

NEW INVENTIONS & INNOVATIONS IN ENDOSCOPIC SURGERY

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Abstract : Laparoscopic surgery has seduced the surgeon and the society equally. In their zeal to do everything endoscopically, laparoscopic surgeons have compromised on the basic scientific principles enunciated by the accumulated evidence of open surgery era. Use of energy sources and its attendant morbidity and mortality is a concern. Similarly laparoscopic hernia surgery has failed to address the anatomical closure of defect. Laparoscopic surgeons have routinely violated the peritoneal cavity for extraperitoneal surgeries and have not explored the safer routes available to them such as axilla for breast surgery. We present our innovations addressing these shortcomings.

LAPAROSCOPIC CHOLECYSTECTOMY (LC) WITHOUT ENERGY SOURCES

Introduction

Outcome of LC can be improved by avoiding energy sources¹. Gall bladder has absolutely avascular planes which help in performance of a safe surgery². Use of energy sources to hide the surgical deviation, amounts to incompetence³. *Technique* (Watch the video at- <http://endosurgeon.googlepages.com>) LC was begun with capnoperitoneum and placement of ports. *The first step* was to establish surgical access to gallbladder (GB) and freeing it from any adhesions. Adhesions were of two types.

Type 1: Adhesion of viscera to other viscera or parietal peritoneum restricting clear view and access to GB

Type 2: Adhesions of GB to surrounding structures i.e.

omentum, duodenum, colon, intestinal loops or parietal peritoneum.

In both these types of adhesions, an avascular band of tissue could be identified between any two adherent structures (Fig 1). A nick was made in this avascular zone and the adherent structure was gently pushed away from the GB aided by sharp dissection.

The second step

Fundus of GB was grasped and retracted superolaterally. The Hartman pouch was then held away from midline by another grasper. The cholecystoduodenal peritoneal fold was identified and a window made close to GB at the point of maximum arch in this fold (Fig 2). Thus two leaves of peritoneum, the anterosuperior and posteroinferior, covering the Triangle of Calot (TOC) were defined. The posteroinferior leaf of peritoneum was then dissected towards the fundus of GB.



This dissection proceeded in the inferior cholecystohepatic peritoneal fold (Fig. 3). This peritoneum was divided with scissors close to surface of gall bladder. This dissection continued towards the GB fundus as far as possible.

The anterosuperior peritoneum of TOC was then pushed superiorly towards the liver. This displayed the anatomy of biliary pedicle in TOC (Fig. 4). The GB pedicle was then dealt with in standard manner. Then the loose areolar tissue attaching the neck of GB to undersurface of liver was cut close to GB (Fig. 5)

In the *third step* of LC, separation of GB from liver bed was begun. GB was gently pushed away from liver. This exposed a zone of loose areolar tissue between GB and liver (fig 6). Dissection was continued in this zone. The anterosuperior and posteroinferior peritoneal reflection from GB to liver were cut close to GB. The fibrous strands in the loose areolar tissue were cut close to surface of GB. Separation of GB was achieved by continuing this procedure towards the fundus of GB. After separation of GB, the liver bed was observed for any bleeding. Capnoperitoneum was abolished. The GB was then extracted in usual manner. Capnoperitoneum was created again. The liver bed was again inspected for any evidence of bleeding. After ensuring the absence of bleeding, the procedure was completed in usual manner.

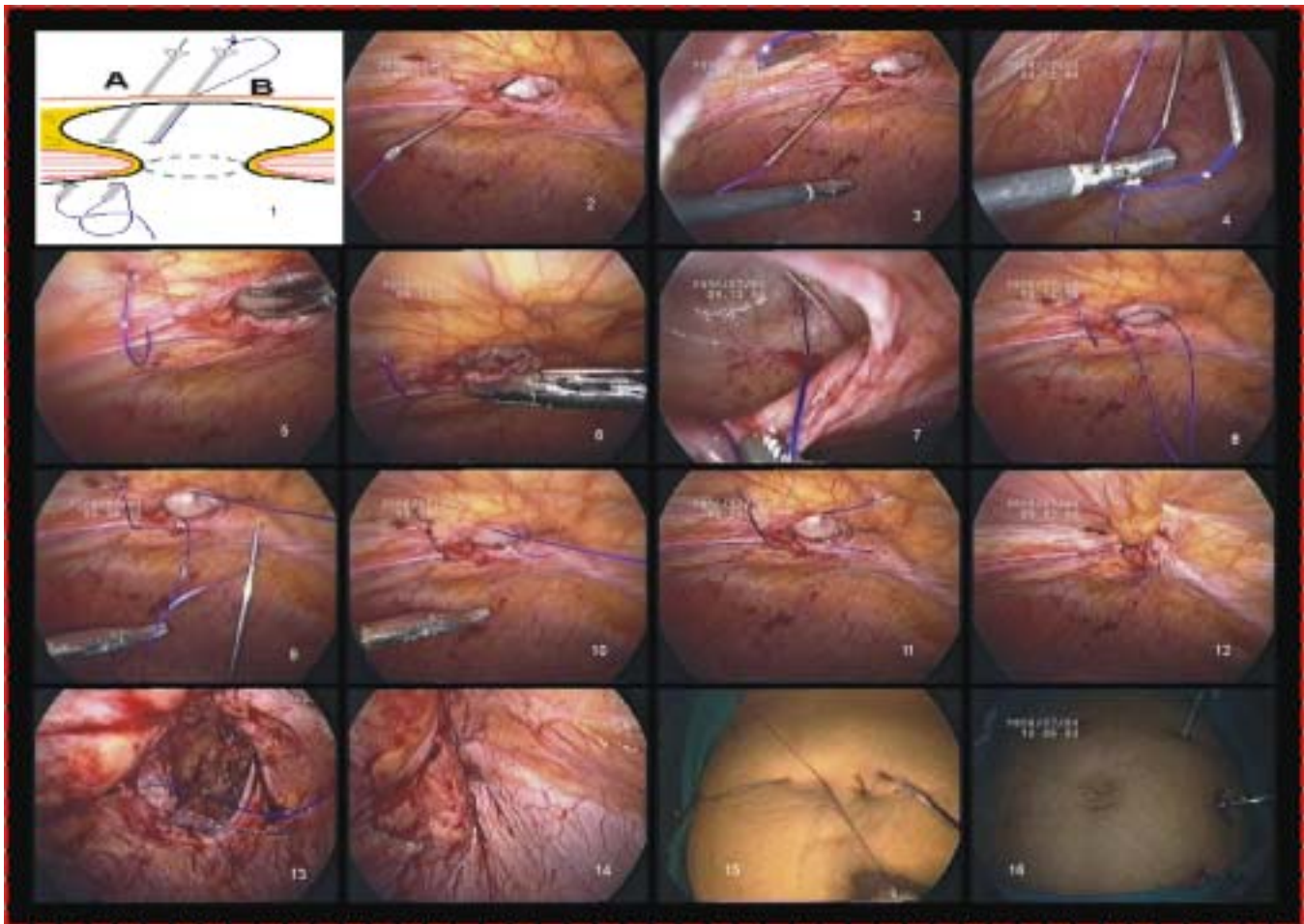
MAYO'S REPAIR AS A PREREQUISITE TO LAPAROSCOPIC VENTRAL HERNIA REPAIR (LVHR)

Introduction

Outcome of LVHR is based upon a generously overlapping mesh, stabilized and aided by Pascal's law⁴. For proper application of Pascal's law closure of defect in ventral hernia have been established in era of open surgery. Mayo's technique is considered a gold standard for this. *Technique* (Watch the video at- <http://endosurgeon.googlepages.com>)

A no. 18 spinal needle was used to introduce a no. 1 prolene suture through its lumen into the abdominal cavity (Fig 1, A- the threader needle). Another spinal needle was used to snare intraabdominal suture out. This needle was threaded with no. 1 prolene suture, which was tied back on its own end to form a loop (Fig 1, B- the snare needle).

Tip of the threader needle was then introduced through a skin puncture overlying the centre of hernial defect (HD) till it was visible intraperitoneally. The tip was then guided towards the caudal lip of the HD to puncture the tissue 1 cm away from the edge of the HD. The suture was pushed further to hang freely



intraperitoneally (Fig. 2). The snare needle was then introduced in a similar manner to the caudal lip of HD. The tissue was similarly punctured 1 cm away from the previous puncture site (Fig 3). The suture from the threader needle was grasped loosely through the loop of snare needle (Fig 4). Both the needles were now pulled out from the skin. This led both the free ends of the suture to come out of skin (Fig 5). Under laparoscopic vision both (Fig 6) the free ends of suture were now (Fig 7) drawn back to the peritoneal cavity (Fig 8). The snare needle was then guided to the cephalic lip of HD through the same skin puncture in a manner similar to one used for the caudal lip (Fig 9). The free ends were then grasped and pulled through the tissue and skin, one at a time (Fig 10). This process was repeated to place these double breasting sutures at 1 cm interval from separate skin puncture wounds. Adequate number of these sutures was placed to ensure approximation of the caudal and cephalic lip of the HD. After placement of all sutures capnoperitoneum was deflated and sutures were tied. Tying of these sutures ensured sliding (Fig 11) of the cephalic lip of HD. (Vest) over the caudal lip of HD (pant). The capnoperitoneum was re-inflated and sutured HD observed for any evidence of bleeding or cutting through (Fig 12). The knot was buried in the subcutaneous space. The closed HD represented by the suture line was then buttressed with an intraperitoneal onlay mesh as in standard LVHR.

ENDOSCOPIC EXTRAPERITONEAL VARICOCELECTOMY

Introduction

Varicocelectomy is the most common surgery performed for male infertility. Laparoscopic varicocelectomy has been abandoned⁵ and considered unscientific⁶ because of failure of this approach to tackle inguinal / subinguinal collaterals. Laparoscopic approach was considered dangerous due to its peritoneal violation⁷ and use of energy sources. Our approach addresses these concerns and replicates the gold standard of open surgery principles as desired by scientific community⁸.

Technique (Watch the video at- <http://endosurgeon.googlepages.com>)

Standard laparoscopy instruments and capnosufflation were used as in TEP repair of inguinal hernias. Working space around both the deep inguinal rings was created as in TEP hernia repair.

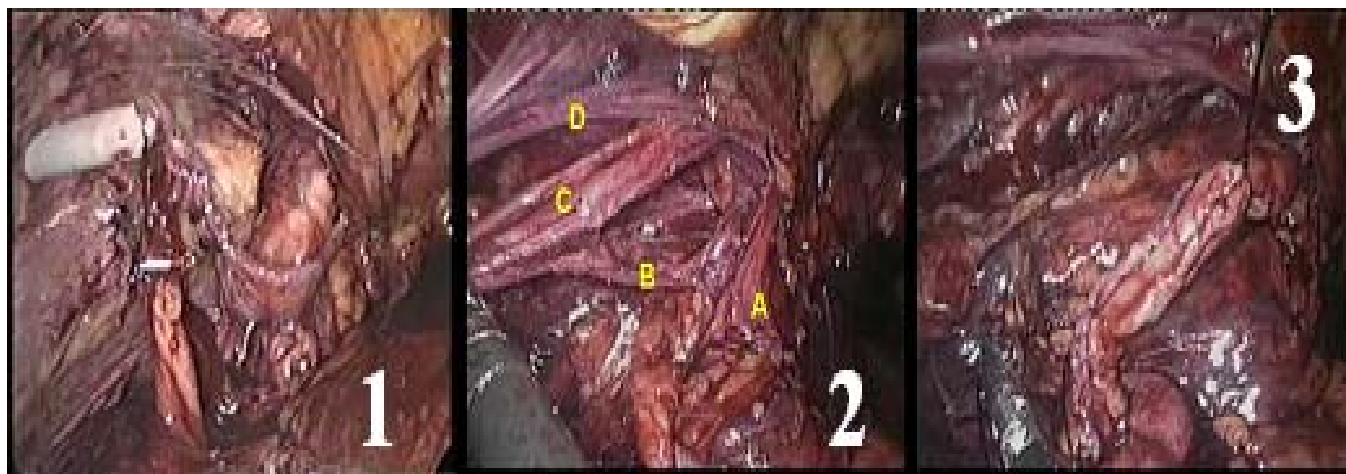
After identification of the peritoneal reflection, peritoneum was gently swept away from the spermatic pedicle. The spermatic pedicle was identified by a tug on ipsilateral testicle. The vas was visualized at the deep ring. Its deviation medially and away from the vasa spermatica interna (VSI) was confirmed. VSI was now lifted with a grasper close to deep ring and pulled out of inguinal canal (Fig. 1) aided by push to the testicle. Pulling the VSI out of inguinal canal exposed any parallel inguinal collaterals, external spermatic vein or vein from vein to vas and vein from inferior epigastric vein (Fig. 2). Veins seen entering VSI at this point were divided between clips. VSI was then released to slide back into scrotum. Venous tributaries of inferior epigastric vein seen entering from medial side of deep ring were similarly divided. The VSI proximal to the vas was then dissected for at least 2" by sweeping the posterior peritoneum away from it. Inclusion of all structures of VSI in the dissected part was confirmed by craniocaudal tug on the ipsilateral testicle. The dissected VSI was then divided between ligatures (Fig. 3). Hemostasis was ensured. No energy sources were used though they were available as standby. Same procedure was repeated on the other side to accomplish bilateral varicocelectomy. This can be refined with artery preserving principle. Now we are routinely dissecting and preserving the testicular artery. We have not faced any technical difficulty in this step.

ENDOSCOPIC EXCISION OF BENIGN BREAST LUMPS (BBL)

Introduction

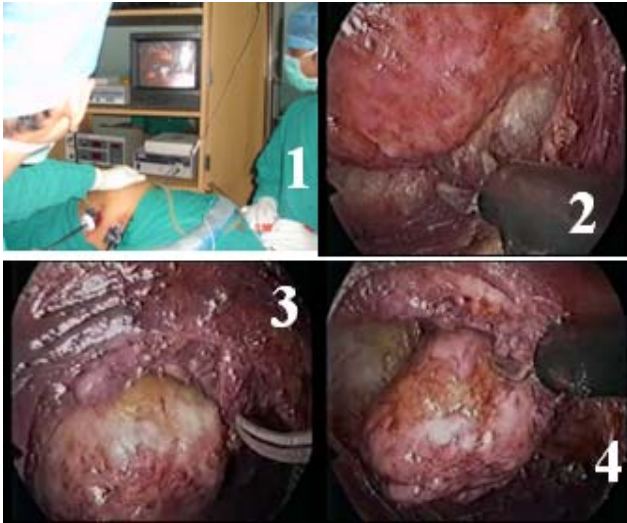
Breast is anatomically contiguous with axilla. Axilla has been used as an approach for mainly cosmetic breast surgeries.

However breast lumps continue to be excised by incisions placed on the breast. Axilla provides a window of opportunity to the



A- The Vas
C- Parallel collaterals pulled out of inguinal canal

B-Venous tributary from the vessels to Vas
D-Collaterals from inferior epigastric vessel/ Pelvic structures



endoscopic surgeon.

Technique (Watch the video at- <http://endosurgeon.googlepages.com>)

Standard laparoscopic equipment, 5 mm- 0 degree and 10 mm- 0 degree telescope, capnosufflation (10-12mmHg) and a standby energy source were used.

Position of patient

Supine with upper limb abducted and extended. The side to be operated was elevated with a sand bag under the scapula and operating table tilted up by 20-30 degrees. Port placement – 10 mm port in mid-axillary line. Two 5 mm ports along the anterior axillary fold, 2 fingers cranial and caudal to the 10 mm port (Fig. 1). The 10 mm port was introduced through the skin incision and advanced toward the breast staying superficial to the muscles of anterior

axillary fold. From the periphery of breast tissue the trocar was guided towards the area of BBL stabilized by the left hand of surgeon. Breast tissue was entered for about 2-3 cms. The trocar was now removed with the port in place. Gas for capnosufflation was connected. 10 mm -0 degree telescope was now introduced. Space for access to site and for working around the BBL was made by telescopic dissection in the loose areolar tissue. Once space was created, the working ports were placed. The BBL was dissected all around with the help of normal laparoscopic hand instruments (Fig.2,3 and 4).

The freed BBL was now guided towards the 10 mm port. Telescope was taken out and changed to a 5 mm -0 degree one. This was introduced through any 5 mm port. The BBL was grasped by the gall bladder extractor introduced in 10 mm port. The tip of extractor was brought upto skin incision. A small BBL could be squeezed out of skin incision. In case of large BBL, it was incised at the skin level and taken out in two parts. The operated space was examined for any bleeding. The axillary port sites were sutured in routine manner.

RECOMMENDED READING

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