

Laparoscopic Colorectal Surgery

Literature Review

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Who Should Perform The Surgery

- **Training periods with experts improve results in colorectal laparoscopic surgery**

“Las estancias de formación con expertos mejoran los resultados en cirugía laparoscópica colorrectal”
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Original

Las estancias de formación con expertos mejoran los resultados en cirugía laparoscópica colorrectal[☆]

Training periods with experts improve results in colorectal laparoscopic surgery

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Resumen

Objetivo

Analizar el efecto del aprendizaje en cirugía electiva laparoscópica colorrectal con seguimiento mínimo de 6 meses para contabilizar complicaciones precoces y tardías mediante la comparación de los primeros 40 casos del primer período (P1) (1996 a 2002) con los 100 casos del segundo período (P2) (2003 a 2008). Entre P1 y P2, uno de los cirujanos realizó 2 estancias formativas.

Material y métodos

Se realizaron 66 resecciones colorrectales por cáncer y 74 intervenciones por enfermedad benigna. Entre P1 y P2 se incrementaron los casos de enfermedad maligna ($p < 0,001$) (*odds ratio* = 0,16).

Resultados

Entre P1 y P2 se incrementaron los casos de intervenciones complejas (resección anterior-amputación, hemicolectomía izquierda, colectomía total, rectopexia) frente a otras (sigmoidectomía, resecciones derechas) ($p < 0,05$), pero se redujo la duración media de las intervenciones en 29 min ($p < 0,01$). Las conversiones alcanzaron el 24%, sin cambiar en P2 ($p = 0,85$). La mortalidad operatoria a 3 meses (1,4%) no mostró diferencias ($p = 0,49$). La tasa total de complicaciones (31%) se redujo significativamente en P2 ($p = 0,001$) a costa de las complicaciones médicas ($p < 0,05$), las quirúrgicas más graves (con reintervención) ($p < 0,05$) y la infección de herida ($p < 0,001$). Las demás complicaciones quirúrgicas se cambiaron

- Objective:

- To analyze the **effects of training** in elective colorectal laparoscopic surgery with a **minimum 6 months** follow up .
- To **assess early and delayed complications**, and comparing:
 - The **first 40 cases** in the 1st Period (P-1: 1996-2002)
 - With **the 100 cases** in the 2nd Period (P-2: 2003-2008).

● Results:

- 66 colorectal cancers & 74 operations for benign disease .
- Mean duration was reduced by 29 minutes ($P < 0.01$).
- Conversion Rate 24% , no change in P-2 ($P = 0.85$)
- Surgical mortality at 3 months (1.4%) showed no differences ($P = 0.49$)
- The total complications rate (31%) was significantly lower in P-2 ($P = 0.001$)
 - Medical complications ($P = 0.05$),
 - More serious surgical complications (with re-intervention) ($P = 0.05$)
 - Wound infections ($P = 0.0001$) were lower.
- The overall mean stay was 7.8 days (3-36) (median=6 days), with no differences between P-1 and P-2 ($P = 0.165$)
- Conversion significantly lengthened the mean hospital stay ($P = 0.015$) (from 7.2 ± 5 days to 10.1 ± 7 days).

- **Conclusion:**

- Training in colorectal laparoscopy and training periods **with experts improve results**:
 - Duration,
 - Complications,
More complex surgery
- Conversions **did not decrease** with experience and the **hospital stays lengthened**, but they were **not associated with more complications**.

Possible New Approaches



5th Feb, 2010

Tech Coloproctol
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TECHNICAL NOTE

Transvaginal specimen extraction in a laparoscopic anterior resection of a sigmoid colon neoplasia with en bloc right salpingo-oophorectomy

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Abstract Laparoscopic colorectal surgery has well-known benefits. However, an abdominal incision, albeit much smaller than conventional surgery, is still needed. A transvaginal extraction of a sigmoid colon neoplasia with en bloc salpingo-oophorectomy and colorectal mechanical anastomosis is described. The technique is feasible and safe. The excellent recovery of the 86-year-old patient shows the potential future of the natural orifices endoscopic surgery.

Keywords Transvaginal extraction · Laparoscopic colectomy · Natural orifice surgery · Minimally invasive surgery · Salpingo-oophorectomy

Introduction

Laparoscopic colon surgery has experienced an important development over the past years, particularly in the field of oncologic resections after the results of controlled trials (COLOR, COST, CLASSIC) [1–3]. Greater advances of laparoscopic colon surgery occur in the immediate postoperative period, with less pain, postoperative ileus and earlier mobilization, enabling a faster enteral feeding and recovery. Current laparoscopic techniques require an abdominal incision for removal of the resected specimen.

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With this incision, albeit much smaller than in conventional surgery, the risk of infection and hernia development is not avoided. The possibility of using natural orifices for the extraction of the operated colon and performing intracorporeal anastomosis enable the option to perform a totally laparoscopic surgery.

Case report

A 86-year-old woman, without previous abdominal surgery, was admitted to the hospital following a self-limited rectorrhagia. Colonoscopy showed a distal sigmoid colon neoplasia with histological diagnosis of adenocarcinoma. The preoperative abdominal CT showed the tumor in contact with the right ovary. Preoperative work-up, anesthetic and gynecological evaluation, antibiotic and venous thrombosis prophylaxis, respiratory physiotherapy and bowel preparation was conducted according to hospital protocols. The patient was fully consented for the operation. She underwent an elective laparoscopic anterior resection with en bloc right salpingo-oophorectomy with mechanical colorectal anastomosis and transvaginal extraction of the surgical specimen. There were no intraoperative complications. The operative time was 3 h and 45 min, and there was a 180-ml blood loss. Postoperative recovery was excellent, and the patient was discharged on postoperative day 6. Neither antibiotics nor special care was needed for the vaginal closure.

Procedure (surgical technique)

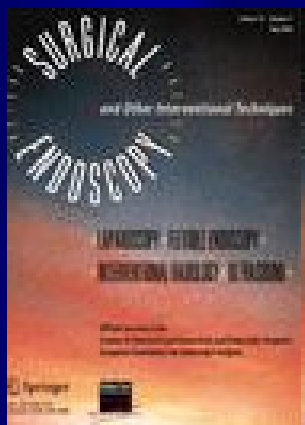
Under general anesthesia, the patient was placed on the operating table supine, in the modified lithotomy position, with legs abducted and slightly flexed at the knees. Urinary

- **Trans-vaginal specimen extraction in a laparoscopic anterior resection of a sigmoid colon neoplasia with en bloc right salpingo-oophorectomy; *Tech Coloproctol.* 2010 Feb 5. [Epub ahead of print]**

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- *86 Y woman with no previous abdominal surgery*
- *Colonoscopy showed distal Sigmoid Colon **Adenocarcinoma***
- *CT Showed **Tumour in contact with Rt. Ovary***
- ***Laparoscopic Approach** : Classic Low Anterior resection with en-bloc Salpingo-Oophorectomy with mechanical Colorectal Anastomosis.*
- *Specimen extraction was **completed Trans-Vaginal***

- **Outcome :**
 - *Operative Time: 3h and 45 min.*
 - *Blood Loss : 180 ml.*
 - *Excellent post-operative recovery*
 - *Patient discharged 6th post-operative day*
 - *Neither antibiotics nor Special care was needed for vaginal closure*



28th Jan, 2010

Surg Endosc
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TECHNIQUE

Totally laparoscopic right colectomy with transvaginal specimen extraction: the authors' initial institutional experience

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Abstract

Background The persistence of early and delayed wound complications related to both open and laparoscopic colectomy remains a significant health burden. Furthermore, as interest in natural orifice transluminal endosurgery (NOTES) continues to grow, bridging techniques may help to attenuate the learning curve associated with NOTES. The authors present their technique and short-term outcomes for totally laparoscopic right colectomy with transvaginal specimen extraction in a series of four patients.

Methods Four consecutive patients from a prospectively maintained laparoscopic colectomy database were analyzed under an institutional review board-approved protocol. Clinicopathologic characteristics and short-term outcomes were reviewed.

Results All the patients were women with no prior pelvic surgery. A four-trocar laparoscopic right colectomy with intracorporeal anastomosis was performed for cancer in two cases and for adenomatous polyp in two cases. Transvaginal extraction was possible in all cases. The average operating room time was 212.25 min. No patient experienced complications associated with the colpotomy; nor did any patient have pain or drainage from the extraction site postoperatively. The median hospital stay was 4.5 days. One patient experienced a bowel obstruction unrelated to the extraction

site. The mean specimen length was 27 cm, and the mean number of lymph nodes retrieved was 15.75.

Conclusion Totally laparoscopic right colectomy with transvaginal extraction appears to be safe and feasible. This technique may provide both an attractive way to reduce abdominal wall morbidity and a bridge to NOTES colon surgery.

Keywords Laparoscopic colectomy ·
Natural orifice transluminal endosurgery (NOTES) ·
Totally laparoscopic right colectomy ·
Transvaginal specimen extraction

The development of natural orifice transluminal endoscopic surgery (NOTES) appears to be the next major frontier in minimally invasive surgery. Nevertheless, numerous technical, visual, and safety issues need to be overcome before widespread acceptance of these techniques occurs [1, 2]. As a bridge to NOTES, natural orifice specimen extraction (NOSE) has been proposed, in which the procedure is performed using conventional laparoscopic techniques, with avoidance of an extraction mini-laparotomy. The NOSE technique is appealing in terms of maximizing the benefits of minimal access procedures and progressing toward scarless surgery without the need for drastically novel laparoendoscopic approaches [3].

Laparoscopically assisted colectomy (LAC) for cancer is a technique equivalent to open resection in terms of safety and oncologic outcomes. In addition, LAC has clear advantages with regard to length of hospital stay, narcotic requirement, and return to work [4, 5]. However, surgical wound complications such as infection and postoperative hernia continue to be substantial after both open and laparoscopic colon surgery [6, 7]. Moreover, the

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- **Totally laparoscopic right colectomy with transvaginal specimen extraction: the authors' initial institutional experience.**
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- **Technique:**

- Four Consecutive patients from a prospectively maintained laparoscopic colectomy database.
- All were females with no prior pelvic surgery
- Four Trocar Laparoscopic Right Colectomy with intracorporeal anastomosis for Ca in 2 Cases and Adenomatous polyps in 2 Cases.
- Transvaginal Extraction was possible in all cases.
- Average operation room time : 212.25 min (3 h, 30 min)
- No complications associated with colpotomy recorded
- Nor did any patient have pain or drainage from extraction site post op.
- Median Hospital Stay : 4.5 days
- One patient experienced obstruction unrelated to extraction site
- Mean Specimen length was 27 cm.
- Mean number of Lymph Nodes was 15.75.

- **Conclusion:**

- Trans-Vaginal Extraction appears to be **Safe and Feasible.**
- The Technique may provide **both an attractive way to reduce abdominal wall morbidity and a bridge to NOTICE colon Surgery**



Jan, 2010

Single incision laparoscopic sigmoid colon resections without visible scar: a novel technique

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Abstract

Objective On the way to 'no-scar' techniques we developed a novel method for colorectal resection utilizing three intraumbilical trocars which results in a nonvisible postoperative scar.

Method Two female patients (Age: 56a, 42a) underwent laparoscopic colorectal resection for diverticulitis and infiltrating endometriosis of the rectosigmoid colon, respectively. The entire operation was carried out transumbilically following the standardized principles of colorectal resection.

Results The operative time was 110 and 180 min, respectively. No intraoperative adverse events or significant perioperative complication was noticed. The speci-

men measured 22 and 18 cm in length respectively. Estimated blood loss was minimal in both cases. Oral diet was resumed on postoperative day one. Patients were discharged on postoperative day 7 and day 6, respectively. At follow-up, patients presented with an optimal cosmetic result without apparent scarring.

Conclusion For the first time, a novel laparoscopic technique for sigmoid colon resection utilizing a single intraumbilical approach is presented. This new method allows further reduction of the surgical trauma and obviates any visible scar.

Keywords Transumbilical single incision laparoscopy, E-NOTES, colorectal resection

Introduction

Laparoscopic colon resection has been recognized since 1991 [1,2] and has proven several advantages over open surgery including decreased postoperative pain, early recovery and better cosmesis. Its use has increased exponentially over the past decade to surgically treat benign and malign colorectal diseases. Laparoscopic procedures are typically performed with three, four or five ports. Each incision might increase the potential risk for morbidity from bleeding, port-site hernia, and internal organ damage although conventional laparoscopy is already associated with a very low risk of poor outcome. However, a higher number of ports are paralleled by a relative decrease in the cosmetic outcome.

As a result, a surge of interest has arisen to reduce the abdominal wall trauma utilizing less-invasive alternatives. NOTES (natural orifice transluminal endoscopic surgery), which uses natural orifices for transgastric, trans-

vaginal, transvesical and transcolonic access to the abdominal viscera, represents the ultimate in minimally invasive surgery avoiding abdominal wall incisions altogether. However, although progress with NOTES continues to be made, several limitations hamper the broad acceptance and standardization of this new technique in particular in the field of colorectal surgery.

As a step towards less-invasive laparoscopy, SILS (single incision laparoscopic surgery) through the embryonic scar of the umbilicus has been proposed by general surgeons and urologists and has been defined as E-NOTES (embryonic natural orifice transumbilical endoscopic surgery). This approach allows refinements of existing technology, such as articulating instruments and new retraction systems. Initial experience in SILS cholecystectomy and bariatric procedures without a visible scar have been published [3,4].

Very recently a transumbilical sigmoid resection technique utilizing endoscopy, magnetic anchors and transrectal passage of stapler anvil has been described [5]. The possibility that this complex technique might be associated with new risks during the learning curve prompted us to develop a novel strategy of laparoscopic colon resection solely via the umbilicus. Herein we report on

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- **Single incision laparoscopic sigmoid colon resections without visible scar: a novel technique.**

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Colorectal Dis. 2010 Jan;12(1):66-70

- **Objective:**
 - **Two female** patients (Age: 56, 42)
 - Laparoscopic resection for **diverticulitis** and **infiltrating endometriosis**
 - The entire operation was carried out **transumbilically** following the standardized principles of colorectal resection

- **Results:**

- The operative time was 110 and 180 min
- Estimated blood loss was minimal in both cases

- No intraoperative adverse events or significant perioperative complication was noticed
- The specimen measured 22 and 18 cm

- Oral diet was resumed on postoperative day one
- Patients were discharged on postoperative day 7 and day 6

- At follow-up, patients presented with an optimal cosmetic result without apparent scarring

- **Conclusion:**

- For the first time, a **novel laparoscopic technique** for sigmoid colon resection utilizing a single intraumbilical approach is presented
- This new method **allows further reduction of the surgical trauma** and **obviates any visible scar.**

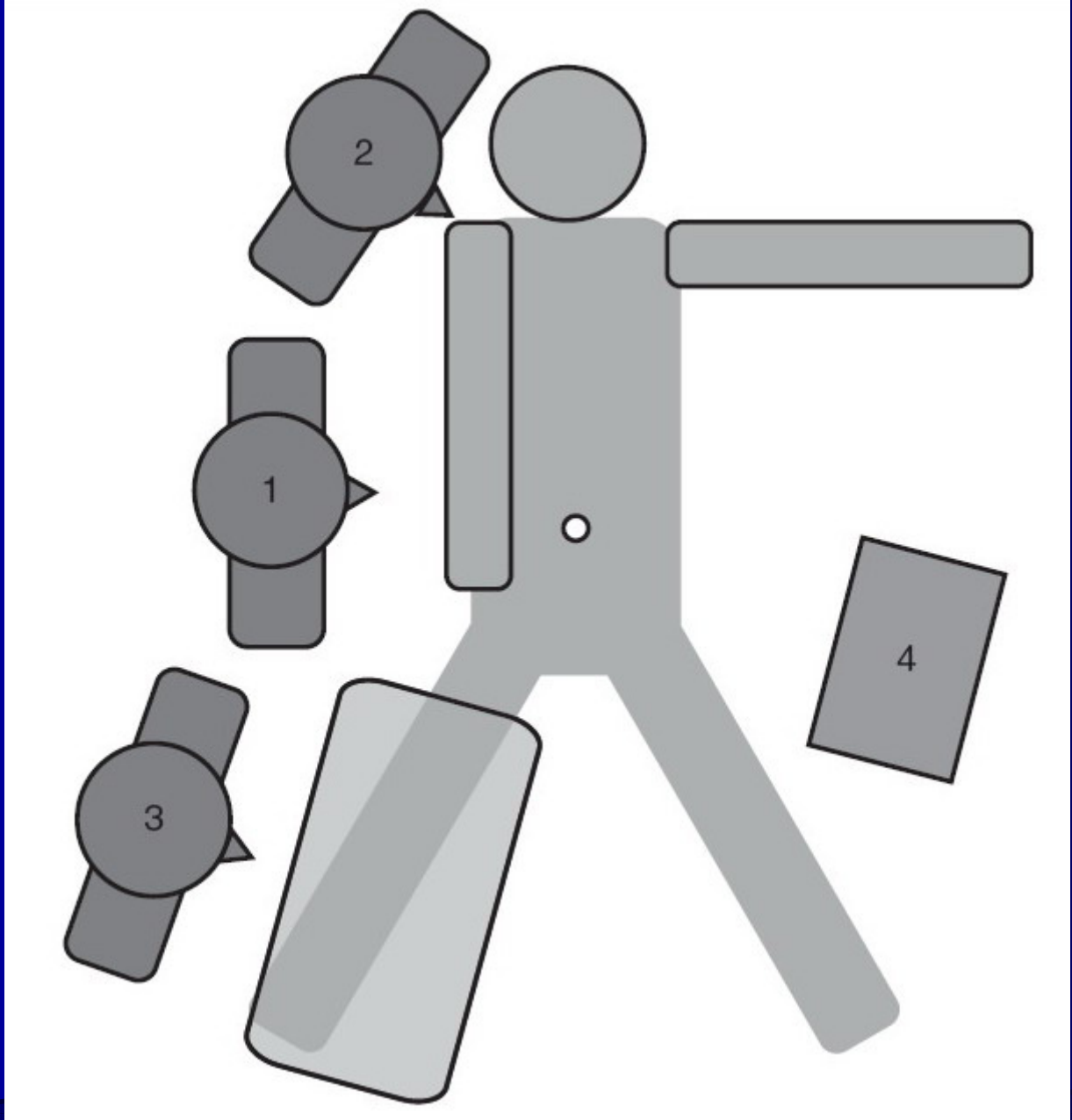




Figure 2 Intraumbilical trocar position for colonic dissection. The linear stapler is inserted directly after removal of one 5 mm trocar.

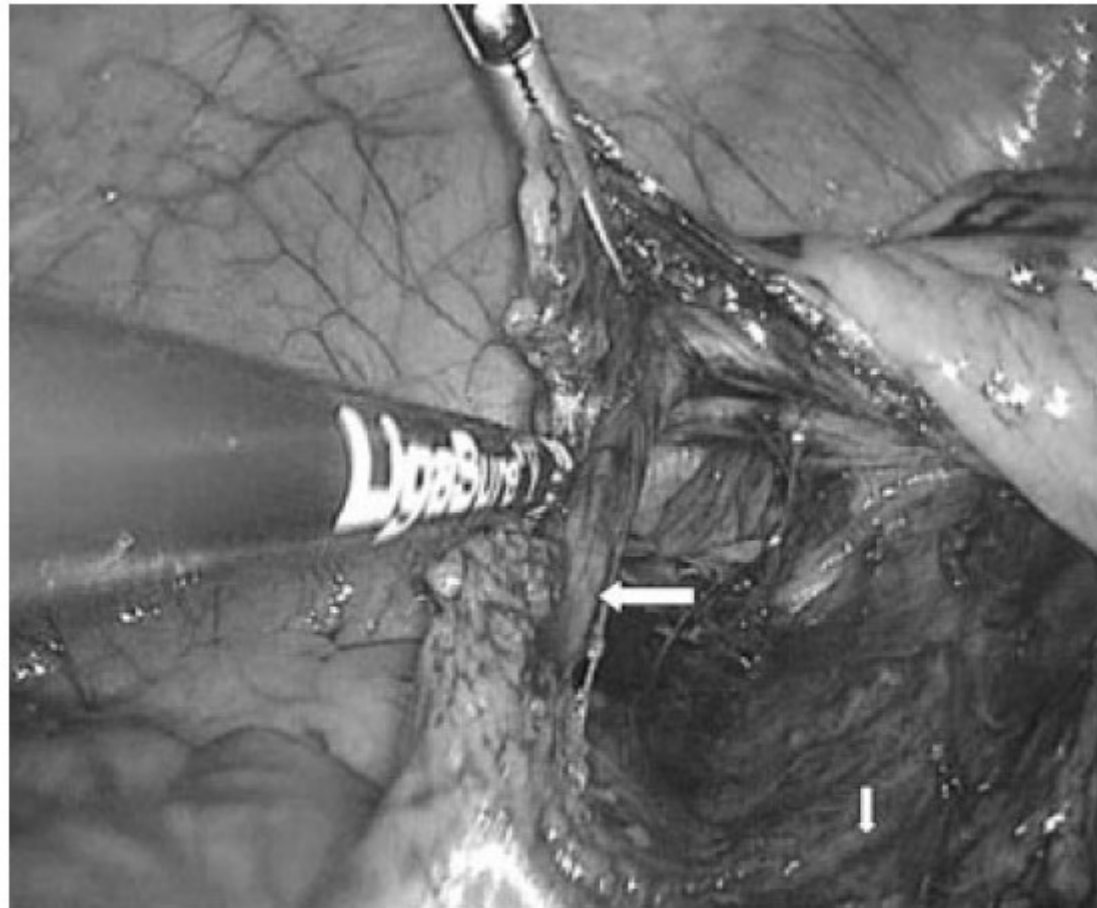


Figure 3 The inferior mesenteric vessels are exposed from the right side creating a retromesenteric window (big arrow: sigmoid artery, small arrow: superior rectal artery).



Figure 4 The colon is transected outside the abdomen and a hand-sewn purse string was performed to insert the anvil thereafter.

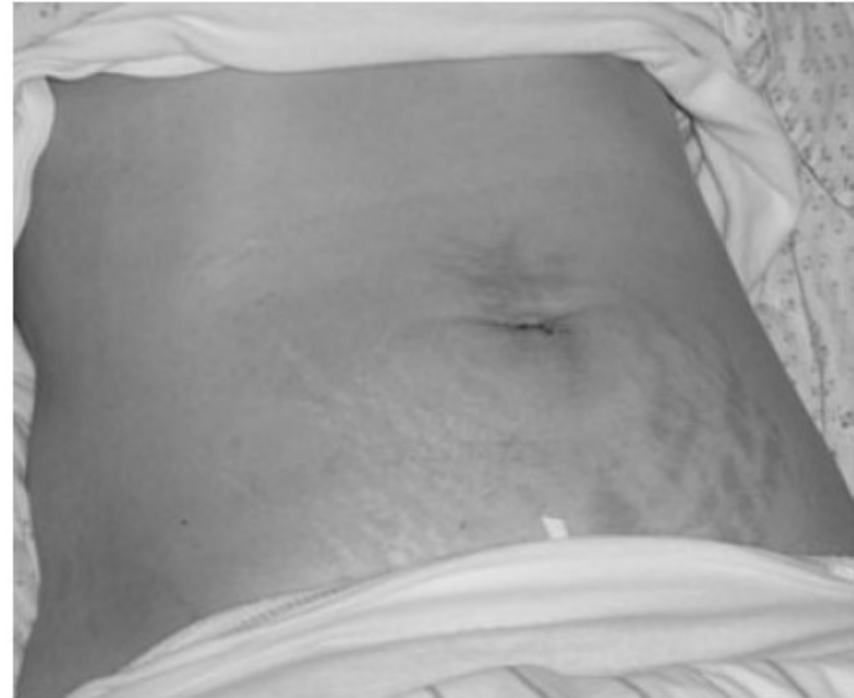


Figure 5 Postoperative view of the abdomen showing the 'invisible' scar at the umbilicus following transumbilical single incision laparoscopic colonic resection.



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Transumbilical single incision laparoscopic sigmoidectomy for benign disease

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Received 22 October 2008; accepted 22 December 2008

Abstract

Background Transumbilical single incision laparoscopic surgery (SILS) has made its initial forays into clinical minimally invasive surgery. SILS combines in part the cosmetic advantage and decrease parietal trauma of natural orifice surgery, but allow operative realization with standard and validated laparoscopic instruments. We report here the first clinical transumbilical SILS sigmoidectomy for benign disease.

Method Preliminary experience with transumbilical single incision laparoscopic surgery (or embryonic natural orifice transluminal endoscopic surgery) sigmoidectomy in a female patient (34 years, BMI 22 kg/m²) with sigmoid stenosis caused by nodular endometriosis was reported. Transumbilical SILS treatment of pelvic endometriosis was performed during the same operation through cauterization.

Results Transumbilical single incision laparoscopic sigmoidectomy was feasible with conventional laparoscopic instruments. The combined uses of straight and articulated laparoscopic instruments allow the avoidance of

transparietal sling suture for exposition. Operative time for sigmoidectomy and endometriosis therapy was 125 min. No intra-operative or postoperative complications were recorded. SILS achieved excellent cosmetic results and may be associated with accelerated recovery.

Conclusion Transumbilical single incision laparoscopic sigmoidectomy is feasible by experienced laparoscopic surgeons using conventional laparoscopic instruments and staplers. The combined uses of straight and articulated instruments allow transumbilical SILS sigmoidectomy without the need for additional incision or transparietal sling suture. SILS sigmoidectomy may have the clinical advantage over NOTES of offering the safety of laparoscopic colectomy and the avoidance of vaginal access. It has to be determined if SILS offers benefit to the patient, except in cosmesis, compared with standard laparoscopic sigmoidectomy.

Keywords Single port access (SPA), single incision, Laparoscopic single-site (LESS), colectomy, sigmoidectomy, laparoscopy

Introduction

Laparoscopic sigmoidectomies have been shown to ameliorate patient recovery compared with the open approach [1–4]. Attempts to decrease parietal trauma and improve the cosmetic results of laparoscopic sigmoidectomy have illustrated the patient's satisfaction with these approaches [5,6]. Recent research and clinical application of either natural orifice transluminal endoscopic surgery (NOTES) or hybrid NOTES (MA-NOS) for sigmoidectomy have demonstrated their feasibility, although diffi-

culties need to be overcome before wider clinical application [6–8]. While NOTES is still embryonic, transumbilical single incision laparoscopic surgery (SILS) has made its initial forays into clinical minimally invasive surgery [9–12].

For the past 2 years, numerous reports of transumbilical SILS application have been published showing the feasibility of this approach including for complex procedures such as living kidney donors procurement [10,13]. Recently, single port access right hemicolectomy has been described by the Geneva and later on by the Cleveland group [14–16].

We report in this paper the first transumbilical single incision laparoscopic sigmoidectomy for benign disease using conventional straight and articulated laparoscopic instruments.

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The present work has not been presented in meeting.

Transumbilical single incision laparoscopic sigmoidectomy for benign disease

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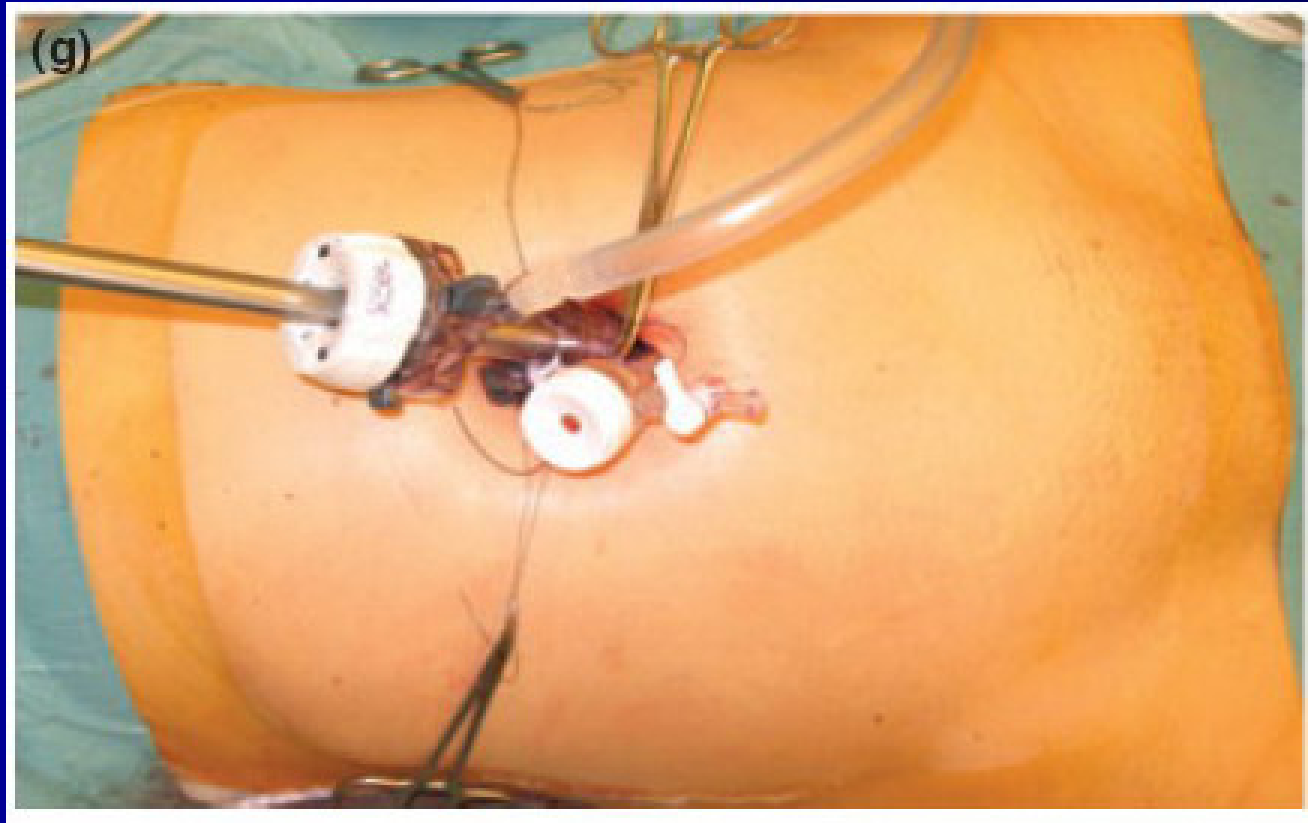
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- **Results:**

- **Transumbilical single incision laparoscopic sigmoidectomy was feasible with conventional laparoscopic instruments.**
- **The combined uses of straight and articulated laparoscopic instruments allow the avoidance of transparietal sling suture for exposition.**
- **Operative time for sigmoidectomy and endometriosis therapy was 125 min.**
- **No intra-operative or postoperative complications were recorded.**
- **SILS achieved excellent cosmetic results and may be associated with accelerated recovery.**

- **Conclusion:**

SILS sigmoidectomy may have the clinical advantage over NOTES of offering the safety of laparoscopic colectomy and the avoidance of vaginal access. It has to be determined if SILS offers benefit to the patient, except in cosmesis, compared with standard laparoscopic sigmoidectomy.



Medial To Lateral Or Lateral to Medial



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Impact of the Standardized Medial-to-lateral Approach on Outcome of Laparoscopic Colorectal Resection

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Abstract Beginning in 2003, a standardized medial-to-lateral approach was adopted in laparoscopic colorectal resection (LaCR) in our institution. The present study aimed to compare the outcomes of patients operated on by the standard approach with those who were operated on prior to the standard approach.

Data were collected from a prospectively collected database on LaCR. The control group included 106 patients operated on from January 2003 to December 2003 and the medial approach group included 224 patients who underwent operations from January 2005 to December 2007. The primary characteristics, operative details, pathology, and surgical outcomes of the two groups were compared.

The patient demographics, types of operations and pathology did not show any statistically significant differences. The medial approach group was associated with significantly less mean blood loss (100 (range 0-300) ml vs 174 (range 0-520) ml, $P < 0.001$), shorter hospital stay (10.8 (range 7-17.7) days vs 16 (range 10-20) days, $P < 0.001$), and more lymph nodes harvested (16 (range 10-22) vs 19 (range 12-25), $P = 0.001$). Significantly higher overall survival was observed in the medial approach group. The mortality and complication did not differ between the two groups.

Conclusion: A standardized medial-to-lateral approach for LaCR is associated with less blood loss, earlier return of bowel function, shorter hospital stay, and increased survival.

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number of lymph nodes harvested. This should be the preferred approach in LaCR.

Introduction

Laparoscopic colorectal resection (LaCR) had been popularized by randomized trials to show the benefits of reduced postoperative pain, early recovery of bowel function, and reduced hospital stay when compared to open surgery [1, 2]. The oncologic outcomes in terms of recurrence rate and survival of cancer patients after LaCR were not inferior to conventional open surgery [1, 3]. However, LaCR is a complicated procedure with a steep learning curve. It requires performance of the procedure in various anatomic locations in different quadrants of the abdomen and multiple steps, including bowel mobilization, ligation of major vessels, resection of a sizable specimen, and construction of an anastomosis. A standardized approach can help to filter the learning curve and improve the outcomes. There are a few approaches to laparoscopic resections of the large bowel. The medial-to-lateral approach was first described by Matsuo et al. in 1994 for an oncologic procedure [4]. A cadaveric model [5, 6] and the medial approach, the procedure is similar to several standardized steps. It begins with proximal ligation of vascular pedicles, open medial-to-lateral exploration of the retroperitoneum for identification and protection of superior structures (i.e., diaphragm, aorta), followed by mobilization and resection of the colon with mesentery. The medial approach continued to gain popularity and was the preferred method in the 2002 Consensus of the European Association of Endoscopic Surgery [7]. However, a long-term review found only one report that compared the clinical outcomes of the lateral and medial approach for

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Impact of the Standardized Medial-to-lateral Approach on Outcome of Laparoscopic Colorectal Resection, Is it a Fair Comparison?

Wai Lun Lau, Patrick Ying Yu Lau

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I read with great interest the article by Chen et al. [1] in which the medial-to-lateral approach of laparoscopic colectomy is superior to lateral-to-medial approach in terms of blood loss, bowel function, hospital stay, and number of lymph nodes. The article mentioned that the comparison was made between two groups of different periods: (1) lateral-to-medial approach group (2003-2007), and (2) medial-to-lateral approach group (2005-2007).

In our hospital, all laparoscopic right hemicolectomies were performed by using the medial-to-lateral approach by two groups of surgeons with similar experience during the same period between January 2008 and July 2009.

To confirm the result of our hospital and compare the difference between the two approaches, I have assessed differences from our prospective colorectal database (CR) between the left-sided colon and right-side gastric resection were selected. Finally 164 cases of laparoscopic

Table 1 Demographics and characteristics of patients

	Medial approach	Lateral approach	P value
No. of patients	106	86	
Gender (male)	78	66	0.738
Age (year)	51.1 (range 30-74)	47.1 (range 30-74)	0.031
High operation rate (%)	5	11	0.477
ASA grade			
I	39 (36.8%)	40 (46.5%)	0.446
II	67 (63.2%)	46 (53.5%)	

Table 2 Operative outcomes of patients

	Medial approach	Lateral approach	P value
Bowel time (min)	111 (88-136)	120 (95-208)	0.115
Conversion	1 (0.9%)	30 (35.0%)	0.048
Bleeding (ml)	7 (5.9%)	7 (8.1%)	0.233

operations for patients and surgeons at that time. Fear of postoperative complications and progression was much less in the medial approach group. In fact, there was no statistically significant difference in the length of hospital stay, surgical, different types of laparoscopic colectomy rates for each study during different periods. The availability of certain devices in different periods was similar. Could it be one of the possible reasons to explain the difference?

The benefit of the medial-to-lateral approach had been demonstrated in a meta-analysis, controlled trial [2]. The preference in above patients also is mentioned [2]. However, Matijevic et al. [8] showed that outcomes of both the medial-to-lateral and lateral-to-medial approach using the 3-Duo system was the same. Does it mean that the medial-to-lateral approach is even superior than the lateral-to-medial approach?

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Reply: The Impact of the Standardized Medial-to-lateral Approach on Outcome of Laparoscopic Colorectal Resection

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We appreciate the interest of Chen and Lau in our article titled "Impact of the standardized medial-to-lateral approach on outcome of laparoscopic colorectal resection" [1]. They and Lau questioned whether the comparison of patients operated on by medial-to-lateral (medial) approach versus lateral-to-medial (lateral) approach might have been biased by factors.

In the Department of Surgery of Queen Mary Hospital, a program of laparoscopic colectomy was started in 1998, and the procedure has been widely applied since 2003. From January 2003, more than 150 cases had been performed. Since laparoscopic colectomy was not a new procedure to surgeons in our team during the period of open indication for the lateral approach group. In the original article, we reported that when compared to the lateral approach group, patients in the medial approach group had earlier return of bowel function and shorter hospital stay. We also mentioned that the medial-to-lateral approach is superior to lateral-to-medial approach in laparoscopic colectomy. In the study, we included 106 patients of the medial approach in our study and 86 patients of the lateral approach in our study. We compared the results of the two groups. The results showed that the medial approach group had significantly better outcomes in terms of blood loss, hospital stay, and number of lymph nodes harvested. This should be the preferred approach in order to provide more evidence on the choice.

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Impact of the Standardized Medial-to-Lateral Approach on Outcome of Laparoscopic Colorectal Resection

Jensen T. C. Poon · Wai-Lun Law ·
Joe K. M. Fan · Oswen S. H. Lo

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Abstract

Background Beginning in 2004, a standardized medial-to-lateral approach was adopted in laparoscopic colorectal resection (LapCR) in our institution. The present study aimed to compare the outcomes of patients operated on by this approach with those who were operated on prior to the adoption of this technique.

Methods Data were retrieved from a prospectively collected database on LapCR. The control group included 196 patients operated on from January 2002 to December 2003 and the medial approach group included 224 patients who underwent operations from January 2005 to December 2007. The patient characteristics, operative details, pathology, and surgical outcomes of the two groups were compared.

Results The patient demographics, types of operation and pathology did not show any statistically significant difference. The medial approach group was associated with significantly less median blood loss [100 (interquartile range [IQR]: 50–174) ml versus 150 (IQR:100–300) ml; $p < 0.001$], shorter hospital stay [4 (IQR: (4–7) versus 7 (5–9) days; $p < 0.001$], and more lymph nodes harvested [12 (7–17.5) versus 10 (6–15); $p = 0.001$]. Significantly earlier bowel function recovery was observed in the medial approach group. The mortality and complications did not show any difference.

Conclusions A standardized medial-to-lateral approach for LapCR is associated with less blood loss, earlier return of bowel function, shorter hospital stay, and increased

number of lymph nodes harvested. This should be the preferred approach in LapCR.

Introduction

Laparoscopic colorectal resection (LapCR) had been proven by randomized trials to have the benefits of reduced postoperative pain, early recovery of bowel function, and reduced hospital stay when compared to open surgery [1, 2]. The oncologic outcomes in terms of recurrence rate and survival of cancer patients after LapCR were not inferior to conventional open surgery [1, 3]. However, LapCR is a complicated procedure with a steep learning curve for surgeons performing it. The procedure involves dissection in different quadrants of the abdomen and multiple steps, including bowel mobilization, ligation of major vessels, extraction of a sizable specimen, and construction of an anastomosis. A standardized approach can help to flatten the learning curve and improve the outcome. There are a few approaches in laparoscopic mobilization of the large bowel. The medial-to-lateral (medial) approach was first described by Milsom et al. in 1994 for an oncologic proctosigmoidectomy in a cadaver model [4]. With this medial approach, the procedure is divided into several standardized steps. It begins with proximal ligation of vascular pedicles; subsequent medial-to-lateral exploration of the retroperitoneum for identification and protection of important structures (e.g., duodenum, ureter), followed by mobilization and resection of bowel with anastomosis. The medial approach continued to gain popularity and was the preferred method in the 2002 Consensus of the European Association of Endoscopic Surgery [5]. However, a literature review found only one report that compared the clinical outcomes of the lateral and medial approach for

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- **Impact of the standardized medial-to-lateral approach on outcome of laparoscopic colorectal resection.**

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WJS; August 2009

- **BACKGROUND:**

- Beginning in 2004, a **standardized medial-to-lateral** approach was adopted in laparoscopic colorectal resection (LapCR) in our institution.
- The present study **aimed to compare the outcomes of patients** operated on by this approach with **those who were operated on prior to the adoption** of this technique.

- **METHODS:**

- Data were retrieved from a prospectively collected database on LapCR.
- The **control group included 196** patients operated **Jan 2002 to Dec 2003**
- The **medial approach group included 224** patients who underwent operations from **Jan 2005 to Dec 2007**.
- **The patient characteristics, operative details, pathology, and surgical outcomes** of the **two groups were compared**.

- **RESULTS:**

- The patient demographics, types of operation and pathology **did not show any statistically significant** difference.
- The **medial approach group** was associated with:
 - Significantly **less median blood loss** [100 (interquartile range [IQR]: 50-174) ml versus 150 (IQR:100-300) ml; $p < 0.001$],
 - **Shorter hospital stay** [4 (IQR: (4-7) versus 7 (5-9) days; $p < 0.001$],
 - **More lymph nodes harvested** [12 (7-17.5) versus 10 (6-15); $p = 0.001$].
 - **Significantly earlier bowel function** recovery
- The mortality and complications **did not show any difference**

- **CONCLUSIONS:**

- **A standardized medial-to-lateral approach is associated with:**
 - Less blood loss,
 - Earlier return of bowel function,
 - Shorter hospital stay, and
 - Increased number of lymph nodes harvested.
- **This should be the preferred approach in LapCR.**



07th Jan. 2010

Impact of the Standardized Medial-to-Lateral Approach on Outcome of Laparoscopic Colorectal Resection. Is it a Fair Comparison?

Weida Day · Patrick Ying Yu Lau

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I read with great interest the article by Poon et al. [1] in which the medial-to-lateral approach of laparoscopic colectomy is superior to lateral-to-medial approach in terms of blood loss, bowel function, hospital stay, and number of lymph nodes. The article mentioned that the comparison was made between two groups at different periods: (1) lateral-to-medial approach group (2002–2003); and (2) medial-to-lateral approach group (2005–2007).

In our hospital, all laparoscopic right hemicolectomies were performed by using the medial-to-lateral approach. However, both lateral-to-medial and medial-to-lateral approaches were performed for left-sided colon and rectum by two groups of surgeons with similar experience during the same period between January 2008 and July 2009.

To review the result of our hospital and compare the difference between the two approaches, I have retrieved information from our prospective colorectal database. Only lesions over the left-sided colon and rectum under elective operation were selected. Totally 144 cases of laparoscopic colorectal operations were performed for malignant lesions over the rectum (68.1%), sigmoid (21.5%), and descending colon (10.4%). There was no significant difference in demographics and characteristics of both groups (Table 1). Outcomes and complications rates in both groups also were not significantly different (Tables 2 and 3).

I have considered two reasons for the findings by Poon et al. [1]. First, the author mentioned that the laparoscopic colectomy was just widely accepted in the early 2000s. The lateral approach group, which was during the period of 2002 and 2003, might still be regarded as a relatively new

Table 1 Demographics and characteristics of patients

	Medial approach	Lateral approach	P value
No. of patients	56	88	
Gender (male)	38	58	0.718
Age (year)	71.88 (40–91)	67.13 (40–89)	0.233
High operative risk (ASA 3/4)	8	11	0.477
Advanced tumor (T3/T4)	39 (69.6%)	60 (68.2%)	0.646

Table 2 Operative outcomes of patients

	Medial	Lateral	P value
Blood loss (ml)	115 (50–150)	120 (50–200)	0.173
Conversion	5 (9%)	10 (11.3%)	0.641
Hospital stay	7 (5–10)	7 (5–21)	0.213

operation for patients and surgeons at that time. Fear of postoperative complications and reoperation may result in the small difference of the hospital stay. Second, different kinds of laparoscopic instruments might be used during different periods. The availability of certain devices is different between two groups. Could it be one of the possibilities to explain the difference?

The benefit of the medial-to-lateral approach had been demonstrated in a small, randomized, controlled trial [2]. The application in obese patients also is successful [3]. However, Ballantyne et al. [4] showed that outcomes of both the medial-to-lateral and lateral-to-medial approach using the da Vinci system were the same. Does it mean that standardization of the procedure is more important than the approach itself?

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- **Impact of the Standardized Medial-to-Lateral Approach on Outcome of Laparoscopic Colorectal Resection. *Is it a Fair Comparison?***

Day W, Lau PY

Department of Surgery, Kwong Wah Hospital, Kowloon, Hong Kong

WJS; Jan 2010

- **Objective:**

- In our hospital **all laparoscopic Rt. Hemicolectomies were performed by using the medial to lateral approach.**
- However, **both approaches were performed for Left sided colon and rectum by 2 groups of surgeons with similar experience**
- During same period: **Jan 2008 - July 2009**

- **Method:**

- Only Lesions over **Lt. sided colon** and rectum under elective operations were selected
- Total **144 Cases for malignant** lesions
- **Rectum (68.1%); Sigmoid(21.5%); Descending Colon(10.4%)**

- Results:

- **No Significant difference** in Demographics and Characteristics of both groups.
- Outcome and Complication rates in both groups also **were not significantly different.**

- **Criticism:**

- I considered two reasons for the findings of Poon et al.

- The term Laparoscopic Colectomy was just widely accepted in the early 2000s, The Lateral approach group which was during the period (2002-2003) might still be regarded as relatively new operation for patients and surgeons, Fear of postoperative complications and re-operation may result in the small difference in the hospital stay.
 - Second: Different kinds of laparoscopic instruments might be used during different periods. The availability of certain devices is different between the two groups. Could it be one of the possibilities to explain the difference ?!

- Question :
 - The benefit of the medial to lateral approach **had been demonstrated in a small, randomized, controlled trial.**
 - The **Application in obese patients is also successful.**
However
 - **Ballantyne et al.** showed that outcome of both approaches using the da Vinci system were the same.
 - **Does it mean that standardization of the procedure is more important than the approach itself ?!**



05th Feb. 2010

Reply: The Impact of the Standardized Medial-to-lateral Approach on Outcome of Laparoscopic Colorectal Resection

Jensen T. C. Poon · Wai Lun Law

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We appreciate the interest of Day and Lau in our article titled "Impact of the standardized medial-to-lateral approach on outcome of laparoscopic colorectal resection" [1]. Day and Lau questioned whether the comparison of patients operated on by medial-to-lateral (medial) approach versus lateral-to-medial (lateral) approach might have been biased by two factors: (1) Patients in the lateral approach group underwent operation earlier in time (January 2002–December 2003), when laparoscopic colectomy was a new procedure, surgeons were more cautious, and patients remained in the hospital longer after operation. (2) Differences in the results for the two groups of patients might be attributable to the use of different laparoscopic instruments.

In the Department of Surgery at Queen Mary Hospital, a program of laparoscopic colectomy was started in 1996, and the procedure has been widely applied since 2000. Prior to January 2002, more than 150 cases had been performed. Hence, laparoscopic colectomy was not a new procedure to surgeons in the unit during the period of patient inclusion for the lateral approach group. In the original article, we reported that when compared to the lateral approach group, patients in the medial approach group had an earlier return of bowel function as indicated by the reduced number of postoperative days to passing flatus (2(2–3) vs. (2(2–2) days, respectively; $p < 0.001$) and bowel motion (3(2–5) vs. (3(2–3), respectively; $p < 0.001$). Furthermore, because postoperative complications are uncommon and wound pain is minimal after laparoscopic colorectal surgery,

patients are usually discharged after return of bowel function and tolerance of diet. We believe that earlier return of bowel function in the medial approach group was the key factor contributing to shorter hospital stays. We have also discussed the potential weaknesses of this comparative study, and we have reported that the same laparoscopic instruments, including the ultrasonic dissector, was used for both the medial and lateral approach groups.

Nevertheless, we concur with Day and Lau that standardization of the procedures is important in laparoscopic colectomy, which is a complex procedure with a steep learning curve. In the medial approach for laparoscopic colectomy, the procedure is divided into several standardized steps including proximal ligation of vascular pedicles, subsequent medial-to-lateral exploration of the retroperitoneum for identification and protection of important structures—e.g., duodenum, ureter—followed by mobilization and resection of bowel with anastomosis. We share the experience of other experts [2, 3] in that the medial approach for laparoscopic colectomy constructs a more standardized operative technique. In the literature, only very few reports have compared the results of the lateral and medial approaches to laparoscopic colectomy. As Day and Lau's surgical unit still performs both approaches, we encourage them to conduct a randomized trial for comparison of these two operative approaches in order to provide more evidence on this debate.

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- **Reply: The Impact of the Standardized Medial-to-lateral Approach on Outcome of Laparoscopic Colorectal Resection.**

Poon JT, Law WL

Department of Surgery, University of Hong Kong Medical Centre, Queen Mary Hospital, Kowloon, **Hong Kong.**

Response:

We appreciate the interest of Day & Lau in our article **but:**

- In the Dept. of Surgery at Queen Mary Hospital, a program of laparoscopic colectomy was **started in 1996** and the procedure has been **widely applied since 2000.**
- Prior to **Jan 2002, more than 150 cases** had been performed
- Hence. Laparoscopic Colectomy **was not a new procedure** to surgeons in the unit during the period of patient inclusion.
- We believe that **earlier return of bowel function** was the key factor contributing to shorter hospital stay
- We have reported that the **same laparoscopic instruments** including the ultrasonic dissector was used in both groups.

- Nevertheless:

- We concur with Day & Lau that **standardization of the procedure is important** in laparoscopic colectomy which is a complex procedure with a steep learning curve.
- We share the experience of other experts in that the medial approach constructs a more standardized operative technique.
- In the literature, Only **very few reports have compared the results** of the two approaches to laparoscopic colectomy.
- As **Day and Lau's surgical unit still performs both approaches**, we encourage them to conduct a randomized trial for comparison of these two operative approaches in order to provide more evidence on this debate.

Outcome



Feb. 2010,
Article in Press

	Standorte
<p>coloproctology 2010 DOI 10.1007/s00053-010-0055-z © Urban & Vogel 2010</p>	<p>M. Morino - M.E. Allaix - G. Monasterolo - C. Garrone Chirurgia Generale I, Center for Minimally Invasive Surgery, Department of Surgery, University of Turin, Torino</p>
<p>Sexual- und Blasenfunktion bei Männern nach laparoskopischer totaler mesorektaler Exzision</p>	
<p>Morino M, Farini U, Allaix M et al (2009) Male sexual and urinary function after laparoscopic total mesorectal excision. Surg Endosc 23:1233-1240</p>	
<p>Eine laparoskopische totale mesorektale Exzision (LTME) aufgrund eines Rektumkarzinoms ist technisch machbar. Sie bietet akzeptable Komplikationsraten und onkologische Kurzergebnisse vergleichbar mit denen einer offenen Operation [1, 2, 3, 4, 5, 6, 7, 8]. Jedoch darf die Lebensqualität („quality of life“, QoL) beim Streben nach onkologischer Spitzenleistung nicht vergessen werden. Bei den postoperativen Sexual- und Blasenfunktionsstörungen, die aus einer versehentlichen Schädigung der Splanchnikus- und hypogastrischen Nerven im Becken resultieren, handelt es sich um bekannte Komplikationen einer Rektumresektion [9, 10, 11].</p> <p>Eine laparoskopische Operation, obwohl technisch anspruchsvoll und assoziiert mit einer langen Lernkurve, hat den Vorteil einer besseren Visualisierung der kleinsten Strukturen, einschließlich der autonomen Nerven. Der Einsatz einer laparoskopischen Methode bei der Behandlung eines Rektumkarzinoms könnte daher die Bewahrung der autonomen Nerven im Becken ermöglichen. Nichtsdestotrotz sind aber die Daten zu den funktionellen Ergebnissen der laparoskopischen TME limitiert und kontrovers [12, 13].</p> <p>Diese retrospektive klinische Studie hatte das Ziel, die sexuellen und funktionellen Ergebnisse bei Männern in einer konsekutiven Patientenserie zu unter-</p>	<p>suchen, in der die Patienten sich wegen eines distalen und mittleren Rektumkarzinoms einer laparoskopischen Operation in unseren Kliniken unterzogen hatten.</p> <p>Materialien und Methoden</p> <p>Männliche Patienten mit der Diagnose eines Karzinoms im mittleren oder distalen Rektum wurden aus einer prospektiven Datenbank aus 850 Patienten mit einer laparoskopischen kolorektalen Resektion herausgesucht. Die Lokalisation des Rektumkarzinoms wurde nach den International Guidelines for Cancer Registrars [14] als distales Rektum (≤ 7 cm vom Analrand) und mittleres Rektum (7–12 cm vom Analrand) definiert.</p> <p>Die präoperative Untersuchung umfasste die körperliche Untersuchung, eine totale Koloskopie, Ultraschall der Leber, abdominale Computertomographie (CT), Röntgenaufnahme des Thorax und Bestimmung von Tumormarkern [karzinoembryogenes Antigen (CEA) und Tumoranigen („cancer antigen“, CA) 19–9]. Präoperativ als T3 oder T4 ohne Fernmetastasen eingestufte Patienten wurden mit präoperativer Chemotherapie mit Bestrahlung (45 Gy über 4 Wochen, zusammen mit systemischer intravenöser 5-Fluorouracil-Infusion) behandelt und 20 Tage nach Beendigung der Behandlung mit einer klinischen Untersuchung und CT nachuntersucht. Zu diesem Zeitpunkt wurde der definitive Einschluss in die Studie entschieden und lokal fortgeschrittene Tumore der Klassifikation T4 (TNM) ausgeschlossen.</p> <p>Sexual- und Blasenfunktionen wurden nicht präoperativ evaluiert</p> <p>Alle Eingriffe wurden von 2 Chirurgen durchgeführt (M.M., U.F.), beides Experten in den fortgeschrittenen laparoskopischen Methoden sowie kolorektalen Operationen. Die beiden Operateure führten die Eingriffe nach den gleichen onkologischen und klinischen Prinzipien durch, einschließlich totaler mesorektaler Exzision, wie beschrieben bei Heald et al. [15]; adäquate Resektionsränder, Bewahrung der autonomen Nerven, en bloc vaskuläre Resektion und Lymphadenektomie sowie minimale intraoperative Manipulation des Tumors. Zeigte die digitale Untersuchung ein Karzinom, das den anatomischen Analkanal erreichte oder am Beckenboden fixiert war, wurde eine laparoskopische abdominoperineale Resektion durchgeführt.</p> <p>Die standardisierten Eingriffe wurden vor Beginn der Studie festgelegt und dann bei allen teilnehmenden Patienten durchgeführt. Unsere Methode der laparoskopischen TME ist andernorts beschrieben [1]. Am Ende der anterioren Resektion wurde ein protektives Stoma angelegt, abhängig von der technischen Einschätzung des Chirurgen bezüglich der Qualität der Anastomose.</p> <p>Das prä- und postoperative Vorgehen war standardisiert. Es wurde präoperativ keine spezielle mechanische Darmvorbe-</p>

Übersetzer Nachdruck: Morino M, Farini U, Allaix M, Monasterolo G, Brachet Corral R, Garrone C. Male sexual and urinary function after laparoscopic total mesorectal excision. Surg Endosc 2009;23:1233-1240.

Male sexual and urinary function after laparoscopic total mesorectal excision

[Sexual- und Blasenfunktion bei Männern laparoskopischer totaler mesorektaler Exzision]

Morino, M., Garrone, C.

Centre for Minimally Invasive Surgery, Univ of Turin, *Italy*

- **Objective:**

- This study **retrospectively evaluated** the frequency of such complications after laparoscopic total mesorectal excision (**LTME**) with autonomic nerve preservation

- **Method:**

- **50 men younger than 75 years** who underwent radical LTME
- **Middle and lower rectal cancer**
- Followed up for at least **12 months**.
- **Interviewed**, and administered a **standardized questionnaire** about postoperative functional outcomes and quality of life.

- **Results:**

- **Sexual desire** was maintained by 55.6% of the patients,
- **Ability to engage in intercourse** by 57.8%, and
- **Ability to achieve orgasm** and ejaculation by 37.8%.
- **Distance of the tumor from the anal verge** and **adjuvant or neoadjuvant** treatments were **significant predictors of poor postoperative** sexual function.
- **Seven patients (14%) presented transitory postoperative urinary dysfunction**, all of whom were medically treated.
- **Tumor stage and distance from the anal verge** were independently associated with the **postoperative global International Prostatic Symptom Score (IPSS)**.
- No **urinary-related differences** in quality of life were observed

- **Conclusion:**

- **LTME did not reproduce or improve on sexual and urinary dysfunction outcomes obtained in the best open TME series**



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Factors Affecting Number of Lymph Nodes Harvested in Colorectal Cancer¹

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Submitted for publication June 13, 2009

Background. Lymph node involvement is a highly important prognostic factor in colorectal cancer staging. Examination of a minimum of 12 nodes is recommended for accurate staging. The purpose of this study was to identify factors affecting the number of lymph nodes harvested in colorectal cancer specimens.

Materials and Methods. Retrospective review of all patients undergoing colectomy for colorectal cancer at our VA hospital from 2002 to 2007 was done. Statistical analysis was done using univariate as well as multivariate analysis. One hundred eighty-three patients were analyzed.

Results. Average number of nodes retrieved was 14.9 with 92 (51%) containing fewer than 12 lymph nodes. Median number of nodes was 11. The only two factors found to have an effect on nodes harvested were pathologist $P < 0.05$ and surgeon experience $P = 0.01$. Factors not found to have an impact on number of nodes harvested were age of patient, previous operation, T stage of tumor, type of colectomy, bowel prep, laparoscopic versus open technique, or BMI. Multivariate analysis confirmed pathologist and surgeon experience as independent factors associated with number of nodes retrieved $P < 0.05$.

Conclusions. Operating surgeon and examining pathologist were the only factors found to have a significant impact on number of nodes harvested. Meticulous dissection both in and outside of the operating room are indicated. © 2010 Elsevier Inc. All rights reserved.

Key Words: colorectal cancer; lymph nodes; prognosis; survival.

INTRODUCTION

Colorectal cancer is the second leading cause of cancer death in the United States. In nonmetastatic colorectal cancer, lymph node status is the single strongest pathologic predictor of patient outcome. In addition to being a significant predictor of outcome and survival, staging through lymph node retrieval is also important in that patients with positive lymph nodes are routinely referred for adjuvant therapy.

As detection of positive lymph nodes is critical for prediction of patient outcome, an adequate number of lymph nodes must be examined. The International Union Against Cancer, American Joint Committee on Cancer, American College of Surgeons, American Society of Clinical Oncology, National Comprehensive Cancer Network, National Quality Forum, and National Cancer Institute have all determined the number of nodes for adequate staging to be 12 [1, 2]. The implications of inadequate lymph node sampling include (1) false negative node status leading to failure to use adjuvant therapy, (2) although controversial, failure of removal of involved lymph may increase the risk of local recurrence, and (3) possibly poor surgical or pathologic care.

Numerous observational studies have shown that patients in whom an adequate number of nodes have been examined have a considerably lower rate of mortality after colectomy for colon cancer than patients with fewer nodes examined [3-6]. Factors that can lead to difficulty in establishing the minimum number of lymph nodes include patient factors (biological variation in the quantity and distribution of lymph nodes in the large bowel), surgeon factors such as surgical extent of lymphadenectomy, and pathologist skill.

¹ This paper was presented as a poster presentation at the March 2009 Society of Surgical Oncology Meeting in Phoenix, Arizona

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Does a laparoscopic approach affect the number of lymph nodes harvested during curative surgery for colorectal cancer?

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Department of Colorectal Surgery, Cleveland, OH 44195, USA

● Background :

- This study aimed to assess the number of lymph nodes (LNs) harvested after laparoscopic and open colorectal cancer resections.

● Methods

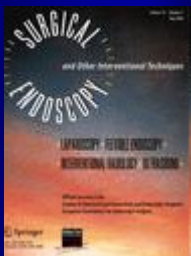
- Between 1996 and 2007,
- 729 Colorectal cancer patients.
 - 243 patients undergoing laparoscopic colorectal cancer resection were matched 1–2 by age, operation, gender, operation date, body mass index (BMI), and tumor stage (TNM) to
 - 486 patients undergoing open surgery. The numbers of examined and involved LNs were compared according to tumor location and year of surgery.

- **Results:**

- The mean number of LNs per case was 24.8 ± 20.6 .
- Did not differ between laparoscopic and open surgery ($p = 0.4$).
- A significant difference was observed between the number of **involved LNs** retrieved laparoscopically (2.2 ± 3.8) and the number retrieved by open surgery (1.6 ± 4 ; $p = 0.03$).
- There were significant differences between the numbers of LNs retrieved from the **right colon** (28.1 ± 14.6), **left colon** (24.5 ± 17.6), and **rectum** (19.1 ± 15.1) ($p < 0.001$).
- There were **significantly fewer examined LNs** in laparoscopic than in open cases during 2002 and 2003 ($p = 0.003$).

- **Conclusion:**

- Laparoscopic resection of colorectal cancer can achieve lymph node retrieval similar to that achieved by the open approach.
- In this era of new technology, laparoscopic lymph node harvest is becoming more optimized



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Risk of clinical leak after laparoscopic versus open bowel anastomosis

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Abstract

Purpose This study was designed to investigate the safety of laparoscopic (Lap) colorectal surgery as reflected by the anastomotic bowel leak (ABL) rate compared with that seen in open surgery.

Methods Between 2000 and 2007, 1,516 consecutive patients undergoing Lap-colorectal surgery with bowel anastomosis were covariate-adjusted to 3,258 patients undergoing open surgery by pathology and site of anastomosis using the institutional review board-approved laparoscopic, diverticular, Crohn's, and colorectal cancer databases. Of these patients, 643 patients in each group were equally matched by pathology, site of anastomosis, date of surgery, age, gender, and body mass index. The clinical ABL rate was compared between the two groups by the location of bowel anastomosis and year of surgery.

Results A total of 4,774 patients (1,516 Lap, 3,258 open; mean age, 55.8 ± 17.4 years; body mass index, 27.8 ± 6.2) underwent colorectal resection with bowel anastomosis (cancer 45.3%, Crohn's 29.6%, diverticulitis 12.3%, other 12.8%). There was no difference in the overall clinical ABL between Lap (2.6%) and open procedures (2.1%; $p = 0.5$), between Lap right versus open right ($p = 0.6$),

between Lap left versus open left ($p = 0.8$), and between patients operated on during different time periods ($p = 0.4$). For the case-matched 643 patients, there were no differences in clinical anastomotic bowel leak between laparoscopic versus open group based on site of anastomosis, pathology, and year of surgery.

Conclusions A laparoscopic colorectal approach is not associated with a higher risk of clinical anastomotic bowel leak.

Keywords Anastomotic leak · Laparoscopy · Colorectal surgery · Risk factors · Morbidity · Mortality

The safety, efficacy, and feasibility of laparoscopic colorectal surgery continue to evolve. The reduced need for analgesics, faster recovery of postoperative activity, and shorter stay in the hospital has been well documented for laparoscopic colorectal surgery [1]. Improved cosmesis, shorter ileus, earlier resumption of dietary intake, and the possibility of reduced immunosuppression appear to be consistently reported as additional major benefits of laparoscopic colectomy [2].

Anastomotic bowel leak is a feared complication specific to colorectal surgery and is associated with significant morbidity, prolonged hospital stay, increased cost, and increased mortality [3]. Its reported prevalence varies widely from 1–39%, with clinically significant leaks occurring in 3–6% of cases, depending on the definition and the type of resection performed [3, 4]. Although the literature is replete with studies that specify a rate of anastomotic bowel leak, it is seldom possible to know what constitutes a “leak.” There is considerable variation in the definition of anastomotic bowel leak and the interpretation of anastomotic bowel leak among studies [5, 6]. In fact,

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Risk of clinical leak after laparoscopic versus open bowel anastomosis

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- **Method:**

- Between 2000 and 2007,
- 1,516 patients undergoing Lap-colorectal surgery with bowel anastomosis
- 3,258 patients undergoing open surgery

- **Results:**

- No differences in clinical anastomotic bowel leak between laparoscopic versus open group based on site of anastomosis, pathology, and year of surgery.

- **Conclusion:**

- laparoscopic colorectal approach is not associated with a higher risk of clinical anastomotic bowel leak

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Any Questions ?!!



Thank You !