



Original Article

Evaluating Laparoscopic Versus Open Surgery for Management of Colorectal Carcinoma

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ABSTRACT

Objective: The aim of this study was to examine whether laparoscopic colorectal surgery improved the short-term postoperative outcomes in comparison with open surgery.

Methods: This is a retrospective cohort study. The study was conducted in the department of Minimal Access and General Surgery, Government Medical College and associated SMHS hospital, Srinagar, from March, 2019 – March, 2025. The study included 31 patients who underwent laparoscopic surgery for colorectal carcinoma and 20 patients who underwent open surgery for the same during the above-mentioned period.

Results: A total of 51 patients were included in the study out of which the laparoscopic group had a longer intra operative time compared to open study (200 ± 35 vs 174 ± 33 p value 0.0109). Whereas the laparoscopic group had a lower VAS pain score compared to open group (6 ± 1.7 vs 9 ± 1.3 p value < 0.0001) and the laparoscopic group also had a faster recovery and return to routine work compared to the open group (p value < 0.0001).

Conclusion: In conclusion, while there is no difference in the post operative quality of life between the laparoscopic and open surgery groups in colorectal cancers, the decreased post operative pain and faster recovery associated with laparoscopic surgery strongly suggests that it should be the preferred technique for surgeons with adequate experience.

Keywords: Laparoscopic colorectal surgery, colorectal cancer, open colorectal surgery, postoperative care

INTRODUCTION

Colorectal cancer represents one of the leading causes of cancer-related mortality in developed nations, contributing to over 10% of all cancer deaths. Surgical removal of the tumor remains the only definitive curative approach. Historically, this has been achieved through open surgery involving complete excision of the primary lesion. However, since the early 1990s, laparoscopic techniques have increasingly been adopted as an alternative approach. These procedures may be carried out entirely intracorporeally or with a component performed extracorporeally, as in laparoscopically assisted surgery.^{1,2}

Traditionally, postoperative recovery following colorectal resection has been prolonged and often associated with significant morbidity, typically requiring hospital stays ranging from several days to weeks.^{3,4} Since its introduction in 1991, laparoscopic colorectal surgery has gained widespread acceptance. Evidence from randomized controlled trials and meta-analyses indicates that the laparoscopic approach is associated with reduced hospital stay, decreased postoperative pain, and lower complication rates compared to open surgery.⁵⁻⁹ Furthermore, long-term oncological outcomes have been shown to be comparable between laparoscopic and open techniques.⁶ Laparoscopic colorectal resection is a technically complex procedure, characterized by a steep learning curve and longer operative durations, which contribute to its increased difficulty in the management of colorectal cancer.^{9,10}

The aim of the present study is to evaluate the clinical outcome of laparoscopic surgeries compared to open surgeries in colorectal carcinoma.

MATERIALS AND METHODS

This was a retrospective cohort study. The study was conducted at the Department of Minimal Access and General Surgery, Government Medical College and associated SMHS Hospital, Srinagar, from March, 2019 – March, 2025. The study population included patients between 18 – 80 years of age who underwent laparoscopic and open surgeries for colorectal carcinoma. The study included 31 patients who underwent laparoscopic surgery for colorectal carcinoma and 20 patients who underwent open surgery for the same during the above-mentioned period. The diagnosis of colorectal carcinoma was based on colonoscopy findings and confirmed by HPE of the biopsy taken which frequently came out to be moderately differentiated adenocarcinoma. The pre-operative staging [CECT based] in LS group ranged from CT2N0M0 to CT4N1M1 and in OS from CT1N0M0 to CT4N2M1. Relevant procedures were performed according to the location of the tumor as per standard protocol [Table 1]. An informed consent was obtained from every patient. The duration of surgery was taken a note of in each of the procedures performed.

PROCEDURES	OPEN	LAPAROSCOPIC
RIGHT HEMICOLECTOMY	3	4
EXTENDED RIGHT HEMICOLECTOMY	2	3
LEFT HEMICOLECTOMY	1	2
EXTENDED LEFT HEMICOLECTOMY	0	1
PANCOLECTOMY	0	3
ANTERIOR RESECTION	4	0
LOW ANTERIOR RESECTION	8	10
ULTRA LOW ANTERIOR RESECTION	0	1
ABDOMINO PERINEAL RESECTION	2	6
TOTAL ANOPROCTOCOLECTOMY	0	1
Total	20	31

In the post operative period, the following parameters were evaluated: post operative pain using visual analog scale (VAS), duration of hospital stay, lymph node yield, time taken to return to routine work. Statistical analysis was performed using appropriate statistical tools.

TABLE 1 Procedures performed in each group

No. of patients that underwent neoadjuvant chemotherapy in OS group were 6(4 LAR and 2 APR), whereas in LS GROUP there were 8 (4 APR, 3 LAR and 1 total APC).

RESULT

During the study period a total of 51 patients were evaluated; 31 patients underwent LS and 20 patients underwent OS for colorectal cancer. Both the groups were well matched in age and sex.

The mean operating time of LS group was 200 min \pm SD 35 min and that of the OS group was 174 min \pm SD 33 min. The difference in operating time was statistically significant (p value: 0.0109).

The pain score assessed by VAS in the two groups was statistically significant (p value:<0.0001). The mean days of hospital stay was 4 days for the LS group and 7 days for the OS group, which was statistically significant (p value:<0.0001).

The mean time taken to return to light work and routine work for the OS group was 24 days and 49 days, respectively, and for the laparoscopic group was 14 days and 28 days, respectively. Both of which were statistically significant (p value:<0.0001).

The mean lymph node yield for OS group was 16 and for that of the LS group was 17, which was statistically insignificant (p value:1.00).

The overall comparison of the patients in laparoscopic and open surgery group is shown in Table 2

	OPEN GROUP (N=20)	LAPAROSCOPIC GROUP (N=31)	P VALUE
AGE (YEARS)	62	62	1.0
SEX (M:F)	12:8	17:14	
INTRA OPERATIVE TIME	174	200	0.0109

(MIN)			
LYMPH NODE YIELD	16	17	1.0
VAS FOR PAIN	9	6	<0.0001
DURATION OF HOSPITAL STAY (DAYS)	7	4	<0.0001
RETURN TO LIGHT WORK (DAYS)	24	14	<0.0001
RETURN TO ROUTINE WORK (WEEKS)	7	4	<0.0001

Table 2

The overall mortality rate following laparoscopic colorectal surgery was 10%, of which 3% was attributable to postoperative ileostomy closure leak, 3% to heart failure and 4% to metastasis. The overall mortality rate following open colorectal surgery was also found to be 10%.

DISCUSSION

Laparoscopic colorectal surgery seems to be associated with less tissue injury than open surgery. Thus, some hypothetical benefits can be expected, such as better preservation of systemic immune function, a less pronounced postoperative inflammatory response, reduced postoperative pain, and faster recovery of intestinal motility and function. This might translate into an improved outcome. In contrast, the potential disadvantages of laparoscopic surgery are the longer operative time and the higher charges for surgical devices and instruments compared to open surgery. Moreover, two studies reported that laparoscopic surgery caused a higher mental strain for surgeons.^{11,12}

Previous studies comparing laparoscopic and open colorectal surgery found a significant shorter hospital stay following laparoscopy.¹³⁻¹⁶

Several RCTs have demonstrated that laparoscopic surgery for colon cancer is safe and feasible procedure. The quality of the surgical specimen and the long-term oncological outcomes of laparoscopic surgery are equivalent to those of open surgery; however, recovery, physiological function, and other short-term outcome measures are improved with laparoscopic approach.¹⁷⁻²¹

The major differences between the laparoscopic and open surgery group, in our study, were found to be that of decreased post-operative pain, faster recovery and return to routine work in the LS group as compared to the OS group.

In our study, LS for colorectal cancer was associated with significantly prolonged operative time. Although prolonged surgery was suggested to be a potential risk factor for development of postoperative pulmonary complications, the smaller incision size and lower pain score outweighed the risk.

While there is no significant difference in the oncological outcome and the case fatality rate in both the groups, LS was found to be associated with quicker recovery as a result of early ambulation and lesser post operative systemic complications.

In a study with rectal cancer patients, which used propensity score matching, laparoscopy had intraoperative costs which were 21% higher than the open approach ($P < .001$).²² However, evaluation of surgical costs was not feasible in our study, as all the procedures were performed in a government funded hospital where patients were not directly billed.

In the present study, the shorter hospital-stay following LS could be attributed to lower postoperative pain score in the said group leading to early ambulation and as a result the earlier recovery of bowel function and oral feeding.

This study is not without its limitations. It was conducted at a single centre with a relatively small sample size, which may not adequately represent the diversity of patient population and surgical practices elsewhere. Being a single centre study, the findings are influenced by the institutional protocols, available infrastructure and patient demographics specific to our setting, which may differ from those of other centres. It has been reported that hospital volume, surgeon volume, and the rate of LS may affect the outcome of colorectal surgery. Higher hospital and surgeon volume and higher laparoscopy rates are generally associated with better outcomes after LS for colorectal cancer.^{23,24}

Furthermore, all procedures were performed by a single surgeon, which, while ensuring uniformity in operative technique and postoperative management, also introduces a degree of operator bias and restricts the applicability of the results to surgeons with different levels of experience or variations in technique.

In light of these limitations, the findings should be interpreted with caution. Future multicentric studies with larger sample sizes and inclusion of surgeons with varying expertise are recommended to validate and expand on these results.

CONCLUSION

In conclusion, while there is no difference in the post operative quality of life in long term between the LS and OS groups in colorectal cancers, the decreased post operative pain and faster recovery associated with LS strongly suggests that it should be the preferred technique for surgeons with adequate experience.

REFERENCES

1. Jacobs M, Verdeja JC, Goldstein HS. Minimally invasive colon resection (laparoscopic colectomy). *Surg Laparosc Endosc.* 1991;1:144-150.
2. Franklin ME Jr, Ramos R, Rosenthal D, Schuessler W. Laparoscopic colonic procedures. *World J Surg.* 1993;17:51-56.
3. Kehlet H. Fast-track colorectal surgery. *Lancet.* 2008;371:791-793.
4. Wick EC, Shore AD, Hirose K, Ibrahim AM, Gearhart SL, Efron J, et al. Readmission rates and cost following colorectal surgery. *Dis Colon Rectum.* 2011;54:1475-1479.
5. Braga M, Vignali A, Gianotti L, Zuliani W, Radaelli G, Gruarin P, et al. Laparoscopic versus open colorectal surgery: a randomized trial on short-term outcome. *Ann Surg.* 2002;236:759-766; discussion 767.
6. Reza MM, Blasco JA, Andradas E, Cantero R, Mayol J. Systematic review of laparoscopic versus open surgery for colorectal cancer. *Br J Surg.* 2006;93:921-928.
7. Guillou PJ, Quirke P, Thorpe H, Walker J, Jayne DG, Smith AM, Heath RM, Brown JM. Short-term endpoints of conventional versus laparoscopic-assisted surgery in patients with colorectal cancer (MRC CLASICC trial): multicentre, randomised controlled trial. *Lancet.* 2005;365:1718-1726.
8. Clinical Outcomes of Surgical Therapy Study Group. A comparison of laparoscopically assisted and open colectomy for colon cancer. *N Engl J Med.* 2004;350:2050-2059.
9. Braga M, Frasson M, Vignali A, Zuliani W, Di Carlo V. Open right colectomy is still effective compared to laparoscopy: results of a randomized trial. *Ann Surg.* 2007;246:1010-1014; discussion 1014-1015.
10. Tekkis PP, Senagore AJ, Delaney CP, Fazio VW. Evaluation of the learning curve in laparoscopic colorectal surgery: comparison of right-sided and left-sided resections. *Ann Surg.* 2005;242:83-91.
11. Bohm B, Rotting N, Schwenk W, et al. A prospective randomized trial on heart rate variability of the surgical team during laparoscopic and conventional sigmoid resection. *Arch Surg.* 2001;136:305-310.
12. Berguer R, Smith WD, Chung YH. Performing laparoscopic surgery is significantly more stressful for the surgeon than open surgery. *Surg Endosc.* 2001;15:1204-1207.
13. Lacy AM, Garcia-Valdecasas JC, Piqué JM, et al. Short-term outcome analysis of a randomized study comparing laparoscopic vs open colectomy for colon cancer. *Surg Endosc.* 1995;9:1101-1105.
14. Stage JG, Schulze S, Moller P, et al. Prospective randomized study of laparoscopic versus colonic resection for adenocarcinoma. *Br J Surg.* 1997;84:391-396.
15. Leung KL, Meng WCS, Lee JFY, et al. Laparoscopic-assisted resection of right-sided colonic carcinoma: a case-control study. *J Surg Oncol.* 1999;71:97-100.
16. Fukushima R, Kawamura YJ, Saito H, et al. Interleukin-6 and stress hormone responses after uncomplicated gasless laparoscopic-assisted and open sigmoid colectomy. *Dis Colon Rectum.* 1996;39(Suppl):S.
17. Clinical Outcomes of Surgical Therapy Study Group, et al. A comparison of laparoscopically assisted and open colectomy for colon cancer. *N Engl J Med.* 2004;350:2050-2059. doi:10.1056/NEJMoa032651.
18. Lacy AM, et al. Laparoscopy-assisted colectomy versus open colectomy for treatment of non-metastatic colon cancer: a randomised trial. *Lancet.* 2002;359:2224-2229. doi:10.1016/S0140-6736(02)09290-5.
19. Veldkamp R, et al. Laparoscopic surgery versus open surgery for colon cancer: short-term outcomes of a randomised trial. *Lancet Oncol.* 2005;6:477-484. doi:10.1016/S1470-2045(05)70221-7.
20. Bonjer HJ, et al. Laparoscopically assisted vs open colectomy for colon cancer: a meta-analysis. *Arch Surg.* 2007;142:298-303. doi:10.1001/archsurg.142.3.298.
21. Jayne DG, et al. Randomized trial of laparoscopic-assisted resection of colorectal carcinoma: 3-year results of the UK MRC CLASICC Trial Group. *J Clin Oncol.* 2007;25:3061-3068. doi:10.1200/JCO.2006.09.7758.
22. Hayashi H, Ozaki N, Ogawa K, et al. Assessing the economic advantage of laparoscopic vs open approaches for colorectal cancer by a propensity score matching analysis. *Surg Today.* 2017;48:439-448.
23. Fox JP, Desai MM, Krumholz HM, Gross CP. Hospital-level outcomes associated with laparoscopic colectomy for cancer in the minimally invasive era. *J Gastrointest Surg.* 2012;16:2112-2119. doi:10.1007/s11605-012-2018-z.
24. Huo YR, Phan K, Morris DL, Liauw W. Systematic review and a meta-analysis of hospital and surgeon volume/outcome relationships in colorectal cancer surgery. *J Gastrointest Oncol.* 2017;8:534-546. doi:10.21037/jgo.2017.01.25.