

Laparoscopic colorectal resections performed over a seven-years period in a single Italian Centre

G. ANANIA, M. SANTINI, C. GREGORIO¹, L. SCAGLIARINI, A. MARZETTI,
L. VEDANA, G. RESTA, G. CAVALLESCO

SUMMARY: Laparoscopic colorectal resections performed over a seven-years period in a single Italian Centre.

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Introduction. *Laparoscopic approach for treatment of colorectal lesion is gaining acceptance gradually. Evidence from numerous randomised controlled trials has shown the short-term benefits of laparoscopic colon resection over open surgery, and its long-term outcomes also does not differ considerably from those of open surgery.*

This study aims at a retrospective analysis of operative and short term outcomes of patients.

Patients and methods. *All laparoscopic colon and rectal resections performed between September 2004 and September 2011 were included. The clinical parameters, operative parameters and short-term outcome details of laparoscopic colorectal surgery patients were collected from the retrospectively reviewed database.*

Results. *A total of 347 patients, median age 71 years (range 32 to 96), underwent laparoscopic resection of the colon and rectum. The median Body Mass Index (BMI) was 26.5. The majority of the procedures were performed for malignant disease (97,1%) and the most common procedure was right colectomy (41%). The median duration of surgery was 202,3 minutes, with conversion to open surgery in 40 patients (11,5%). Complications occurred in 23 patients (6,6%). The median length of hospital stay was 8,9 days. In patients with malignant disease, the median number of lymph nodes removed was 14,9.*

Conclusion. *Our results show that laparoscopic approach for colon-rectal lesions is safe, feasible and produces favourable results. The most important aspect of surgery for malignant disease is the ability to remove radically the disease. However all data are still related to the experience of the operator.*

RIASSUNTO: Chirurgia laparoscopica del colon-retto: oltre 7 anni di esperienza in un Centro italiano.

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Introduzione. *L'approccio laparoscopico per il trattamento delle lesioni coloretali è stato gradualmente accettato. Da numerosi studi randomizzati sono emersi i benefici a breve e lungo termine della laparoscopia rispetto alla chirurgia open. Lo scopo di questo studio è un'analisi retrospettiva dell'outcome a breve e lungo termine dei pazienti sottoposti a chirurgia laparoscopica.*

Pazienti e metodi. *Sono stati inclusi tutti i pazienti sottoposti a resezione laparoscopica del colon-retto tra settembre 2004 e settembre 2011. I parametri clinici, chirurgici e l'outcome a breve e lungo termine di tali pazienti sono stati estrapolati retrospettivamente dal nostro database.*

Risultati. *Il totale è di 347 pazienti, con età media di 71 anni (range 32-96), sottoposti a resezione laparoscopica del colon-retto. Il valore medio del BMI (Body Mass Index) è di 26,5. La maggior parte degli interventi sono stati effettuati per patologia maligna (97,1%), perlopiù emicolectomie destre (41%). La media dei tempi operatori è di 202,3 minuti e il tasso di conversione del 11,5% (40 pazienti). In 23 pazienti (6,6%) abbiamo avuto complicanze maggiori. I tempi medi di degenza sono stati di 8,9 giorni. Nei pazienti affetti da neoplasia il numero di linfonodi rimossi è in media di 14,9.*

Conclusioni. *I nostri risultati mostrano come l'approccio laparoscopico per le resezioni coloretali sia sicuro, appropriato e permetta di ottenere ottimi risultati. L'aspetto principale nella chirurgia dei tumori del colon-retto è la radicalità oncologica, anche se in ogni caso i risultati sono correlati all'esperienza dell'operatore.*

KEY WORDS: Colorectal - Surgery - Laparoscopy.
Colon-retto - Chirurgia - Laparoscopia.

Introduction

Colorectal cancer is one of the most prevalent cancer in the industrialised world. Surgery is the mainstay of the treatment, with or without chemotherapy and/or radiotherapy. About 90–92% and 84% of patients with cancer of colon and rectum, respectively, are treated surgically (1,2).

Arcispedale "S. Anna", Ferrara, Italy
Thoracic and General Surgery Unit
¹"SS. Annunziata" Hospital, Cento (FE), Italy
General Surgery Unit

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Conventional open surgery is associated with significant morbidity and long convalescence. Laparoscopic approach for the treatment of malignant colorectal lesions is still evolving. The first successful laparoscopic sigmoidectomy for cancer was reported in 1991 by Jacob's et al. (3).

However, the laparoscopic technique was not adopted by surgeons worldwide because of concerns about the adequacy of intra-abdominal exploration and the initial reports of high incidence of port-site metastases (4-5). As a consequence, laparoscopic surgery for colon cancer was not adopted widely until initial reports of few randomized trials were published.

Evidence from numerous randomised controlled trials has shown the short-term benefits of laparoscopic colon cancer resection over open surgery, and its long-term oncological outcome also does not differ considerably from that of open surgery (6-10). Recent published data suggests similar benefits for laparoscopic rectal cancer resection (11).

To extend the potential benefits of laparoscopic approach to the patients with colorectal malignancy, our Unit began performing laparoscopic colorectal surgery in 2004. We reviewed our experience by assessing the results of laparoscopic colorectal resections performed over a seven-years period.

Patients and methods

Between September 2004 and September 2011, 347 patients underwent laparoscopic colorectal surgery in our Unit. The clinical parameters, operative parameters and short-term outcome details of laparoscopic colorectal surgery patients were collected from the retrospectively reviewed database.

The relevant clinical data, intraoperative parameters and postoperative outcomes were obtained (Tables 1 and 2). All procedures were performed by consultant colorectal surgeons, all of whom had been trained in laparoscopic colorectal surgery in overseas centres of excellence. Patients were selected based on individual surgeon preference and included those with both benign and malignant lesions. All procedures were performed in elective setting, with patients admitted one day prior to surgery.

All patients, apart from routine evaluation, underwent colonoscopic biopsy, contrast-enhanced multislice CT scan to localise the lesion preoperatively. In case of patients with small/early lesions; preoperative colonoscopic tattooing was performed to facilitate localisation of tumours during laparoscopy. Patients with previous colonic resection, multiple previous surgeries, severe co-morbid conditions, coagulopathy and metastatic disease were excluded. All other patients were offered laparoscopic approach during the study period. Preoperative bowel preparation with liquid diet on the preoperative day was performed.

All procedures were done under general anaesthesia. Patients with rectal or left colon lesions were placed in a Lloyd Davies position and adequate shoulder support was ensured to prevent the patient from slipping off the operating table in a steep Trendelenburg position. Patients arms are kept on the sides and anti-embolism stockings were applied to the lower limbs. An 12 mm trocar insertion under umbilicus was used in all cases by open access. Intraabdominal pressure was

TABLE 1 - PATIENT CHARACTERISTICS.

Total patients, n		347
Age, years	Average	71
	S.D.	11,6
	Min-Max	32 -96
Sex	Male	186
	Female	161
	Ratio M/F	1,5
BMI	Average	26,5
	S.D.	4,4
	Min - Max	17 - 43

TABLE 2 - POSTOPERATIVE OUTCOMES.

Gas evacuation, days	Average	3,3
	S.D.	1,7
	Min - Max	1-17
Bowel movements, days	Average	4,9
	S.D.	2,3
	Min - Max	1-7
Removal of naso-gastric tube, days	Average	2,5
	S.D.	2,1
	Min - Max	0-17
Liquid diet, days	Average	3,9
	S.D.	2,2
	Min - Max	1-18
Solid diet, days	Average	5,2
	S.D.	2,5
	Min - Max	2-20
Discharge, days	Average	8,9
	S.D.	5,3
	Min - Max	3-43

maintained at 12–14 mmHg. A 30° telescope was used. For left and rectal lesions, subsequent port placements included two 12 mm ports in right anterior axillary line, with an additional 5 mm port in the left iliac fossa. For right lesions, subsequent port placements included two 12 mm ports in left anterior axillary line, with an additional 5 mm port in the right iliac fossa. Dissection was facilitated by use of ultrasonic shears (Harmonic Scalpel™, Ethicon Endo-Surgery).

Results

Over an seven-years period from September 2004 to September 2011, 347 patients underwent laparoscopic resection of the colon and rectum. The majority of the procedures were performed for malignant disease. The number of laparoscopic surgeries performed increased

over the three-year study period. The most common laparoscopic procedure performed was right colectomy 143 (41%), 86 (24.7%) were sigmoidectomies, 43 (12.4%) anterior resections, and 49 (14.9%) left colectomies (Table 3). The median duration of surgery was 202.3 minutes (range 75–450). Conversion to open surgery was necessary in 40 (11.5%) patients, most commonly for excessive adhesions. We feel that the conversion is getting shorter as we gain more experience.

Early postoperative complications were defined as complications occurring within 30 days after surgery; late complications were defined as those occurring 30 days after surgery. Complications occurred in 23 (6.6%) patients, including anastomotic leaks in 7 (2.01%) patients (Table 4). There were no pulmonary complications or incidence of deep vein thrombosis. This is mainly due to early ambulation and lesser postoperative pain after laparoscopic resection. The median duration of hospital stay was 8.9 days (range 3–43).

Gas evacuation was after 3.3 days (range 1 to 17), stool evacuation was after 4.9 days (range 1 to 7), liquid diet was resumed after 3.8 days (range 1 to 18), while solid diet after 5.2 days (range 2 to 20) (Table 2).

The median number of lymph nodes removed was 14.9 (range 2 to 42).

Discussion and conclusions

Laparoscopic colorectal resection has come a long way since the first reported case in 1991 (3). It has now evolved to become an integral component in the colorectal surgeon's armamentarium and has gained popularity over the last decade. We feel that a good experience in open colorectal surgeries is a prerequisite to master laparoscopic colorectal surgery. There is a steep learning curve to achieve advanced laparoscopic skills, and specialized equipment is required (12).

In keeping with the worldwide increase in laparoscopic colorectal surgeries performed, there has been a similar resurgence in laparoscopic cases performed in our unit in recent years. In this prospective series conducted over an seven-years period from 2004 to 2011, we have shown that laparoscopic colorectal resections, when performed in a specialised colorectal unit, can yield favourable short-term results. In this series, we included all cases of elective colorectal resections performed without restriction to the disease type. The median duration of surgery was 202.3 minutes (range 75–450) but we feel that the operating time is getting shorter as we gain more experience although the time might also be influenced by the increasingly complex cases treated in relation to the experience as well.

Operative morbidity is an important consideration in any surgical procedure, and the Cochrane Review of

TABLE 3 - SURGICAL PROCEDURES.

Procedure	Number	Percentage
Right colectomy	143	41%
Sigmoidectomy	86	24.7%
Left colectomies	49	14.9%
Anterior resection	43	12.4%
Other	26	7.5%

TABLE 4 - MAJOR POSTOPERATIVE COMPLICATIONS IN 23 PATIENTS.

Complication, n	
Enterocutaneous fistula	1 (0.2%)
Anastomotic leak	7 (2.01%)
Occlusion	6 (1.7%)
Anaemia	9 (2.6%)

the short-term benefits of laparoscopic colorectal surgery showed a lower postoperative complication rate in the laparoscopic group compared to the conventional group (18.2% vs. 23.0%, relative risk [RR] = 0.72, $p = 0.02$) (13, 14).

In particular, the laparoscopic group in the Cochrane Review had lower rates of wound infections (4.6% vs. 8.7%, RR = 0.56, $p = 0.002$) and intra-abdominal abscesses (0.9% vs. 1.3%, RR = 0.71, $p = 0.47$), and our study achieved similar results, with a low rate of postoperative complications (6.6%).

Conversion to open surgery was necessary in 40 patients (11.5%), most commonly for excessive adhesions. A meta-analysis of the large randomized trials has shown a conversion rate of 19% (15). Also in this case, we feel that the conversion is getting shorter as we gain more experience. It has been suggested that a low conversion rate contributes to reduced operative morbidity, with some fearing that the benefit of laparoscopic surgery is not only lost in patients with conversion, but that outcomes may even be compromised compared to open procedures.

Dissection through small incisions, precise dissection aided by magnification, lack of manual handling of viscera and forceful retraction in laparoscopy helps in early recovery of gut function (16–18). There were no pulmonary complications or incidence of deep vein thrombosis. This is mainly due to early ambulation and lesser postoperative pain after laparoscopic resection. All these factors contributed to the short median duration of hospital stay that was 8.9 days.

In recent years, long term results of multicentre randomised trials like COST, CLASSIC and COLOR have demonstrated equal disease free and overall survival for

colorectal cancer treated by laparoscopy compared to open surgery (19-21). These observations imply that laparoscopic approach for resection of colorectal is oncologically safe in treating this disease. However, the widespread application of this technique had initially been hampered by the steep learning curve as well as concerns regarding oncological safety, with early reports of port-site recurrences. (22, 23)

Perhaps the most important aspect of surgery for malignant disease is the ability to remove the disease radically without compromising on oncologic principles. The

number of lymph nodes cleared, the number of patients with positive resection margins etc were similar in the experience of most large trials. (24-27) The median number of lymph nodes removed was 14.9, suggesting that it is feasible to perform laparoscopy for oncological surgery, consistent with the recommended minimum of 12 lymph nodes for accurate staging. (15)

As a specialised Center for minimally invasive surgery, our unit continuously strives to push the envelope of advanced surgical technologies, so as to achieve better patient outcomes.

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