LAPAROSCOPIC HYSTERECTOMY – A STEP FORWARD?

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ABSTRACT

Laparoscopic gynaecological surgery has made tremendous progress since the last decade and the introduction of laparoscopic hysterectomy has gained immense popularity amongst both gynaecologists and consumers alike in its short history of 5 years. This review surveys the literature available on this technique and critically evaluates the indications, limitations as well as the benefits and risks of this approach to hysterectomy.

There is some evidence presently that laparoscopic hysterectomy may offer benefits to selected patients who otherwise have indications for an abdominal hysterectomy. Overall, the incidence of laparotomy for hysterectomy may be decreased by converting a portion of these patients to the laparoscopically-assisted vaginal approach.

Keywords: *laparoscopic hysterectomy*

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INTRODUCTION

Laparoscopic approach to gynaecological surgery has made tremendous progress since the 1980s, catalysed by various technological advances in instruments as well as surgical techniques. Currently, almost all pelvic procedures can be performed using the laparoscopic approach[1]. One major milestone in this chronology of innovation and progress has been the publication of laparoscopic hysterectomy in 1989 by Dr H Reich and colleagues[2]. Indeed, the laparoscopic approach has since extended itself beyond the realms of simple hysterectomy to encroach on the very controversial field of gynaecological oncology, including pelvic[3] and para-aortic[4] lymphadenectomies and radical hysterectomies[5-7]. While the latter techniques remain very much the domain of pioneering specialised centres, laparoscopic hysterectomy, and its many different variations, has gained immense popularity amongst both the practitioners and consumers alike in its 5 short years of history[8].

In the recent two years, there were several thoughtful and critical commentaries which questioned whether the whole phenomenon of operative surgery is truly a surgical advance or merely a technical gimmick[9]; and whether (with some exceptions) there is sufficient evidence of the benefits from the laparoscopic approach over the conventional techniques to advocate its dissemination[10,11]. In particular, there is a danger that we may inadvertently convert straightforward hysterectomies to unnecessarily "expensive hysterectomies" with current propensity towards use of disposable instruments[12].

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Overall, laparoscopic surgery has several well known advantages over conventional laparotomy. These include reduced post-operative analgesic requirement[13], faster post-operative recovery[14] which may be translated to shorter hospital stay, reduced costs[15] and earlier return to economic activity, as well as improved cosmesis and a lower risk of adhesion formation[16-18]. Indeed, the Economist[19] in a survey of the future of medicine has placed endoscopic surgery as a definite milestone in the history of medicine alongside other major milestones such as introduction of penicillin and heart transplants.

The pendulum swing phenomenon of each new technique is all too familiar and currently laparoscopic surgery is enjoying tremendous popularity on its upward swing. Frontiers are being pushed forward with each new publication. It will be some time more before the technique matures when proper indications and contra-indications will be established.

This review surveys the techniques of laparoscopic hysterectomy currently available, assesses the possible benefits over the conventional approach and the potential role of this approach in gynaecological surgery.

OBJECTIVE AND INDICATIONS

It has been known for some time that patients who underwent vaginal hysterectomy in competent hands suffer less post-operative morbidity and require a shorter convalescent period than similar women who underwent abdominal hysterectomies[20,21]. Yet abdominal hysterectomy remains the predominant way of removing the uterus, with some figures being in the region of 95% of all hysterectomies performed in pre-menopausal women[22]. Many gynaecological surgeons find vaginal hysterectomy to be a technically more demanding procedure, particularly when it is performed in a younger patient with an enlarged uterus without uterine descent. Further, there are many instances where an abdominal approach is preferable such as in the presence of adnexal pathology, endometriosis, or suspicion of pelvic adhesions.

Laparoscopically assisted vaginal hysterectomy or laparoscopic hysterectomy offers the combined advantage of the excellent exposure and visualisation of the abdominal approach in selected cases as well as the improved post-operative recovery of the patient comparable with the vaginal approach.

It must be emphasised that the laparoscopic or laparoscopically assisted procedure is not intended to complicate what would otherwise be a straight-forward vaginal hysterectomy with additional abdominal trocar puncture wounds. Indeed, if the condition of the patient and the surgical skills of the

gynaecologist permit a vaginal approach, this should be the procedure of choice. However, in selected patients in whom an abdominal hysterectomy would otherwise have been indicated, laparoscopic hysterectomy may be able to convert a good proportion of these patients to the vaginal approach with considerable benefits to the patient as well as the health care system.

CLASSIFICATION

Many different versions of "laparoscopic hysterectomy" have cropped up over the years, differing in the degree of "assistance" provided by the laparoscopic route – ranging from simple diagnostic laparoscopies to exclude adnexal pathologies or adhesions[23], to adnexectomy by the laparoscopic approach followed by the vaginal approach, to the procedure being entirely performed by the laparoscopic approach.

This has created a lot of confusion in the terminology, particularly when many of the terms have been used interchangeably without specifying the surgical technique. This makes it difficult to truly compare laparoscopic hysterectomy and laparoscopically assisted vaginal hysterectomies with conventional laparotomy or vaginal techniques.

To encourage uniform use of terminologies, several classification systems have been recommended[24-26].

A simple classification proposed by the group in Clermont Ferrand[24] is as follows:

Type 0: Diagnostic laparoscopy with adhesiolysis followed by vaginal hysterectomy.

Type 1: The laparoscopic approach is limited to the adnexae and round ligaments.

Type 2: The laparoscopic approach is extended to include dessication and section of the uterine arteries, while the cardinal and utero-sacral ligaments are ligated vaginally.

Type 3: The procedure is performed in its entirety laparoscopically, including the opening of the vaginal wall.

Type 4: Similar to the type 3 procedure but with laparoscopic suturing of the vagina.

Type 0 and 1 can only be considered to be a prelude to vaginal hysterectomy, whilst types 2, 3 and 4 are considered to be true laparoscopic hysterectomies.

Garry and Reich in their recently published book on laparoscopic hysterectomy[25] proposed a more elaborate classification of 9 different types of the laparoscopic approach.

Briefly, they consider the mobilisation of the adnexae or infundibulopelvic ligaments by the laparoscopic approach with vaginal approach to the uterine arteries, cardinal and uterosacral ligaments to be a "laparoscopically assisted vaginal hysterectomy" or LAVH.

When the uterine artery is taken laparoscopically but with vaginal division of the cardinal and uterosacral ligaments (the equivalent of Type 2 procedure in French classification) – it is termed a "laparoscopic hysterectomy".

A "total laparoscopic hysterectomy" would involve the complete mobilisation of the uterus laparoscopically, including the cardinal and uterosacral ligaments as well as opening the anterior and posterior cul-de-sacs.

Other terms used to complete the description of the spectrum of hysterectomy accomplished with the help of laparoscopy include diagnostic laparoscopy with vaginal hysterectomy, laparoscopic vault suspension after vaginal hysterectomy, laparoscopic supra-cervical hysterectomy, laparoscopic hysterectomy with lymphadenectomy, laparoscopic hysterectomy with lymphadenectomy and omentectomy, and radical laparoscopic hysterectomy[25].

The term most frequently used in publications is laparoscopically-assisted vaginal hysterectomy (LAVH) even though the techniques described included taking the uterine artery laparoscopically in most of the reports. They thus qualify to be at least type 2 procedures or laparoscopic hysterectomies by the above classifications. This review retains the terminologies used by the authors in the original reports to avoid confusion with the references.

The many different terminologies should not detract from the main objective of the laparoscopic approach – which is to liberate the uterus sufficiently by the laparoscopic approach so as to facilitate the safe and easy removal of the uterus by the vaginal route and to confer benefits to the patient by avoiding a laparotomy.

Often, technical purists will debate over which is a more laparoscopic, and therefore presumably "better" procedure, but this would miss the whole point in this new surgical advance.

LIMITS AND PATIENT SELECTION

Recognising the limits of the technology and appropriate selection of patients according to one's competence with the technique are two important points to remember in order to avoid unnecessary complications and a high conversion rate to laparotomy.

Currently, uterine size is one obvious limiting factor. Most teams with reasonable experience should be able to deliver uteri of up to between 12 to 14 weeks size fairly consistently with this approach. Although larger uteri have been removed laparoscopically, difficulties are often encountered in obtaining sufficient exposure of the adnexae and the uterine vessels in such cases of voluminous uteri. In addition, delivery by the vaginal route will be a struggle with need for morcellation and piecemeal extraction of the uterus.

Other limiting factors include severe adhesions which render the procedure too long to be practicable; and in exceptional cases, poor vaginal access.

However, it must be emphasised that this is a new approach. Compared with conventional surgical technique by laparotomy or by vaginal surgery which has had over a hundred years of development[27,28], laparoscopic hysterectomy is still in its infancy with many more improvements to be expected; both in terms of technique as well as instrumentation.

SURGICAL TECHNIQUES

Many different techniques have evolved to secure the different pedicles (infundibulopelvic ligaments, round ligaments, fallopian tubes, utero-ovarian ligaments, uterine vessels, and cardinal ligaments) laparoscopically and they have been well described in the initial reports[2,24,29-35] (Table I). It is beyond the scope of this review to discuss the details of each of them but, broadly, they may be divided into 3 groups.

1. Bipolar coagulation

This is by far the most popular method for taking the various uterine pedicles, perhaps owing to the long experiences with the bipolar technique used for tubal sterilisation in the pioneering days of operative laparoscopy[36-38]. It is also the technique extensively used by the team in Clermont Ferrand and experience with this technique in well over three hundred cases has shown it to be adequate to dessicate both the ovarian and uterine vessels. This has also been confirmed in animal studies where bipolar electrodessication has been consistently reliable in achieving haemostasis in blood vessels of diameters 3mm or less[39].

Table I – Laparoscopic hysterectomy: clinical series

Study	Liu 1992 [29]	Padial 1992 [30]	Mage 1992 [24]	Mage 1993 [35]	Daniell 1993 [32]	Lee 1993 [34]	Davis 1993 [33]
Cases	72	75	44	100	68	82	46
Uterine Wts (g)	–	41-462 (159)	37-445 (152)	35-510 (190)	–	–	81-474 (191)
Technique	Bipolar	Bi/Mono Staples	Bipolar	Bipolar	#Bipolar *Staples	Staples	Suture Bipolar Staples
Success	100%	100%	77%	95%	91%	97%	87%
Laparotomy	0%	0%	23%	5%	9%	3%	13%
Major Complicatn	–	Haem. (2)	Bladder (1)	Bladder (5) Ureter (1)	–	Bladder (2)	Ureter (1) Bowel (1) Haem. (2)
Mean Surg. Time (Min.)	120	121	120	165	(#) 223 (*) 117	152	191
Hospital Stay (Days)	1.18	2.17	5.2	4.4	(#) 2.75 (*) 2.53	2.6	2

Abbreviations:
Complicatn: Complications
Surg.: Surgical
Haem.: Haemorrhage
(#): Surgical outcomes using bipolar (Daniel et al)
(*): Surgical outcomes using automatic staples (Daniel et al)

The coagulated area should be at least 1 cm long and several applications may be necessary to ensure adequate dessication[31]. The difficulty is in the judgement of whether the vessel has been adequately coagulated and the initial transection of the vessel wall should be a partial one with the bipolar forceps ready at hand to reapply onto the vessel should the dessication be inadequate. This difficulty may be overcome with the use of an ammeter[40] as current flow essentially stops on complete dessication. No secondary haemorrhage has been noted with this technique.

2. Automatic endosurgical staples

Automatic endosurgical staples are popular with many teams[30,32,34] owing to their ease of application and reduction in surgical time associated with their use. In particular, it is an excellent technique to take the adnexae.

However, it is an expensive piece of disposable instrument and adds considerably to the cost of the procedure. In addition, the designs of the current instruments are not perfect and several complications including ureteric occlusion, bladder perforation, and haemorrhage from persistent arterial bleeders after application of the staples have been reported[41,42].

Part of the problem is that the endoscopic linear stapling devices are relatively broad instruments requiring the use of a 12mm trocar. Thus, when this is applied onto the uterine artery at the side of the cervix, there is little room to manoeuvre the instrument as the anatomic distance between the ureters and the lateral margins of the cervix is only between 2 to 2.5 cm. One other point worth noting when using the linear stapling device is that dissection of the bladder flap should always precede its application on the adnexae or uterine vessels, both to avoid injury to the bladder and also to displace the ureters a little further from the operative field.

Although each side of the pedicle transected by the linear stapling device is secured by 3 staggered rows of titanium staples, bleeding from such pedicles occur not infrequently. Further, additional steps to secure haemostasis with bipolar coagulation subsequently is often difficult owing to the presence of the metallic staples and sutures may be necessary to secure the bleeding pedicle[42].

3. Sutures with extra-corporeal knotting and clips

Advocated by Reich in his book on laparoscopic hysterectomy[25], suturing of the pedicle is a technically more demanding manoeuvre as it is necessary to dissect and isolate the vascular bundle, pass a suture under the pedicle, and bring out the suture to perform an extra-corporeal knot. This may either be the multiple half hitch slipknots with the Clarke-Reich knot pusher as demonstrated by Reich or using a Roeder knot with a conventional knot pusher. It is important to ensure that when sutures are pulled out of, or pushed into the peritoneal cavity, they do not impinge on the vessels as the friction may tear the vessel walls resulting in haemorrhage.

Alternatively, endoscopic clips may be used to secure vessels which have been skeletonised and well isolated but there are two problems with this technique. Experience has shown that there is a tendency for the clips to slip when pulling on the uterus or repositioning the uterus during the procedure. In addition, the uterine artery at the level of the isthmus is often surrounded by a bunch of veins and it may be very difficult to isolate the artery well for application of the clips.

Laparoscopic supracervical hysterectomy

Vaginal vault prolapse is not altogether rare after hysterectomy[43]. It has been argued that in addition to the interruption of nearly all the major supporting ligaments to the vagina, thus predisposing to the problems of vault prolapse, total hysterectomy also disturbs the (Frankenhauser) plexus of nerves intimately associated with the cervix, thus leading to increased urinary, bowel and even sexual disturbances[44]. Semm responded to this challenge and introduced laparoscopic supracervical hysterectomy with intra cervical enucleation (Classic Abdominal

Serrated Macro-morcellator Hysterectomy or CASH)[45]. A retrospective comparison between laparoscopic supracervical hysterectomy with laparoscopically assisted vaginal hysterectomy indicated that the former is associated with lower surgical morbidity and quicker recovery[46].

However, the unique risk of supracervical hysterectomy is the development of cervical carcinoma in the remaining cervical stump. After excluding cases with coincidental cervical carcinoma not detected at the time of surgery, the development of de novo cancer on the cervical stump does not seem to be increased over patients with an intact uterus[47,48]. In addition, patients with electro-coagulated cervices appear to be at decreased risk of developing cervical cancer[49].

While the prognosis and survival rate for cancer detected on the cervical stump remain comparable with those patients with an intact uterus[50], complication rates for either therapeutic options of radiotherapy or radical surgery[50,51] are high. This is because the cervical stump presents a special problem for intracavitary radium or caesium with insufficient space to insert a central tandem and there is a tendency to rely on external radiation therapy. The problems posed to radical surgery are obvious with previous surgery and the high likelihood of bladder and bowel adhesions in addition to distortion of the anatomy of the ureter.

It remains to be seen whether supracervical hysterectomy with intra-cervical ennucleation does eliminate the risk of cervical cancer and it would be prudent to continue cytologic surveillance in these patients till a larger and longer experience with the technique is obtained.

An interesting alternative to preserve the complex relationship between the endopelvic fascia and the vagina is intrafascial hysterectomy[52] but using the laparoscopic approach.

OPERATING TIME

One of the major criticism of the laparoscopic approach has been the long surgical time required. The mean surgical time reported in the initial reports varied between 117 mins to 223 minutes. (Table I). The uteri removed had mean weights between 152 to 191 g. Davis et al reported one of the longer mean surgical time of 191 minutes but they dealt specifically with patients with severe endometriosis and the patients also had larger uteri with mean weight of 191 g. Daniell et al found shorter operating times associated with the use of automatic endoscopic staples compared with the use of bipolar coagulation for haemostasis (117 minutes vs 223 minutes) although it is difficult to draw any valid conclusion from this as the two groups were not randomised, and the pathologies and uterine sizes in the respective groups were not controlled.

Importantly, none of these experiences report any complications of deep vein thrombosis (DVT) associated with long arduous pelvic procedures. Most teams emphasised the importance of careful positioning of the legs of the patients not only to minimise the risk of DVT but also to facilitate the surgery. Speed in itself is not an important criterion of good surgery but extended surgical time exposes the patient to prolonged anaesthesia, greater risk of infection, and complications from a fatigued surgeon. There is a learning curve to the technique as with all others and over the 5 years of development, most hysterectomies respecting the limits of the laparoscopic approach, can be accomplished in under 2 hours.

COMPLICATIONS

Mortality

The overall mortality rate associated with hysterectomy by the conventional approaches varied widely but in general are low: between 12 to 15 per 10,000 procedures[53,54]. If mortality from procedures associated with pregnancies and cancer are excluded, the mortality risk is only 6 per 10,000 procedures[53].

Laparoscopic hysterectomy has not had a sufficiently long and large experience to produce mortality statistics and no report of mortality associated with the laparoscopic procedure has been published at the time of writing.

Morbidity

It is increasingly apparent that many problems need to be overcome judging from the emerging morbidity reports[55]. The magnitude is comparable to the morbidity in women who undergo vaginal or abdominal hysterectomies which ranges between 25% to 50% for the conventional approaches although most are minor and reversible complications[20,56,57].

Schwartz[55] reported an intraoperative complication rate of 11%, postoperative complication rate of 16% and equipment failure rate of 56% in his series of 45 patients. All but one of the intraoperative and postoperative complications were minor. The single major complication was a bladder perforation with an Nd:YAG laser tip. The high equipment failure rate, the majority of which were bipolar cautery problems, is a testimony to the amount of work still required to improve the present equipment systems.

1. Haemorrhage

One of the major advantages of the laparoscopic approach has been the excellent visualisation of tissues which makes for excellent dissection with lower mean blood loss in most reports which compared it with conventional approach by laparotomy. Significant haemorrhage requiring transfusion has not been a major feature in most series reported (Table I). Two patients in the series of 75 cases by Padial[30] reportedly lost more than 1000ml of blood but did not require any transfusion. Davies et al[33] had 2 of the 46 endometriotic patients who required blood transfusion.

However, difficulty in achieving satisfactory haemostasis, particularly at the uterine and cervico-vaginal vessels, is one of the most frequent reasons for conversion to laparotomy[24,35]. Interestingly, the inferior epigastric artery is not infrequently lacerated causing troublesome bleeding and may on occasions require conversion to laparotomy[42]. It is important that secondary trocar insertions be performed under direct laparoscopic control, lateral to the rectus muscle, well away from the inferior epigastric vessels which may be identified running lateral to the obliterated umbilical arteries.

2. Bladder injury

In addition to the report by Schwartz, bladder injury also featured prominently among the major complications in the initial studies (Table I): one (2.3%) in the series of 44 by Mage in Clermont-Ferrand[24], five (5%) in his later series of 100 patients[35] and two (2.4%) in the series of 82 patients by Lee in Taiwan[34]. Liu reports 4 bladder injuries (1%) in his series of 407 patients[58].

It is significant that a history of previous Caesarean sections is a strong risk factor in most of these studies. Three of the five bladder lacerations reported in the second study by Mage[35] were associated with laparoscopic Burch colposuspension procedures.

The above rates would appear rather high by comparison with bladder injury during hysterectomy by conventional approaches which were reported to be between 0.3 to 0.8 per 100 procedures[58,59]. However, it must be remembered that this is a new technique and it is instructive to take home the message that particular care is necessary with the dissection of the bladder particularly in patients with previous Caesarean sections using

the laparoscopic approach. Although the magnified images through the laparoscope provide ideal conditions for dissection, the surgeons may be unaware of the force transmitted to the fragile adherent tissues through the mechanical advantage afforded by the long laparoscopic instruments acting as levers.

3. Ureteric injury

Ureteric injuries may potentially occur at the usual sites at the level of the pelvic brim beside the infundibulopelvic ligament, in the area of the ureteric canal as it passes under the uterine vessels and in the area of the cardinal ligament. Attention has been brought to the ureteric injuries associated with the use of automatic endoscopic linear stapliers, particularly at the region of the ureteric canal owing to the narrow confines of the anatomic space between the cervix and the ureter[41,42]. Anuria from bilateral ureteric transection with EndoGIA automatic stapling device during laparoscopic hysterectomy has been reported in at least two publications[42,60].

Bipolar coagulation of the uterine artery when taken too low may inflict thermal damage to the ureter[35] and is particularly treacherous in patients with previous surgery or pathology such as endometriosis[33] which predispose to changes in the course of the ureter. The bipolar forceps taking the uterine arteries should be applied at the level of the isthmus, as close to the uterus as possible.

In addition, a recent report highlighted the possibility of ureteric injury after laparoscopic hysterectomy from the sutures placed during transvaginal closure of the vaginal cuff[61].

Most American literature on the subject advocate that the pelvic course of the ureters be identified and dissected from the peritoneal fold all the way down to the ureteric canal right from the beginning of the operation. This is to enable the ureters to be kept under direct vision at all times[25,62]. The French school in Clermont Ferrand is of the opinion that this is not necessary, but rather the ureters are identified in all the potentially dangerous areas through the peritoneum before any pedicle is taken definitively.

While laparoscopic repair of bladder[63,64] and ureteric injuries[65] have been reported, repair by laparotomy is still the standard of care in most institutions.

4. Others

Bowel injury is uncommon with only one case of thermal bowel injury noted in the series of endometriotic patients by Davis et al[33] among the articles reviewed. A higher risk of incisional hernias have been noted in 10-12mm trocar wounds[66,42] such as those used to admit endoscopic clips and automatic staples. It is important in these cases to close the fascia layer with suture.

CONVERSION TO LAPAROTOMIES

The fraction of laparoscopic or laparoscopically assisted vaginal hysterectomies which needs to be converted to laparotomy depends in part on the uterine size tackled, the presence of other pathologies such as severe adhesions and of course with the skill of the surgical team.

It is obvious that there is a learning curve for each team. The first series of 44 cases published by Mage et al[24] which reported their initial experience between 1989 and 1991 for hysterectomies of uteri averaging 152g in weight has a laparotomy conversion rate of 23%. In their later publication of 100 cases[35] performed in 1992, the laparotomy conversion rate was only 5% even though the size of the uteri extracted were bigger with a mean weight of 190g.

The factors responsible for the failures in the first series[24], where there were 10 conversions to laparotomy out of the 44 cases, include difficulty in achieving haemostasis particularly at the uterine arteries (60%), difficulty in obtaining sufficient exposure in cases of voluminous uteri of between 164 to 445g (30%), and a single case of bladder laceration (10%).

In the latter series with 5 laparotomies out of the 100 cases[35], the factors responsible for failure were chiefly difficulty in obtaining haemostasis at the uterine pedicle (60%) and severe endometriosis with obliteration of the pouch of Douglas (40%).

Davis et al[33] were able to complete the procedure laparoscopically in 40 of their 46 patients (87%) with moderate to severe endometriosis. Four of the 6 laparotomies were performed because of the requirement for bowel resection. In the remaining 2 laparotomies, severe bowel endometriosis was noted although no resection of bowel was required.

COMPARATIVE STUDIES

It has become a custom in any review article to conclude by calling for large prospective randomised clinical trials to settle the question of whether a newly introduced technique has any merits over conventional established methods[10]. While this is scientifically satisfying, there are enormous local organisational and ethical considerations which must be overcome before such a study can be launched. This is particularly so in surgical techniques where so much is dependent on the training and skill of individual surgeons which may biase the results.

Nonetheless, three prospective trials have been identified in the literature.

A randomised comparison of laparoscopy-assisted vaginal hysterectomy with vaginal hysterectomy in an outpatient setting conducted by Summitt et al[67] is flawed in its design by virtue of the argument that if a vaginal hysterectomy may be performed in either group of the study population, there is then no indication for assistance by operative laparoscopy, inflicting additional abdominal trocar wounds for no evident benefit[68,69]. As expected, vaginal hysterectomy was found to be faster, cheaper and associated with less postoperative pain[67] when compared with laparoscopically assisted vaginal hysterectomy.

Nezhat et al[70] published a small prospective but non-randomised study comparing 10 women who underwent LAVH with another 10 who were treated with abdominal hysterectomy. While LAVH was a longer procedure compared with abdominal hysterectomy (160 v 102 minutes), blood loss was less (210 vs 330 ml), length of hospitalisation was shorter (2.4 vs 4.4 days) and the recovery period was similarly shorter (3 vs 5 weeks).

Phipps and Nayak[71] in another prospective non-randomised series of 53 patients, comparing LAVH using automatic staples with conventional abdominal hysterectomy, came to essentially the same conclusion with the additional information that postoperative analgesic requirement of patients who underwent LAVH was lower. Although equipment cost of the endoscopic automatic staples was 10 times the price of conventional laparotomy (500 vs 50 sterling pounds), there was overall savings from the shorter hospital stay and shorter absence from work.

Retrospective surveys between lapartoscopically assisted vaginal hysterectomies and abdominal hysterectomies have supported the above conclusions[72-74].

ALTERNATIVE CONSERVATIVE MANAGEMENT

The most common indication for hysterectomy is uterine fibroids[75] and it represents at least a quarter of the indications for hysterectomy by laparoscopy in many of the published studies review[29,32,35,70]. There has been growing debate as to whether surgery is indicated for asymptomatic fibroids by virtue of their size alone[76]. Myomectomy is the treatment of choice in women who desire to keep their reproductive potential[77]. Laparoscopic

approach to myomectomy currently still faces the problems of a time consuming, often piecemeal, extraction of the myoma as well as complications from inadequate uterine reconstruction after myomectomy[78,79]. Symptomatic submucous fibroid may be amenable to treatment by hysteroscopic resection[80,81] or vaporisation with the Nd:YAG laser[82].

In selected groups of women, gonadotropin releasing hormone (GnRH) analogues may be used as a temporizing measure for patients who wish to postpone or delay surgery[83]. The reduction of myoma size is temporary and regrowth of the tumour is noted after cessation of medical treatment[83]. Prolonged administration of GnRH analogues is limited by the side effects of hypooestrogenism. GnRH analogues have also been used to reduce the vascularity and size of fibroids so as to facilitate surgery, although data to demonstrate definite cost-benefit of such a strategy to prepare voluminous uteri for laparoscopic hysterectomy is not available at the time of writing.

Menstrual disturbance is also a common indication for laparoscopic hysterectomy[35]. Surgery is generally indicated only after medical treatment has failed. Endometrial resection whether by electrocoagulation[84,85] or the Nd:YAG laser[86] are valuable surgical tools to treat such conditions conservatively as the first surgical option after excluding neoplastic pathology.

CONCLUSION

There is presently a growing body of evidence indicating that laparoscopic hysterectomy is indeed a step forward as it offers significant benefits to selected patients who otherwise have indications for abdominal hysterectomy. Overall, the incidence of laparotomy can be decreased with this approach. The technique is however still in its infancy and further refinements are expected.

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