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Gasless Laparoscopic Surgery – Lesson 6

Ovarian and Uterine Surgery

This lesson talks about the benefits of gasless single incision laparoscopic surgeries for ovarian and uterine surgeries.

Objectives

By the end of the unit, you should be able to:

- Understand the problems of ovaries and the uterus that need surgical treatment.
- Understand the advantages of lift laparoscopy for the above surgeries.
- Understand the steps for carrying out gasless ovarian and uterine surgeries.
- Understand the possibilities of using gasless SILS procedures for ovarian and uterine surgeries.

Introduction

Hysterectomy is one of the most common gynecological operations that are performed. Worldwide, approximately 75% of the hysterectomies are performed abdominally for various indications. Hysterectomy is an effective standard procedure when treating dysfunctional uterine bleeding, uterine myomatosis, adenomyosis, endometriosis, and other benign diseases.

Minimally-invasive operation techniques, if indicated and performed correctly, have considerable advantages for the patient. Compared with other conventional and laparoscopic methods, the **lift laparoscopic total hysterectomy** has the advantages concerning variables like:

- Operative time
- Blood loss
- Intraoperative and postoperative complications
- Postoperative pain
- Being back to normal work
- Vaginal discharge

History of Hysterectomies

The first successful vaginal hysterectomy was performed by the "patient" in 1670, as reported by Percival Willouby. A 46-year-old peasant named Faith Haworth was carrying a heavy load of coal when her uterus prolapsed completely. Frustrated by this frequent occurrence, she grabbed her uterus, pulled as hard as possible, and cut the whole lot off with a short knife. The bleeding stopped and she lived on for many years, "water passing from her insensibly day and night" (personal communication from S. Joel-Cohen). Conrad Langenbeck performed the first planned vaginal hysterectomy in 1813.

Abdominal hysterectomy was first performed in 1843 by Clack, but the patient died of a pulmonary

embolism. Walter Burnham performed the first successful abdominal hysterectomy in 1853, by accident. Upon opening the patient to remove a large ovarian cyst, she vomited, expelling a large fibroid uterus. As the surgeon was unable to put it back into the peritoneal cavity, he removed it supracervically. The first elective abdominal hysterectomy was by Clay and Koeberle in 1863.

Vaginal hysterectomy and abdominal hysterectomy techniques were progressively refined over the remainder of the nineteenth century, and by the early twentieth century had become established as the “classic” techniques, to be passed down essentially unaltered to successive generation of gynecologists.

Most gynecologists believe that they know the correct indications for performing vaginal hysterectomy and abdominal hysterectomy, but after more than 100 years of experience, there is still no consensus. Individual gynecologists may perform close to 100 percent of their hysterectomies by either “classic” route. Though Querleu, Kovac, Grody, and Stovall report more than 70 percent of their hysterectomies are performed vaginally, most data from around the world suggest that more than 70 percent of hysterectomies are abdominal, even in the absence of structural pathology.

Amazingly, vaginal hysterectomy and abdominal hysterectomy have never been subjected to a single class-A evidence study (randomized controlled trial), and have attracted very few comparative studies until the recent introduction of LH. Most studies were single-center retrospective – covering many years (class C: personal series by experts).

After a century of experience with the world’s most commonly performed major operation, the gynecological profession as a whole still has no clear indication of the optimal method to perform hysterectomy in differing situations. It is accepted that abdominal hysterectomy can be used for every indication and can be considered the “default operation."

Into this foray came laparoscopic hysterectomy (LH) in 1988. LH stimulated a much greater interest in proper scientific evaluation of all forms of hysterectomy. From its invention, LH was considered a substitute for abdominal hysterectomy and not for vaginal hysterectomy. Yet unfavorable reports were published comparing LH to vaginal hysterectomy, to further academic careers and hinder its acceptance in the US. Laparoscopic surgery has never been indicated for hysterectomy if the operation is feasible quickly and under good conditions via the vaginal route.

Dr. Semm was the first one to do describe LH and was extremely innovative in the field of operative laparoscopy. He described techniques for laparoscopic myomectomy (removing fibroids without hysterectomy), hysterectomy, removal of ovaries and ovarian cysts. As is the case with many revolutionary advances, Dr. Semm was ridiculed and persecuted by his peers, who instantly rejected his ideas. At one point, he was forced to submit to apsychological exam to prove he was not crazy. He persevered and now has an annual award given in his honor by the American Association of Gynecologic Laparoscopists, for excellence in laparoscopic pelvic surgery.

Advantages of Laparoscopic Hysterectomies

There are many surgical advantages to laparoscopy, particularly magnification of anatomy and pathology, easy access to the vagina and rectum, and the ability to achieve complete hemostasis and clot evacuation during underwater examination. Patient advantages are multiple and are related to avoidance of a painful abdominal incision. They include reduced duration of hospitalization and recuperation, and an extremely low rate of infection and ileus.

The goal of vaginal hysterectomy, LAVH, or LH is to safely avoid an abdominal wall incision, with resultant benefits just described. The surgeon must remember that if he/she is more comfortable with vaginal hysterectomy after ligating the ovarian ligaments, this should be done. Laparoscopic inspection at the end of the procedure will still permit the surgeon to control any bleeding and evacuate clots, and laparoscopic cuff suspension should limit future cuff prolapse. Unnecessary surgical procedures should not be done because of the surgeon's preoccupation with the development of new surgical skills.

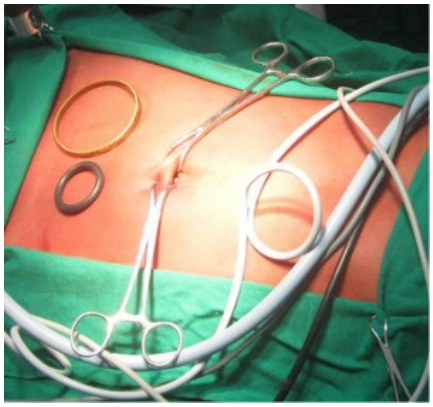
The Procedure

Patients are advised to hydrate and eat lightly for 24 hours prior to the surgical procedure, after optimizing their medical conditions. Prophylactic antibiotics are important, as some parts of the

equipment like the optics are not sterile. The patient is placed in the lithotomy position with the free arm tucked in and with shoulder braces to prevent slipping in steel Trendelenburg position. Both the perineum and abdomen are cleaned and draped.

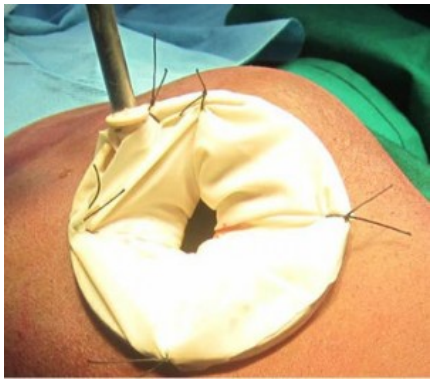
The SIMS speculum is used to visualize the cervix, which is held with a vulsellum forceps. Dilatation of the cervix is carried out, to pass the uterine manipulator comfortably. Several types are available. A simple one can be made by lengthening a Haegar dilator. The manipulators used for total laparoscopic hysterectomies differ from the ones used for LAVH.

Two towels clips are used for holding the lower edge of umbilicus, as shown in the figure below. They are held up, and an incision is made towards the half near the umbilicus. The upper portion of the umbilicus is held with the towel clip, and S shaped retractors are used for retraction while deepening the incision. Once the peritoneum is entered, the intra-abdominal portion of the Lapro–Lift is placed inside the abdomen and then connected to the lifting apparatus.



It is important to start the lift process with the lifting part at the lowest position, and after making the connections and tightening them, the apparatus is lifted under vision so that there is no omentum or bowel caught in the intra-abdominal portion of the apparatus. The port is prepared as shown in the figure below.

A recent study documented that most women prefer the cosmetic appearance of a 15 cm Pfannenstiel incision to multiple 12 mm high incisions required for stapling devices. Reduction in wound morbidity and scar integrity as well as cosmesis is enhanced by using 5 mm sites. When required with the Lift laparoscopy, the 10 mm ports are placed at the site of Pfannenstiel incision, and hence have less pain and would be cosmetically preferred by the ladies.



The inner flexible rubber ring is placed within the arm portion of the glove and folded over. Then, the fingers portion of the glove is cut, and both the ends of the glove are folded over the bangle and sutured, as shown above. This makes an excellent port.

Staying close to the Uterus the tubo-ovarian ligaments, the round ligaments are divided. Modern tools like the vessel sealing systems (Valley lab or the local equivalents), harmonic shears or regular mono-polar or bipolar energy sources could be used. Once well coagulated, the tissues appear white, and sufficient stretch offered by the uterine manipulator is important. The uterine manipulator holds the uterus pushed in (superior), anterior and to the opposite side of division of vessels.

The broad ligaments are then dealt with by coagulating and dividing. Then, the bladder is dissected off the uterus by holding it with an atraumatic forceps and holding the uterus down and pushed in with the manipulator. Then, the posterior fornix could be entered by cutting over a large Haegar dilator pushed from below in the posterior fornix. The uterine manipulator holds the uterus anteverted.

From this point, the uterus could be removed vaginally.

Skeletonizing the broad ligament leads to the uterine vessels. They could either be tied, if using multiple trocars, or sealed using the vessel sealing systems. Staying close to the uterus avoids injury to the ureters and bladder. The cervico-vaginal junction could be identified using the delineator portion of the uterine manipulator, or if such instruments are not available, using the Hagar's dilator in the anterior fornix. The division could be carried out using a hook electrode.

Suturing the vaginal walls is easy with Lift laparoscopy and using the regular long needle holders. Doing it with a single incision requires a little practice.

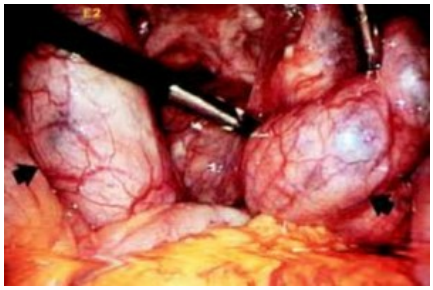
In cases with poor exposure, the use of sutures to retract organs away from the surgical field is helpful. A redundant sigmoid can be retracted by taking a series of bites with a 0 Prolene suture through the epiploica and pulling the suture through the lower quadrant port. The port is removed to get the sutures out and then reinserted. The sutures are then secured to the skin with a hemostat. Take care to include a number of epiploica to avoid tearing.

Tubal Swellings

There are 3 types of tubal swellings, namely:

- Hydrosalpinx
- Pyosalpinx
- Hematosalpinx

The first one is a collection of sterile fluid, due to obstruction. Chlamydia and Neisseria are common organisms that cause infection in the tubes. Hematosalpinx occurs when there is blood and could be associated with ectopic pregnancies.



These tubal swellings can cause any of the following symptoms:

- pain in the lower abdomen (both sides), especially when moving or walking
- chronic pelvic pain
- infertility
- fever and chills
- irregular or abnormal menstrual bleeding or spotting
- vaginal discharge

In some cases, there are no symptoms. These could be easily tackled by gasless lift-laparoscopy and single incision.

Ovarian Surgery

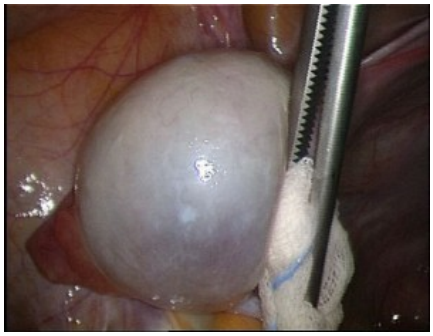
Ovarian cysts are small fluid-filled sacs that develop on a woman's ovaries. Most cysts are harmless, but some may cause problems such as bleeding and pain, and surgery may be required to remove those cysts. The cyst contains only fluid and is surrounded by a very thin wall. This kind of cyst is also called a **functional cyst**, or **simple cyst**. If a follicle fails to rupture and release the egg, the fluid

remains and can form a cyst in the ovary. This usually affects one of the ovaries. Small cysts (smaller than one-half inch) may be present in a normal ovary while follicles are being formed. Ovarian cysts affect women of all ages. Ovarian cysts are considered functional (or physiologic). In other words, they have nothing to do with disease. Most ovarian cysts are benign, meaning they are not cancerous, and many disappear on their own in a matter of weeks without treatment. Cysts occur most often during a woman's childbearing years.

Ovarian cysts can be categorized as non-cancerous or cancerous growths.

All of the following are non-cancerous ovarian growths or cysts. A woman may develop 1 or more of them:

- **Follicular cyst**: This type of simple cyst can form when ovulation does not occur or when a mature follicle involutes (collapses on itself). It usually forms at the time of ovulation and can grow to about 2.3 inches in diameter. The rupture of this type of cyst can create sharp severe pain on the side of the ovary on which the cyst appears. This sharp pain (sometimes called mittelschmerz) occurs in the middle of the menstrual cycle, during ovulation. About one fourth of women with this type of cyst will experience pain. Usually, these cysts produce no symptoms and disappear by themselves within a few months. The doctor monitors these to make sure they disappear and looks at treatment options, if they do not.

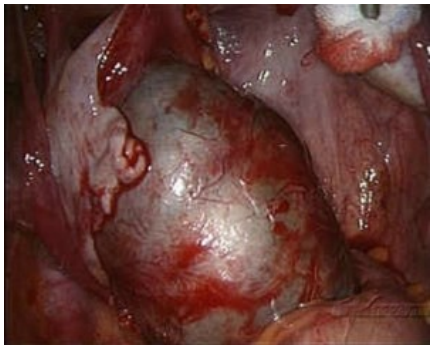


- **Corpus luteum cyst**: This type of functional ovarian cyst occurs after an egg has been released from a follicle. After this happens, the follicle becomes what is known as a corpus luteum. If a pregnancy doesn't occur, the corpus luteum usually breaks down and disappears. It may, however, fill with fluid or blood and stay on the ovary. Usually, this cyst is on only one side and produces no symptoms.

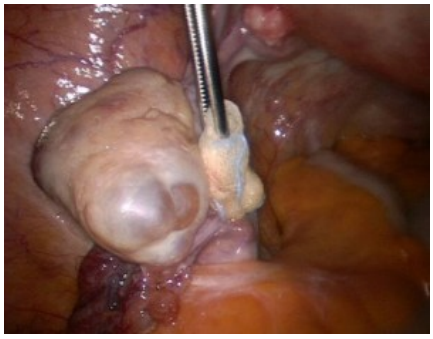
- **Hemorrhagic cyst**: This type of functional cyst occurs when bleeding occurs within a cyst. Symptoms such as abdominal pain on one side of the body may be present with this type of cyst.

- **Dermoid cyst**: This is an abnormal cyst that usually affects younger women and may grow to 6 inches in diameter. This cyst is similar to those present on skin tissue and can contain fat and occasionally bone, hair, and cartilage. The ultrasound image of this cyst type can vary because of the spectrum of contents, but a CT scan and MRI can show the presence of fat and dense calcifications. These cysts are also called mature cystic teratomas. They can also twist around (a condition known as ovarian torsion), causing severe abdominal pain.

- **Endometriomas or endometrioid cysts**: This type of cyst is formed when endometrial tissue (the mucous membrane that makes up the inner layer of the uterine wall) grows in the ovaries. It affects women during the reproductive years and may cause chronic pelvic pain associated with menstruation. Endometriosis is the presence of endometrial glands and tissue outside the uterus.Women with endometriosis may have problems with fertility, because 80% of all pelvic endometriosis is found in the ovary (one or both). These cysts, often filled with dark, reddish-brown blood, may range in size from 0.75-8 inches and are also called as "chocolate cysts" because the colour of the fluid in the cyst is similar to that of chocolate.



- **Polycystic-appearing ovary**: Polycystic-appearing ovary is diagnosed based on its enlarged size—usually twice normal—with small cysts present around the outside of the ovary.This condition can be found both in "normal" women and in women with endocrine disorders. An ultrasound is used to view the ovary in diagnosing this condition. Polycystic-appearing ovary is different from the polycystic ovarian syndrome, which includes other symptoms in addition to the presence of ovarian cysts. Polycystic ovarian syndrome involves metabolic and cardiovascular risks linked to insulin resistance. These risks include increased glucose tolerance, type 2 diabetes, and high blood pressure.Polycystic ovarian syndrome is associated with infertility, abnormal bleeding, increased incidences of pregnancy loss, and pregnancy-related complications. Polycystic ovarian syndrome is extremely common, and it is thought to occur in 4-7% of women of reproductive age and is associated with an increased risk for endometrial cancer. More tests than an ultrasound alone are required to diagnose polycystic ovarian syndrome.



Surgery for Ovarian Cysts

Single incision gasless laparoscopic surgeries are helpful in evaluating and treating these cysts. The added advantage of gasless surgery is that suction could be comfortably used while deflating the cyst. Here, again, the newer energy sources make the surgery more comfortable and easy. However, with a gasless procedure, the pedicles could be ligated in the traditional way.

Sometimes retrieval of large dermoid cysts or solid tumours could be carried out through the posterior fornix. Unlike with the regular laparoscopic surgeries, because the problems with gas leak are not there, the procedure is comfortable.

Recent Changes

With more experience, after this lesson was written, the following changes have taken place:

1. We have stopped using the gloves and ring for the umbilical incision. We have designed a new self-retaining retractor for the umbilical incision.
2. For large dermoid cysts, we have used the posterior fornix for removal when they are too large for the umbilical opening
3. We have a new video about suturing after mymomectomy: https://www.youtube.com/watch?v=zirfb1DqKfk
4. We have made new easy positioning stirrups

New self-retaining retractor

Summary

Lift laparoscopy for surgery on the uterus, tubes and ovaries is comfortable for the surgeon, the patient and the OR team. It saves time and money, and it gives less pain to the patients. Single incision surgeries are possible and less demanding.

ASSIGNMENTS

Additional Reading

- http://www.adlap.com/PDF/hysto.pdf
- http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2673000/

Discussion

1. What is the reason for 75% of the hysterectomies being carried out by the open method, despite the many recent advantages?
2. In what way would Lift laparoscopy help in overcoming the difficulties of laparoscopic surgeries?
3. In which situations is the absence of gas leak (commonly associated with laparoscopic surgeries) particularly helpful?

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