

## Guest Article

# Do We Need The Laparoscopic Route ?

Shirish S. Sheth, Kurush P. Paghdwalla

*Breach Candy Hospital & Research Centre and Sir Harkisondas Narottandas Hospital, Mumbai, India. Masina Hospital and B D Forti Parsi General Hospital, Mumbai, India*



Shirish S Sheth

It has been estimated that about one third of American women will have undergone hysterectomy by the age of 65 years. It is estimated that in the United States about 70% to 80% of the approximately 500,000 to 600,000 hysterectomies performed annually are performed by laparotomy (Health Care, 1995). More than 80% of hysterectomies in the United Kingdom are being performed by the classical abdominal route (Garry, 1995). In Sweden, more than 95% of all hysterectomies that are not performed in conjunction with a uterovaginal prolapse are performed abdominally (Olsson et al, 1996). Although vaginal hysterectomy is the procedure associated with the quickest operating time, the shortest hospital stay, and the lowest hospital costs, (Meikle et al, 1997), many surgeons do not feel comfortable enough with this approach, especially in the presence of what are traditionally considered contraindications to a vaginal route.

The advent of laparoscopy and the training of

the surgeons in endoscopic techniques have recently facilitated the shifting of many hysterectomies to a vaginal approach. In our opinion, the laparoscopic phase has the function of removing what are thought to be contraindications to the vaginal route. The aim of laparoscopically assisted vaginal hysterectomy should be, to extend the applications of a vaginal route, particularly in allowing safe use of a vaginal approach in patients for whom, according to traditional standards, vaginal hysterectomy may be contraindicated.

Over the past few decades, abdominal hysterectomy has been the procedure of choice for many surgeons, with a ratio of 3:1 over vaginal hysterectomy. Whether this ratio can be justified on the basis of greater morbidity associated with abdominal surgery is a subject of debate. When Dicker et al. (1982) concluded in 1982 that vaginal hysterectomy was associated with fewer complications and shorter convalescence than abdominal hysterectomy, the vaginal approach became the standard procedure for patients who were without so-called contraindications. Contraindications, however, were rarely documented but were based on presumptions that more severe pathologic conditions were present that made vaginal removal difficult or impossible. Combining laparoscopy with hysterectomy, separate surgical groups investigated the traditional contraindications to the vaginal approach and explored the "severe" pathologic conditions that indicated abdominal hysterectomy.

In 1989 Reich et al (1989) demonstrated in a case report that hysterectomy could be accomplished by use of laparoscopy as the access mode. They recommended that this procedure be used in selected patients to decrease the trauma and morbidity associated with abdominal hysterectomy without sacrificing the surgical advantages

afforded by laparotomy. From this, the term laparoscopic hysterectomy evolved.

Kovac et al (1990) assessed a group of women believed to be candidates for abdominal hysterectomy because of a contraindication to vaginal hysterectomy. They wanted to determine whether laparoscopy performed immediately before hysterectomy could be used to alter the planned route of hysterectomy. Of this group of women, 91% underwent vaginal hysterectomy without complications. They concluded that laparoscopy may allow more hysterectomies to be performed by the vaginal route by eliminating some of the reasons for which hysterectomies are traditionally performed abdominally; however, no portion of the hysterectomy was completed with laparoscopy; from this term laparoscopically assisted vaginal hysterectomy was added to our growing vocabulary. These investigators regarded laparoscopically assisted vaginal hysterectomy as the first step in an evolutionary process in which more accurate diagnosis and improved laparoscopic techniques would extend the indications for vaginal hysterectomy to patients whose conditions were previously thought to preclude this approach. The introduction of laparoscopic hysterectomy and laparoscopically assisted vaginal hysterectomy presented new options for uterine removal. Thus, Reich initially saw laparoscopy as a technique to replace uterine removal by the abdominal route, whereas Kovac (1986) considered the laparoscope as a tool to evaluate presumed contraindications to the vaginal approach, with the primary goal being to assist in vaginal hysterectomy. The potential of converting abdominal to vaginal hysterectomies has substantial implications for patients and the allocation of health care resources given the large numbers of hysterectomies performed abdominally. These two reports provided the impetus for others to further substantiate the benefits of combining laparoscopy with hysterectomy. To determine the appropriate use of the different approaches to hysterectomy, it is critical that the myriad indications for a specific operative technique be refined. Sorting through the maze of indications has been complicated by several factors. (1) In the rush to embrace any form of remote control, minimal-access surgery has often led to uncritical acceptance of new techniques. (2) Heightened market-driven, demand-side patient expectations of pain-free and improved outcomes have forced the medical community to act prematurely in some cases. (3) The dearth of well-conducted, published studies, especially randomized controlled trials, comparing laparoscopically assisted vaginal hysterectomy with vaginal and abdominal hysterectomy (five to date) are substantially weakened by their small sample sizes and limited statistical analysis.

## Costs

The true cost of laparoscopically assisted vaginal hysterectomy was difficult to determine because most articles specified amounts billed by the provider for a service rather than expenses incurred by the provider of the service. The pricing structure of the provider influences charges. In many hospitals, services that are more lucrative are often used to subsidize less profitable services, thus obscuring the actual cost. However, all studies comparing laparoscopic and vaginal hysterectomy reported laparoscopic hysterectomy to be more expensive (Daniell et al, 1993). Studies that examined components of total charges indicated that laparoscopic hysterectomy was often more expensive because of the use of disposable instruments, longer operating room and anesthesia times, and intraoperative pharmacy charges (Summit et al, 1992). Thus, when laparoscopic surgery is used more extensively, the costs are higher. In a very recent randomized study by Ottosen et al (2000) the objective was to detect differences in clinical short-term outcome between total abdominal hysterectomy, vaginal hysterectomy and laparoscopic assisted vaginal hysterectomy. One hundred-twenty women scheduled for hysterectomy for various indications were randomized into three treatment arms: total abdominal hysterectomy (n=40); vaginal hysterectomy (n=40) and laparoscopic assisted vaginal hysterectomy (n=40). During traditional abdominal and vaginal surgery, laparoscopic assistance was kept to a minimum. Substantial number of cases needed volume-reducing manoeuvres due to uterine size. Main outcome measures were duration of surgery, anaesthesia, time in hospital and recovery time. Mean duration (range) of surgery was significantly longer for laparoscopic assisted vaginal hysterectomy compared with vaginal hysterectomy and total abdominal hysterectomy, 102 min (50-175), 81 min (35-135) and 68 min (28-125), respectively. Mean stay in hospital and mean time to recovery was significantly longer for total abdominal hysterectomy compared with vaginal hysterectomy and laparoscopic assisted vaginal hysterectomy. The difference between vaginal hysterectomy and laparoscopic assisted vaginal hysterectomy was not significant. It was possible to remove uteri under 600 g with all three methods. Four laparoscopic assisted vaginal hysterectomies and one vaginal hysterectomy were converted to open surgery. Re-operation and blood transfusion were required after two vaginal hysterectomies and one laparoscopic assisted vaginal hysterectomy. One woman needed blood transfusion after total abdominal hysterectomy. Thus concluding that traditional vaginal hysterectomy proved to be feasible and the faster operative technique compared with vaginal hysterectomy with laparoscopic assistance. The abdominal technique was somewhat faster, but time

spent in theatre was not significantly shorter. Abdominal hysterectomy required on average a longer hospital stay of one day and one additional week of convalescence compared with traditional vaginal hysterectomy. Vaginal hysterectomy should be a primary method for uterine removal.

It is clear from this review that laparoscopically assisted vaginal hysterectomy is not cost effective for patients in whom vaginal hysterectomy can be performed. In comparison to abdominal hysterectomy, the cost is comparable, but this varies according to the individual institution.

Length of stay was consistently shorter for laparoscopic than for abdominal hysterectomy. However, the meta analysis could not confirm that laparoscopic and vaginal hysterectomy differed in regard to this variable and further investigations are needed for clarification. Also related to costs are operating and anesthesia times. In this regard, the meta analysis found that operating and anesthesia times were greater for laparoscopic than either abdominal or vaginal hysterectomy. Although in our setting even if patients are fit for early discharge they prefer to stay back a day or two longer, to recuperate better, hence there is no saving on the duration of stay, and obviously longer anaesthesia and operating times result in a heavier professional fee towards the surgeon and anaesthetist. As the saying goes, small hole on the abdomen, large hole in the pocket!! Dr. Raymond Doucetter has noted, (Unger, 1999), that a 10 percent shift from abdominal to vaginal hysterectomy in the United States would save more than \$ 7.5 million in hospital costs alone.

#### **Risk and complications:**

As laparoscopic surgical procedures have become more complex, operative risks and the number of complications have increased (Excarce et al, 1995). Often, a new surgical technique is associated with a new potential complication. Defining new techniques that may be performed more quickly and more efficiently by laparoscopy may be difficult.

#### **Unique to Laparoscopy**

Insertion of laparoscopic trocars has unique complications that are separate from the surgical procedure. Laceration of the epigastric vessels is a common complication (Nezhat et al, 1990). In obese patients, the epigastric vessels commonly cannot be transilluminated, nor can vessels be seen through the peritoneum. Herniation of the bowel has been reported when the trocar incisions are 12 mm in dimensions (Unger, 1999). Some

surgeons now advocate closure of fascial defects that are more than 10 mm. Intra-abdominal complications related to trocar placement include perforation of a viscus. Bladder perforation occurs when the trocar is not inserted sufficiently superior to the pubic symphysis or in situations when the bladder is unusually high on the abdominal wall, as is often the case after laparotomy. Bowel injuries are less common than are urinary tract injuries but are potentially more severe. Bowel perforation may occur with trocar insertion, with electrocautery spread, and directly during dissection of adhesions. These injuries may be difficult to identify. Patients may become critically ill before the injury is suspected. As laparoscopists must be vigilant to avoid major vessel injury during endoscopic procedures. This rare but life-threatening injury can be largely prevented with careful technique, which comes from a clear understanding of the positions, both normal and variant, of the major blood vessels in the pelvis. Laceration of these vessels during endoscopy immediately threatens the patient's life via exsanguination. The occurrence of such vascular injury has been shown in many series to be approximately 0.1%. Less experienced surgeons (those performing fewer than 100 laparoscopic cases) have nearly four times the complication rate of more experienced endoscopists (Phillips et al, 1984).

#### **Unique to the Procedure**

LAVH shares complications of vaginal hysterectomy and abdominal hysterectomy. The incidence of cuff cellulitis, cuff haematoma, and atelectasis is similar among the techniques. During the vaginal portion of the procedure, hemorrhage from the cuff or the lower pedicles may occur. Cystotomy also may occur as the anterior colpotomy incision is made. It also may occur when a bladder flap is being dissected from the cervix, especially if scarring of the bladder is present (Unger, 1999). The ureter also may fall in harm's way with dissection around the ovarian vessels, uterine arteries, or uterosacral cardinal ligament complex (Woodland, 1992). Visualization of the ureter is perhaps the best way to ensure that it is not included in a pedicle. The ureter normally is not seen or dissected because it runs through the cardinal ligament. Some surgeons advocate cystoscopy for all procedures. Cystoscopy is not warranted when hysterectomy and oophorectomy are performed without a pelvic floor procedure. Caution is warranted when a posterior colpotomy incision is made because the large bowel is at risk. The prevalence of these complications is unknown and may be much higher than commonly thought because of under-reporting.

In the early part of the learning curve of laparoscopic hysterectomy, there were significantly more

number of complications. Despite an increase in laparoscopic skills most gynaecologists still find that laparoscopic hysterectomy is technically demanding, takes too long and may need expensive disposable equipment. Major concern is towards urinary tract injuries. Cystotomy and ureteric injury rate is 1.38% and 0.91% respectively (Garry, 1995). This rate is far too high when compared with conventional vaginal hysterectomy. In order to minimize the urological injuries, recourse is taken by offering the patient a supracervical subtotal hysterectomy, by the laparoscopic route, but statistically and scientifically, this procedure has yet to demonstrate significant benefits over total hysterectomy and should not be offered as a standard of care. In spite of the considerable ease of the laparoscopically assisted Doderlein hysterectomy, in a recent study by Howe et al (1999) the reported overall complication rate was 18%, of which 6.2 were classed as major. These included four cystotomies, five unscheduled laparotomies, seven post-operative blood transfusions, one pulmonary embolus and two re-operations (within 6 weeks). The mean hospital stay was three days.

A more recent prospective study from the technology assessment group at Kaiser Permanente, which examined quality-of-life measures, found that patients who had vaginal hysterectomy returned to normal activity much sooner and had more favourable pain, activity, and function outcomes than patients who underwent either laparoscopically assisted vaginal hysterectomy or abdominal hysterectomy (Van Den Feden et al, 1997). However, 28 days after surgery, outcomes for patients with laparoscopically assisted vaginal hysterectomy were similar to those for patients who underwent vaginal hysterectomy. Thus, when all clinical decisions are equal, vaginal hysterectomy appears to provide the most satisfactory outcomes from the patient's point of view, although quality-of-life outcomes for the laparoscopic procedure were often as favorable and both were superior to abdominal hysterectomy.

It is imperative to emphasize that the goal of all minimally invasive surgery should be to accomplish the operative task in an efficient manner while lowering patient morbidity. This unfortunately cannot be said of LAVH.

### Evidence-based guidelines: Making a difference

Clinical medicine has been forced to adopt more rigid evidence-based practice guidelines that are defined by outcomes rather than physician values of preference or experience. Physicians are being asked to measure outcomes not only of appropriate care but also of quality and cost-effective care with the goal of developing

guidelines for medical practice. Guidelines to determine appropriateness of care can help resolve issues of quality of care as well as avoid the legal and financial implications of inappropriate care.

If the outcomes associated with the vaginal approach are indeed better, gynecologic surgeons should perform hysterectomies vaginally whenever possible (Querleu et al, 1993). To do this, the indications for each route must be identified. Optimum surgical practice mandates that the severity of the pathologic disorder be the primary criterion in selecting the route of hysterectomy. Where guidelines based on the severity of the pathologic disorder have been adopted at centers in the United States, and United Kingdom (Richardson et al, 1995) the majority of patients have undergone successful vaginal hysterectomy without abdominal or laparoscopic assistance. These guidelines are not just propositions; they are the byproduct of evidence-based medicine and applied medical decision analysis. These studies indicate that the vaginal route is contraindicated in only 10% to 20% of cases, far less than formerly assumed. Use of these specific guidelines implies that vaginal hysterectomy will replace abdominal hysterectomy rather than being replaced by laparoscopic hysterectomy. Laparoscopy has a definite role in hysterectomy as a diagnostic tool in a small percentage of patients. These reports also indicate that laparoscopic surgical techniques should not be used in >20% of patients scheduled for hysterectomy. Because of the measurable differences in medical and economic outcomes for abdominal, vaginal, and laparoscopic hysterectomy, the severity of the pathologic condition must be the primary criterion for selecting the appropriate route of hysterectomy. Because criteria are now available to determine the extent of the pathologic condition, a surgeon's experience and preference should not solely dictate the route of hysterectomy, and successful completion of hysterectomy alone is not an acceptable measure of appropriate care. Whatever the route of hysterectomy, the procedure must be performed with minimal patient morbidity, recuperative time, and costs. Analogous to a trial of labor, a vaginal hysterectomy trial is needed before resorting to abdominal or laparoscopic hysterectomy. Such a plan will considerably reduce the number of abdominal hysterectomies, enhance the operation's experience and sharpen his skill and judgment (Sheth, 1993). The goal is to use the laparoscope to assist with vaginal hysterectomy, as well as to guide, rather than promote a new operation to supplant other hysterectomies. When more severe pathologic conditions are thought to exist, the laparoscope is an excellent tool that can readily assess the extent of the pathologic condition and confirm, whether, on the basis of laparoscopic findings, a vaginal, laparoscopic or abdominal approach is indicated.

Identifying the severity of pelvic disease is the key to determining the appropriateness and extent of laparoscopic surgery with hysterectomy, not classifying types of laparoscopically assisted vaginal hysterectomy on the basis of the amount of surgery performed laparoscopically. The evidence-based pathway for performing a hysterectomy thus proceeds from a vaginal to a laparoscopic to the abdominal route, not the reverse.

Several conclusions can be drawn from the studies reviewed (Table I). Because vaginal hysterectomy is possible in the majority of patients for benign uterine disease, laparoscopically assisted hysterectomy appears to be a waste of time and money for most indications. Vaginal hysterectomy appears to have more benefits for the patient and the gynecologic surgeon. It is quicker to perform than abdominal or laparoscopic hysterectomy, and it is the most cost effective. There are no scars, complications are not greater, postoperative stay is similar to laparoscopic hysterectomy, and recuperation time is shorter. The laparoscope may increase the awareness of gynecologists to the possibility of a straightforward vaginal hysterectomy. There are two randomized, controlled trials comparing LAVH and Vaginal Hysterectomy techniques. The first was reported by Richardson (1995) from the Royal Free Hospital in London. They had 45 patients in their study and the operating time was much longer with the LAVH approach and other measures of recovery and morbidity were similar in the two groups. The other slightly larger study is reported by Summit et al (1992). In this study 56 patients were included who had adequate uterine mobility and a good shaped pelvis. As expected the operating time in the LAVH group was longer than in the conventional vaginal hysterectomy group, but other measures suggested little difference between the two approaches, apart from the fact that operative blood loss after conventional vaginal hysterectomy was significantly greater. One of the patients having a vaginal hysterectomy developed a vesico-vaginal fistula, but apart from this there were no statistically significant differences between the two procedures. After observing the explosion of laparoscopy during the last decade, as well as learning, performing, and teaching many of the techniques ourselves, we believe that it is time to step back and ask what is reasonable and right for our patients. There is ample evidence now that these operations are not necessarily cheaper, they are not necessarily easier, and they are not necessarily appropriate for malignancies or for procedures that can be performed in a retroperitoneal fashion or transvaginally. The growth in these procedures has in part been motivated by forces outside the medical profession. It is easy to overuse these procedures and to convince ourselves that they are the best choice simply because we want them to be so. The recognition of the

truth is that most of the cases can be done vaginally, if the operator chooses to train himself in the minutiae's of the technique. In Brown's (Brown and Frazer, 1991) series from Australia, 79% of the hysterectomies were completed vaginally, and in the first author's personal series of 6517 hysterectomies, 5344 (82%) were carried out vaginally, 90% of which were in the absence of uterovaginal prolapse (Sheth, 1993).

Table I. Summary of meta analysis

Measure	Statistical significance	Interpretation
Abdominal vs laparoscopic hysterectomy		
Operating time	p < 0.01	LH > AH
Anesthesia time	p < 0.01	LH > AH
Length of stay	p < 0.01	LH > AH
Hospital charges	p < 0.01	No difference
Vaginal vs laparoscopic hysterectomy		
Operating time	p < 0.01	LH > VH
Anesthesia time	p < 0.01	LH > VH
Length of stay	p > 0.05	No difference
Hospital charges	p < 0.05	LH > VH

Modified from Betram DA, Kovac SR, Cruikshank SH. The role of laparoscopy in hysterectomy. *J Pelvic Surg* 1997; 39: 147-58. LH, Laparoscopic hysterectomy; AH; abdominal hysterectomy; VH, vaginal hysterectomy.

### Incidence of Types of Hysterectomies

There is no doubt that vaginal hysterectomy is the least morbid, least expensive technique associated with the most rapid postoperative recovery (Richardson et al, 1995). The preferred method of removing the uterus is usually determined by the surgeons training, preference and experience in a particular technique. However a gynecologist is now frequently recognized for his/her level of expertise in a particular type of hysterectomy – the one using a laparoscope is looked upon as most updated and laparoscopic hysterectomy being looked upon as the pinnacle of surgical skills which in actuality is far from true (Sheth 2001). It is unfortunate that abdominal hysterectomy – the least preferred technique of hysterectomy can be performed in all categories of patients where vaginal or laparoscopically assisted vaginal hysterectomy can be performed. Querleu reported on a series of 149 patients requiring a hysterectomy and he was able to do this by the vaginal route in 77% of cases (Querleu et al, 1993). Kovac (1990) from the United States of America showed that 458 of 617 (89%) of the patients requiring a hysterectomy could be successfully performed vaginally.

### Relevance to the developing world and India

In a country where clean drinking water for all is not yet a reality, we should be discerning in our choice of procedures. Multiparity, lax tissues because of poor involution following multiple deliveries, lesser tissue

tensile strength afford a lot of comfort to the vaginal surgeon even in the presence of significant uterine enlargement. Training in vaginal route, unlike endoscopic surgery requires no sophisticated equipment, set up, and running expenses towards maintenance, hence would be ideal for the developing world.

Even in the major teaching institutes in the metropolis, advanced laparoscopic equipment is not yet a reality. Hence, broad based training in the skills of operative endoscopy is non-existent. Whereas we have masters in the art of vaginal surgery from India, whom even the westerners give due credit, and pride of place. It is a lot easier to train our budding gynaecologists in the art of vaginal surgery. The cost of disposables, equipment, video endoscopic apparatus, maintenance etc are prohibitive to say the least.

Hysterectomy via the vaginal route without laparoscopic assistance is the least invasive and most minimally accessed hysterectomy. It is almost a necessity for every gynaecologist to think of the vaginal route and put it to use in the best interest of patients. Confidence will increase from examination under anaesthesia, and expertise from trial of vaginal hysterectomy practice. Abdominal route should be used only when the vaginal route is contraindicated and LAVH is risky or very difficult (Sheth, 2001). In the absence of uterine prolapse, DCB, adenomyosis, & fibroids comprise more than 80% of the indications for hysterectomy and 90% of these uteri can be successfully removed by the vaginal route (Sheth, 2000).

**Conclusion**

The LAVH revolution beginning in the late 1980s is over. The overwhelming growth and at times, overuse of the laparoscopic approach have waned somewhat as physicians reevaluate LAVH, adopt new techniques such as arterial embolization and myolysis, and rediscover old techniques such as uterine morcellation at vaginal hysterectomy. In addition, the cost of new procedures and instrumentation has come under intense scrutiny. The challenge to accumulate data, critically analyze each approach, and select the most appropriate procedure for each patient holds the greatest promise for improved patient satisfaction and outcomes.

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