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Laparoscopically – Assisted Vaginal Hysterectomy (LAVH) – An Alternative to Abdominal Hysterectomy

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ABSTRACTS

Aim: To study the outcomes of 42 consecutive patients who were scheduled for a laparoscopically-assisted vaginal hysterectomy (LAVH) between 1 January 1994 to 31 December 1999.

Method: Retrospective study

Results: Two patients required conversion to an abdominal hysterectomy. The range of uteri removed was from six to 16 weeks' size. Menorrhagia was the commonest presenting complaint and uterine fibroids was the commonest diagnosis. The mean duration of surgery (± SD) was 131.0 ± 31.7 minutes. Mean blood loss (± SD) was estimated at 417 ± 169 mls. Six percent of patients required a perioperative blood transfusion. Fifty-five percent of patients did not require any injectable analgesics and 45% were able to ambulate on the day of surgery. The mean duration of hospital stay (± SD) was 4.2 ± 2.3 days. The commonest complication was post-operative fever.

Conclusions: LAVH patients have a quick post-operative recovery with less pain at the expense of a long duration of surgery. LAVH is a feasible option in a selected group of patients who would otherwise require an abdominal hysterectomy.

Keywords: hysterectomy complications, minimally-invasive surgery, laparoscopy

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INTRODUCTION

Today, hysterectomy is one of the most common major surgical procedures performed by gynaecologists. Approximately 675,000 hysterectomies are performed yearly in the United States of America[1]. It is estimated that almost 20% of women will have a hysterectomy by age 55 in the United Kingdom[2] whilst one woman in three is deprived of her uterus by age 60 in the United States[3]. Until the beginning of the 1990s, there were only two ways of carrying out this operation: by laparotomy or vaginally. Although it has been established that patients who undergo vaginal hysterectomy have a shorter hospital stay, less pain and a quicker recovery than those who undergo abdominal hysterectomy[4], the majority of hysterectomies are still performed by the abdominal route. On average, only 27% of hysterectomies are performed by the vaginal route[5].

The reason for this preponderance of abdominal hysterectomies over vaginal hysterectomies is the many relative contraindications to vaginal hysterectomy which include pelvic adhesions from endometriosis or pelvic inflammatory disease, previous abdomino-pelvic surgery and the need to ensure removal of the ovaries.

In 1989, Reich et al reported the first case of laparoscopically-assisted vaginal hysterectomy[6]. Laparoscopy was used to dissect the uterus and ovaries. Vascular pedicles were secured with bipolar diathermy. The remainder of the procedure was completed from a vaginal approach. An alternative to abdominal hysterectomy was born. The rationale for performing LAVH is to convert an abdominal hysterectomy into a vaginal hysterectomy and therefore reduce trauma and morbidity[7]. To achieve this purpose, the gynaecologist must use laparoscopic equipment and techniques available to him to overcome the difficulties and contraindications to vaginal hysterectomy.

In this way, laparoscopy allows a proportion of patients who would otherwise have required an abdominal hysterectomy to have a combined laproscopic and vaginal procedure, i.e. LAVH. Data from other centres have shown that LAVH patients share many of the benefits that vaginal hysterectomy patients have over those who undergo abdominal surgery[8]. We present our experience with 42 patients who were scheduled for a LAVH at the Singapore General Hospital.

MATERIAL AND METHODS

All patients who were planned for LAVH for between 1 January 1994 and 31 December 1999 were reviewed. These cases were presented for discussion at weekly gynaecology audit meetings prior to the surgery. Patients who could be treated with vaginal hysterectomy alone were not scheduled for LAVH. Patients with known

Table I. Patient characteristics of LAVH patients.

Age (mean) ± SD in years	49.0 ± 6.5
Parity (mean) ± SD	2.6 ± 1.5
Estimated uterine size (mean) in weeks (range)	9.6 (6-16)
Previous abdomino-pelvic surgery	7
One or more ovaries removed	20

Table II. Presenting complaint.

Presenting complaint	LAVH (n=40)
Menorrhagia	16
Abdominal pain	8
Abdominal mass	3
Irregular/abnormal menstrual bleeding	7
Symptoms of anaemia	1
Incidental ovarian cyst on ultrasound	1
Symptoms of genital prolapse	2
Urinary symptoms	1
Abnormal Pap smear	1

Table III. Diagnosis.

Diagnosis	LAVH (n=40)
Uterine fibroids	21
Adenomyosis	8
Ovarian cyst/tumour	2
Endometrial hyperplasia	5
Genital prolapse	2
CIN (cervical intraepithelial neoplasia)	1
Endometriosis	1

Table IV. Blood loss and transfusion requirements in the study subjects.

	LAVH
Total blood loss (ml) ± SD	417 ± 169
Patient requiring blood transfusion	6 (15%)
Mean drop in haemoglobin (g/dl) ± SD	2.2 ± 1.3
Mean drop in haematocrit (%) ± SD	9.3 ± 6.1

Table V. Detailed analysis of perioperative blood transfusion in the study patients.

Units of blood transfused	LAVH (n=40)
Nil	34 (85%)
One	4 (10%)
Two	2 (5%)

Table VI. Time to diet, ambulation, analgesic use and total hospital stay in study patients.

Outcome measures	LAVH
Time to diet (days) ± SD	1.2 ± 0.5
No of patients able to ambulate on day of surgery	18 (45%)
No of doses of injectable anlgesics used ± SD	0.7 ± 1.0
Total hospital stay (days) ± SD	4.2 ± 2.3

Table VII. Analysis of injectable analgesics used in LAVH patients.

No of doses of injectable analgesics	No of patients
Nil	22 (55%)
One	11 (27.5%)
Two	4 (10%)
Three	3 (7.5%)
More than three	0

Table VIII. Summary of the complications encountered.

Complication	No of patients
Overall complication rate	
(Patients with at least one complication)	14 (35%)
Fever	11
Urinary tract infection	5
Wound infection	1
Urinary tract/bowel injury	0
Repeat surgery	2
Re-admission to hospital	3
Pelvic hematoma/abscess	3

or suspected gynaecological malignancies were excluded. All case records were retrieved from the hospital medical records office. The necessary information was extracted.

OPERATIVE DETAILS

Patients were placed in the Trendelenburg position and preparation and draping in the usual manner ensued. The bladder was emptied and the abdominal cavity insufflated with three litres of carbon dioxide using the Veress needle. A subumbilical incision was made for insertion of the telescope. One or two other incisions were made suprapubically. The suprapubic incisions were made medial to the inferior epigastric vessels. In our department, operators usually use three laparoscopic ports – a 10 mm subumbilical port and two 5 mm suprapubic ports.

A Hegar dilator was then introduced into the uterus to allow anteversion and manipulation of the uterus. The uterus was then manipulated to place the round ligament on stretch. Using bipolar diathermy forceps, 2 cm of the round ligaments were diathermied. The Fallopian tubes and ovarian ligaments were also diathermied close to the uterine end. The round ligaments, ovarian ligaments and fallopian tubes were subsequently cut with laparoscopic scissors. The broad ligament was then opened. Incision of the uterovesical fold was continued to the contralateral side.

If the ovaries were to be removed, the same initial steps were taken except that the fallopian tubes were not cut. In these cases, the infundibulopelvic ligaments, in which the ovarian vessels run, were identified and diathermied close to the ovary. Separation of the ovary from the infundibulopelvic ligament was done in stages to prevent potential damage to the ureter. Subsequently, incision of the posterior and anterior leaf of the broad ligament was carried inferiorly towards the uterine arteries. The subsequent steps were performed vaginally as described:

1. A circumferential incision was made around the cervix.
2. The bladder was reflected off the cervix and the peritoneal cavity entered.
3. The Pouch of Douglas was entered.
4. The cardinal ligaments were exposed.
5. The cardinal ligaments were clamped, cut and tied.
6. The uterine arteries were clamped, cut and tied.
7. The uterus was removed by cutting any remnants of tissues above the cut artery.
8. The pelvic peritoneum and vaginal mucosa were closed separately.
9. A vaginal pack and Foley catheter were inserted for 24 hours.
10. The surgery then changed gowns and gloves and re-insufflated the abdomen to inspect all vascular pedicles. Cautery was used to achieve haemostasis if necessary. Skin incisions were closed with subcuticular absorbable sutures.

Postoperatively, patients were monitored on the gynaecology ward. Analgesics in the form of oral non-steroidal anti-inflammatory drugs (NSAIDs) and intramuscular pethidine were administered. Liquids were given orally usually on the day of surgery and solids were introduced when bowel sounds were heard and flatus passed. Foley catheters were removed on the first postoperative day in cases where surgery had been uneventful but were sometimes kept longer if the patient's mobility was restricted by pain. Ambulation was encouraged after recovery from anaesthesia.

RESULTS

LAVH was attempted in a total of 42 patients during the study period. Two patients required conversion to laparotomy after the diagnostic laparascopy stage of the procedure. The remaining 40 patients successfully underwent LAVH. The characteristics of these patients are summarised in Table I. Menorrhagia was the commonest presenting complaint (Table II) while uterine fibroids was the commonest diagnosis (Table III). The mean duration of surgery was 131.0 minutes (SD ± 31.7). Six patients (15%) required a peri-operative blood transfusion. Details of blood loss and transfusion requirements are summarised in Table IV and V. Post-operative recovery and analgesic usage is as summarised in Table VI and VII. The commonest complication seen was post-operative fever (Table VIII).

DISCUSSION

The two patients who required conversions to abdominal hysterectomy after the diagnostic laparascopy stage of the LAVH both had multiple uterine fibroids which distorted the normal anatomy such that identification of vital structures was deemed difficult. We do not regard these as complications as the decision for conversion was made prior to any attempt to dissect the uterus and adnexae. The laparoscopic stage of the procedure was, hence, an assessment of the feasibility to proceed with a LAVH. The remaining 40 patients in whom dissection was commenced laparascopically all successfully underwent LAVH.

Two nulliparous patients successfully underwent LAVH. It is notable that the largest uterus removed by LAVH was 16 weeks size. Seven patients in the LAVH group underwent unilateral or bilateral salpingo-oophorectomy. In all cases where ovaries were conserved the decision was a deliberate one and not due to technical difficulties that prevented their removal. Furthermore, in cases where the ovaries were conserved, the surgeon was able to visualise the ovaries intra-operatively via the laparoscope and confirm that they were free from disease.

The main presenting complaint in the majority of patients was menorrhagia. Other presenting complaints are shown in table II. Only two patients presented with symptoms of genital prolapse. This is far less than would be expected in a population of patients who underwent vaginal hysterectomy and serves to emphasise the point that LAVH was not performed in patients who could be treated with vaginal hysterectomy alone.

The pathological diagnosis which was most frequently was uterine fibroids (see Table III). One patient who initially presented with postmenopausal

bleeding and had evidence of endometrial hyperplasia on dilatation and curettage interestingly had an oestrogen-secreting Sertoli-Leydig tumour discovered at the time of LAVH. This ovarian lesion was not detected on the pre-operative ultrasound scan. This is a good case to demonstrate the importance of ovarian assessment made possible through LAVH. Such a patient may not have received adequate treatment if a vaginal hysterectomy alone had been performed because the ovarian tumour was small and could have escaped detection at time of surgery.

The long mean operating time in patients undergoing LAVH, 131.0 minutes (SD ± 31.7) in our study, is a universal finding reported by other authors as well. For comparison, the mean duration of surgery of 40 consecutive patients undergoing an abdominal hysterectomy during the same study period was looked at and found to be 88.3 minutes (SD ± 29.6). Although this group of patients represents only historical controls, they do give us an idea of the approximate duration of surgery for an abdominal hysterectomy. We recognise that the duration of operation is dependent on many factors such as the surgeon's experience, pathologic conditions encountered, previous surgery, equipment performance and training of staff[11]. This longer operating time is somewhat compensated for by the relatively short mean hospital stay in the LAVH patients - 4.2 days. By comparison, patients undergoing abdominal hysterectomies in our hospital are usually discharged after five to seven days. As these 40 cases of LAVH represent our initial experience with the technique, we exercised caution in discharging patients early following surgery. In fact, LAVH has been successfully performed as an outpatient procedure in the United States. With increasing experience with the procedure, it is likely that we will be able to allow these patients to return home even earlier.

Quantifying intra-operative blood loss is difficult and no perfect method exists to do this. We used the volumetric method which involves measuring pre-operative and postoperative irrigation. The difference between the two represents blood loss. This method has been studied by Rhyme and Williams[13]. In this study, the estimated blood loss in LAVH patients was 417 mls (SD ± 169). We studied the requirement for blood transfusion in the intra-operative or immediate post-operative period which is an indirect indicator of operative blood loss. Only 15% of patients who underwent LAVH required transfusion.

Postoperative recovery was quick in these patients. LAVH patients were able to consume solids and ambulate early. Notably, 45% of these patients were ambulating on the day of surgery. The requirement for injectable analgesics in LAVH patients was low. In fact 22 patients (55 %) in the LAVH group did not require any injectable analgesics and were comfortable with oral non-steroidal anti-inflammatory drugs (NSAIDs) alone.

Complications were encountered in 35% of patients who underwent LAVH. At a glance, these complication rates may seem high but in reality the vast majority of complications seen were from transient febrile episodes that fulfilled the criteria for post-operative fever that we had previously defined (an oral temperature greater than 37.5 degrees Celsius on postoperative day 2 or later).

None of the LAVH patients suffered complications from inadvertent urinary tract or bowel injuries. We attribute this to the advantage of using the laparoscope for dissection. This is especially pertinent when mobilising the bladder flap in patients who have had previous surgery. Ureteric injuries have been reported in cases of LAVH especially when linear staplers have been used to secure the uterine arteries[14]. We secure the uterine vessels from a vaginal approach. Other authors have suggested that securing the uterine vessels laparoscopically is of little benefit as it does not confer additional mobility to the uterus that will allow the procedure to be completed from a vaginal approach. In addition, the use of stapling devices significantly increases the costs involved in performing the procedure[15].

Two patients required repeat surgery. The first required laparotomy approximately three hours after initial surgery for persistent heavy bleeding per vagina. At laparotomy, the source of bleeding was the vaginal vault at the site where colpotomy had been performed. The vascular pedicles were secure. This bleeding was not detected at the end of the LAVH when the abdominal cavity was inspected laparoscopically to ensure haemostasis. We note that this complication arose as a result of the vaginal stage of the LAVH and hence could have occurred even if an exclusively vaginal hysterectomy had been performed. The patient subsequently made an uneventful recovery. The second patient presented at post-operative day eight with fever and abdominal pain. Physical examination and ultrasound confirmed the presence of a pelvic abscess that was subsequently drained laparoscopically. This patient also recovered after a course of intravenous antibiotics.

The three patients who required re-admission presented between post-operative day eight and 10. All three presented with a low grade temperature of approximately 38 degrees Celsius and lower abdominal pain. One had a pelvic abscess which, as described previously, required laparoscopic drainage.

The remaining two had evidence of vaginal vault haematomata on examination. Ultrasound showed localised collections in the pelvis. There was no free fluid demonstrated in the pelvis and both patients were not septicaemic. Both these patients responded well to a course of intravenous antibiotics and did not require surgical drainage. In one patient, the diagnosis was confirmed when she developed per vaginal discharge of altered blood that coincided with an immediate resolution of fever and symptoms.

CONCLUSIONS

We make the following conclusions from this study:

1. LAVH is a feasible option in a carefully selected group of patients who would otherwise require abdominal hysterectomy.
2. Our results suggests that LAVH patients have a quick post-operative recovery with little postoperative pain at the expense of a longer duration of surgery.

Our initial experience with this relatively new technique is promising. In appropriately selected patients, LAVH can be utilised for beneficial effect. This effect is likely to be more apparent when the learning curve for the procedure is overcome as duration of the operation will then be shorter.

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