Introduction

Increasing number of minimally invasive therapies are replacing conventional ones in every field of medical specialties. Laparoscopic hysterectomy (LH) was first performed in 1989 and should now be one of the options when the uterus needs to be removed. Demand for LH grows with heightened media publicity and public awareness. In the process of learning to do LH, the gynaecologist should take note of the various pearls and pitfalls.

Definition of Laparoscopic Hysterectomy (LH)

The following definitions are commonly used:

1. Laparoscopically assisted vaginal hysterectomy (LAVH)—a combined laparoscopic and vaginal approach with laparoscopic division of the structures above the uterine artery; the remainder of the procedure is completed vaginally.
2. Laparoscopic hysterectomy (LH(a))—a combined laparoscopic and vaginal approach with laparoscopic division of the uterine artery; the remainder of the procedure is completed vaginally.
3. Total laparoscopic hysterectomy (TLH)—the operation is performed entirely laparoscopically.

Pros and cons of LH

In comparison with the conventional abdominal hysterectomy, LH is associated with small incisions and better cosmetic result, less blood loss, less tissue trauma, less post-operative pain, shorter hospital stay, faster recovery with an earlier return to work and full activity, and fewer post-operative adhesion formation. LH also allows better visualisation of the pelvic pathology through magnification and targeted lighting.

However, disadvantages of LH include increase in operating time and cost, longer learning period to develop surgical proficiency and increase in the risk of urinary tract injuries.

Learning to do LH

Training should start with attending post-graduate courses, watching video demonstrations and practising on pelvic simulator, and continue with assisting in LH procedures and operating under supervision. It has been suggested that 15 to 20 cases of LH performed under supervision are necessary to allow for the encounter of a wide enough variation in pelvic pathologies to capture both the basic surgical technique and other modifications. And experience of performing 80 cases of LH is needed to allow the learning process to stabilise and the time curve to reach a plateau.

Set-up in the operating theatre

The laparoscopic team consists of three people. The right-handed surgeon stands at the left side of the patient. The first assistant stands at the right side and holds the camera with his left hand, leaving him another hand for instruments. The second assistant can manipulate the uterus, often this will be the nurse, who is also assisting with the instruments.

Before the operation starts, the bladder should be catheterised. Correct application of the uterine manipulator and vaginal vault delineator is a very important step in LH so as to allow the uterus to be optimally manipulated to facilitate the operative steps, especially, colpotomies.

Starting the operation

Firstly, the umbilical area should be thoroughly cleaned by everting the whole umbilicus to avoid wound, and worse still, pelvic infection. A cut is made into the depth of the umbilicus. The closed method is usually employed where the Veress needle, which is open to air, is inserted vertically into the intra-umbilical incision and advanced till a double click is felt. The first click is due to the passage through the rectus sheath and the entry of needle tip into the peritoneal cavity produces the second click. The first click is due to the passage through the rectus sheath and the entry of needle tip into the peritoneal cavity produces the second click. Smooth and gradual build-up of CO2 pneumoperitoneum is an indication of correct positioning of the needle tip. The intra-peritoneal pressure should be built up to 15mmHg before a sharp 10mm trocar is inserted. Alternatively, the umbilical port may be created by the more time consuming open method which reduces the risk of sharp trauma to retroperitoneal vessels and minimises but does not completely obviate the risk of entering the lumen of adherent bowel.

Introduction of the laparoscope is followed by the creation of 5mm side ports in the left paramedian, left lower quadrant and right lower quadrant under direct laparoscopic guidance according to the ultralateral port
siting (Figure 1) advocated by Koh. This allows the upper and forearms to be adducted, the wrists and hand motion to be natural, and the needle-holder to approach tissue in a horizontal plane as in open surgery, totally eliminating the fulcrum effect.¹¹ Ultra-lateral port placement can also avoid injuries to the inferior and superficial epigastric vessels.

Steepest possible Trendelenburg position is then adopted so that the bowels will fall away from the pelvic organs. A nasogastric tube may be needed to empty the distended stomach.

Laparoscopic Hysterectomy

The abdomen is explored and, whenever needed, anatomy is restored by adhesiolysis using the ultrasonic scissors. The ureters in the pelvic side wall should always be visualised through the peritoneum by noting the peristalsis before the start of the operation.

Firstly, the lateral attachments of the uterus, the round ligaments, the infundibulopelvic ligaments or the ovarian ligaments and fallopian tubes are dissected with bipolar forceps at 30W and divided by ultrasonic scissors. Tissue coagulation with ultrasonic instruments occurs with minimal heat at the blades because heat is generated directly in the tissue. The result is minimal tissue damage and no charring or smoke production. However, vessels larger than 3mm cannot be occluded. Bipolar electrocautery is used to desiccate and occlude large vessels and achieve meticulous haemostasis. Sufficient desiccation is indicated by tissue whitening and completion of vapour emission. Though the flow of current is restricted to the volume of tissue between the blades, the potential lateral thermal spread of up to 10mm should be noted so that the adjacent structure like the ureter will not be injured. Brief and intermittent activation of the bipolar electrocautery and constant saline irrigation will reduce the temperature in the tissues and hence decrease the risk of inadvertent thermal injuries. The pedicles should be re-inspected and desiccated further if required before the vessels retract.

The structures to be divided should always be adequately exposed and put under sufficient tension to allow correct entry into the tissue planes. Therefore, the uterus should be manipulated away from the ipsilateral pelvic side-wall. Traction and counter-traction is of utmost importance. Failure to achieve optimal exposure and tension in the structures to be divided is a contra-indication to laparoscopic surgery.

The broad ligaments are then opened by ultrasonic scissors. The loose retroperitoneal areolar tissues should be dissected skillfully by using ultrasonic scissors to expose the uterine vessels. Perfect skeletonisation of the uterine vessels is not required to avoid unnecessary bleeding. Care is taken in opening the posterior leaf of the broad ligament by making sure that the ureter is not involved in the peritoneal layer being cut. Following the opening of the anterior leaf of the broad ligament, the vesical peritoneum is opened with ultrasonic scissors. The bladder is separated from the lower uterine segment and cervix by sharp dissection. The bladder will be more easily dissected by manipulating the uterus more cephalad and posteriorly. Any bleeding should be quickly controlled with bipolar electrocautery, otherwise it will obscure the operative field. The bladder pillars are desiccated with bipolar forceps first before division.

Before making the anterior and posterior colpotomies, the vaginal occluder is inflated to prevent the loss of pneumoperitonium. It is of utmost importance that the upper edge of the vaginal delineator is correctly and clearly identified. Monopolar hook at 70W cutting mode is then used to make cuts onto the anterior and posterior vaginal vaults. The cuts should not be oblique or else the bleeding can be profuse and difficult to stop since the raw surface area will be increased and inverted. Bleeding should always be controlled with bipolar electrocautery before proceeding further. Suction is used to keep the operative field clear of fumes. In LH(a) and TLH, the next step is the desiccation and cutting of the uterine vessels at the isthmic level which should be slightly above the level of anterior and posterior colpotomies. Again, the vaginal delineator should be maximally pushed up during this step so that the ureters are at a safe distance away. The uterus will be blanched after both uterine vessels are cut.

Total Laparoscopic Hysterectomy (TLH)

In TLH, the next step will be lateral colpotomies-desiccation and division of the cardinal-uterosacral complex. This step can sometimes only be achieved without excessive bleeding by proceeding bit by bit. The push-up on the vaginal delineator is particularly helpful when the cardinal-uterosacral complex is thickened and fibrotic. It will be helpful if the lateral colpotomy is first made over the less fibrotic side so that the more thickened and fibrotic side will be put under maximum tension before division. After the uterus is delivered, the vault is closed laparoscopically by intra- or extra-corporeal suturing.

Laparoscopic Hysterectomy (LH(a)) and Laparoscopic Assisted Vaginal Hysterectomy (LAVH)

In LH(a) and LAVH, the vaginal part will start by inserting a right angle retractor into each of the anterior and posterior colpotomies. The circumferential incision around the cervix is completed. The lateral attachments of the uterus, including cardinal and uterosacral ligaments and uterine vessels, are sequentially clamped, cut and ligated. Sometimes, it is easier to leave all the ligation at the end, especially in cases with minimal cervical descent. An alternative method is to ligate the various lateral pedicles with the help of the vaginal ligation needle before dividing them. (Figure 2) The use of clamps and needle holder are thus avoided in the narrow vaginal and deep pelvic spaces. After the delivery of the uterus, the full thickness of the vaginal vault is sutured vaginally, taking care to avoid injuring the bladder and rectum.

Conclusion

In view of the various advantages of LH, it should be on the list of the armaments of the modern-day gynaecologists. However, the pitfalls of doing LH should be remembered so that complications can be avoided.
References


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