointestinal surgery, part 1: pathophysiological considerations. *Acta Anaesthesiologica Scandinavica*, *59*(10), 1212-1231.
7. Feldheiser, A., Aziz, O., Baldini, G., Cox, B. P. B. W., Fearon, K. C. H., Feldman, L. S., ... & Carli, F. (2016). Enhanced Recovery After Surgery (ERAS) for gastrointestinal surgery, part 2: consensus statement for anaesthesia practice. *Acta Anaesthesiologica Scandinavica*, *60*(3), 289-334.
8. Gustafsson, U. O., Scott, M. J., Schwenk, W., Demartines, N., Roulin, D., Francis, N., ... & Ljungqvist, O. (2013). Guidelines for perioperative care in elective colonic surgery: Enhanced Recovery After Surgery (ERAS®) Society recommendations. *World journal of surgery*, *37*, 259-284.
9. Melnyk, M., Casey, R. G., Black, P., & Koupparis, A. J. (2011). Enhanced recovery after surgery (ERAS) protocols: Time to change practice?. *Canadian Urological Association Journal*, *5*(5), 342.
10. Robitaille, S., Wang, A., Liberman, A. S., Charlebois, P., Stein, B., Fiore Jr, J. F., ... & Lee, L. (2023). A retrospective analysis of early discharge following minimally invasive colectomy in an enhanced recovery pathway. *Surgical Endoscopy*, *37*(4), 2756-2764.
11. Safety of hospital discharge before return of bowel function after elective colorectal surgery. *Journal of British Surgery*, 2020, 107.5: 552-559.
12. Squires, M. H., Donahue, E. E., Wallander, M. L., Trufan, S. J., Shea, R. E., Lindholm, N. F., ... & Salo, J. C. (2023). Factors Associated with Early Discharge after Non-Emergent Right Colectomy for Colon Cancer: A NSQIP Analysis. *Current Oncology*, *30*(2), 2482-2492.
13. Tavernier, C., Flaris, A. N., Passot, G., Glehen, O., Kepenekian, V., & Cotte, E. (2022). Assessing criteria for a safe early discharge after laparoscopic colorectal surgery. *JAMA surgery*, *157*(1), 52-58.
14. Emmanuel, A., Chohda, E., Botfield, C., & Ellul, J. (2017). Accelerated discharge within 72 hours of colorectal cancer resection using simple discharge criteria. *The Annals of The Royal College of Surgeons of England*, *100*(1), 52-56.