assessed using a laparoscopic De Bakey tissue forceps, the length of its distal metal portion is about 5 cm. If the distance between the tumour and the pelvic floor is less than 5 cm, then a total mesorectal excision is considered mandatory. At this stage it is helpful to have the second assistant pressing the patient's perineum with his fist; this maneuver helps to bring the levator muscles into laparoscopic view. In our experience, the exposure of the pelvic floor muscles is the 'end-point' of the distal rectal mobilization, and by this stage the rectum should consist of a denuded muscle tube relatively free of mesorectum. An atraumatic forceps is then used to occlude the rectal lumen just below the tumour to allow distal cystoscopic rectal washout from below; after that the rectum is divided with endo-stapler just above the pelvic floor. To facilitate a transection low down at the pelvic floor and to avoid an oblique transection line, the assistant should retract the rectum cephalad; the operator then approaches and clamps the rectum anteriorly with the endo-stapler. In our experience, this trick will result in an almost transverse staple line.

2. Mobilization of the Distal Transverse Colon and Splenic Flexure

The assistant now changes position and stands at the perineal side of the patient. The chief surgeon (still on right side) and the assistant are now operating via the second monitor placed on the patient’s left side. The patient is now put in a reverse-Trendelenburg position (while maintaining a right-side-down tilt) to bring the stomach and transverse colon into laparoscopic view.

An additional 5mm port is positioned over the epigastrium. The second surgeon continues to provide counter-traction using the left iliac fossa ports by holding the proximal cotton tape. The camera assistant could use the subumbilical or the right iliac fossa 5-12mm port interchangeably, whereas the chief surgeon operates via the remaining ports. Starting from the mid-transverse colon, the greater omentum is gradually peeled off from the transverse mesocolon. The splenic flexure is then gradually taken down and mobilized off the Gerota’s fascia. Mobilization is considered adequate if: (1) the splenic flexure could be swung to the midline; and (2) the sigmoid-descending junction could go to the true pelvis without undue tension.

3. Exteriorization of the Specimen, and Creation of the Colonic J Pouch

An approximately 4-6 cm gridiron incision is made in the left iliac fossa. The wound is protected with plastic bag, and the specimen is retrieved and excised. A 5-6cm long colonic J pouch was fashioned with a 80mm linear cutter using either the descending or the proximal sigmoid colon.

4. Intracorporeal anastomosis and Creation of Covering ileostomy

Intracorporeal pouch-anal anastomosis is performed with the circular stapler under laparoscopic view, extreme caution being exercised to avoid inadvertent stapling of thelevator muscles or adjacent structures. In the female the second assistant could 'lift' the vagina upward with a finger while he was closing the circular stapler; this maneuver helps to exclude the vaginal vault from the anvil.

A point in the terminal ileum some 20 cm from the ileocaecal valve is then identified for the formation of loop ileostomy. The antimesenteric border is marked lightly with bipolar cautery at 2 different points to differentiate the proximal and distal limb, and a covering ileostomy is finally fashioned over the pre-marked stoma site.

REFERENCE


HAN D-ASSISTED LAPAROSCOPIC COLORECTAL SURGERY

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INTRODUCTION

Since the initial success of laparoscopic cholecystectomy in the late eighties, the laparoscopic approach to colorectal surgery has been attempted and feasibility has been shown in a variety of colorectal operations. Although totally feasible, there has been doubts on the actual benefits accrued to the recipients of this kind of surgery, the longer operating time required, degree of tumor clearance, excessive recurrence especially port site recurrence in its application to cancer cases, the higher cost of the operation and a significant learning curve involved. The development and popularization of laparoscopic approach to colorectal surgery has been slow when compared with its counterpart of cholecystectomy which is a relatively simpler procedure most general surgeons can acquire the skills adequately in a short time. However, in some centers where laparoscopic colorectal colectomy has been developed intensively and large experience is accumulated, encouraging results that favored laparoscopic operations are produced.

One limitation of laparoscopic surgery in the past has been the inability of the operating surgeon to put his or her hand into the abdomen. This has put a lot of surgeons off the idea of laparoscopic surgery in colorectal surgery because they feel that the dexterity of the hand and the tactile sense that cannot be replaced with the instruments are important elements that are prerequisites for good surgery. Recently, the availability of the hand port has made it possible for surgeons to put their hands into the abdomen in laparoscopic surgery yet preserving the pneumoperitoneum. The hand assist technique in laparoscopic surgery has been tried with success in many solid organ removal operations such as splenectomy and nephrectomy. We have used the hand assist approach in colectomies since January 2000 in our center. We would like to report our experience in hand assist approach in laparoscopic colectomies with a background experience of over 500 cases of laparoscopic colorectal resections for colorectal cancer.

HAND ASSIST AS A CONTINUATION OF INNOVATION

The psychomotor skills required for laparoscopic colorectal resection are very different from the conventional open operation. Although most of the steps involved in the procedures are the same as in the open version, laparoscopic operations involved a totally different set of instrumentation, limited degree of freedom in maneuvering and relearning of eye hand coordination. Another obstacle to adoption of laparoscopic surgery is the inability to use the hand inside the abdomen for its highly versatile motor skills and fine tactile sense. Because conventional open colorectal surgery is very much hand based which provide flexible retraction, displaying of structures, ability to perform safe blunt dissection and palpation of tumor margins and enlarged lymph nodes.

With the hand port technique, a device is anchored at the abdominal incision of about 7 cm. Coupled with the plastic sleeve over a gloved hand, either the right or the left hand of the surgeon can be inserted into the abdominal cavity without loss of pneumoperitoneum. The ability of putting in a hand for operation using the hand port technique has restored the possibility of hand manipulation under laparoscopic guidance and facilitated the whole laparoscopic procedure.

WHAT DIFFERENCE DOES IT MAKE USING HAND ASSIST TECHNIQUE

As an effective retractor

Because the hand can be opened or closed at great ease and is an effective and efficient fan retractor of organs especially small bowel which is very slippery, the hand assist technique is particularly useful in situations where small bowel easily gets into the way such as right, transverse and left colectomies. In sigmoid resection, anterior resection and abdominoperineal resection, patient positioning is usually good enough to gravitate the small bowel away from the operative sites, the hand assist...
As a manipulator
Manipulation of the large bowel during dissection is possible with good laparoscopic bowel forceps such as the endo-DeBakey forceps. We have also invented the use of cotton tape for effective manipulation of the bowel being mobilized. Flipping of the bowel from one side to the other can be done within a second and counter traction can be maintained with just the right strength for easy dissection. This technique is particularly useful in cases where redundancy of bowel is expected such as in colectomies.

Blunt dissection along planes and around pedicles
In laparoscopic surgery, most dissections are sharp using scissors or harmonic shears. This is good especially when accurate dissection along planes is mandatory such as in total mesorectal excision. However in right or left hemicolectomies where colon is mobilized along pretty avascular planes and in mobilization of the hepatic and splenic flexures, blunt dissection along natural planes is particularly helpful with the hand because the tactile sensation at the fingertips facilitates the task. Palpation of the pulses of the arteries not only makes it easier to locate the appropriate pedicles at their root for division, but also the finger is the ideal tool to hook round the pedicle to present for vascular transection. Any enlarged nodes could be palpable and dissected with our background experience of laparoscopic colectomy in hand assist laparoscopic surgery, the hand inside the abdomen in hand assist laparoscopic surgery, any accidental bleeding points can be controlled with the pressure of the fingers immediately and dealt with using harmonic shears, diathermy, clips, stapler or even sutures with ease and minimal blood loss. Without the hand assist approach, major bleeding is frequently an indication for conversion to open.

EXPERIENCE WITH HAND ASSIST LAPAROSCOPIC COLECTOMY
Since January 2000, 17 consecutive patients who had carcinoma of the colon proximal to the sigmoid colon estimated to have non-bulky tumor (less than 6 cm in ultrasound or CT scan) without evidence of obstruction or perforation were subjected to hand assist laparoscopic colectomy. The patients were put in the Lloyd Davis position with the legs spread apart and general anesthesia was administered. A one-centimeter supraumbilical incision was made for the laparoscopic port. A 6.5 to 7 centimeter lower midline incision was made to accommodate the cuff of the hand port. One epigastric port was added for the dissecting instrument. In right hemicolectomy, the surgeon stood on the left side of the patient using his left hand in the abdomen and right hand to operate the dissecting instruments through the epigastric port. If the splenic flexure was to be mobilized in extended right hemicolectomy or left hemicolectomy, the surgeon stood on the right side of the patient and use his right hand through the hand port. The colon was then mobilized with the harmonic shears under laparoscopic guidance and hand assistance. The relevant vascular pedicles were dissected at the root level and transected under laparoscopic guidance with scissors between clips or endoscopic linear staplers. Following adequate colonic mobilization, the loop of bowel with the tumor was exteriorized via the hand port, excised and anastomosed extracorporeally. The mesenteric window was then closed via the hand port.

In the rest of 16 patients who had completed hand assist laparoscopic colectomy, three patients had a synchronous cholecystectomy for chronic cholecystitis. Another right hemicolectomy patient received on table colonoscopy to locate the tumor because the tumor was too small to be palpable. The left hemicolectomy patient also received repair of the umbilical hernia in the same setting. The age of the patients ranged from 46 to 84 and the mean age was 70.7. The operating time for right hemicolectomy ranged from 105 to 240 with a mean of 157.5 minutes. The operating time for extended right hemicolectomy ranged from 155 to 230 with a mean of 182 minutes. The operating time for the left hemicolectomy and umbilical hernia repair was 190 minutes. The mean operating time for all patients was 171.3 minutes. The laparoscopic time spent in the operation ranged from 35 to 120 and a mean of 89.5 minutes. The mean length of stay in the hospital was 8.2 days. There was no complication except one patient had an episode of urinary tract infection post operatively.

INDICATIONS FOR HAND ASSIST LAPAROSCOPIC COLECTOMY
Hand assist laparoscopic surgery is a recent advance in laparoscopic surgery. With the continuing innovation in technology and instrument design, the hand can perform many new tricks that were not possible before. It is difficult at this stage to define the full potential of hand assist laparoscopic surgery. However, with our background experience of laparoscopic colectomy in our center, I would like to suggest certain indications in which hand assist laparoscopic colectomy may have advantage over laparoscopic colectomy.

In situations where long length of bowel is mobilized and either the hepatic or the splenic flexure has to be mobilized such as in right and extended right hemicolectomy, transverse colectomy, left hemicolectomy, subtotal colectomy and panproctocolectomy, hand assist approach is suitable. The hand can facilitate retraction, counter traction and manipulation of the redundant large bowel. The other advantage is that the hand can easily fend off the small bowel for exposure.

In sigmoid resection, anterior resection and abdominoperineal resection of the rectum, I found manipulation of the bowel with a cotton tape tie is handy to use and the need of the hand is much less. In fact very often the hand serves to obstruct the laparoscopic view and the relatively small space of the pelvic cavity does not allow good vision with the hand inside the pelvis.

REFERENCES


THE CONTINUUM OF OPEN, HAND ASSIST LAPAROSCOPIC AND LAPAROSCOPIC COLORECTAL SURGERY
Laparoscopic surgery and open surgery have been looked upon as two extremes of surgery and people have gone into details to differentiate between laparoscopic, laparoscopic assist and open operations by the length of incision on the abdomen. However I feel that minimal invasiveness should be an aim to achieve as far as possible so long as the surgery does not have added adverse factors whether it involves no incision or a limited incision. A big incision would of course negate the benefits of laparoscopic surgery. A limited incision of about 7 centimeter used in hand assist surgery is often needed even in totally laparoscopic colorectal excision for exteriorization of tumor together with the bowel loop. Therefore, hand assist technique can facilitate the laparoscopic procedure without adding significant trauma. It is in fact an operation that combines the advantages of laparoscopic vision and dexterity of the hand. Hand assist laparoscopic surgery should be looked upon as an in-between surgical method on the continuum of open surgery on one side and totally laparoscopic operation on the other. Each surgical method will find its own indications and more technological advances will push surgery towards the laparoscopic end.
As a manipulator

Manipulation of the large bowel during dissection is possible with good laparoscopic bowel forceps such as the endo-Delbakey forceps. We have also invented the use of cotton tape for effective manipulation of the bowel being mobilized. Flipping of the bowel from one side to the other can be done within a second and counter traction can be maintained with just the right strength for easy dissection. This technique is particularly useful in cases where redundancy of bowel is expected such as in colectomies.

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Palliation of tumor

It has been documented that in laparoscopy, identification of tumor could be a problem if the tumor is small and does not infiltrate the serosa. With the hand inside the abdominal cavity, the hand assist approach largely eliminates the risk of taking out the wrong colonic segment because the hand can accurately locate the palpable tumors.

Control of active bleeding

In laparoscopic surgery, bleeding was less compared with the open surgery. This is due to the meticulous technique common in laparoscopic surgery and surgeons would like to avoid bleeding at all cost because control of bleeding is troublesome. With the hand inside the abdomen in hand assist laparoscopic surgery, any accidental bleeding points can be controlled with the pressure of the fingers immediately and dealt with using harmonic shears, diathermy, clips, stapler or even sutures with ease and minimal blood loss. Without the hand assist approach, major bleeding is frequently an indication for conversion to open.

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There were ten right hemicolectomy, six extended right hemicolectomy and one left hemicolectomy. In one patient who had a tumor at the hepatic flexure infiltrated to the gall bladder fossa of the liver (there was a previous cholecystectomy in this patient), the hand assist laparoscopic colectomy was abandoned and converted to open because a synchronous wedge resection of the liver was considered necessary.

In the rest of 16 patients who had completed hand assist laparoscopic colectomy, three patients had a synchronous procedure in addition to the colectomy. One patient who had a right hemicolectomy received a synchronous laparoscopic cholecystectomy for chronic cholecytis. Another right hemicolectomy patient received on table colonoscopy to locate the tumor because the tumor was too small to be palpable. The left hemicolectomy patient also received repair of the umbilical hernia in the same setting.

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