

Tissue Retrieval Technique

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INTRODUCTION

One of the limitations of minimal access surgery is difficulty in retrieval of tissue. Previously, surgeons were reluctant to perform many of the advanced surgical procedure due to this difficult procedure. New techniques for removing tissue have helped increase the number and types of laparoscopic surgeries that can be done laparoscopically. Recently, the Food and Drug Administration (FDA) recommends that surgeon should use tissue containment systems when using laparoscopic power morcellators, and that they ensure the laparoscopic power morcellator and tissue containment system are compatible. Legally, marketed laparoscopic power morcellation containment systems are intended to isolate and contain tissue the is considered benign. Based on testing and clinical data use of a containment system confines morcellated iss within the containment system.

Safe removal of tissue is an important consideration in laparoscopic surgery and applies to all specimens irrespective of whether they are thought to be benign or malignant. The importance of wound protection is shown by considering laparoscopic cholecystectory for symptomatic gallstone disease. Most of the gallbladders at the time of retrieval can be squeezed out through an unprotected port wound. At the time of extraction exit wound must be of sufficient size, and wound protection should be used to ensure that there is no contact between the specimen and the abdominal wall during removal. We all know that the incidence of unsuspected gallbladder cancer is between 0.5 and 1% and there are reported cases of port site tumor nodules because of implantation of tumor cells after extraction of the gallbladder through an unprotected wound.

Tissue reduction enables extraction through small wounds but can be used only for benign specimens. Tissue reduction can be carried out by various techniques, including mechanical fragmentation and morcellation. It should be done inside a rip-proof bag whenever possible. This is essential for laparoscopic splenectomy to prevent implantation of splenic fragments on the serosal surfaces, which leads to splenosis **(Fig. 1)**.



Fig. 1: Appendix hidden within cannula.

Most commonly the resected tissue should be hidden under port and then everything should come together with port. This technique is used for most of the small size organs such as appendix, gallbladder, small ovarian cyst, ectopic pregnancy, salpingectomy, small oophorectomy, etc.

ENDOBAGS

In some cases, the tissue to be removed is first encased in a specimen retrieval bag. These tissue retrieval bags are available in market and can be prepared by surgeon himself at the time of laparoscopic surgery (Fig. 2A).

For infected tissue and in case of suspected carcinoma, tissue retrieval bag should be used. Many sizes of disposable tissue retrieval bags are available and hard rims of these retrieval bags are easy to negotiate inside the abdominal cavity (**Figs. 2B to D**).

One can easily make the retrieval bag by tying and cutting the fingers of sterilized gloves. If the gloves used for the retrieval of tissue, it should be used carefully. It should not puncture while removing from the abdominal cavity (**Fig. 3**).

The glove is kept stretched while one assistant will tie it in the middle **(Figs. 4A and B)**.





Fig. 3: Endobags.



Figs. 4A and B: Making endobag with glove.

Keeping it stretched will create a good dumbbell after knotting and so there is no chance of slipping of knot inside the abdominal cavity (Fig. 5).

The latex material used to manufacture gloves sometimes, react with human tissue and it can create a problem if the glove is punctured and a piece of latex is left inside human body. Most commonly this torn piece of gloves can be missed in the layers of abdominal wall (Fig. 6).

At the time of introduction of glove endobag, it should be held by its cut end and kept stretched over the shaft of grasper to decrease its thickness (Fig. 7).

The polythene covering of Ryle's tube can also be used as inexpensive readymade retrieval bag. This is sterilized and open at one end (Figs. 8A and B).

These polythene bags can be used as excellent retrieval pouch if used carefully. The polythene bag has one demerit that sometime the edges are difficult to find out because it is transparent and secondly because it is thin and does not have elastic property like gloves so it slips easily after once held by grasper (Figs. 9A to E).

Drawback of this self-made retrieval bag is that they do not have hard rim so it is difficult to manipulate inside the

La De Introduced inside the abdominal cavity through 10 mm ports. In special circumstances if there is difficulty is found, it can be introduced directly through the port wound after withdrawing the cannula. Once the retrieval bag is inside ¹⁴ ¹ free abdomine¹

free abdominal space and the rim of bag should be stabilized with nondominant hand and dominant hand should be used to put the specimen inside. Once the bag is inside the abdominal cavity both the edges of the retrieval bag should be lifted to displace the specimentato the base of the bag (Figs. 10A and B). Condom can also be used for retrieving tissue. Lubricated condom should be avoided because it can cause tissue reaction.

To take the specimen out, surgeon should hide the mouth of retrieval bag inside the cannula by pulling it and then the cannula together with the neck of bag is pulled outside the abdominal cavity.

Once the neck of the bag is out, its opening is stretched by the help of assistant. Ovum forceps can be introduced inside to morcellate the tissue manually if there is difficulty in pulling the bag out (Fig. 11).

COLPOTOMY

For large size gynecological tissue, colpotomy route is good for retrieval. Colpotomy can be done laparoscopically with the help of heal of hook. Counter pushing by other instruments is effective. Sponge over sponge-holding forceps is inserted in posterior vaginal fornix by one assistant and surgeon cuts the vaginal fascia between both the uterosacral ligaments with the heel of hook (Fig. 12).



Fig. 6: Way of introducing endobag.



Fig. 5: Glove endobag.



Fig. 7: Using glove endobag.



Figs. 8A and B: Polypropylene endobag.



Figs. 9A to E: Introduction of tissue in endobag.



Figs. 10A and B: Neck of endobag pulled outside the abdominal wall.



Fig. 11: Morcellation of tissue through endobag.



Figs. 12: Colpotomy.



Fig. 14: Different type of morcellator.

HAND-ASSISTED LAPAROS COPIC SURGERY

Hand-assisted technique was initially started keeping inside ease of tissue retrievals, wherein the surgeon uses his or her hand, inserted through the initial incision, to aid in the exploration, isolation, and removal of tissue.

Hand-assisted technique offers distinct advantages, the superior visualization afforded by the laparoscope and a tactile component that is important in many aspects of surgery and has allowed surgeons to apply a less invasive approach to surgeries that previously could not have been done laparoscopically.

Hand-assisted laparoscopy can also serve as a bridge between open surgery and straight laparoscopy, making it easier for surgeons to practice and learn the skills necessary for performing laparoscopic procedures.

MORCELLATOR

Use of morcellator is another way which facilitates grinding of solid tissue and then these can be taken out without any difficulty. Recently many companies have launched battery-operated morcellator. The morcellator is important instrument for tissue retrieval in myomectomy and splenectomy (Fig. 13).

One of the early concerns about laparoscopic procedures in cancer patient was that they caused port site metastases, i.e., the appearance of recurrent tumor tissue at the site of trocar entry (Fig. 14). Use of laparoscopic power morcellators allow for minimally invasive surgical procedures, which, when compared to open abdominal surgery, typically reduce the risk of infection, and shorten the postoperative recovery period. However, when used in myomectomy or hysterectomy procedures, there is an increased risk of spreading unsuspected cancer and benign tissue within the abdomen and pelvis. The risk of unsuspected cancer increases with age, particularly in women over 50 years of age.

Cancer surgery, however, poses some unique challenges that make the application of laparoscopic surgery in oncology more problematic. It is critically important in



Fig. 15: Power morcellation of tissue.



Fig. 16: Morcellation of tissue.

cancer that whole organs should be removed intact (en bloc) so that pathologists can properly examine them and measure and document the depths and margins of tumor invasion. A second concern for surgical oncologists is cell transfer or cell spillage. Diseased tissue must be removed without contaminating adjacent tissues and structures with cancer cells. Because of these concerns, tissue morcellation, a technique commonly used in noncancer laparoscopic surgery in which the tissue is divided into pieces so that can be removed more easily should not be used for ouccoegic procedures. All the 10 mm or >10 mm defects should be closed properly to prevent any future possibility of heraia **(Figs. 15 and 16)**.

The suture passer should be used to pass the thread and then it should be tied externally.

Especially, designed port closure instruments are also available commercially.

If port is suddenly taken out, the chance of port site hernia and adhesion is much higher. It is a good practice to insert some blunt instrument while removing the last port out, to prevent entrapment of omentum or bowel content.

After closing the rectus sheath, the skin can be closed by intradermal, skin stapler or by any of the surgical skin glues available.

FDA Warnings about Power Morcellation (Fig. 15)

When laparoscopic power morcellators are used for myomectomy or hysterectomy in women with presumed uterine fibroids that are actually uterine sarcomas, the surgical procedure poses a risk of spreading cancerous tissue beyond the uterus, worsening a woman's chance of long-term survival. In April 2014, the FDA issued a statement discouraging use of laparoscopic power morcellation in hysterectomy for uterine fibroids; this was followed by a warning in November 2014 against use of uterine power morcellation because of risk for dissemination of malignant tissue thresponse, many hospitals banned power morcellation. The FDA currently estimates that a hidden uterine servome may be present in approximately 1 in 225 to 1 in 580 women undergoing surgery for uterine fibroids based on recent publications. The FDA also estimates that a lefonyosarcoma may be present in approximately 1 in 195 to 1 in 1,100 women undergoing surgery for uterine fibroids based on recent studies. Prior to 2014, the clinical community estimated uterine sarcomas to be present much less frequently, in as few as 1 in 10,000 women undergoing surgery for uterine fibroids.

Several studies show that using a laparoscopic power morcellator during gynecologic surgery in women with hidden uterine sarcomas is associated with lowering their chances of long-term survival without cancer. While these studies have limitations, women who have had fibroid surgery with a laparoscopic power morcellator later found to have a hidden uterine sarcoma, have lower disease-free survival, when compared to women who were treated with manual morcellation or without morcellation. MorSafe[®] is an innovative single-use disposable device intended to be used as a receptacle for benign tissue mass during gynecological procedures such as laparoscopic myomectomy or laparoscopic hysterectomy. The device has unique features to allow for quick deployment, insufflation, morcellation, and spill-proof withdrawal of the bag.

MorSafe[®] Tissue Isolator

MorSafe[®], with its unique two port design, offers the surgeon superior visibility during the surgery compared to a single port approach (**Figs. 17A and B**). Designed to fit and take the shape of the abdomen, it has been constructed utilizing a special tear-resistant material to prevent leakage. It also contains a special ring in the bag opening to allow the surgeon ultimate control of the bag opening and easy access to the interior of the bag during surgery.



Figs. 17A and B: MorSafe® tissue isolator.

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