Hand-Assisted Laparoscopic Surgery

As described by
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Introduction

Hand-assisted laparoscopic surgery is a newly developed technique. It involves the intra-abdominal placement of a hand or forearm through a mini-laparotomy incision while pneumoperitoneum is maintained. In this way, the hand can be used as in an open procedure to palpate organs or tumors, reflect organs atraumatically, retract structures, identify vessels, dissect bluntly along a tissue plane and provide finger pressure to bleeding points while proximal control is achieved. Additionally, this approach may be more economical than a totally laparoscopic approach, reducing both the number of laparoscopic ports and number of instruments required. Some advocates of the technique claim that it is also easier to learn and perform than totally laparoscopic approaches.

Original Techniques for Hand-Assisted Laparoscopic Surgery

Hand-assisted laparoscopic surgery involves the creation of a small mini-laparotomy incision at the beginning of the laparoscopically-assisted procedure. Formerly, the gloved hand was inserted directly through this incision and the pneumoperitoneum maintained by its apposition with the wound edge. The incision length needed to produce this close apposition while allowing hand access was found to be as long in centimeters as the surgeon's glove size. If the incision was too long, the pneumoperitoneum could not be maintained. In this instance, sutures may be placed in the subcutaneous tissues in order to more closely approximate the edges, restoring a gas-tight seal.

This procedure allows the surgeon to use his hand in the insufflated abdomen under the direct vision offered by the video-laparoscope, enabling palpation of intra-abdominal organs and masses, atraumatic reflection, blunt linger dissection, knot tying, hemorrhage control and identification of vessels, structures and tissue planes.

The sharp dissection and electro-cautery are then carried out using laparoscopic tools in a conventional manner, a process facilitated by presentation of tissues to the instrument tip by the intraperitoneal hand. This has advantages over conventional laparoscopic techniques as the hand can not only present the tissue to be clipped or divided but can simultaneously ensure that no other tissues are present between the jaws of the instrument.

One further way in which the intra-abdominal hand may assist the laparoscopic surgeon is by allowing the surgeon to more accurately judge depth perception in the two-dimensional view offered by the laparoscope. Although this perception is gained by experience in surgeons who are used to operating laparoscopically, errors in depth perception are common with less experienced surgeons. However, with the hand placed intra-abdominally, the surgeon has additional information concerning the depth from his proprioceptive feedback from the inserted hand. This, hypothetically, may shorten the learning curve associated with laparoscopic surgery.

Hand Access Ports

The main problem with the method described for the introduction of the hand into the peritoneal cavity is that the hand is essentially fixed to the abdominal wall. It cannot be advanced further because of the tight tissue apposition, nor can it be withdrawn as gas leakage will occur. These problems have led to the development of the Smith & Nephew HandPort™ System.

The System consists of: a HandPort Base Retractor that allows for simple, non-adhesive attachment to the peritoneum, a HandPort Sleeve that offers mobility to the surgeon and a HandPort Bracelet that allows easy Sleeve attachment and eliminates pressure on the surgeon's arm.

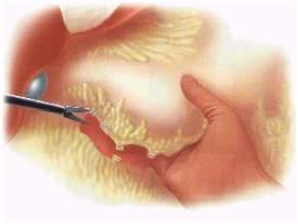
The HandPort System quickly attaches to the peritoneum without adhesives, providing a reliable sealing mechanism, efficiently preserving the pneumoperitoneum.

What Procedures Are Suitable For A Hand-Assisted Laparoscopic Technique?

The most obvious group of procedures that may benefit from a hand-assisted technique are those procedures that already require the fashioning of laparoscopic entry and a mini-laparotomy for their completion. These procedures include those that are presently termed "laparoscopically-assisted." These operations avoid the major morbidity associated with a laparotomy by utilizing the advantages of the video-laparoscope during the initial dissection stage and completion of the procedure through a mini-laparotomy, which allows both application of standard surgical instruments and the utilization of the surgeon's hand. In procedures such as these, it seems that the patient has little to lose as a result of an application of a hand-assisted technique, as the physical insult is of the same order in both cases. However, the literature suggests that the surgeon may in fact benefit from the adoption of a hand-assisted technique.

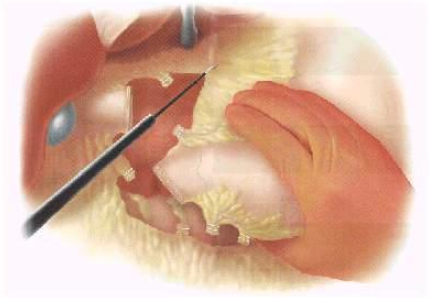
Hand-Assisted Laparoscopic Gastrectomy

Demetrius E. M. Litwin, M.D., FRCSC and John J. Kelty, M.D.



Division of right gastroepiploic artery

Division of right gastric artery



Division along lesser curve of stomach

***Re*section of stomach**

Formation of gastro-jejunostomy

Closure of enterotomy to complete gastro-jejunostomy

Hand-Assisted Laparoscopic Colorectal Surgery

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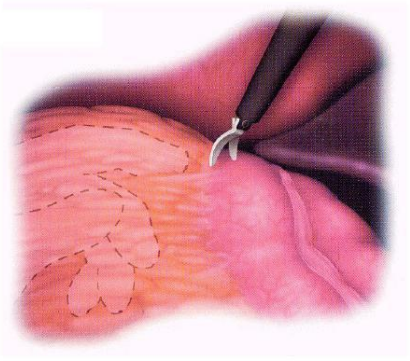
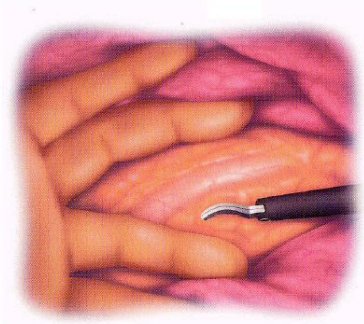
The fingers are used to retract the peritoneum



The omentum is retracted off the transverse colon using gentle finger retraction.



The right ureter is identified.

The specimen delivered through the HandPort device.

Hand-Assisted Laparoscopic Splenectomy

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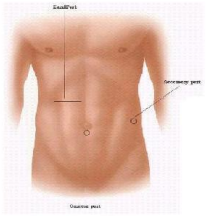
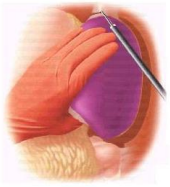


Port positioning

Location of trocars and incision

The spleno-colic ligament is divided.

The lateral peritoneal reflection of the spleen is divided.



The anterior, inferior approach to the splenic hilum is achieved with the liberation of the upper part of the spleen.

The hilar vessels are isolated with the fingers from the pancreatic tail.

The hilar vessels are stapled with an endoscopic stapling device.

The short gastric vessels are secured.

The spleen is extracted through the HandPort device and placed into a heavy plastic bag.