

Laparoscopic Hysterectomy Versus Abdominal Hysterectomy: A Controlled Study of Clinical and Functional Outcomes

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ABSTRACT

Objective: To compare the clinical and functional outcomes of patients undergoing laparoscopic versus open hysterectomy for benign gynaecological pathology.

Setting: Gynaecological unit in a university hospital.

Methodology: Forty consecutive cases of laparoscopic hysterectomy performed by the first author between June 1994 and December 1998 were reviewed. Their post-operative clinical and functional outcomes were compared with that of 40 patients with similar uterine size who had abdominal hysterectomy through a Pfannenstiel incision performed by consultant gynaecologists over the same time period.

Findings: Thirty-seven (92.5%) of the 40 patients had successful completion of laparoscopic hysterectomy. Of the patients who had successful laparoscopic hysterectomy, the duration of surgery was longer (mean duration: 159 vs 98 minutes), but they had a lower risk of complications (8.1% vs 20%), reduced analgesic requirement (mean pethidine dose: 93 vs 199 mg), and stayed for a shorter time in hospital (mean post-operation stay: 3.1 vs 4.9 days) when compared with patients who had abdominal hysterectomy. They were also able to return to full domestic function and sexual activity earlier. More patients in the laparoscopic hysterectomy group were happy with the appearance with the surgical scar, and the overall satisfaction with the surgery was also more positive than those who had abdominal hysterectomy.

Conclusion: Laparoscopic hysterectomy is associated with improved clinical and functional outcomes when compared with open hysterectomy.

Keywords: laparoscopic hysterectomy, abdominal hysterectomy

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INTRODUCTION

Minimal access surgery has allowed patients to recover faster and with less pain when compared with similar procedures performed through conventional open approach.

Laparoscopic hysterectomy has been introduced since 1989⁽¹⁾ and represents one of the more advanced gynaecological minimal access procedures. One of the claims of laparoscopic hysterectomy has been that the post-operative recovery of patients is superior to that of conventional abdominal hysterectomy⁽²⁾. While vaginal hysterectomy remains the approach of choice, only a minority of patients are suitable for the vaginal approach. The abdominal approach has been the predominant route for hysterectomy⁽³⁾. Laparoscopic hysterectomy has the potential of converting many patients who otherwise would have an abdominal hysterectomy to a total laparoscopic or laparoscopically assisted vaginal procedure. The overall advantage would be less painful post-operative recovery and shorter hospital stay for patients.

However, there is still considerable controversy as to whether all the effort put into achieving a laparoscopic approach is worthwhile, given the longer anaesthetic time required even with a skilled team of surgeons. Further, while the improved clinical outcomes have been well documented, few studies looked at the functional recovery, and whether patient perception at the end of the procedure is still favourable when compared with the traditional abdominal approach.

The purpose of this study is to compare the clinical and functional outcomes, as well as overall level of satisfaction among patients who had laparoscopic hysterectomy, with patients who had abdominal hysterectomy through a Pfannenstiel incision for benign gynaecological pathology.

METHODS

Cases records of 40 consecutive laparoscopic hysterectomies performed by the first author between June 1994 and December 1998 were reviewed.

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Table I. Clinical profile of patients.

	Laparoscopic Hysterectomy (n=40)	Abdominal Hysterectomy (n=40)	P value
Mean Age (years)	47.2 (range 37-62)	46.6 (range 34-56)	n.s.
Presence of medical history (%)	15 (37.5%)	15 (37.5%)	n.s.
Intra-peritoneal adhesions (%)	16 (40%)	17 (42.5%)	n.s.
Mean size of uterus (weeks)	10.6 (range 6-16)	11.4 (range 6-14)	n.s.
Indications for hysterectomy (cases)			
• Fibroids	25	23	
• Adenomyosis	10	11	
• Endometrial hyperplasia	2	1	
• Endometriosis	1	2	
• Stree incontinence with prolapse	2	0	
• Others (ovarian cyst, DUB)	0	3	

Note: n.s. = not statistically significant.

The clinical and functional outcomes were compared with a similar group of patients who had abdominal hysterectomy for benign gynaecological conditions with enlarged uteri equal to or below 16 weeks size, by gynaecologists of consultant level and above. Four equally spaced time frames in the same time period of June 1994 to December 1998 were used to select patients who had abdominal hysterectomy for controls. The controls were matched with patients who had laparoscopic hysterectomy for uterine size. The duration of surgery, need for blood transfusion, presence of complications, postoperative analgesic requirement, time to unaided ambulation, duration of hospital stay and recovery to normal functions were the main evaluation parameters. All patients have at least one year of follow-up.

The technique for laparoscopic hysterectomy was essentially the same for most patients. All patients received general anaesthesia and were placed in Lloyd-Davis position. A uterine manipulator was used transcervically. Carbon dioxide pneumoperitoneum was established using a Veress needle and the optical port was placed through the umbilicus. A 10 mm zero degree laparoscope was used. Three secondary 5 mm ports were placed under direct video laparoscopic guidance: one in each iliac fossa lateral to the inferior epigastric vessels and one in the suprapubic region placed at a level above the fundus of the uterus. The round ligaments, fallopian tubes/ovarian ligaments or infundibulopelvic ligaments (if the ovaries were removed) were dissected, secured with bipolar electrocautery and divided with laparoscopic scissors. Automatic stapling device was used in one patient to secure the above pedicles. The utero-vesical fold was incised and the bladder dissected caudally with sharp dissection. The ascending branch of the uterine vessels at the level of the isthmus of the uterus was identified and coagulated with bipolar electrocautery. The uterine vessels were divided laparoscopically.

The cardinal ligaments and the uterosacral ligaments were similarly divided laparoscopically. At this point, the anterior vaginal fornix was distended by gauze soaked with Povidone iodine. With the bladder well retracted laparoscopically, the anterior vaginal fornix was opened with monopolar electrical energy laparoscopically. The rest of the procedure was performed vaginally, including suturing of the vaginal vault. A final inspection of the peritoneal cavity was performed to ensure that satisfactory haemostasis has been achieved.

Post-operative pain medication included intramuscular pethidine (in doses of either 50 or 75 mg) and followed by either non-steroidal anti-inflammatory agents or paracetamol.

Patients were interviewed by a researcher who was not directly involved in the clinical management of patients in this study. They were asked about the time taken for them to resume full domestic function and sexual activity. They were also interviewed regarding their level of satisfaction with the appearance of the surgical scar and their overall level of satisfaction with the procedure.

Patient satisfaction with the appearance of the surgical scar was classified into three categories: happy and satisfied, indifferent, or unhappy with scar. Overall patient satisfaction with the procedure was scored on a numerical 1 to 10 scale, with 1 representing lowest level of satisfaction and 10 representing highest level of satisfaction.

STATISTICS

Statistical analysis of the results was performed using SPSS Windows 9.0. Non-parametric Mann Whitney U test and Chi-Square test were used for evaluation of statistical significance where appropriate.

RESULTS

Patient Profile

Table I summarises the profile of the patients included in this study. Patients in the two groups were similar with respect to age, presence of a significant medical history (e.g. diabetes mellitus, hypertension), presence of intra-peritoneal adhesions, and size of the uterus. The indications for hysterectomy in both the laparoscopy and abdominal groups were also similar, with uterine fibroids and adenomyosis forming the main indications for surgery.

Rate of successful completion of laparoscopic hysterectomy

Thirty-seven of the 40 patients scheduled for laparoscopic hysterectomy were completed successfully. Three of the 40 patients (7.5%) had to be converted to the

Table II. Clinical and functional outcome.

	Group A (n=40) Laparoscopic Hysterectomy (Total)	Group A1 (n=37) Successful Laparoscopic Hysterectomy	Group A2 (n=3) Conversion to Abdominal Hysterectomy	Group B (n=40) Abdominal Hysterectomy	P value (Gp A vs B)
Mean duration of surgery \pm S.D. (minutes)	162 \pm 46	159 \pm 44	207 \pm 58	98 \pm 40	<0.001
Patients requiring blood transfusion (%)	4 (10%)	2 (5.4%)	2 (66.5%)	7 (17.5%)	n.s.
Mean total Pethidine dose \pm S.D. (mg)	99 \pm 92	93 \pm 89	175 \pm 115	199 \pm 89	<0.001
Mean total number of doses of oral analgesics \pm S.D.	4.3 \pm 2.7	4.2 \pm 2.8	5.0 \pm 1.7	7.0 \pm 4.1	0.001
Mean time from surgery to normal diet \pm S.D. (days)	1.8 \pm 0.8	1.7 \pm 0.7	3.0 \pm 1.0	2.9 \pm 0.6	<0.001
Mean time from surgery to unassisted ambulation \pm S.D. (days)	2.6 \pm 0.8	2.5 \pm 0.7	3.3 \pm 0.6	4.0 \pm 0.9	<0.001
Mean post-operative hospital stay \pm S.D. (days)	3.2 \pm 1.1	3.1 \pm 1.1	4.0 \pm 1.0	4.9 \pm 1.1	<0.001
Mean time to return to full activity \pm S.D. (weeks)	6.2 \pm 4.5	5.8 \pm 4.5	10.0 \pm 2.0	10.7 \pm 6.3	0.001
Mean time to return to sexual activity \pm S.D. (weeks)	11.6 \pm 5.1	11.3 \pm 5.1	15.3 \pm 4.2	16.6 \pm 5.9	0.001

Note: n.s. = not statistically significant.

abdominal approach owing to problems with the large uterine size and inability to secure the uterine vessels.

Duration of surgery

The time taken for the procedure was significantly longer in the laparoscopic hysterectomy group than in the abdominal hysterectomy group. The mean duration was 162 minutes for the laparoscopic hysterectomy group while abdominal hysterectomy averaged 98 minutes (Mann Whitney U, $p < 0.001$). The mean duration of a successfully completed laparoscopic hysterectomy was 159 minutes.

When the 40 patients were divided into the group of first 20 cases and the group of last 20 cases of laparoscopic hysterectomy, the duration of surgery was significantly reduced from a mean of 188 minutes in the first half of the series to 137 minutes in the latter half (Mann Whitney U, $p < 0.01$). There was no difference in mean size of the uterus attempted in the first half (10.1 weeks/265 grams) of the laparoscopic hysterectomy series when compared with the latter half (11.0 weeks/281 grams).

Post-operative recovery

The post-operative recovery clinical and functional parameters are summarised in Table II. Patients who had laparoscopic hysterectomy required less parenteral and oral analgesics, were able to ambulate earlier and were discharged earlier than their counterparts who had an abdominal hysterectomy. They were also able to resume full domestic activity much earlier.

Thirty-five of the 37 patients who had successful laparoscopic hysterectomy were sexually active and they were able to resume sexual function by a mean of 11.3 weeks. Thirty-two of the 40 patients in the

abdominal hysterectomy group were sexually active. One declined to answer the question on resumption of sexual activity. Of the 31 respondents, five did not resume sexual activity at all, while the 26 who did reported a significantly longer mean time to resumption of sexual activity of 16.6 weeks (Mann Whitney U, $p = 0.01$). The three patients who had the laparoscopic procedure converted to laparotomy reported a mean time to resumption of sexual function of 15.3 weeks, not significantly different from those who had abdominal hysterectomy.

Patient satisfaction

A greater proportion of patients who had laparoscopic hysterectomy were happy with the appearance of the surgical scars than when compared with those who had abdominal hysterectomy through a Pfannenstiel incision (Fig. 1). The overall satisfaction level was higher among patients who had laparoscopic hysterectomy than those who had an abdominal procedure (mean satisfaction score 8.5 vs 7.2, Mann Whitney U, $p < 0.01$) (Fig. 2).

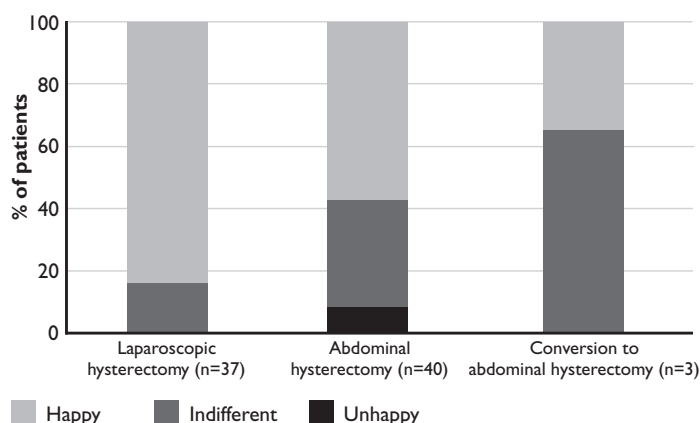
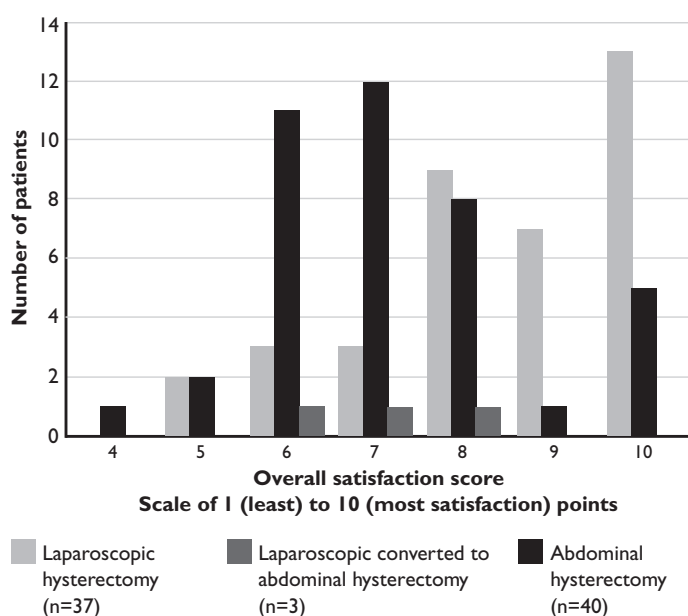
Complications

The overall complication rate was lower in the laparoscopic hysterectomy group when compared with the abdominal hysterectomy group (8.1% vs 20%, Chi-Square, $p < 0.01$).

Major Complications

There were no major complications in the laparoscopic hysterectomy group which either required readmission to hospital or repeat surgery.

Two patients in the abdominal hysterectomy group encountered major complications. One patient was readmitted with sub-acute intestinal obstruction,

Fig. 1 Patient satisfaction with appearance of scar.**Fig. 2** Overall satisfaction with procedure.

which resolved with conservative treatment. One patient required a re-laparotomy to secure a bleeding vessel after an abdominal hysterectomy.

Minor Complications

Febrile morbidity was encountered in one (2.7%) patient in the laparoscopic hysterectomy group and in two (5%) patients in the abdominal hysterectomy group. Similarly, there was one (2.7%) patient who suffered wound infection after laparoscopic hysterectomy as compared with two (5%) after abdominal hysterectomy. None of the patients who had laparoscopic hysterectomy suffered from post-operative urinary tract infection while there were three patients who did in the abdominal hysterectomy group. Both groups had one patient each which required repair of serosal defect over the sigmoid colon encountered during adhesiolysis. In the laparoscopic group, repair of the serosa after adhesiolysis was performed laparoscopically.

Cases converted from laparoscopic to abdominal hysterectomy

Three of the 40 patients who were scheduled for laparoscopic hysterectomy were converted to the abdominal approach, a conversion rate of 7.5%. One was in the first 20 cases while two were in the latter half of the series. The reasons for conversion were difficulty with achieving haemostasis at the uterine vessels and difficulty in access owing to adhesions and the size of the uterus. The sizes of the uteri in these three cases were among the larger of the series. They ranged from 12 to 16 weeks size and weighed between 668 and 764 grams.

The duration of the procedure was longer in these cases, averaging 207 minutes. There was a higher risk (two of the three patients or 67%) of requiring blood transfusion during or after the procedure. However, no other major complications were noted in these three cases.

Patient satisfaction with the appearance of the scar and overall experience was not different from patients who had a straightforward abdominal hysterectomy (Mean satisfaction score 7.0 vs 7.2, Mann Whitney U, $p > 0.05$) (Fig. 2).

Concurrent and additional procedures

For the laparoscopic hysterectomy group, two patients had a concurrent laparoscopic Burch colposuspension and one patient had a concurrent laparoscopic cholecystectomy. There was no delayed second procedure required for the laparoscopic hysterectomy group.

For the abdominal hysterectomy group, one patient had a concurrent Burch colposuspension. One patient required a re-laparotomy to secure bleeding from one of the vascular pedicle.

DISCUSSION

Laparoscopic hysterectomy has been introduced for a little more than 10 years. However, the take-up rate of this procedure remains limited by the more advanced laparoscopic techniques involved and the longer duration of the procedure. Only about 6% of hysterectomies for benign gynaecological conditions were performed laparoscopically in our department during the study period. The majority of hysterectomies were performed abdominally (88%) and a small proportion was performed vaginally. A report from Australia⁽⁴⁾ looking at the health insurance database noted that about 8% of hysterectomies were attempted laparoscopically in the private sector over the period of 1994-95. Another report⁽⁵⁾ from a centre in United States suggested that laparoscopic hysterectomy rate could be increased to the region of 35%.

Vaginal hysterectomy is the approach of choice where technically feasible as it has been quite amply demonstrated that post-operative recovery for this

technique is equal, if not superior, to the laparoscopic approach⁽⁶⁾. However, it remains a difficult technique for enlarged uteri without much descent. Laparoscopic hysterectomy is a highly visual technique, which has the potential of being able to convert patients who otherwise would have an abdominal procedure to either a total laparoscopic or a laparoscopically assisted vaginal procedure.

Where the technical expertise is available, patients who have the procedure performed through the laparoscopic approach have better post-operative outcomes when compared to that of the conventional abdominal approach. This study is consistent with other studies^(7,8) in demonstrating that patients who had laparoscopic hysterectomy were given the benefit of reduced post-operative pain, and shorter hospitalisation. In addition, this study demonstrated that the functional recovery in terms of time taken to return to full domestic function and resumption of sexual activity was also shorter. It is also heartening to note that patient satisfaction with the appearance of the surgical scar, as well as the overall experience with the procedure was rated highly when compared with the abdominal approach.

One of the major criticisms of the laparoscopic approach is the longer surgical and anaesthetic time required. Indeed, owing to the greater need for fine dissection, it is not quite possible to secure the vascular pedicles with one quick clamp as is usual with the open technique. It is far more effective to proceed slowly but surely with careful meticulous dissection as it takes much longer to correct a mistake committed in haste than the time needed to cautiously avoid one in the first instance. With experience, the surgical time can be reduced significantly. When the latter half of the series was compared with the earlier half, there was a significant reduction in time of 51 minutes, with the mean operating time in the last 20 cases averaging 137 minutes. This compares well with mean operating times reported in published series of laparoscopic hysterectomy⁽⁹⁻¹¹⁾ (range of mean surgical times: 120 to 149 minutes). Presently, laparoscopic hysterectomy for similar size uterus can be comfortably performed under two hours in most cases.

The other concern about laparoscopic hysterectomy is the possible increased incidence of ureteral injuries⁽¹²⁾. This is true whether automatic staples⁽¹³⁾ or electrocautery⁽¹⁴⁾ were used, as both techniques have been involved in reported cases of ureteral injuries. Although none was encountered in this small series, it is acknowledged that particular care needs to be exercised when the ascending branch of the uterine artery is secured, or when dealing with the cervico-vaginal vessels while taking the cardinal ligaments, as the ureter is just about 1.5 to 2 cm lateral to this point in the normal anatomy. It is critical to

recognise that with the use of bipolar electrocautery, there is significant lateral thermal spread of about 1 cm from the bipolar forceps⁽¹⁵⁾. It is thus important that the distance between the uterine vessel and the ureter be maximised by careful caudal dissection of the bladder, together with good upward mobilisation of the uterus by the assistant handling the uterine elevator, before the uterine pedicle is taken. Recognition of this anatomical relationship, and sound understanding of the tissue effects of energy modality used will go a long way to help reduce the risk of ureteral injury.

CONCLUSION

Laparoscopic hysterectomy in trained hands has allowed patients to enjoy a lower complication rate, lower analgesic requirement, shorter hospital stay and earlier return to normal domestic and sexual functions when compared with abdominal hysterectomy. The level of patient satisfaction was also higher with laparoscopic hysterectomy. However, the surgical time is longer than the abdominal approach. With increasing experience, this surgical time may be reduced.

REFERENCES

1. Reich H, DeCaprio J, McGlynn F. Laparoscopic Hysterectomy. *J Gynecol Surg* 1989; 5:213-6.
2. Loh FH, Canis M, Ng SC. Laparoscopic hysterectomy —A step forward? *Singapore Med J* 1995; 36:197-203.
3. Vessey MP, Villard-Mackintosh L, McPherson K, Coulter A, Yeates D. The epidemiology of hysterectomy: findings in a large cohort study. *Br J Obstet Gynaecol* 1992; 99:402-7.
4. Malloy D, Crosdale S. National trends in gynaecological endoscopic surgery. *Aust NZ Obstet Gynecol* 1996; 36:27-31.
5. Harris MB, Olive D. Changing hysterectomy patterns after introduction of laparoscopically assisted hysterectomy. *Am J Obstet Gynecol* 1994; 171:340-4.
6. Summitt RL Jr, Stovall TG, Lipscomb GH, Ling FW. Randomized comparison of laparoscopically-assisted vaginal hysterectomy with standard vaginal hysterectomy in an outpatient setting. *Obstet Gynecol* 1992; 80:895-901.
7. Summitt RL Jr, Stovall TG, Steege JF, Lipscomb GH. A multicenter randomized comparison of laparoscopically assisted vaginal hysterectomy and abdominal hysterectomy in abdominal hysterectomy candidates. *Obstet Gynecol* 1998; 92:321-6.
8. Nezhat F, Nezhat C, Gordon S, Wilkins E. Laparoscopic versus abdominal hysterectomy. *J Reprod Med* 1992; 37:247-50.
9. Liu CY. Laparoscopic hysterectomy. A review of 72 cases. *J Reprod Med* 1992; 37:351-4.
10. Canis M, Mage G, Chapron C, Wattiez A, Pouly JL, Bruhat MA. Laparoscopic hysterectomy: a preliminary study. *Surg Endosc* 1993; 7:2-5.
11. Shushan A, Mohamed H, Magos AL. How long does laparoscopic surgery really take? Lessons learned from 1000 operative laparoscopies. *Hum Reprod* 1999; 14:39-43.
12. Harkki-Siren P, Sjoberg J, Tiitinen A. Urinary tract injuries after hysterectomy. *Obstet Gynecol* 1998; 92:113-8.
13. Woodland MB. Ureter injury during laparoscopy-assisted vaginal hysterectomy with the endoscopic stapler. *Am J Obstet Gynecol* 1992; 167:756-7.
14. Harkki-Siren P, Sjoberg J, Makinen J, Heinonen P, Kauko M, Tomas E, et al. Finnish national register of laparoscopic hysterectomies: A review and complications of 1165 operations. *Am J Obstet Gynecol* 1997; 176:118-22.
15. Loh FH, J Kumar, C Chan, SC Ng. Tissue thermal changes during haemostasis with bipolar electrocoagulation. *Proceedings of the 6th Annual Congress of International Society for Gynecologic Endoscopy*. 1997, April 16-19, Singapore *Gynecological Endoscopy* 1997; Vol 6 (Suppl 1):Abstract F11.4.