

## Feasibility and Benefits of Laparoscopic Sigmoidectomy Versus Open Sigmoidectomy, for Sigmoid cancer

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### Original Research Article

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**Abstract:** Laparoscopic sigmoidectomy has been shown to have benefits compared to open. The incorporation of laparoscopy in colon surgery is challenging, due to the high cost of equipments. The aim of this study was to evaluate the safety and feasibility of laparoscopic sigmoidectomy for cancer that could be performed in developing countries under different circumstances. Twenty patients with sigmoid cancer with mean age of 48years (35–70) have been enrolled for 10 laparoscopic & 10 open sigmoidectomy in Beni- Suef Faculty of Medicine between March 2017 and March 2018. Regarding laparoscopic sigmoidectomy, the mean operative time was 147 min. The mean blood loss was 141 ml. The mean hospital stay was 7 day. Pathologic outcome revealed that the mean number of retrieved lymph nodes was 9 with positive infiltrate in 2. No wound infection, no leak no repeats surgery. In open sigmoidectomy the mean operative time was 113 min The mean estimated blood loss was 350 m, The mean hospital stay was 10 days with 3 morbidity cases( one leakage& two abdominal wound infection), Histopathologic examination revealed that the mean number of retrieved lymph nodes was 16 lymph nodes with 5 positive infiltrate and all had free margins. Laparoscopic sigmoidectomy for cancer is safe and feasible. Tissue integrity and safety margin are nearly equal between laparoscopic & open surgery. Major advantages of laparoscopic sigmoidectomy are: less blood loss, less LOS, low rat of wound infection, early mobilization compensating the higher cost.  
**Keywords:** Sigmoidectomy, Laparoscopic, open.

### INTRODUCTION

Laparoscopic sigmoidectomy has been shown to have significant short- and long-term benefits compared with the open approach [1]. Laparoscopic approach became attractive for its potential in reducing surgical trauma while maintaining oncologic outcomes [2]. Studies evaluating the impact of the surgical approach have verified a decrease in blood loss during surgery, less post-operative surgical pain (reduced consumption of analgesic medication), earlier return of bowel function, and shorter length of hospital stay, offering safe and esthetically pleasing alternatives to conventional methods at the same time [3]. Major surgery induces surgical stress with increased demands on patient's reserves, and major inflammatory and immunological responses are triggered [4]. Besides that, trauma causes endocrine and metabolic changes as well. Laparoscopy, by reducing surgical trauma, could attenuate those responses [5]. This could begin to explain the reduced postoperative morbidity associated with this surgical approach [6].

Demonstrating oncologic outcomes similar to those achieved in a developed setting will further support and encourage the continued growth of laparoscopy for cancer in developing countries [7].

### PATIENTS AND METHODS

The study was conducted at Beni -Suef Faculty of Medicine, Beni- Suef University, Egypt. Twenty patients (12males and 8 females) have been enrolled for laparoscopic sigmoidectomy {group A} (10 patients) versus open sigmoidectomy{group B}(10 patients) in the period of March 2017 to March 2018. The diagnosis of cancer was confirmed with colonoscopy and biopsy. The study was approved by the ethical committee at Beni -Suef Faculty of Medicine. The surgical approach was decided with the consent of the patients after a thorough discussion on the advantages and risks of the each approach.

The patients were placed in lithotomy with head down position for laparoscopic sigmoidectomy.

For economic causes, we used reusable laparoscopic instruments. The only disposable laparoscopic instrument that has been used in this study was the vascular sealing device (ligasure). All other surgical instruments used in this study were reusable.

Regarding laparoscopic procedure, dissection was performed in the majority of patients by bipolar vascular sealing devices. (ligasure device) Vessels were controlled with bipolar vascular sealing device or metallic clips intra-corporeally in most circumstances. Regarding sigmoidectomy, mobilization and resection following the same principles as in open surgery, colorectal anastomosis was performed using a circular stapler which was inserted trans-rectal. Points of comparison were total operative time, total blood loss, post-operative hospital stay, integrity of tissues histopathologically, wound infection, leakage.

## RESULTS

Regarding laparoscopic sigmoidectomy, the mean operative time was 147 min (123–180 min). The mean estimated blood loss was 141 ml (75–260 ml). The mean hospital stay was 7 day (5–10 days). Pathologic outcome revealed that the mean number of retrieved lymph nodes was 9 (range 6-12) with positive infiltrate in 2 (1-3). No wound infection, no leak no repeats surgery. In open sigmoidectomy the mean operative time was 113 min (90–129 min) The mean estimated blood loss was 350 m (100 – 1200), The mean hospital stay was 10 days (7–12 days) with and 3 morbidity cases (one leakage & two abdominal wound infection), Histopathologic examination revealed that the mean number of retrieved lymph nodes was 16 (range 8–28 lymph node) with 5 (1-9) positive infiltrate and all cases had free surgical margin.

## DISCUSSION

Laparoscopic colonic resection for curable cancer is now being performed worldwide. It is now firmly established as a viable, and perhaps, the preferred option for colon cancer resection [8]. The benefits of laparoscopic surgery are well established and result from the reduced surgical trauma through the use of smaller incisions plus minimal bowel handling which leads to a reduction in the systemic inflammatory response [9]. The reduced disturbance of the immune function has led to the suggestion that a laparoscopic approach may have an added benefit in cancer patients in reducing tumor recurrence and improving survival [10].

More acceptable however, is that there is improved pulmonary function, earlier return of bowel function, less post-operative pain, faster return to activity and ultimately, shorter hospital stay. Compared to conventional open surgery, cosmetic results are excellent this goes hand in hand with Guillou *et al.* [11].

This study showed that the mean operative time for laparoscopic group patients 147 min (123 - 180), while mean for open technique 113 min (90-129), relatively longer operative duration time for laparoscopic group during first trials of introducing laparoscopic procedures and also parallel to learning curve and near to results of COST & COLOR studies the clinical outcomes of surgical therapy (COST) and the colorectal cancer laparoscopic or open resection (COLOR I) [12]. Also similar to Van Ye *et al.* [13]. Who stated that the average operating room time for laparoscopic sigmoidectomy varies from 130 to 261 min and, while the time taken for open resection varies from 77 to 231 min, most series showed a significantly longer operation time for the laparoscopic group. The operation times for laparoscopic resection decreased with experience in most series and, as such, future series may show laparoscopic operation times approximating open times.

Postoperative length of hospitalization also is reported as being decreased after laparoscopic bowel resection, with the average number of days being between 5 and 10 with mean of 7 days. Bokey *et al.* [14] summarized, the majority of publications found a statistically significant decrease in length of stay in comparison to open controls, including both of the randomized trials. This finding was not, however, universal. Similarly, mean operative stay for laparoscopic patients 7 days, while open classic technique 10 days. The study shows less hospital stay for laparoscopic procedure, this goes hand in hand with Rispoliet [7].

Three cases developed wound infection in open group, range from superficial wound infection to burst abdomen whom required additional surgery for closure of abdomen, these showed increased cost, increased stay, morbidity to patients that overcome increased total cost, operative time of laparoscopic procedure, this is in concordance with Guillou *et al.* [1].

One of the most significant complications of sigmoid resection is anastomotic leak. This complication is reported in several of the available series, being the direct cause of death in at least one case as reported by Tucker *et al.* [15]. This complication was reported in this study for one case with sigmoid carcinoma done by open technique using hand sewing anastomosis, leakage discovered early at 4th day. (total leucocytic count, 18,000, fever, fecal matter in the drains, US shows mild to moderate collection), reoperation was done, colostomy, mucus fistula also this case developed wound infection, while all laparoscopic cases didn't develop any anastomotic leakage.

Regarding this study mean totally harvested LN in open approach were 16 (8- 28) LN 5 +ve [1-9],

while that of laparoscopic group were 9 ( 6 – 12) LN2+ve(1–3), relative low number of this study of harvested LN in laparoscopic sigmoidectomy due to loss of tactile sensations for assessment of lymph nodes and this was statistically accepted in comparison to Neugat *et al.* [16] who showed that 12 or more LNs were found in only 18% of resected specimens, also other study by Lacy *et al.* [17] stated that accurate resection and identification of positive LNs is important not only for staging and planning adjuvant therapy, but also for prognosis, number of retrieved LNs was by itself a prognostic variable in the outcome of patients.

This study also revealed free safety margin for all cases in laparoscopic and open cases, and this results were in favor of laparoscopic approach and parallel to results of Lacy *et al.* [17] who reported very few series addressing the length of the resected bowel as an independent factor that can influence the number of LNs harvested.

Our work showed overall complication in laparoscopic group is markedly less than open group and that was in favour of laparoscopic procedure, and this was hand in hand with Grailey *et al.* [18] and Frasson *et al.* [19].

Despite the evidence from multiple, prospective randomized trials revealed adoption rate of laparoscopic colectomy has been reported to be low. Robinson *et al.* [20] stated that of all colorectal surgeries performed in high volume hospitals; only 7.3% have been performed using minimal invasive surgery (MIS). They found a significant socioeconomic disparity in the use of minimal invasive surgery compared with conventional open resections; laparoscopic colorectal resections are associated with less invasive incision sizes, less postoperative ileus and earlier tolerance of diet which may contribute to less need for analgesic treatment and earlier recovery of the patient with a reduced hospital stay. A faster hospital recovery has been demonstrated to translate significantly lower total costs owing to lower pharmacy, laboratory, and ward nursing costs. Reduced analgesia requirements and lower occurrence of complications may also decrease costs associated with laparoscopic treatment. However, studies reporting differences between the two procedures are equivocal [7].

## CONCLUSION

Laparoscopic sigmoidectomy for cancer is safe and feasible. Tissue integrity and safety margin are nearly equal between laparoscopic & open surgery. Major advantages of laparoscopic sigmoidectomy are: less blood loss, less LOS, low rate of wound infection, early mobilization compensating the higher cost.

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