



Comparison of Open Colorectal Surgeries versus Laparoscopic and Lap Assisted Colorectal Surgeries for Short Term Outcomes in Colorectal Malignancy

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ABSTRACT

Introduction: *Laparoscopy has increasing been used in treatment of colorectal cancers. Its benefits and adequacy as compared to open procedures continue to be investigated. The short term outcomes of laparoscopic and laparoscopy assisted colorectal surgeries are compared to open procedures.*

Method: *Patients undergoing colorectal surgeries were included in the study. The demographic and surgical parameters and outcomes were compared for laparoscopic and open approaches.*

Results: *The duration of surgery was longer for laparoscopic approach. While the duration of hospital stay, return of bowel function, requirement of blood transfusion, post operative ventilation requirement, wound infection, wound dehiscence, return to normal activities were favourable for laparoscopic procedures. The adequacy of resection and nodal clearance were comparable for both laparoscopic and open approaches*

Conclusion: *Laparoscopic approach is a feasible and safe procedure for colorectal surgeries when performed by a surgeon of adequate laparoscopic experience. The short term outcomes are in favour of laparoscopic approach.*

INTRODUCTION

Colorectal cancer (CRC) is a formidable health problem worldwide. It is the third most common cancer in men and the second most common in women⁽¹⁾. The feasibility and safety of laparoscopic colorectal resection for colorectal malignancies have been repeatedly reported from western countries. Even though studies have documented superiority of laparoscopic approach, the acceptability has remained low among surgeons. Adequate training in laparoscopic dissection is vital in having an oncologically

sufficient resection. The technically demanding nature of these procedures limit their wide spread use.⁽²⁾ Oncologic safety has been evaluated in many randomized controlled trials and comparable results were obtained for both laparoscopic and open surgeries.^(3,4) The rate of conversion to open surgery is low when eligibility criteria are applied and the surgical team is well trained. 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 immune

function, less pronounced postoperative inflammatory response, reduced postoperative pain and faster recovery of intestinal motility and function^(5,6). This may translate into an improved outcome. In contrast the potential disadvantages of laparoscopic surgery are the longer operative time and higher cost of surgical device and instrument compared to open surgery. This study aims to evaluate the short term operative and oncologic outcomes of laparoscopic and laparoscopy assisted surgeries as compared to open surgeries for colorectal malignancies.

MATERIALS AND METHODS

This prospective observational study was carried out in the Department of General Surgery of our Institute from January 2016 to December 2016. Patients undergoing colorectal surgeries for colorectal malignancies were included in the study after informed written consent. Patients undergoing laparoscopic or lap assisted surgeries were compared with patients undergoing open surgeries with regard to short term outcomes. Ethical committee approval was obtained for the study. Patients with biopsy proven colorectal malignancies, aged 18 – 60 years, ASA grade 1 and 2 were included in the study. Patients with recurrence, metastasis, cardiovascular dysfunction (NYHA class>3), respiratory dysfunction (arterial pO₂ <70mmHg), hepatic dysfunction (child pugh class C), ongoing infection, ASA grade 3 and 4 were excluded from the study. Study involved detailed history taking and clinical examination which included history about duration of hospital stay and history of flatus and motion passed in the post operative period, wound infection, wound dehiscence, pus culture and sensitivity in postoperative wound, perioperative blood transfusion requirement, and post operative ventilator requirement and histopathology report on margins and clearance. The two groups were compared in terms of Intra operative bowel injury, duration of surgery, peri operative blood transfusion requirement, post operative mechanical ventilation requirement, post operative

wound complications, post operative bowel recovery, duration of hospital stay, specimen margin positivity and return to routine activities. Data entry was done using Microsoft excel and analysis was done using SPSS. P value <0.05 was considered significant.

RESULTS

The study included 22 patients who underwent open colorectal surgeries and 18 patients who underwent laparoscopic and lap assisted colorectal surgeries. Mean age of the study population was 52.8 +/-5.6. 35% of patients were less than or equal to 50 years and 65% were more than 50 years. Of the total study population 42.5% were males and 57.5% were females

Mean duration of surgery in minutes for Group 1 or open colorectal surgeries were 175 +/- 41.173 while for Group 2 or laparoscopic and lap assisted surgeries were 228.61+/-38.950

Mean of post op bowel recovery in days for open surgery was 5.32+/-0.945. Mean for laparoscopic and lap assisted surgeries were 4.61+/-0.608. Mean duration of hospital stay for open surgeries were 13.59+/-2.684 while for lap surgeries were 12.33+/-1.085.

Mean of return to routine activities in weeks for open surgery was 7.64+/-1.465 where as for lap surgeries were 6.44+/-1.756. None of the patients in either group had intra operative bowel injury. (Table 1)

In open colorectal surgeries 77.3% required perioperative blood transfusion while in laparoscopic surgeries only 38.9% required transfusion. Applying Mann Whitney Test ,p value is found to be <.05 (Fig 1). In open surgery 27.3% patients required post operative mechanical ventilation while in laparoscopic surgery 77.8% required post operative ventilation with a p value<.05 (Fig 2). In open surgery 45.5% had postoperative wound infection and in laparoscopic surgeries only 22.2% had postoperative wound infection with a p value>.05. (Fig 3). Incidence of post operative wound dehiscence is 22.7% in open surgery compared to no wound dehiscence in

laparoscopic surgery with a p value<.05 (Fig 4). None of the patients had specimen margin

positivity in either groups. Adequate tumor and nodal clearance was present in both groups.

Table 1:

	Type of surgery	N	Mean	Std. Deviation	Std. Error Mean
Duration of surgery in minutes	Open surgery	22	175.00	41.173	8.778
	Laparoscopic surgery	18	228.61	38.950	9.181
Postop bowel recovery in days	Open surgery	22	5.32	.945	.202
	Laparoscopic surgery	18	4.61	.608	.143
Duration of hospital stay in days	Open surgery	22	13.59	2.684	.572
	Laparoscopic surgery	18	12.33	1.085	.256
Return to routine activity in weeks	Open surgery	22	7.64	1.465	.312
	Laparoscopic surgery	18	6.44	1.756	.414

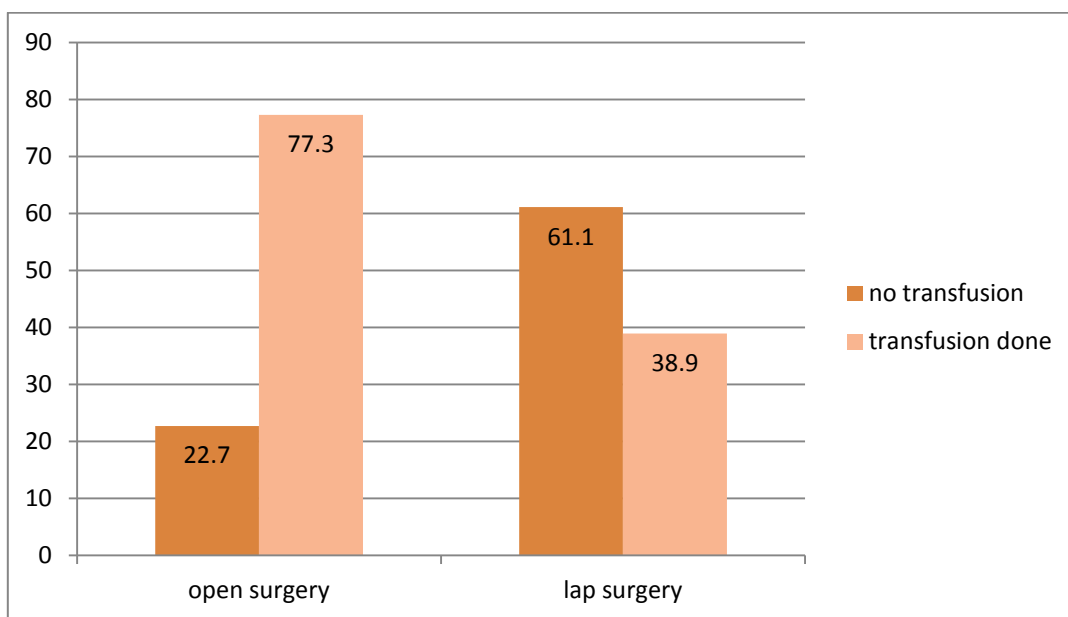


Figure 1: Perioperative blood transfusion requirement

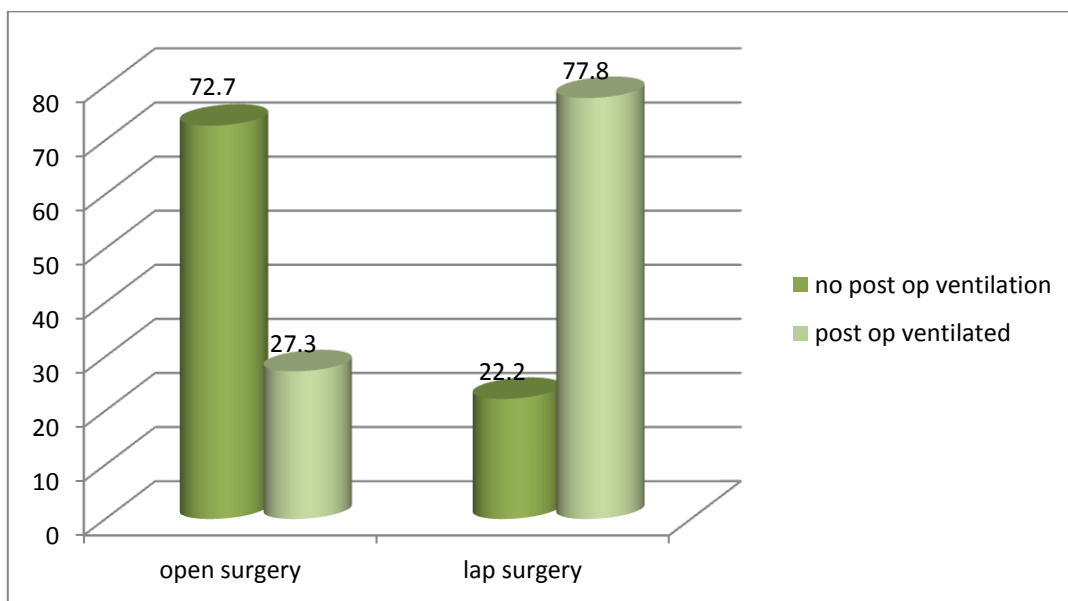


Figure 2: Post operative mechanical ventilation

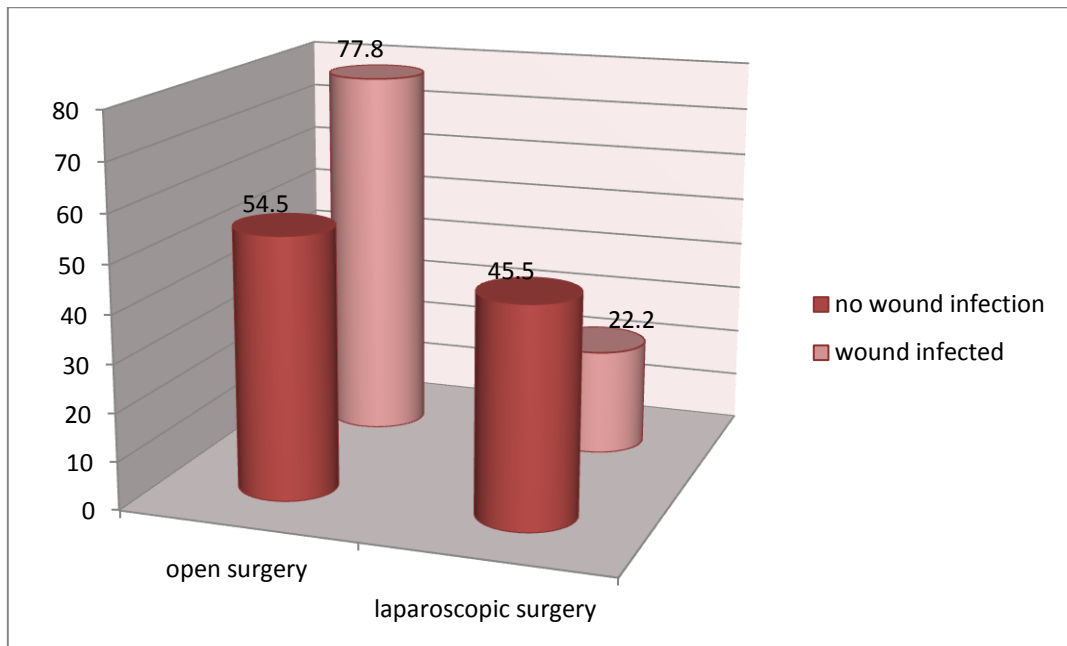


Figure 3: Post operative wound infection

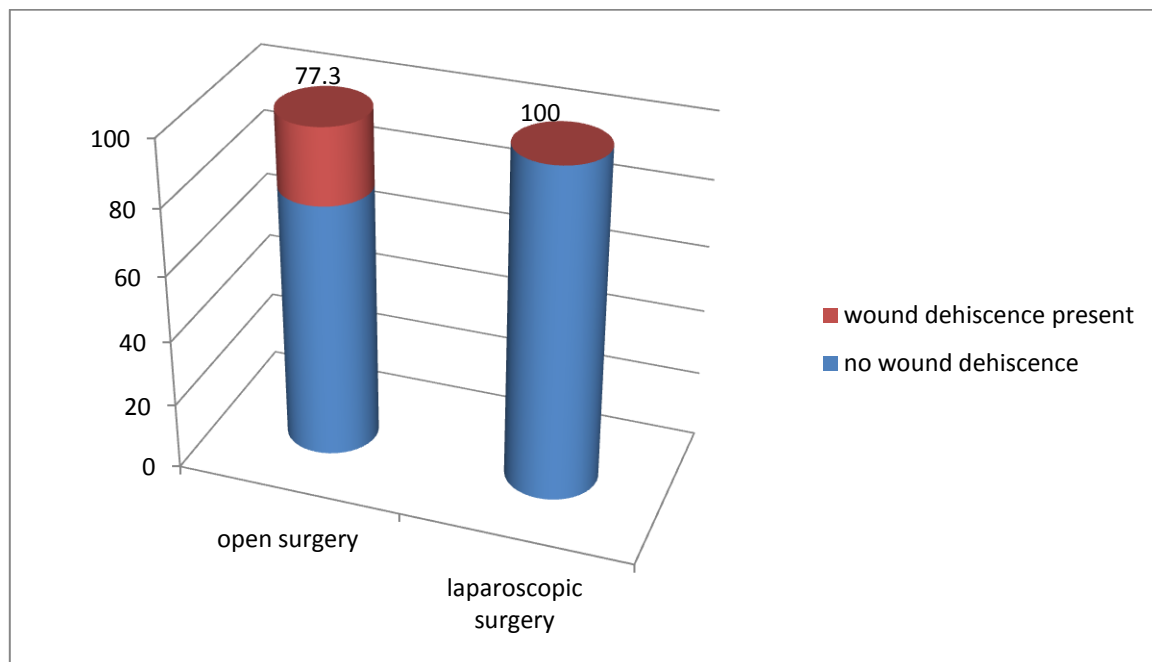


Figure 4: Post operative wound dehiscence

DISCUSSION

With the advent of laparoscopy, surgeons have ventured to utilise this technique for treatment of colorectal malignancies. The interest in laparoscopic approach has particularly increased in the last two decades. Many randomised controlled trials have compared the safety and adequacy of laparoscopic approach and found equal oncologic results as open approach. ^(3,7,8). However widespread adoption of laparoscopic

technique has not occurred over the world. Technical difficulties have limited the use of this approach. Laparoscopic colorectal surgeries require both adequate expertise in open colorectal surgeries and advance laparoscopic skills. ⁽²⁾. The learning curve for the procedures are long. The operating time for laparoscopic procedures are significantly longer than for open approach ⁽⁹⁾. With adequate training the operation time gradually decreases. Bedirli et al noted a mean

difference of 40 minutes for laparoscopic approach compared to open. ⁽¹⁰⁾. In our study laparoscopic approach had longer operating time with mean difference of 53 minutes.

Intraoperative blood loss in laparoscopic surgery is noted to be less than in open surgery. However it is difficult to standardise the blood loss. The high definition and fine dissection in laparoscopic surgery reduces the blood loss. In our study, we used the requirement of perioperative blood transfusion as an indicator for intraoperative blood loss. Our results were similar to previous studies ^(9,11). The requirement of blood transfusion was lesser for laparoscopic group. When difficulty is encountered during laparoscopy, it is always advisable from patient point of view to have conversion to open surgery. Different series describe rates of conversion ranging from 10 to 15 % ^(12,13). Some reasons for conversion include obesity, nature of surgery, organ injuries, technical problems, adhesions, large size of tumors, difficult dissection, and difficulty in anastomosis. Surgical experience and careful patient selection decreases the conversion rates. In our study, there was no unplanned conversion. The post operative complications decrease with increased experience especially of anastomotic leakage, intraabdominal infection and mortality ^(2,14). In meta-analyses comparing outcomes in laparoscopic colorectal surgery by Kelly and colleagues, the overall rate of anastomotic leak rate was 2.7% ⁽¹⁵⁾

Return of bowel function, duration of hospital stay, post operative assisted ventilation, wound infection rates, incidence of wound dehiscence and return to routine activities were favourable for laparoscopic surgeries as compared to open approach in our study. Laparoscopic rectal surgery is still developing with promising short-term benefit, although depending on the skills and techniques of the surgeon ⁽¹⁴⁾. According to the COLOR study, the increased number of the patients treated with laparoscopy at an institution closely related with the improved short-term results of the operations ⁽⁶⁾.

Oncologic safety of laparoscopic approach has been studied in multiple trials. A well defined dissection by an experienced laparoscopic surgeon in selected patients gives adequate oncologic safety. An important parameter for quantitating clearance is the number of lymph nodes resected. At least 12 lymph nodes should be resected as part of sufficient nodal dissection. Bedirli et al. noted 19 lymph nodes in laparoscopic as compared to 23 lymph nodes in open surgeries ⁽¹⁰⁾. The number of resected lymph nodes is seen to increase with experience of surgeon ^(16,17). In our study, patients in both groups had adequate margin and nodal clearance. The COST and COLOR studies advises to operated on small T1, T2 tumors in learning curve period and the operate on big tumors and difficult cases like low anterior resection when of sufficient experience. ^(18,19)

CONCLUSION

The laparoscopic approach for colorectal cancer is a recent area of interest. Studies including ours show that this approach is oncologically safe to perform, when performed by a surgeon of adequate laparoscopic experience. The short term patient outcomes are in favour of laparoscopic approach. However the technical difficulties and cost may limit the usage of this approach in developing countries. With adequate training and logistics, laparoscopic colorectal surgeries will be carried out with increased frequency.

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