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REVIEW ARTICLE

LAPAROSCOPIC HYSTERECTOMY, WHAT IS THE LIMIT?

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INTRODUCTION

Hysterectomy is one of the most frequently performed surgical procedures in the United States. During 2000–2004, approximately 3.1 million hysterectomies were performed (approximately 600,000 per year). The most common indications for hysterectomy are symptomatic uterine leiomyomas (40.7%), endometriosis (17.7%), and prolapse (14.5%)¹.

Hysterectomies are performed vaginally, abdominally, or with laparoscopic or robotic assistance. When choosing the route and method of hysterectomy, the physician should take into consideration how the procedure may be performed most safely and cost-effectively to fulfill the medical needs of the patient. Most literature supports the opinion that, when feasible, vaginal hysterectomy is the safest and most cost-effective route by which to remove the uterus.² However, analysis of U.S. surgical data shows that abdominal hysterectomy is performed in 66% of cases, vaginal hysterectomy in 22% of cases, and laparoscopic hysterectomy in 12% of cases.³

Factors That Influence the Route of Hysterectomy

Factors that may influence the route of hysterectomy for benign causes include the size and shape of the vagina and uterus; accessibility to the uterus; extent of extrauterine disease; the need for concurrent procedures; surgeon training and experience; available hospital technology, devices, and support; emergency or scheduled cases; and preference of the informed patient.⁴

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A thorough pelvic examination and history reveal factors that help determine the optimal surgical route for a patient. Uterine size and mobility are important. There is no agreed-upon size that precludes LH. However, a wide, bulky uterus with minimal mobility may make it difficult to visualize vital structures, to manipulate the uterus during surgery, and to remove it vaginally. Once a patient has been deemed eligible for a laparoscopic approach, the same preoperative evaluation as for abdominal hysterectomy applies⁵

The Advantages of Laparoscopic Hysterectomy

The laparoscopic approach offers advantages over traditional total abdominal hysterectomy (TAH). These include significant decreases in analgesic requirements, shorter hospital stays, rapid recovery, greater patient satisfaction, and lower rates of wound infection and wound hematoma formation.^{6,7} Disadvantageously, surgical time is lengthened, although the learning curve may be a factor. TLH offers fewer advantages compared with VH. Thus, in most cases, TLH should be an alternative to TAH.^{8,9} Poor candidates for a vaginal approach include poor uterine descent, extensive abdominal or pelvic adhesions, a large uterus not amenable to morcellation, adnexal pathology, a restricted vaginal vault due to scarring or radiation, or contracted pelvis. Patients with these findings are generally considered for TAH and are also considered for TLH.⁷

Indication

In a CREST study in 1982 the indications for abdominal hysterectomy included fibroids (40%), and pelvic pain and endometriosis (22%), but those for vaginal hysterectomy included pelvic relaxation (30%), bleeding (28%), cervical dysplasia (21%) and fibroids (7%) (Dicker et al. 1982). Laparoscopic hysterectomy is considered as an alternative to abdominal hysterectomy when vaginal hysterectomy is contraindicated, with the advantages of avoiding a major abdominal scar and reducing recovery time.^{10,11,12}

Symptomatic Uterine Fibroids

Almost all of these cases can be performed laparoscopically as an outpatient, or during a 1-to-2-day hospital stay. Morcellation is often necessary and is done laparoscopically and/or vaginally using a scalpel. Fibroids fixed in the pelvis or abdomen without descent are easier to mobilize laparoscopically. For the surgeon, it is important to obtain current uterine size and weight measurements to confirm the appropriateness of the

laparoscopic hysterectomy, since most small uteri can be removed vaginally. For example, the normal uterus weighs 70-125 g, a 12-week gestational age uterus weighs 280-320 g, a 24-weeks uterus weighs 580-620 g, and a term uterus weighs 1,000-1,100 g.

Endometriosis.

Endometriosis can involve the uterus and the areas around the uterus. Very commonly the endometriosis will grow in the posterior cervix and cause very painful periods. In all these cases, the endometriosis should be removed. Hysterectomy should not be done for stage IV endometriosis with extensive cul-de-sac involvement, unless the surgeon has the skill and time to resect all deep fibrotic endometriosis from the posterior vagina, uterosacral ligaments, and anterior rectum, and only then a hysterectomy to remove possible deep intrauterine endometriosis, which is called adenomyosis. Unfortunately, hysterectomy is commonly done using an intrafascial technique which leaves the deep fibrotic endometriosis behind to cause future problems. Later, when pain persists, it becomes much more difficult to remove deep fibrotic endometriosis when there is no uterus between the anterior rectum and the bladder. After hysterectomy, the endometriosis left in the anterior rectum and vaginal cuff frequently becomes densely adherent to, or invades into, the bladder and one or both ureters. In many patients with stage IV endometriosis and extensive cul-de-sac obliteration, it is preferable to preserve the uterus and prevent future vaginal cuff, bladder, and ureteral problems.¹³ Oophorectomy is not usually necessary at hysterectomy for advanced endometriosis, if the endometriosis is carefully removed. Re-operation for recurrent symptoms is necessary in less than 5 percent of my patients in whom one or both ovaries have been preserved. Bilateral oophorectomy is rarely indicated in women under age 40 undergoing hysterectomy for endometriosis.

Obese Women

Laparoscopic procedures allow the surgeon to make an incision above the panniculus. Therefore it will shorten the operating time and minimize wound infection risk.

Abnormal Uterine Bleeding

Hysterectomy may be performed in women of reproductive age. Abnormal uterine bleeding is defined as excessive uterine bleeding, or irregular uterine bleeding, for more than eight days during more than a single cycle or as profuse bleeding requiring additional protection (large clots, gushes, or limitations on

activity). There should be no history of a bleeding diathesis or use of medication that may cause bleeding. A negative effect on quality of life should be documented. Hormonal or other medical treatment should be attempted before hysterectomy, and its failure, contraindication, or refusal should be documented. The presence of anemia is recorded and correction with iron supplementation attempted. Laparoscopic hysterectomy is done only when vaginal hysterectomy is not feasible, including history of previous abdominal surgery and lack of prolapse (nulliparous or multiparous). TLH is considered if the surgeon has little experience with the vaginal approach.^{14,15,16}

Laparoscopic vs Laparotomy Hysterectomy

There are many factors that contribute for the options of hysterectomy. The decision lies between vaginal, laparoscopic and open hysterectomy. As with the evaluation for vaginal hysterectomy, it is useful to take a stepwise approach to determine if laparoscopic or abdominal hysterectomy is most appropriate. There are few questions need to be asked first.

Is Laparoscopy contraindicated?

There are very few contraindications to laparoscopic surgery, which usually arise from inability to tolerate pneumoperitoneum and/or Trendelenburg positioning, such as in patients with severe cardiopulmonary disease. For women with these conditions who need hysterectomy, an open approach may be indicated for patient safety. Obesity may make a laparoscopic approach to hysterectomy more challenging due to comorbid diseases, the impact of obesity on respiratory mechanics, and the impact of abdominal body fat distribution on patient positioning, trocar placement, and intraoperative visualization.¹⁷ Obesity, particularly morbid obesity, is associated with increased operative time, estimated blood loss, and perioperative morbidity when compared with patients of normal weight.^{18,19} However, when compared to obese women having abdominal hysterectomy, those undergoing minimally invasive routes of hysterectomy benefit from lower estimated blood loss and shorter hospital stay.^{20,21} Obesity alone should not be considered a contraindication to vaginal or laparoscopic approaches.

Are the uterine vessels accessible laparoscopically?

The next important factor in determining if laparoscopic hysterectomy is possible is access to the uterine vasculature. The upper pedicles can typically be secured regardless of uterine size. Access to the uterine

vessels deeper in the pelvis can be limited, however, by the confines of the bony pelvis, particularly if the lower uterine segment is wide.

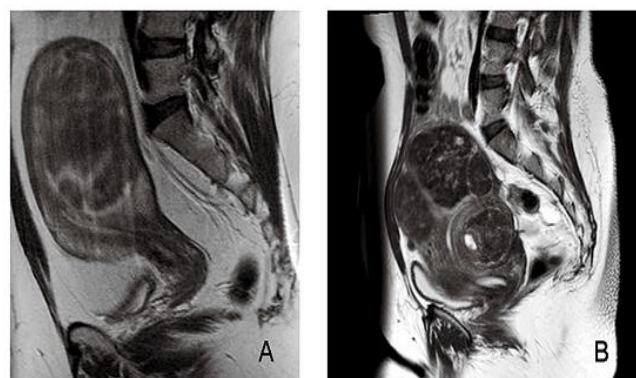


Figure 1. Comparison between narrow (A) and wide low uterine segment (B).

Despite the fact that the first uterus projects higher above the sacral promontory and may be palpably larger on exam, the uterine vessels are likely more accessible, because there is more space between the uterus and pelvic side wall. Uterine manipulation can also be impaired in cases in which significant uterine bulk is present. Access to the vasculature can be evaluated on bimanual exam by palpating the width of the lower uterine segment at its junction with the cervix, and by moving this segment of the uterus toward the contralateral pelvic side wall. Lateral mobility of more than 2 cm on each side usually provides adequate access to the uterine vessels.

Obstructing fibroids or pelvic adhesive disease limiting uterine mobility should also be considered. Placing cephalad pressure on the lower uterus and evaluating if it can be elevated out of the pelvis is also helpful, as lateral space and therefore access to uterine vessels increases higher in the pelvis.²²

Can extrauterine pathology be addressed laparoscopically?

The presence of pelvic adhesive disease, endometriosis, adnexal cysts, or other benign pelvic pathology can impact successful completion of laparoscopic hysterectomy. The ability to address these issues laparoscopically is dependent on the experience, skill, and comfort of the surgeon. Diagnostic laparoscopy can also be useful in these cases, adding minimal time and risk in the event that abdominal hysterectomy is ultimately required. Consultation with surgeons who have additional training and/or expertise in minimally invasive gynecologic surgery can also be of benefit to the patient.

Practical considerations such as the hospital environment, availability of surgical mentorship from senior partners, and availability of skilled surgical assistants can impact a surgeon's ability to acquire or improve on existing minimally invasive surgical skills. It is helpful to reflect on which portion of the procedure is the most challenging. Is it entering anteriorly or securing the upper pedicles during vaginal hysterectomy, or creating the colpotomy or closing the vaginal cuff during laparoscopic hysterectomy? Are you comfortable with vaginal or laparoscopic morcellation techniques needed for removal of large uterine specimens? Thinking about the steps that are difficult for you can help you to define your strikes and allow you to seek additional training or assistance with those portions of the procedure. National courses and simulation training are available to those who want to add new surgical skills or refine existing techniques.²²

Complications

It is notable that surgical volume has been found to affect route of hysterectomy and postoperative morbidity and mortality, with high-volume surgeons (those who perform more than 10 hysterectomies per year) performing significantly fewer abdominal hysterectomies and having significantly lower rates of postoperative complications and death.²³ Surgical complications and procedure costs associated with laparoscopic hysterectomy have also been found to be lower for high-volume surgeons (those who perform more than 14 hysterectomies per year) at high-volume centers.²⁴

Complications of laparoscopic hysterectomy are those of hysterectomy and laparoscopy: anesthetic accidents, respiratory compromise, thromboembolic phenomenon, urinary retention injury to vessels, ureters, bladder, and bowel, and infections, especially of the vaginal cuff.²⁵⁻²⁹ Ureteral injury is more common when staplers or bipolar desiccation are used without ureteral identification. Complications unique to laparoscopy include large vessel injury, epigastric vessel laceration, subcutaneous emphysema, and trocar site incisional hernias.³⁰ Since the introduction of prophylactic antibiotics, vaginal cuff abscess, pelvic thrombophlebitis, septicemia, pelvic cellulitis, and adnexal abscesses are rare. Abdominal wound infection is rare.³¹

CONCLUSION

Laparoscopic hysterectomy is an alternative to abdominal hysterectomy for those patients in whom a vaginal hysterectomy is not indicated or feasible. If the goal of gynecologic surgeons is to select the optimal route of hysterectomy based on the best medical outcomes, the clinical factors that are valid indicators of the route to be selected must be identified. Given the considerable data supporting an association between less-invasive routes of hysterectomy and lower morbidity and faster recovery, vaginal and laparoscopic routes should be considered for every patient in need of hysterectomy. Structured evaluation in clinic and the operating room can help the surgeon choose the appropriate type of hysterectomy by clarifying factors that hinder or facilitate a given route.

Medical standards in today's managed care environment rely on evidence-based practice guidelines that are defined by outcomes rather than subjective criteria, such as physician comfort, preference, or experience. Gynecologic Surgeons must clearly demonstrate that the route of hysterectomy they choose not only benefits the patient medically but also represents a wise use of health care costs. Developing clinical guidelines based on accurate physical findings is the first step in ensuring that women will undergo the most appropriate route of hysterectomy that is cost-effective and meets the standard of quality care.^{32,33,34}

No woman prefers the discomfort of an abdominal incision and as more women become aware of their options offered by the hysterectomy guidelines, they will surely question whether their physician is influenced by his training, preference and sometimes his lack of experience in offering the best surgical options, thus informed consent will be a further issue. We must decide whether we are prepared to offer and deliver this type of care. The future surgical relationships with our patients will depend whether we make our surgical decisions based on evidence or because of our lack of surgical expertise. The choice is ours to make.

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