

Laparoscopic Right Colectomy from Up to Bottom

Radu Moldovanu*

Department of Surgery and Oncology, St. Mary Clinic, Cambrai, France

Abstract

The laparoscopic right colectomy became a well-established technique in the surgical armamentarium of colorectal operations. It has well proved advantages: reduction in postoperative pain, time to return of bowel function, and length of hospital stay. Different studies have also proven its safety in colorectal adenocarcinoma, with equivalence in nodal harvest, recurrence rates, disease-free survival, and overall survival. We present herein the technique of laparoscopic right colectomy from "up" to "bottom". Different anatomical and technical key-points are highlighted. The results of a short series of the first 11 cases are also presented: men to woman ratio: 8 to 3; mean age 53.72 ± 12.39 years old; BMI 26.18 ± 2.92 kg/m²; surgical time: 132.75 ± 16.43 minutes; mean harvest lymphnodes: 16.72 ± 3.17 ; tumor stage: pTis (N=2); pT1 (N=6); pT2 (N=2); pT3 (N=1). Laparoscopic right colectomy using the "up" to "bottom" approach is a feasible and safe technique and allows the mesocolon excision with outstanding number of harvest lymph nodes. The procedure can be performed in good conditions by a single surgeon with one assistant.

Keywords: Colorectal cancer; Right colectomy; Laparoscopy; Stapled anastomosis; Hand-sewn anastomosis

Introduction

Laparoscopic right colectomy (LRC) for colon cancer became a well-established technique in the surgical armamentarium of colorectal operations [1]. It has well proved advantages: reduction in postoperative pain, time to return of bowel function, and length of hospital stay. Different studies have also proven its safety in colorectal adenocarcinoma, with equivalence in nodal harvest, recurrence rates, disease-free survival, and overall survival [2-5].

Different techniques have been described for LRC [5]:

- 1) Totally laparoscopic right colectomy - all steps including intracorporeal ileo-colic anastomosis are performed in laparoscopy.
- 2) Single incision LRC through a larger multichannel single (about 3 cm diameter) trocar.
- 3) Laparoscopic assisted right colectomy which provides right colon mobilization but laparoscopic vessel ligations and the ileo-colic anastomosis are performed extracorporeally by an open incision.
- 4) Hand-assisted right colectomy with laparoscopic mobilization of colon by hand help through a right side minilaparotomy and extracorporeal anastomosis.
- 5) Robotic right colectomy.

There are also further possibilities to perform LRC: with and without total mesocolic excision, the dissection direction (from "cranial" to "caudal" or from "caudal" to "cranial" or form "lateral" to "medial" or to "medial" to "lateral"), the place of the incision to remove the specimen, type of anastomosis (hand-sewn or stapled, iso- or aniso-peristaltic) etc. [3-5].

The aim of this video is to present the LRC technique from "cranial" to "caudal" (up-to-bottom).

https://drive.google.com/file/d/0B_LzcN0DMqZnQmg0MVFOTWVGOEE/view?usp=drive_web

Operative room set-up

The patient is in supine position with left arm along the body. The surgeon and assistant are placed on the left side and the laparoscopic

tower is placed on the right side opposite to the surgeon. During the procedure different steps, the surgeon and assistant can change the places.

Trocars and instruments

Usually it is used 3 or 4 trocars (2 of 12 mm and 2 of 5 mm), fenestrated graspers, monopolar scissors, bipolar graspers, laparoscopic needle holder and a thermofusion instrument. A laparoscopic stapler is also necessary for totally intracorporeally anastomosis. Common classical instruments are also used (Kelly and Kocher graspers, Mayo scissors, needle holder etc.).

Gaining access and trocars placement

The pneumoperitoneum is performed by a periumbilical access; then a 12 mm trocar is placed. 2 other trocars are placed in the left upper and lower abdominal quadrants. An accessory 4th trocar can be placed in the right quadrant.

Procedure

A step-by-step approach is used to better describe the technique and anatomic and surgical key points:

- 1st step: Exposure and division of gastro-colic ligament along the stomach greater curve just off the gastropiploic vessels. Then, the stomach and omentum are free from the ventral surface of transverse mesocolon and duodenum and pancreatic head are exposed.
- 2nd step: The posterior peritoneum (Toldt fascia) is divided and the right colic flexure is freed from Gerota fascia and mobilized

***Corresponding author:** Moldovanu Radu, MD, PhD, Department of Surgery and Oncology, St. Mary Clinic, 22 rue Watteau, 59403 Cambrai, France, Tel: +33 3 277356 03; Fax : + 33 3 27 73 56 96; E-mail: rmoldovanu@gmail.com

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to the midline.

- 3rd step: The dissection is followed in Toldt fascia plane and the right colon and its mesocolon are completely freed.
- 4th step: The mesocolon is divided along the mesenteric root and right colic vessels are sealed; the mesocolic excision can be performed “upward”, “downward” or “combined”.
- 5th step: The ileo-colic anastomosis can be performed in different manners: intracorporeally or extracorporeally. Usually we performed a side-to-side stapled anastomosis. Before anastomosis it is mandatory to carefully check that is no twist. After the anastomosis is completed the specimen is removed and the mesentery is closed by resorbable sutures.
- Additional step: For the tumors located on the transverse colon or even to left colic flexure, a subtotal colectomy can be performed; 2 additional “mirror” trocars are placed in the right upper and lower abdominal quadrants and the gastrocolic ligament is divided to the left side; the left colic flexure is dropped and then the transverse mesocolon and middle colic vessels are divided from right to left. The left superior vessels are divided but the inferior mesenteric vein is preserved. A side-to-side ileo-colic stapled anastomosis is then performed.

Results

14 cases were operated by up-to-bottom LRC and prospectively reviewed. 3 cases were converted and excluded from the analysis. The man to woman ratio was 8 to 3 with a mean age 53.72 ± 12.39 years old (range 35 to 81). The average BMI was $26.18 \pm 2.92 \text{ kg/m}^2$ (range 25 to 32). Mean surgical time was 132.75 ± 16.43 minutes (range 110 to 160). The ileo-colic anastomosis was performed intracorporeally in 8 cases (72.72%) and extracorporeally in 3 cases (27.27%). The postoperative stay was 6.18 ± 2.12 days (range 4 to 9). All the tumors were colic adenocarcinoma; the tumor stage was: pTis 18.18% (N=2), pT1 54.54% (N=6), pT2 18.18% (N=2), and pT3 9.09% (N=1). The mean harvest lymphnodes was 16.72 ± 3.17 (range 13 to 25). In one case a lymphnode was positive (pN1). The overall postoperative morbidity rate was 18.18% (one case with wound infection and urinary infection and a second case with urinary infection). There were no postoperative leaks. FOLFOX chemotherapy was performed for the pN1 patient. The 1 year follow up revealed no local or distant recurrence and no incisional hernia.

Discussion

The oncologic results of laparoscopic colectomy for cancer are comparable with those of open colectomy as several studies confirmed it [6,7]. Improved perioperative recovery and quality of life were also demonstrated as well as longterm benefits in terms of a reduction in adhesions and incisional hernias [5,8].

However, there is no real gold standard technique for LRC and several techniques are described in the literature [5,9,10].

The “up-to-bottom” technique is relative recently described [10]. It allows a complete dissection of the colon with better exposure of anatomic planes [11] and the mesocolic excision with an outstanding number of harvested lymphnodes [12,13]. In the presented series, the mean harvested lymphnodes was 16.72 close to the literature 22 [9]. It must be noted that the surgical technique explains the difference. Adamina M et al. [9] described a totally mesocolic excision that correspond to a D3 type lymphnode dissection and the presented technique is a D2 type excision [3]. The high rate of conversion (21%; N=3) is explained by the surgical team experience; this series is the initial experience for this technique. The conversion causes were:

obesity and impossibility to find the correct anatomic plane (2 cases) and obesity and hemorrhage from Henle trunk (1 case).

The both intracorporeal and extracorporeal ileocolic anastomosis are feasible and safe; to note that extracorporeal hand sewn anastomosis is cheaper than stapled anastomosis and more rapid than intracorporeal hand sewn anastomosis [5]. Note that the mesenteric closure is mandatory to avoid postoperative internal hernia and obstruction [10].

Conclusion

Laparoscopic right colectomy using the “up” to “bottom” approach is a feasible and safe technique and allows the mesocolon excision with outstanding number of harvest lymphnodes. The procedure can be performed in good conditions by a single surgeon with one assistant.

Conflict of Interest

Authors have no conflict of interest to disclose

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