Comparative Study of Laparoscopic Versus Open Low Anterior Resection (LAR)

Vikas Warikoo[1], Krunal Solanki[2], Kiran C Kothari[3], Mahesh H Patel[4], Dinesh Sharma[5]

ABSTRACT

Introduction: Rectal cancer is among the most common cancers and one of the leading causes for cancer death in both males and females. Surgery is the mainstay of treatment, with about 84% of patients with cancer of rectum treated surgically, with or without chemotherapy and/or radiotherapy. **Material & methods:** From August 2011 to February 2014, 44 patients with rectal malignancy undergoing LAR were included in the study, out of which 19 (43%) underwent laparoscopic LAR & 25 (57%) underwent open LAR. Both type of surgeries were performed by surgeons with similar expertise and experience in a single institute to make comparison and conclusions valid. **Conclusion :** Laparoscopic LAR surgery results have been shown to be similar in safety and oncological adequacy and completeness of the resection compared to open procedure, with benefit of reduction in the morbidity, hospital stay, returns to normal daily activities ,lesser blood loss and analgesia requirement. These favourable findings of laparoscopic resection for colorectal malignancy warrant further longer follow-up and results of prospectively randomized studies.

Keywords: Laparoscopic, Open Low anterior resection

[1,5] Resident Mch, Onco, [3]Professor, [4]Associate Professor, Gujarat Cancer Research Institute, Ahmedabad, Gujarat, India

[2]Assistant Professor, Dept. Surgery, AMCMET Medical College, Ahmedabad, Gujarat, India

Corresponding author email: krunal2526@gmail.com

Conflict of interest: Nil

INTRODUCTION

Rectal cancer is among the most common cancers and one of the leading causes for cancer death in both males and females. Surgery is the mainstay of treatment, with about 84% of patients with cancer of rectum treated surgically, with or without chemotherapy and/or radiotherapy.

Low anterior resection (LAR) is defined as the removal of the proximal portion of the rectum with reanastomosis of the colon to the extraperitonealized portion of the rectum.

Laparoscopic and laparoscopic assisted LAR offers several theoretical advantages over Open LAR like less blood loss, faster recovery, early feeding, lower morbidity rate, possibly reduced immunosuppression and preventing unintentional injury of autonomic nerves due to a magnified view of the pelvis.

This study is an attempt to evaluate and compare the role of laparoscopy in rectal surgery versus open rectal surgery as, the role of laparoscopy is rapidly emerging as a standard modality to approach these patients.

OBJECTIVES

To assess the safety, post operative short term morbidity and efficacy of Laparoscopic Low Anterior Resection for rectal cancer as compared with Open Low Anterior Resection.

To study adequacy of oncological resection with regard to distal and circumferential resection margins in both Open Low Anterior Resection and Laparoscopic Low Anterior Resection.

METHODOLOGY

From August 2011 to February 2014, 44 patients with rectal malignancy undergoing LAR were included in the study, out of which 19 (43%) underwent laparoscopic LAR & 25 (57%) underwent open LAR. Both type of surgeries were performed by surgeons with similar expertise and experience in a single institute to make comparison and conclusions valid. All patients had colonoscopy and biopsy proof of cancer. In all patients routine haematological investigations (compete hemogram, renal function test, liver function tests) chest X-ray, USG of abdomen, CT Scan of abdomen or MRI, colonoscopy& CEA were done to stage the tumour, judge the patient operability, anaesthesia fitness and for appropriate management of patient. Surgery was performed 6 weeks after radiotherapy.

Data was collected prospectively and included Pt. demographics, co morbidity, tumour site and morphology. Operative information included blood loss and duration of surgery. The complications were documented fully, including all unexpected major and minor events.

Histopathological analysis assessed Tumour penetration, No. of positive nodes, no. of total nodes dissected in each patient, margins of resection in terms of proximal, distal and circumferential and pathological stage of tumour.

The groups were compared in terms of perioperative outcomes, morbidity,

mortality and adequacy of oncologic excision.

RESULTS

Total 44 patients observed during this period. Divided in 2 groups, laparoscopic group (LG) with 19 (43%) and to open low anterior resection group (OG) with 25 (57%) patients.

Clinical characteristics are tabulated as below:

Table 1 : Demographic Profile of patients

Clinical variable	Laparoscopic surgery	Open surgery
Gender		
Male	12(63%)	13(52%)
Female	7(37%)	12(48%)
AGE(yrs)	55.84(25-76)	55.52(20-81)
CEA levels(ng/mL)	11.24	12.12
No of patients receiving NACT/RT (%)	13 (68.42)	14(56)
Clinical stage N (%)		
Stage I	4(21)	5 (20)
Stage II	8(42)	10(40)
Stage III	7(36)	10(40)
Stage IV	0	0

In operative findings there were no conversions of laparoscopic to open procedure. Mean operative time was 4.76 (3.5-6) hrs in lap compared to 3.57 (2.5-5) hrs in open group. Intraoperative blood loss was 352.63 (200-700) ml in lap group vs. 500(250-800) ml in open group. Postoperative recovery was studied according to the below mentioned table:

Table 2: Day of Ambulation

Study variable	Laparoscopic surgery	Open surgery
Day of ambulation Earliest Maximum Mean	 02 10 4.21	 02 15 5.56
Day of NG tube removal Earliest Maximum Mean	 2 10 3.74	 2 7 4.36
Day of Analgesia Required Minimum Maximum Mean	 3 8 4.36	 3 7 5.24

Complications including mortality and morbidity studied as:

Table 3: Complication in Laparoscopic and Open surgery

Complication	Laparoscopic	Open
LEAK	2	1
Infective complication	2	3
Electrolyte disturbances	0	0
Death	0	0
Obstruction	1	2
Abdominal burst	0	2
Resurgery required	2	2

Oncologic Adequacy is accessed in terms of free resection margins and lymph node retrieval as per table 4

Table 4: Oncologic Adequacy

	Positive CRM (%)	Positive Proximal Margin	Positive Distal Margin	No of nodes retrieved Mean(range)
Laparoscopic	1(5.26)	0	1(5.26)	8.74(1-21)
Open	1(4)	0	1(4)	9.64(3-19)

DISCUSSION

Performing laparoscopy for rectal cancer is technically a relatively straightforward transition for surgeons with advanced laparoscopic skills and familiarity with abdominal anatomy[1-4]. Complete removal of the primary tumour and tumour deposits in the mesorectum is the goal of surgery in patients with rectal cancer[5-6]. A resection is judged radical when the circumferential, distal, and proximal edges of the specimen are devoid of tumour cells[4]. Data from our

study indicate that extent of resection, including proximal, distal and CRM margins and lymph node examination, were similar in both rectal resection groups. The laparoscopic group experienced less pain, shorter hospitalization, and quicker return of bowel function. The wound complication rate was lower in the laparoscopic group long-term and oncologic outcomes are similar in terms of recurrence and survival. Earlier trials like MRC CLASICC trial[7] demonstrated a higher rate of positive circumferential margin after laparoscopic compared with open anterior resection. These results may be due to the learning curve[8] associated with the surgical technique. But the short-term outcomes of recent studies like the COLOR II[9] & Corean trial [10]show that the radicality of laparoscopic resection (as assessed by pathology report) in patients with rectal cancer is no different to that of open surgery, and that laparoscopic surgery was associated with similar rates of intraoperative complications, morbidity, and mortality.

In study by Laurent et al[11] at 5 years, there was no difference of local recurrence (3.9% vs. 5.5%; *P* = 0.371) and cancer-free survival (82% vs. 79%; *P* = 0.52).

CONCLUSION

Laparoscopic LAR surgery results have been shown to be similar in safety and oncological adequacy and completeness of the resection compared to open procedure, with benefit of reduction in the morbidity, hospital stay, returns to normal daily activities ,lesser blood loss and analgesia requirement. These favourable findings of laparoscopic resection for colorectal malignancy warrant further longer follow-up and results of prospectively randomized studies.

REFERENCES

1.Jacobs M, Verdeja JC, Goldstein HS. Minimally invasive colon resection (laparoscopic colectomy). Surg Laparosc Endosc.1991;1:144-50.

2. Fowler DC, White SA. Brief clinical report:Laparoscopic assisted sigmoid resection. Surg Laparosc Endosc 1991; 1:183-8.

3. Laparoscopic Surgery Edited by Garth H. Ballantyne, Patrick F. Leahy, and Irvin M. Modlin. 710 pp., illustrated. Philadelphia, W.B. Saunders, 1994.

4. National Institute for Clinical Excellence, NICE Technology Appraisal Guidance – No.17: Issue Date Dec 2000.

5. Heald RJ, Husband EM, Ryall RD. The mesorectum in rectal cancer surgery-the

clue to pelvic recurrence? :Br J Surg 1982; 69: 613-6.

6. C.J.H. van de Velde. Total mesorectal excision outcomes-The Dutch trial: BCMJ, Vol. 45, No. 7, Sept 2003;314-8.

7 . Guillou PJ, Quirke P, Thorpe H, Walker J, Jayne DG, Smith AM et.al. MRC CLASICC Trial Group. Short-term endpoints of conventional versus laparoscopic assisted surgery in patients with colorectal cancer (MRC CLASICC trial): multicentre, randomised controlled trial. Lancet 2005; 365: 1718–26.

8. Clinical Outcomes of Surgical Therapy Study Group. A comparison of laparoscopically assisted and open colectomy for colon cancer. N Engl J Med.2004;350:2050-59.

9. Veldkamp R, Kuhry E, Hop WC, Jeekel J, Kazemier G, Bonjer HJ et.al. Colon cancer Laparoscopic or Open Resection Study Group (COLOR). Laparoscopic surgery versus open surgery for colon cancer: short-term outcomes of a randomized trial. *Lancet Oncol* 2005; 6: 477–84.

10. Kang SB, Park JW, Jeong SY, et al. Open versus laparoscopic surgery for mid or low rectal cancer after neoadjuvant chemoradiotherapy (COREANtrial): short-term outcomes of an open-label randomised controlled trial. *Lancet Oncol.* 2010;11:637-645.

11. Laurent, Christophe , Leblanc, Fabien MD, et al. Laparoscopic Versus Open Surgery for Rectal Cancer: Long-Term Oncologic Results : Annals of Surgery. 2009;250(1):54-61.