Twenty-four Hours Stay After Colorectal Surgery; A Systematic Review

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Abstract

Introduction The introduction of Enhanced Recovery After Surgery led to increasing twenty-four hours discharge pathways, for example in laparoscopic cholecystectomy and bariatric surgery. However, implementation in colorectal surgery still must set off. This systematic review assesses safety and feasibility of twenty-four hours discharge in colorectal surgery in terms of readmission and complications in current literature. Secondary outcome was identification of factors associated with success of twenty-four hours discharge.

Methods Pubmed and EMBASE databases were searched to identify studies investigating twenty-four hours discharge in colorectal surgery, without restriction of study type. Search strategy included keywords relating to ambulatory management and colorectal surgery. Studies were scored according to MINORS score.

Results Thirteen studies were included in this systematic review, consisting of six prospective and seven retrospective studies. Number of participants of the included prospective studies ranged from 5 to 157. Median success of discharge was 96% in the twenty-four hours discharge group. All prospective studies showed similar readmission and complication rates between twenty-four hours discharge and conventional postoperative management. Factors associated with success of twenty-four hours discharge were low ASA classification, younger age, minimally invasive approach, and relatively shorter operation time.

Conclusions Twenty-four hours discharge in colorectal surgery seems feasible and safe, based on retro- and prospective studies. Careful selection of patients and establishment of a clear and adequate protocol are key items to assure safety and feasibility. Results should be interpreted with caution, due to heterogeneity. To confirm results, an adequately powered prospective randomized study is needed.

Keywords
- ERAS
- ambulatory
- 24 hours discharge
- twenty-four hours stay
- hospitalization
- colorectal

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Introduction

Colorectal cancer is the second leading cause of cancer death worldwide, accounting for almost one million deaths in 2020 worldwide.[1] Surgery is a cornerstone in the curative treatment of colorectal cancer. Last decades, major developments improved postoperative outcomes and resulted in faster discharge in colorectal surgery. Examples of these developments are new minimally invasive surgical techniques as laparoscopy and robot assisted surgery.[2–5] Meanwhile, Enhanced Recovery After Surgery (ERAS) was implemented, which enhanced and fastened recovery and improved postoperative care from a patient, medical, financial and logistic perspective.[6,7] For example in laparoscopic cholecystectomy, this even led to successful twenty-four hours discharge for 96% of patients and reduced length of stay for this entire patient population.[8–13] This was cost-effective and increased bed capacity without increased readmission rates.[9,12,14] These benefits are important considering the increasing healthcare costs worldwide.[15]

Twenty-four hours discharge has been expanded to other types of gastrointestinal surgery, such as laparoscopic sleeve gastrectomy and Roux-en-Y gastric bypass, where it is also safe and feasible.[16,17] Despite these developments, wide implementation of twenty-four hours discharge still must set off in colorectal surgery. Theoretically advantages are those found in other types of surgery; lower morbidity, earlier return to work, reduction of costs and increase of bed capacity.[14,18]

Since severe complications can occur in colorectal surgery, such as anastomotic leakage, safety, and feasibility in terms of complications and readmission should be carefully considered before wider implementation. On the other side, severe complications such as anastomotic leakage require early detection and treatment.

Therefore, this systematic review assesses whether twenty-four hours discharge is feasible and safe in colorectal surgery. Secondary aim was to determine the characteristics of twenty-four hours discharge pathways and criteria for patient selection.

Methods

This review was pre-registered in the PROSPERO database under ID CRD42021283836.

Literature Search and Eligibility Criteria

This systematic review was conducted according to the PRISMA guidelines for reporting systematic review.[19] Two researchers (I.S. and B.S.) independently performed a structured search of two different electronic databases PubMed and EMBASE on December 7th, 2022. The search strategy consisted of synonyms for 24 hours discharge and colorectal surgery (►**Supplementary Table S1**). References lists of eligible studies were screened to identify relevant articles that were not found in the original search, and related studies. Studies were included if they reported on a postoperative pathway which aimed for 24 hours discharge after colorectal surgery. Patients' series and comparative studies were eligible. There was no restriction for language or date limits. Case reports, editorial letters, conference abstracts were excluded. The search was repeated on January 22nd 2023 which provided on additional studies.

Quality Assessment

The methodological quality of all studies was independently assessed by two researchers (I.S. and B.S.), using validated methodological index for non-randomized studies (MINORS score).[20] The CASP (Critical Appraisal Skills Program) was used for quality assessment of randomized control trials. Studies were not excluded based on the quality assessment.[21] Disagreement over inclusion of studies was resolved through discussion with a third independent researcher (T. W.).

Data Extraction

Data were retrieved by two independent researchers (I.S. and B.S.). Extracted data included 1) study characteristics: author, year, study period, study design, country, included patients and inclusion criteria; 2) protocols used in the studies; 3) baseline characteristics: mean age, sex, ASA score, comorbidity, site of surgery and surgical indications; and 4) outcomes: success of discharge within twenty-four hours, mean length of stay, readmission, complications, complications grade, mortality, pneumonia, anastomotic leakage, and wound infections; 5) quality of life (EQ-5D-5L) and patient satisfaction (20-questionnaire). Outcomes were retrieved with confidence intervals and p-values (if available) and summarized in a table.

Outcome Measurements

Predefined primary outcome was safety of discharge within twenty-four hours, expressed in complication rates. Secondary outcomes were readmission rates, initial length of stay, total length of stay and identification of factors which were associated with success of twenty-four hours discharge pathway.

Results

The literature search yielded 2212 studies. After removal of duplicates and screening on title and abstract, 87 articles were full text screened for eligibility. Of the 87 articles, 57 were excluded due to non-relevance based on full-text review or type of article, 6 were editorials and 11 were conference abstract. After application of in/exclusion criteria, a total of thirteen articles were included in this review.[22–31] No additional articles were found through reference check. A PRISMA flowchart of study selection is provided in ►**Figure 1**.

Baseline Characteristics

This review included fourteen studies: seven retrospective, six prospective and one randomized control trial. Study characteristics are shown in ►**Table 1**. Sample size widely differed ranging from 5 to 157 for prospective studies and 55

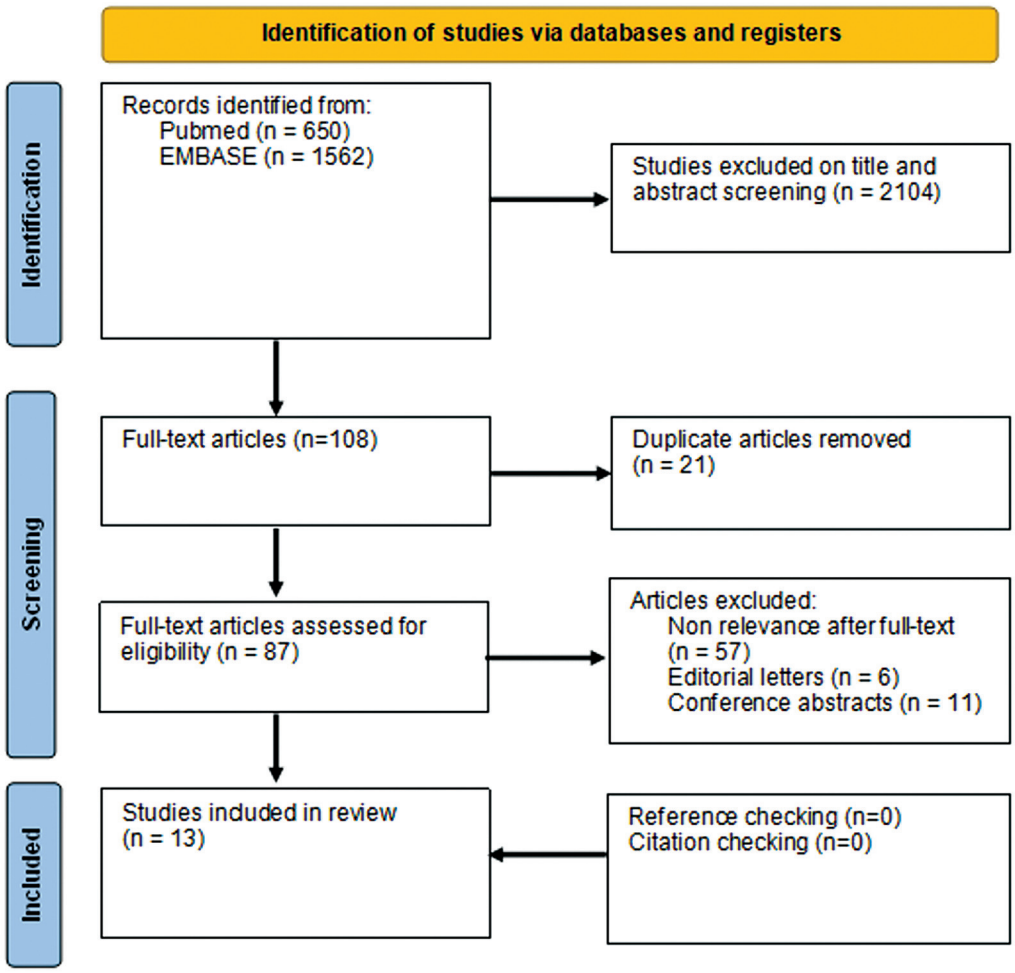

Fig. 1 PRISMA flow diagram representing search and screening process of articles

to 115,858 patients for retrospective studies.[25,26,29,31] As for type of procedures, six of the studies included all types of colorectal surgery[22,27,28,30,32] and eight studies included colectomies only.[24–26,29,31,33–35] Seven studies assessed safety, feasibility and postoperative morbidity outcomes of twenty-four hours discharge, with or without home surveillance.[25–27,30–33] Seven of the studies assessed preoperative variables to identify patients who would be suitable for 24 hours discharge.[22,24,28,29,31,34,35] In- and exclusion criteria from included prospective studies are shown in ►**Supplementary Table S2**.

Quality Assessment

The total MINORS score of the included studies is noted in the ►**Supplementary Table S3**. On average MINORS score was 15.5, with a range of 8-22.

24 hours Discharge Protocol

Twelve of the fourteen studies provided information on the protocol that was used in their patients.[22,24–28,30–33,35] Most elements were modifications of the conventional ERAS® society recommendations.[36] These consist of preoperative consultation on expectations, minimally invasive surgery, as little as possible invasive perioperative actions, early mobilization, early intake and clear discharge criteria. The provided information on study protocols is described in ►**Supplementary Table S4**. Sadaat et al, did not report the perioperative protocol since they conducted a national registry study which did not contain this information.

Length of Stay

There were eight studies reporting quantitative data on length of stay. Four studies compared outcomes of a 24-hour discharge pathway to conventional ERAS management. A 24-hour discharge pathway reduced length of stay compared to conventional management in all studies. Median success rate of 24 hours discharge was 96% in the included prospective studies with a range from 33 to 100%. Chasserant reported the shortest initial length of stay in the 24 hours discharge group (median 2 hours [range 1-4 hours]).[25] Besides initial length of stay, The total reduction of length of stay was reported in a range of 24-92 hours less compared to conventional treatment in the included studies. An overview of length of stay is reported in ►**Table 1**.

Discharge Criteria

Ten studies gave a description of their discharge criteria, which are shown in ►**Supplementary Table S4**. Gignoux used

Table 1 Baseline characteristics

Study	Country	Design	Study duration, months	Total of patients	ED, n	ERAS, n	Success <24hr discharge	LOS <24hr	LOS ERAS	Readmission <24hr	Readmission ERAS	Complication <24hr	Complication ERAS	CD >2 <24hr	CD >2 ERAS
Kiran, et al 2022	USA	Prospective, single centre	12	87	29	58	29 (33)	Mean 17.2 hours, ± 7.4	Mean 109 hours, ± 102.9	4 (14)	4 (7)	4 (14)	17 (30)	0 (0)	2 (3)
Lee, et al 2021	Canada	Prospective, single centre	10	121	48	73	37 (77)	0 days IQR [0-0 days]	2 days IQR [1-4]	3 (6)	3 (4)	8 (17)	11 (15)	NR	NR
Gignoux, et al 2019	France	Prospective, single centre	47	157	157	–	146 (93)	10 hours [7-14 hours]	–	9 (6)	–	39 (25)	–	6 (4)	–
Chasserant, et al 2016	France	Prospective, single centre	12	40	40	–	39 (98)	2 hours [1-4 hours]	–	0 (0)	–	1 (3)	–	0 (0)	–
Levy, et al, 2009	United Kingdom	Prospective, single centre, single surgeon	NR	40	10	30	10 (100)	23 hours IQR [23-23 hours]	77 hours IQR [58-94 hours]	0 (0)	NR	0 (0)	NR	0(0)	–
Gignoux et al, 2015	France	Prospective pilot, single centre	16	5	5	–	5 (100)	11 hours [10-12 hours]	–	0 (0)	–	2 (40)	–	0 (0)	–
Curfman et al, 2022	USA	Retrospective, single centre	35	326	115	211	–	NR	NR	1 (1)	NR	1 (1)	NR	0 (0)	NR
Popeskou, et al 2022	United Kingdom	Retrospective, multi centre	120	833	51	782	–	NR	NR	4 (7)	72 (9)	NR	NR	2 (4)	15 (3)
De Azevedo et al, 2021	Brazil	Retrospective, single centre	120	664	237	427	–	NR	NR	16 (7)	NR	16 (7)	NR	2 (1)	NR
Studniarek et al, 2021	USA	Retrospective, single centre, single surgeon	36	360	78	282	–	NR	NR	6 (7)	25 (9)	8 (10)	42 (15)	2 (3)	1 (0)
Saadat, et al 2020	USA	Retrospective, national	60	155,858	1905	113,953	–	NR	NR	115 (6)[a]	10256 (9) [a]	NR	NR	27 (1)	4437 (4)
Dobradin, et al, 2013	USA	Retrospective single centre, single surgeon	12	55	7	48	–	Mean 22hr [range 18-24 hours]	NR	0 (0)	NR	0 (0)	NR	0 (0)	NR
Brandt, et al 2013	Denmark	Retrospective single centre	45	233	24	209	–	NR	NR	0 (0)	4 (2)	0 (0)	20 (10)	0 (0)	9 (4)

ED= Early Discharge, ERAS = Enhanced Recovery After Surgery, CD= Clavien Dino, NR = not reported. Values reported as Median [range] and n (%), unless reported differently. *a* = P value <0.05.

the existing Chung exit criteria in both studies.[25,37] The Chung exit criteria considers vital signs, mobilisation, nausea and vomiting, pain, and surgical bleeding as factors for discharge. Chasserant, followed the Post Anaesthetic Discharge Scoring System (PADSS) which takes vital signs, ambulation, nausea/vomiting, pain, bleeding and voiding into account.[38] The other eight studies included local checklists as part of their discharge protocol, which included mobilization, pain control, oral intake, vital parameters, and patient approval of discharge. Patients were discharged when they met all the criteria.

Complications

In the included studies, 24 hours discharge protocol was not associated with significant higher complication rates. Twelve of the thirteen studies reported on complications, both prospective and retrospective. However, only five studies compared outcomes to conventional ERAS management.[24,28,32,33] None of the comparing studies showed a significant difference in complications rates. A few smaller sized studies observed no complications in their 24 hours discharge study participants.[24,30,31] Three studies compared mortality rates between groups, which were all not significant.[25,28,29] Complications were reported with a wide range of rates from 0 to 40%. However, the incidence of serious complications (Clavien Dindo >2) was low, with a range from 0 to 4%. An overview of complication rates can be found in ►**Table 1**.

Readmission

All studies reported on readmission rates, but only six compared their outcomes to conventional ERAS management.[22,28,29,32,33,35] Saadat, found a significant decrease in readmission rate in the 24 hours discharge group (24 hours discharge group 6.3% versus conventional ERAS 9.3%, $p < 0.001$).[29] The other five studies showed comparable readmission rates between groups. An overview of readmissions rates can be found in ►**Table 1**.

Home Surveillance and Follow-up

A striking addition to the conventional ERAS protocol, is the intensity of post-operative follow-up in some of the included studies. Follow-up at home was intensified in four studies by daily use of a mobile platform app, daily surveillance by a specialized nurse at home or laboratory testing at home.[25–28] However, there are studies who chose a less intensive follow-up scheme. For instance, Levy, chose a follow-up with a onetime telephonic consultation on the evening of discharge and follow-up appointment after seven days.[30] Besides four of the studies showed a follow-up with only outpatient visit on postoperative day seven or ten, in combination with telephonic availability of the hospital staff after discharge.[22,24,30,31] Follow-up schemes are summarized in ►**Supplementary Table S4**.

Quality of Life and Patient Satisfaction

Quality of life is not frequently reported in the current literature on 24 hours discharge pathways. Only Lee addressed patient satisfaction in a 6-item questionnaire using 5-level Likert scales. In this study 80% of the participants felt no need for longer admission and 94% was satisfied with the postoperative home recovery.

Factors Associated with Discharge within 24 Hours

Factors associated with 24 hours discharge were identified in five studies. Lower ASA score, younger age, minimally invasive approach, and shorter operation time seem to positively influence outcomes in terms of success rate and readmission rates in 24 hours discharge.[22,24,28,29,31] Additionally de Azevedo, described higher age as a risk factor for readmission in the 24 hours discharge group. Also, perioperative complications and higher tumour stage were identified as a risk for longer hospital stay.[29,31] In the nationwide database study Saadat, also associated following factors with longer hospital stay presence of inflammatory bowel disease, diabetes, low albumin levels or bleeding disorders, need for preoperative blood transfusion, chemotherapy and perioperative steroid therapy.

Discussion

This systematic review assessed safety and feasibility of a discharge within twenty-four hours pathway in colorectal patients and determining factors which are associated with discharge within twenty-four hours. This review indicates that discharge within twenty-four hours in selected patients in colorectal surgery may be feasible without rising postoperative complications and readmission rates. Twenty-four hours discharge after surgery seems to benefit from establishment of a clear protocol and careful patient selection.

Median success rate of 24 hours discharge protocol was 96% in the included studies. Even though not all patients successfully completed the 24 hours discharge protocol, all studies reporting on length of stay showed a significant decrease in length of stay in the 24 hours discharge group, in comparison to conventional treatment. This is in line with the reduction in length of stay which is described in previous research in laparoscopic cholecystectomy and bariatric surgery with discharge within twenty-four hours.[12,13,17]

No 30-day mortality was observed, and readmission rates were low in the 24 hours discharge group, which may be due to patient selection but could also suggest an effect of telemonitoring after discharge in the prevention of readmission. Included studies showed a wide complication range, whilst incidence of serious complications remained low. The wide range of complications may be partly explained by the variance in sample sizes. However, local postoperative management and hospital volume could also affect complication rates.[39,40]

As for patient selection for twenty-four discharges, most studies followed inclusion criteria on age, good clinical condition, uncomplicated minimally invasive elective surgery, full understanding and favourable social conditions (defined as accompanying person at home, living in a non-isolated and non-hostile environment). This was in line with

factors that were associated with 24 hours discharge. Gignoux also reported a number of hospital admissions due to poor social conditions, which may have been prevented by addressing social conditions more carefully during patient selection.[25,41] Setting expectations on discharge and hospitalization is known to reduce length of stay after colorectal surgery within the existing Enhanced Recovery After Surgery program.[42] Since there is a wide variability in discharge criteria after colorectal surgery, pre-defined discharge criteria may prevent elongated stay.[43,44]

A striking modification to the conventional ERAS principles in the included studies was the development of post-discharge telemonitoring surveillance, to contribute to the safety of discharge within twenty-four hours. Although home monitoring seems mandatory in 24 hours discharge, the studies which follow a more conventional follow-up show similar complication rates. This may suggest that an intense follow-up approach is not mandatory for adequate detection of postoperative complications. Quality and usability of home monitoring technology in follow-up have yet to be further verified in good quality studies.[45]

Patient satisfaction was only reported in one of the included studies.[32] Quality of life and patient satisfaction were high and comparable with control group. This confirms previous research, which concluded that patient's satisfaction is based on wellbeing (in terms of complication rates), stoma presence and cancer free survival. Length of stay and minimal invasive approach were deemed as less important in assessment of quality of life.[46] This may suggest that 24 hours discharge provides shorter length of stay without compromising patient satisfaction, although this needs more confirmation in future research.

This is the first review to describe safety and feasibility of discharge within 24 hours in colorectal surgery in current literature. However, results should be interpreted with caution due to great heterogeneity in study design, populations, sample size and reported outcomes of the literature up to now. Many of the included studies have a retrospective or non-comparative character with a risk of selection bias. Additionally, there is risk of bias by the non-blinding nature of studies, differences in patients' demographics and health care systems. This heterogeneity between studies disabled the performance of a meta-analyses. As a result, clinical outcomes and possible advantages may not be generalizable for every population and healthcare system. Also, some important topics of interest were scarcely reported in included studies, such as patients' satisfaction and quality of life.

Conclusion

This review indicates that discharge within twenty-four hours after colorectal surgery seems safe. However careful selection of patients and establishment of a clear and adequate protocol are key items to assure safety and feasibility. These findings pave the way for development of a discharge within twenty-four hours pathway for selected patients in colorectal surgery. To confirm the results of this study, an adequately powered prospective study is needed on twenty-four hours discharge after colorectal surgery compared to conventional treatment, where quality of life and patients' satisfaction is considered as well.

Authors' Contributions

Substantial contributions to the conception and design of the work: Smalbroek, Schuffel, Weijs, Smits
Drafting the article: Smalbroek. Schuffel
Revising the article critically for important intellectual content: Weijs, Dijksman, Poelmann,, Boerma, Smits
Final approval of the version to be published: Smalbroek, Schuffel, Weijs, Dijksman, Poelmann, Wijffels, Smits
All authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Availability of Data

All data used is present in this article or supplementary material.

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Conflict of interests

A.B. Smits is an independent contractor as a surgeon proctor at Intuitive surgical Inc. Other authors declare no conflict of interest.

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References

1 Sung H, Ferlay J, Siegel RL, et al. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA Cancer J Clin 2021;71(03): 209–249
2 Zhao D, Li Y, Wang S, Huang Z. Laparoscopic versus open surgery for rectal cancer: a meta-analysis of 3-year follow-up outcomes. Int J Colorectal Dis 2016;31(04):805–811
3 Zhang X, Wu Q, Hu T, Gu C, Bi L, Wang Z. Laparoscopic Versus Conventional Open Surgery in Intersphincteric Resection for Low Rectal Cancer: A Systematic Review and Meta-Analysis. J Laparoendosc Adv Surg Tech A 2018;28(02):189–200
4 Trinh BB, Jackson NR, Hauch AT, Hu T, Kandil E. Robotic versus laparoscopic colorectal surgery. JSLS 2014;18(04):e2014.00187
5 Zhang X, Wei Z, Bie M, Peng X, Chen C. Robot-assisted versus laparoscopic-assisted surgery for colorectal cancer: a meta-analysis. Surg Endosc 2016;30(12):5601–5614

6 Campbell S, Fichera A, Thomas S, Papaconstantinou H, Essani R. Outpatient colectomy-a dream or reality? Proc Bayl Univ Med Cent 2021;35(01):24–27
7 Cavallaro P, Bordeianou L. Implementation of an ERAS Pathway in Colorectal Surgery. Clin Colon Rectal Surg 2019;32(02):102–108
8 Balciscueta I, Barberà F, Lorenzo J, Martínez S, Sebastián M, Balciscueta Z. Ambulatory laparoscopic cholecystectomy: Systematic review and meta-analysis of predictors of failure. Surgery 2021;170(02):373–382
9 Gurusamy K, Junnarkar S, Farouk M, Davidson BR. Meta-analysis of randomized controlled trials on the safety and effectiveness of day-case laparoscopic cholecystectomy. Br J Surg 2008;95(02): 161–168
10 Ahmad NZ, Byrnes G, Naqvi SA. A meta-analysis of ambulatory versus inpatient laparoscopic cholecystectomy. Surg Endosc 2008;22(09):1928–1934
11 Greilsamer T, Orion F, Denimal F, et al. Increasing success in outpatient laparoscopic cholecystectomy by an optimal clinical pathway. ANZ J Surg 2018
12 Trevino CM, Katchko KM, Verhaalen AL, Bruce ML, Webb TP. Cost Effectiveness of a Fast-Track Protocol for Urgent Laparoscopic Cholecystectomies and Appendectomies. World J Surg 2016;40 (04):856–862
13 Calland JF, Tanaka K, Foley E, et al. Outpatient laparoscopic cholecystectomy: patient outcomes after implementation of a clinical pathway. Ann Surg 2001;233(05):704–715
14 Topal B, Peeters G, Verbert A, Penninckx F. Outpatient laparoscopic cholecystectomy: clinical pathway implementation is efficient and cost effective and increases hospital bed capacity. Surg Endosc 2007;21(07):1142–1146
15 Global spending on health: Weathering the storm. 2020
16 Aftab H, Fagerland MW, Gondal G, Ghanima W, Olsen MK, Nordby T. Gastric sleeve resection as day-case surgery: what affects the discharge time? Surg Obes Relat Dis 2019;15(12):2018–2024
17 Barbat S, Thompson KJ, Mckillop IH, Kuwada TS, Gersin K, Nimeri A. Ambulatory bariatric surgery: does it really lead to higher rates of adverse events? Surg Obes Relat Dis 2020;16(11):1713–1720
18 Friedlander DF, Krimphove MJ, Cole AP, et al. Where Is the Value in Ambulatory Versus Inpatient Surgery? Ann Surg 2021;273(05): 909–916
19 Moher D, Shamseer L, Clarke M, et al; PRISMA-P Group. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. Syst Rev 2015;4(01):1
20 Slim K, Nini E, Forestier D, Kwiatkowski F, Panis Y, Chipponi J. Methodological index for non-randomized studies (minors): development and validation of a new instrument. ANZ J Surg 2003;73(09):712–716
21 Hyde M, Higgs P, Wiggins RD, Blane D. A decade of research using the CASP scale: key findings and future directions. Vol. 19, Aging & mental health. England; 2015:571–575
22 de Azevedo JGM, Mendes CRS, Lima MA, et al. Laparoscopic colorectal surgery and discharge within 24 h-who is at risk for readmission? Colorectal Dis 2021;23(10):2714–2722
23 Lee L, Kelly J, Nassif GJ, deBeche-Adams TC, Albert MR, Monson JRT. Defining the learning curve for transanal total mesorectal excision for rectal adenocarcinoma. Surg Endosc 2020;34(04): 1534–1542
24 Brandt E, Poulsen M, Lykke J, Jess P, Ovesen H. A minority of patients discharged within 24. hours after laparoscopic colon resection. Dan Med J 2013;60(07):A4658
25 Gignoux B, Gosgnach M, Lanz T, et al. Short-term Outcomes of Ambulatory Colectomy for 157 Consecutive Patients. Ann Surg 2019;270(02):317–321
26 Gignoux B, Pasquer A, Vulliez A, Lanz T. Outpatient colectomy within an enhanced recovery program. J Visc Surg 2015;152(01): 11–15
27 Chasserant P, Gosgnach M. Improvement of peri-operative patient management to enable outpatient colectomy. J Visc Surg 2016; 153(05):333–337
28 Studniarek A, Borsuk DJ, Kochar K, Park JJ, Marecik SJ. Feasibility assessment of outpatient colorectal resections at a tertiary referral center. Int J Colorectal Dis 2021;36(03):501–508
29 Saadat LV, Mahvi DA, Jolissaint JS, et al. Twenty-Three-Hour-Stay Colectomy Without Increased Readmissions: An Analysis of 1905 Cases from the National Surgical Quality Improvement Program. World J Surg 2020;44(03):947–956
30 Levy BF, Scott MJP, Fawcett WJ, Rockall TA. 23-hour-stay laparoscopic colectomy. Dis Colon Rectum 2009;52(07):1239–1243
31 Dobradin A, Ganji M, Alam SE, Kar PM. Laparoscopic colon resections with discharge less than 24 hours. JSLS 2013;17(02): 198–203
32 Lee L, Eustache J, Baldini G, et al. Enhanced Recovery 2.0 - Same Day Discharge With Mobile App Follow-Up After Minimally Invasive Colorectal Surgery. Ann Surg 2021
33 Kiran RP, Herman K, Khoshknabi D, Angistriotis A, Church JM. Feasibility and Safety of Ambulatory Surgery as the Next Management Paradigm in Colorectal Resection Surgery. Ann Surg 2022;276(03):562–569
34 Curfman KR, Poola AS, Blair GE, et al. Ambulatory colectomy: a pathway for advancing the enhanced recovery protocol. J Robot Surg 2022; (0123456789): . Doi: 10.1007/s11701-022-01463-0
35 Popeskou SG, Christou N, Panteleimonitis S, Langford E, Qureshi T, Parvaiz A. Safety and Feasibility of a Discharge within 23 Hours after Colorectal Laparoscopic Surgery. J Clin Med 2022;11(17): 5068
36 Gustafsson UO, Scott MJ, Hubner M, et al. Guidelines for Perioperative Care in Elective Colorectal Surgery: Enhanced Recovery After Surgery (ERAS®) Society Recommendations: 2018. World J Surg 2019;43(03):659–695
37 Chung F. Discharge criteria–a new trend. Can J Anaesth 1995;42 (11):1056–1058
38 Palumbo P, Tellan G, Perotti B, Pacilè MA, Vietri F, Illuminati G. Modified PADSS (Post Anaesthetic Discharge Scoring System) for monitoring outpatients discharge. Ann Ital Chir 2013;84(06): 661–665
39 Ripollés-Melchor J, Ramírez-Rodríguez JM, Casans-Francés R, et al; POWER Study Investigators Group for the Spanish Perioperative Audit and Research Network (REDGERM) Association Between Use of Enhanced Recovery After Surgery Protocol and Postoperative Complications in Colorectal Surgery: The Postoperative Outcomes Within Enhanced Recovery After Surgery Protocol (POWER) Study. JAMA Surg 2019;154(08):725–736
40 Diers J, Baum P, Matthes H, Germer C-T, Wiegering A. Mortality and complication management after surgery for colorectal cancer depending on the DKG minimum amounts for hospital volume. Eur J Surg Oncol 2021;47(04):850–857
41 Diaz A, Barmash E, Azap R, Paredes AZ, Hyer JM, Pawlik TM. Association of County-Level Social Vulnerability with Elective Versus Non-elective Colorectal Surgery. J Gastrointest Surg 2021; 25(03):786–794
42 Tweed TTT, Woortman C, Tummers S, Bakens MJAM, van Bastelaar J, Stoot JHMB. Reducing hospital stay for colorectal surgery in ERAS setting by means of perioperative patient education of expected day of discharge. Int J Colorectal Dis 2021;36(07): 1535–1542

43 Emmanuel A, Chohda E, Botfield C, Ellul J. Accelerated discharge within 72. hours of colorectal cancer resection using simple discharge criteria. Ann R Coll Surg Engl 2018;100(01):52–56
44 Fiore JFJ Jr, Browning L, Bialocerkowski A, Gruen RL, Faragher IG, Denehy L. Hospital discharge criteria following colorectal surgery: a systematic review. Colorectal Dis 2012;14(03):270–281
45 Haveman ME, Jonker LT, Hermens HJ, Tabak M, de Vries J-PP. Effectiveness of current perioperative telemonitoring on postoperative outcome in patients undergoing major abdominal surgery: A systematic review of controlled trials. J Telemed Telecare 2021:1357633 × 211047710
46 Wrenn SM, Cepeda-Benito A, Ramos-Valadez DI, Cataldo PA. Patient Perceptions and Quality of Life After Colon and Rectal Surgery: What Do Patients Really Want? Dis Colon Rectum 2018; 61(08):971–978

