Hand-assisted Laparoscopic Colectomy at Khon Kaen Hospital

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Abstract

Background Data

Hand-assisted laparoscopic surgery is a recent technique that combines the benefits of the open and laparoscopic surgery. At Khon Kaen Hospital, we have employed the hand-assisted laparoscopic surgery since 2010. It has been used mainly for colectomy.

Objective

This study gathered information on characteristics, surgical data, operative details and postoperative outcomes of patients who had gone through Hand-assisted Laparoscopic Colectomy at Khon Kaen Hospital.

Methods

This descriptive retrospective study was conducted at Khon Kaen Hospital from January 2010 to December 2015 on patients who had a hand-assisted laparoscopic colectomy (HALC).

Results

A total of 20 patients were subjected to the study. Hand-assisted laparoscopic colectomy included Right hemicolectomy, Right extended hemicolectomy, Left hemicolectomy, Sigmoidectomy, Low anterior resection and Abdomino-perineal resection.The incision size had a range of 5.9-7 cm. We needed to convert to an open surgery in one because the tumour had spread to nearby tissues. The length of the hospital stay was 9 days on average. Two with surgical site infection and one with urinary tract infection. Perioperative mortality was null and no patients were subjected to a repeated surgery.

Conclusions

The hand-assisted laparoscopic surgery to treat colon diseases at the Khon Kaen Hospital was found to be safe with no serious complications nor perioperative mortality. We achieved similarly satisfying results as in other studies.

Introduction

Colectomy can be performed by an open, a hand-assisted laparoscopic or a laparoscopic surgery. Laparoscopy was first introduced in 1980[1] and is advantageous to a conventional open surgery in many ways; smaller incision, less pain, quicker recovery and shortened stay at hospital[2-4]. However, the laparoscopic surgery is a complicated procedure. It lasts longer, involves expensive instruments and requires highly trained staff.

Hand-assisted laparoscopic surgery is a recent technique that combines the benefits of the open and laparoscopic surgery. One hand of a surgeon, usually a recessive hand, is involved in the camera-aided operation. While retaining the benefits of the laparoscopic surgery, in which incision remains relatively small and the impact to the surrounding tissue minor, the hand-assisted laparoscopic surgery makes use of the surgeon's ability to feel the pathology of the tissue, cut open the tissue, when needed, and, in case of bleeding, control it more efficiently than the regular laparoscopic surgery[5-8]. Many studies on the hand-assisted laparoscopic surgery have been carried out on colorectal, renal and spleen tumour. In comparison to an open and a laparoscopic surgery, it yields satisfying results[9-12].

At Khon Kaen Hospital, we have employed the hand-assisted laparoscopic surgery since 2010. It has been used mainly for colectomy. This study gathered information on characteristics, surgical data, operative details and postoperative outcomes of patients suffering from a colon disease who had gone through this type of surgery at our hospital.

Methods

This descriptive retrospective study was conducted at Khon Kaen Hospital from January 2010 to December 2015 on patients who had a hand-assisted laparoscopic colectomy (HALC). Our study collected data on age, sex, body mass index, underlying disease, history of previous abdominal surgery, operative time, incision size, blood loss, size and location of tumour, length of hospital stay and complication of the patients as shown in Figure 1.

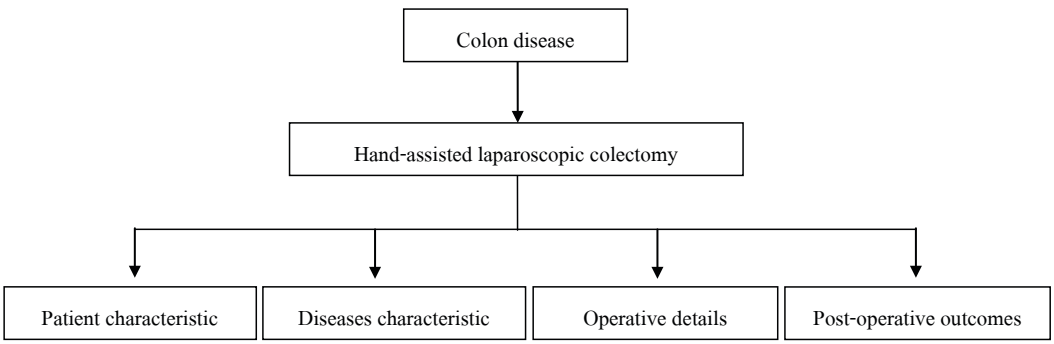

Figure1. Data collected for the study

Definition

Conversion to open surgery was defined as removal of the base retractor and extension of the incision to complete the procedure safely for reasons other than specimen extraction.

Length of hospital stay was defined as the number of nights the patient spent from the day of surgery.

Surgical technique

The HALC patients lay on their back and had anaesthetic applied on their 5.5-9 cm incision (depending on the size of a surgeon's hand). The surgeon wore a hand-port inserted inside the peritoneal cavity on one hand while the surgeon's other hand was used to operate a laparoscope. Another surgeon assisted in the operation of the laparoscope (Fig. 2).

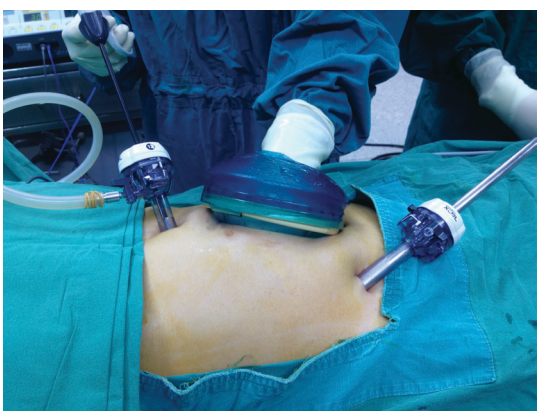

Figure 2. Operative Procedure

Statistics

Data were entered, calculated and analysed as descriptive statistic in percentage and mean in Microsoft Office Excel 2014. We report most analyses as descriptive statistics. This project was approved by the Khon Kaen Hospital Ethical Review Board.

Results

A total of 20 patients were subjected to the study. There were 9 males and 11 females. Age between 30–77 years old (mean 52) while body mass index (BMI) range 15.9 – 26.2 kg/m^2 (mean 20.1). The most common clinical presentation was a change in bowel habit. There were 4 patients who had had previous abdominal surgery. Table 1 shows the characteristics of our patients.

Table 1 Patient characteristics (n = 20)

Patient characteristics	Number of patients (Percent)
Age (yrs. old)	range 30 – 77 (mean 52)
Sex	
Male	9 (45)
Female	11(55)
Underlying disease	
No underlying disease	15 (75)
Hypertension	2 (10)
DM	3 (15)
Renal insufficiency	2 (10)
Gout	1 (5)
Smoking	
Non Smoking	16 (80)
Smoking	4 (20)
Previous abdominal surgery	
Non previous abdominal surgery	16 (80)
Previous abdominal surgery	4 (20)
Peptic ulcer perforation	2 (10)
Appendectomy	2 (10)
Clinical presentation	
Abdominal pain	13 (65)
Bowel habit change	15 (75)
Abdominal mass	5 (25)
Lower gastrointestinal bleeding	9 (45)
Anemia	6 (30)

Table 1 Patient characteristics (n = 20)

Patient characteristics	Number of patients (Percent)
Abdominal mass	
Absent	15 (75)
Present	5 (25)
ASA class	
II	16 (80)
III	4 (20)
BMI(kg/m^2)	range 15.9 -26.2 (mean 20.1)

The HALC was performed differently on our 20 patients depending on the location of the disease. The surgery lasted 110-240 minutes depending on the type of the surgery. The longest surgery was the hand-assisted laparoscopic abdomino-perineal resection, while the shortest one was the hand-assisted laparoscopic left hemicolectomy. There was one case of an air leak from the instrument around the hand port in an hand-assisted laparoscopic right hemicolectomy. We needed to convert to an open surgery in one patient who had undergone an hand-assisted laparoscopic low anterior resection because the tumour had spread to nearby tissues to such an extent that only the open surgery could remove all of the tumorous tissues. The incision size had a range of 5.9-7 cm. The patient who had had an hand-assisted laparoscopic abdomino-perineal resection lost more blood than any other patient. Hand fatigue of the surgeons was recorded when operating on every patient who had had the hand-assisted laparoscopic low anterior resection. In all patients, we were successful in removing the target tissues through the incisions. Table 2 details the surgical data of the patients.

Table 2 Surgical data of Hands-assisted laparoscopic (n = 20)

Procedure (HALC)	n	Mean Operative time (min)	Mean Incision size (cm)	Mean Estimated blood loss (ml)	Number of Conversion (n)	Number of Pneumo leakage (n)	Number of Hand fatique (n)
Right hemicolectomy	7	133	6.35	67	0	1	2
Right extended hemicolectomy	3	170	6.5	83	0	0	0
Left hemicolectomy	1	110	6	50	0	0	0
Sigmoidectomy	5	123	5.9	110	0	0	1
Low anterior resection	3	181	6.6	100	1	0	3
Abdomino-perineal resection	1	240	7	150	0	0	0

HALC: Hands-assisted laparoscopic colectomy

In most of the patients (16 out of 20), the procedure was to remove cancerous tissue of the colon. Most of them were suffering from stage 1 cancer at the time of the surgery. The size of the tumour was 4.9 cm on average. In one patient, the incision had to be made on the right side of the abdomen because there was a surgical scar, resulted from an operation on a stomach ulcer, at the centre of the abdomen. To connect the colon, we used surgical staples. The operative details are shown in Table 3.

Table 3 Operative details (n = 20)

Patient characteristics	Number of patients (Mean)
Tumor size (cm) (n=16) range 2 – 10 (mean 4.9)	
Tumor staging (n=16)*	
I	7
IIA	3
IIIB	6
Location for incision	
Midline	19
Right lower quadrant	1
Indication for surgery	
Benign tumour	4
Malignant tumour	16
Anastomosis method**	
Hand sew	3
Staple	16

* Non tumor 4 cases (TB = 2, Diverticulum = 2)
** Abdominoperineal resection = 1

Table 4 Post operative outcomes (n = 20)

Post operative outcomes	Number of patients
Post operative NPO (day)	range 3–5 (mean 4)
Total length of hospital stay (day)	range 6–16 (mean 9)
Number of retrieved lymph node (n)	range 13–40 (mean 18)
Angiolymphatic invasion (n=16)*	
Present	4
Absent	12
Post operative antibiotic	20
Re-operation	0
Post operative complication	
Surgical site infection	2
UTI	1
No	17
Perioperative mortality	0

*Non tumor = 4

Post-operative diet resumed after 4 days since the operation. The length of the hospital stay was 9 days on average. The mean number of retrieved lymph nodes was eighteen lymph nodes. Three patients had post-operative complications, Two with surgical site infection and one with urinary tract infection. They were treated with antibiotics through vein injection. Perioperative mortality was null and no patients were subjected to a repeated surgery. The detailed post-operative outcomes are shown in Table 4.

Discussion

Several indicators have pointed out to the continued success of the hand-assisted laparoscopic surgery. It has been employed on many diseases particularly on colectomy.

It combines together the benefits of the open surgery with those of the laparoscopic surgery leading to better quality of patients resulted from small incision, little pain, short hospital stay, quick recovery, shortened duration and less complication of the surgery as well as relatively short training time for surgeons on the operation procedures. However, it requires a laparoscope making it more expensive than the conventional open surgery. At our hospital, the availability of the laparoscopes means we only need to equip the machines with hand-ports, which are

produced by many companies and can be had at low cost.[13-15]

In case of bleeding, through the hand-assisted laparoscopic surgery, the stop of the blood flow can be directly and promptly controlled. The hand of the surgeon inside the hand-port helps feel the organ and tissues in need of operation so that the surgery is precise just like in a regular open surgery.[16]

For the hand-assisted laparoscopic surgery, the hand-port is inserted through the incision at the navel. If needed, the incision can be widened for an open surgery and a stoma easily opened as the stoma will be on the left side of the abdomen not at the incision, which is centred around the navel.

Most surgeons use their recessive hands for the hand-port causing hand fatigue if the surgery is long and complicated like in the hand-assisted laparoscopic low anterior resection. To reduce hand fatigue, resting of the hand and right positioning of the hand-port and laparoscope should help.

Most of our patients suffered from cancer or other diseases whose tumorous tissues have been removed. Our data showed that on average 18 lymph nodes were removed from every patient. This indicated an effective treatment of lymph nodes through this type of surgery. The outcomes of our operation met similar standards achieved by other studies.[17-19] Serious complications or perioperative mortality was not recorded.

Summary

The hand-assisted laparoscopic surgery to treat colon diseases at the Khon Kaen Hospital was found to be safe with no serious complications nor perioperative mortality. We achieved similarly satisfying results as in other studies. We recommend the use of the hand-assisted laparoscopic surgery and aim to develop treatment methods and conduct further research on it at our hospital.

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COMPETING INTERESTS

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