

Total Laparoscopic Hysterectomy versus Total Abdominal Hysterectomy in Uterine Tumors

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ABSTRACT

Background: laparoscopic hysterectomy (LH) rates have increased but abdominal hysterectomy (AH) still high and often the first choice for many surgeons even with most of studies reported that the minimal access method offers significant patient benefit over open surgery.

Aim of the Work: we aimed to compare the outcome of total laparoscopic hysterectomy as regard the result and safety compared to total open abdominal hysterectomy in cases of uterine tumors.

Patients and Methods: this prospective randomized controlled study performed on 25 patients who underwent LH (group 1) compared to 25 patients who underwent AH (group 2). The mean age of the cases, body mass index (BMI), duration of operation, estimated blood loss (EBL), rate of complications, post-operative hospital stay and convalescence time were compared for two groups.

Results: LH was associated with a significantly longer operating time (139.96±22.66 minutes vs. 106.54±21.8 minutes P 0.001). As regard intraoperative complications and estimated blood loss there was no difference in both groups. In LH group the pain score and analgesia requirements in post-operative period were significantly less with fewer requiring opioid analgesia. There was a highly significant difference between groups in postoperative wound infection which was higher in AH group. LH was also associated with a significantly shorter inpatient hospital stay (2.22 days vs. 5.52 days P= 0.022) and earlier returned to normal life (7.5 days vs. 20.6 days P<0.001).

Conclusion: total laparoscopic hysterectomy is safe and feasible procedure in treatment of uterine tumors with accepted peri-operative morbidity and good improvement of quality of life post-operative.

Keywords: Total laparoscopic hysterectomy, total abdominal hysterectomy, uterine tumors, outcomes and complications.

INTRODUCTION

Hysterectomy is one of the most common gynecological procedures performed wide world. Approximately 600,000 hysterectomies are performed annually in the United States. Most hysterectomies are performed for benign indications⁽¹⁾. Hysterectomy can be performed abdominally, vaginally, laparoscopy or with robot-assisted. It can also be performed by combining two of these routes⁽²⁾. Choosing route of hysterectomy is influenced by many factors as shape and size of the uterus and pelvis, surgical indications, presence or absence of adnexal pathology, extensive pelvic adhesive disease, surgical risks, hospitalization and recovery length, hospital resources, and surgeon expertise are all weighed once hysterectomy is planned. Each approach carries distinct advantages and disadvantages, discussed with the patient⁽³⁾. Kurt Semm in Germany first described a technique for laparoscopic assistance in vaginal hysterectomy in 1984. The adnexa were separated laparoscopically in order to simplify vaginal hysterectomy this was later called laparoscopic assisted vaginal hysterectomy (LAVH)⁽⁴⁾. Harry Reich⁽⁵⁾ performed the first

laparoscopic hysterectomy (LH) in January, 1988. The ligaments and uterine vessels were coagulated with bipolar forceps and the vagina was closed vaginally. The total operating time was 180 minutes and the patient was discharged on the fourth postoperative day. Like other minimally invasive surgeries laparoscopic hysterectomy have been clearly associated with lower morbidity as less blood loss, shorter hospital stay, speedier return to normal activities, and fewer abdominal wall infections when compared with open abdominal hysterectomies⁽⁶⁾.

AIM OF THE WORK

The aim of this study is to compare the outcome of laparoscopic hysterectomy with open abdominal hysterectomy in uterine tumors.

PATIENTS AND METHODS

Study design: This is a prospective randomized controlled study performed on fifty patients recruited from those attending the outpatient surgical oncology department and obstetrics and gynecology department in Bab-ElSharia University Hospital, who were candidate for hysterectomy for uterine tumors during the

period from March 2016 to March 2018. Simple randomization allocated patients into two groups. Group 1 involves 25 patients who had LH operation and group 2 involves 25 patients who had AH operation. The operations were done for all cases with exclusion of uterine size more than 10 cm or uterus more than 14 weeks, locally advanced malignancy fixed to other organ and contraindication of laparoscopic surgery. **The study was approved by the Ethics Board of Al-Azhar University. Patient's selection:** All of the patients had same pre-operative preparation; total laboratory tests, and hospitalization one day before operation. Operations were performed under general anesthesia. All of the patients received antibiotic prophylaxis. **Surgical details:** AH was performed through pfannenstiell incision or lower midline incision. The pelvis and abdomen were explored then bilateral clamping, division and ligation of utero ovarian ligaments if the ovaries are to be preserved, or infundibulo-pelvic ligaments if the ovaries were removed. The anterior and posterior leaf of both broad ligaments was opened. The bladder was then dissected downwards and separated from the underlying lower uterine segment and cervix by blunt or sharp dissection. The uterine vessels were identified and ligated along the lateral aspects of the uterus at the level of internal os close to the uterus. The cervix is palpated inside vagina by thumb and index finger, the anterior vagina is then opened by an incision which is extended all around cervix. The angles of the vagina held with clamps and the vagina is closed by interrupted or continuous sutures. LH was performed in low dorsal lithotomy position and vaginal examination under anesthesia after foley's catheter insertion then uterine manipulator was placed in uterine cavity. Open technique for first port insertion to advance 10 mm umbilical port. Two 5 mm trocars were inserted one lateral to the left inferior Epigastric arteries under direct laparoscopic vision and another trocar was inserted 2-3cm above the right anterior superior iliac spine under direct vision. The uterus was pushed cephalad and to one side from below using the uterine manipulator. Using bipolar diathermy or Harmonic instrument the infundibulo-pelvic ligament is dissected and cut, taking progressive bites of tissue starting at pelvic brim and moving towards the round ligament and continue downwards till controlling uterine vessels. Bladder

is separated using monopolar diathermy then the vagina is opened anteriorly and continues circumferentially till complete separation the uterus and cervix from the vagina. The specimen is delivered out through vagina and the vagina closed by laparoscopic continues or interrupted sutures ⁽⁷⁾. **Measured outcomes:** Operation timing was estimated between skin incision and last skin suture. Intraoperative blood loss is recorded. Hospital stay and analgesics given to the patients were recorded. Patient discharged to home after she can tolerate oral fluid with regular follow up at outpatient clinic for evaluation of delayed complications. Groups were compared in terms of mean age, body mass index (BMI), operation time, estimated blood loss, complication rate, postoperative pain score and analgesic doses, postoperative hospitalization time and Convalescence time. **Statistical analysis:** Continuous data was registered as mean \pm standard deviation (SD) or median and range. Discrete data was described as number and percentage Data analysis was done with chi square and student-t tests of SPSS program. $P < 0.05$ value was regarded as statistically significant.

RESULTS

Mean age and body mass index (BMI) of both of these two groups were similar and there was no statistically significant difference. Operation indications were similar for both two groups and major indication was uterine fibroid. Patients' characteristics and operation indications were shown in Table 1.

Table (1): The pre-operative data of all cases of study.

	AH (group 2)	LH (group 1)	P- value	Sig.
Age (Mean \pm SD)	54 \pm 7.6	53.8 \pm 7	0.923	NS
BMI (Mean \pm SD)	31.3 \pm 3	30.8 \pm 2.7	0.538	NS
Uterine size in weeks (Mean \pm SD)	12.8 \pm 1.7	12.6 \pm 1.4	0.652	NS
Parity (Mean \pm SD)	3 \pm 1.8	2.9 \pm 1.5	0.832	NS
Indication of hysterectomy				
Fibroid	18	17	0.732	NS
Irregular uterine bleeding	2	2		
Endometrial hyperplasia	5	6		

AH=abdominal hysterectomy, LH=laparoscopic hysterectomy, Sig=significance, NS=non-significant.

Mean operation time was longer in group 1 than group 2 and this was statistically significant (139±22 minutes for LH compared to 106±21 minutes for AH, $p < 0.001$). Mean hospitalization time was shorter for patients who undergone LH (group 1) than patients who undergone AH (group 2) and this was statistically significant (2.22±0.95 days compared to 5.52±6.91 days, $p = 0.022$). Estimated blood loss was not significantly different in LH group (184.8 ± 214.69) compared to AH group (208.75 ± 234.23) $P = 0.711$. There were two cases needed conversion to laparotomy. One patient in each of groups had intraoperative bladder injury (table 2).

Table (2): The operative data of both groups.

	AH	LH	P	Sig.
Operative time /minute				
Mean ±SD	106.5±21.8	139.9±22.66	0.000	HS
Range	68-150	105 – 181		
Blood loss/ ml				
Mean ±SD	208.75±21.8	184.8±24.69	0.711	NS
Range	50 – 950	50 – 800		
Hemorrhage (need BT)	2 (8.0%)	2 (8.0%)	1.000	NS
Bladder injury	1 (4.0%)	1 (4.0%)	1.000	NS
Conversion to laparotomy	0 (0.0%)	2 (8.0%)	0.149	NS

AH=abdominal hysterectomy, LH=laparoscopic hysterectomy, Sig=significance, NS=non-significant, ml=milliliter, BT=blood transfusion

Postoperative pain score and analgesic doses required was significantly lower in patients in LH group compared to AH group. Delayed intestinal motility occurred in 16 % of cases of open hysterectomy group compared to 0% of LH group ($p = 0.037$). Women after LH reported that they could returned to normal life within 7.5±1.4 days compared to open abdominal hysterectomy 20.6±6.68 ($p < 0.001$). As regard wound infection and dehiscence there was a highly significant difference between both groups in which wound infection was occurred in 24% of paint with open hysterectomy compared to no significant infection at port sites. One case of open hysterectomy group complicated by burst abdomen, exploration for intestinal obstruction, ICU admission and died after pulmonary complications (table 3).

Table (3): Post-operative complications and outcome.

	AH	LH	P	Sig.
Burst abdomen and mortality	1 (4.0%)	0 (0.0%)	0.313	NS
Wound infection	6(24%)	0(0%)	0.009	HS
Delayed intestinal motility	4(16%)	0(0%)	0.037	S
Pulmonary complications	2(8%)	1(4%)	0.551	NS
Post-operative pain score (in first 2 days)				
Mean ±SD	6.17±1.01	2.24±0.66	0.000	HS
Range	4-10	2-8		
Post-operative analgesic doses (in first 2 days)				
Mean ±SD	8.77±1.03	5.64±0.44	0.000	HS
Range	5-11	2-8		
Hospital stay				
Mean ±SD	5.52±6.91	2.22±0.95	0.02	S
Range	2 – 31	1.5 – 5		
Return to normal life				
Mean ±SD	20.63±6.81	7.52±1.42	0.000	HS
Range	15 – 39	6 – 11		

AH=abdominal hysterectomy, LH=laparoscopic hysterectomy, Sig=significance, NS=non-significant, HS=highly significant, S=significant.

Postoperative pathology results were reported; fibroid at 35 patients, endometrial hyperplasia at 11 patients and endometrial carcinoma at 4 patients.

DISCUSSION

Hysterectomy is one of the most common gynecologic surgeries performed by gynecologists and used for treatment of both malignant and benign diseases. There are many approaches for hysterectomy vaginal, laparoscopic or abdominal approach and the choice between them remains controversial. AH rates remain significantly higher than LH even with most of studies which advocate the use of LH, because of comparable complication incidence, lower postoperative pain, less blood loss, shorter hospitalization period, shorter healing time and earlier turn back to daily activities^(8, 9). Because of laparoscopic surgery needs experience, laparoscopic hysterectomy take a long time at the beginning, with progressive experience operation time is getting shorter. A lot of studies^(6, 9, 10, 11, 12) agree with our results and reported that laparoscopic hysterectomy takes longer operation

time than abdominal hysterectomy while **Seracchioli *et al.*** ⁽¹³⁾ reported no statistically significant difference about LH and AH operation time. On the other hand **Sesti *et al.*** ⁽¹⁴⁾ found that LAVH took shorter time than abdominal hysterectomy. This was the same result reported in recent study by **Mallick *et al.*** ⁽¹⁵⁾ on a series of 296 hysterectomies, they reported that TLH was associated with a significantly lower mean operating time (63.4 minute versus 75.3 minute $P < 0.001$). When discussing LH complication rate particularly the urinary tract injury we found no significant difference between AH and LH. Starting with a study of **Donnez *et al.*** ⁽¹⁶⁾ on 3190 women underwent laparoscopic hysterectomy, they reported more complications than abdominal hysterectomy and they found significantly higher risk for urinary tract injuries with LH. However since its publication there has been significant criticisms of this study; it can be hypothesized that the increased complication rates may have been a consequence of the relative inexperience of the surgeons rather than the technique of LH. **Mallick *et al.*** ⁽¹⁵⁾ in 2016 reported that the intraoperative complication rates were significantly less in the LH group 1.9% versus 7.0% in AH group ($P = 0.029$). Low complication rate is replicated in other literatures (16, 17, and 18). In our study there was no significant difference as regard intra-operative complications between both groups. But there was a significant difference between groups when comparing the post-operative complications in which there were higher rate of delayed intestinal motility and wound infection after open hysterectomy. This result agrees with other studies ^(12, 13, 14). In study by **Lowell *et al.*** ⁽¹⁹⁾, in which LAVH had more estimated blood loss than AH. But in other studies as **Perino *et al.*** ⁽²⁰⁾, **Long *et al.*** ⁽²¹⁾, **O'Hanlan *et al.*** ⁽²²⁾ and **Candiani *et al.*** ⁽¹⁸⁾ they found that intraoperative blood loss in laparoscopic hysterectomy was less than abdominal hysterectomy. In our study estimated blood loss was not significantly lower in LH group (mean 184.8 ± 24.69) when compared to AH group (mean 208.75 ± 21.8). Also in our study there was no difference in the number of patients whom received blood transfusion but the number of transfused units of blood is more in LH group. On other hand **Çelik *et al.*** ⁽²³⁾, **Seracchioli *et al.*** ⁽¹³⁾ and **Ribeiro *et al.*** ⁽²⁴⁾ found that no statistically significant difference about blood loss between LH and AH.

Postoperative pain was significantly lower in laparoscopic hysterectomy group than abdominal hysterectomy group in all post-operative period. Our data is in keeping with the anticipated decrease in postoperative pain associated with minimally invasive surgery, which is supported by the many literature as **Harkki-Siren *et al.*** ⁽¹²⁾, **Naik *et al.*** ⁽²⁵⁾ and **Ghezzi *et al.*** ⁽²⁶⁾. Our study found that significantly lower analgesics doses were required postoperatively in the LH group than AH group. **Mallick *et al.*** ⁽¹⁵⁾ report data keeping with this as they found that overall analgesia requirements to be significantly less in the LH group. One would also expect that hospital stay would be reduced when surgery is performed by the minimally invasive route and this is supported by the literatures, as **Celik *et al.*** ⁽²³⁾, **Balci**, ⁽²⁷⁾, **Pather *et al.*** ⁽²⁸⁾ and **Kondo *et al.*** ⁽²⁹⁾. Like other studies, hospital stay for our patients in LH group was significantly shorter than that for patients with AH group and women reported that they could returned to normal life earlier after LH than AH.

CONCLUSION

Laparoscopic hysterectomy is safe and feasible procedure in treatment of uterine tumors with accepted peri-operative morbidity and good improvement of quality of life post-operative.

CONFLICTS OF INTEREST

There are no conflicts of interest.

REFERENCES

- 1- **Doll KM, Dusetzina SB, and Robinson W (2016):** Trends in inpatient and outpatient hysterectomy and oophorectomy rates among commercially insured women in the United States, 2000–2014. *JAMA Surg.*, 151(9): 876–7.
- 2- **Lonnerfors C, Reynisson P, Persson J (2015):** A randomized trial comparing vaginal and laparoscopic hysterectomy vs robot-assisted hysterectomy. *J Minim Invasive Gynecol.*, 22(1): 78–86.
- 3- **Van Der Meij E and Emanuel MH (2016):** Hysterectomy for Heavy Menstrual Bleeding. *Women's Health (Lond)*, 12(1): 63–9.

- 4- **Semm K (1984):** Operationslehre für endoskopische Abdominal-Chirurgie. Stuttgart, New York, Schattauer.
- 5- **Reich H, DeCaprio J, McGlynn F (1989):** Laparoscopic hysterectomy. *J Gynecol Surg.*, 5 (2): 213-6.
- 6- **He H, Yang Z, Zeng D, Fan J, Hu X, Ye Y et al. (2016):** Comparison of the short-term and long-term outcomes of laparoscopic hysterectomies and of abdominal hysterectomies: a case study of 4,895 patients in the Guangxi Zhuang Autonomous Region, China. *Chin J Cancer Res.*, 28 (2): 187-96.
- 7- **Einarsson J and Suzuki Y (2009):** Total laparoscopic Hysterectomy: 10 Steps toward a Successful Procedure. *Rev Obstet Gynecol.*, 2(1): 57-64.
- 8- **Cheung VYT, Rosenthal DM, Morton M and Kadanka H(2007):** Total Laparoscopic Hysterectomy: A Five-Year Experience. *J Obstet Gynaecol Can.*, 29(4):337-43.
- 9- **Arts JW, Nieboer TE, Johnson N, Tavender E, Garry R, Mol BW et al. (2015):** Surgical approach to hysterectomy for benign gynaecological disease. *Cochrane Database Syst Rev.*, 12; (8): CD003677.
- 10- **Uccella S, Casarin J, Marconi N, Cromi A, Morosi C, Gisone B et al.(2016):** Laparoscopic versus open hysterectomy for benign disease in women with giant uteri (≥ 1500 g): feasibility and outcomes. *J Minim Invasive Gynecol.* ,23 (6): 922-7.
- 11- **Olsson JH, Ellstrom M, Hahlin M(1996):** A randomized prospective trial comparing laparoscopic and abdominal hysterectomy. *Br J Obstet Gynaecol.*, 103 (4):345-50.
- 12- **Harkki-Siren P, Sjoberg J, Toivonen J and Tiitinen A (2000):** Clinical outcome and tissue trauma after laparoscopic and abdominal hysterectomy: a randomized controlled study. *Acta Obstet Gynecol Scand.*, 79 (10):866-71.
- 13- **Seracchioli R, Venturoli S, Vianello F, Govoni F, Cantarelli M, Gualerzi Bet al. (2016):** Total laparoscopic hysterectomy compared with abdominal hysterectomy in the presence of a large uterus. *J Am Assoc Gynecol Laparosc.*, 9 (3):333-8.
- 14- **Sesti F, Calonzi F, Ruggeri V, Pietropoli A and Piccione E (2008):** A comparison of vaginal, laparoscopic-assisted vaginal and minilaparotomy hysterectomies for enlarged myomatous uteri. *Int J Gynecol Obstet.*, 103 (3):227-31.
- 15- **Mallick R, English J and Waters N (2016):** Total Laparoscopic Hysterectomy versus Total Abdominal Hysterectomy in the Treatment of Benign Gynaecological Disease: A Retrospective Review Over 5 Years. *Gynecological surgery*, 13(4): 359-64.
- 16- **Donnez O, Jadoul P, Squifflet J and Donnez J (2009):** A series of 3190 laparoscopic hysterectomies for benign disease from 1990 to 2006: evaluation of complications compared with vaginal and abdominal procedures. *BJOG.*, 116(4): 492-500.
- 17- **Gendy R, Walsh C, Walsh SR and Karantanis E (2011):** Vaginal hysterectomy versus total laparoscopic hysterectomy for benign disease: a metaanalysis of randomized controlled trials. *Am J Obstet Gynecol.*, 204(5):388.e1-8.
- 18- **Candiani M, Izzo S, Bulfoni A, Riparini J, Ronzoni Sand Marconi A (2009):** Laparoscopic vs vaginal hysterectomy for benign pathology. *Am J Obstet Gynecol.*, 200(4): 368.e1-7.
- 19- **Lowell L and Kessler A (2000):** Laparoscopically assisted vaginal hysterectomy. A suitable substitute for abdominal hysterectomy? *J Repord Med.*, 45(9):738-42.
- 20- **Perino A, Cucinella G, Venezia R Castelli A and Cittadini E (1999):** Total laparoscopic hysterectomy versus total abdominal hysterectomy: an assessment of the learning curve in a prospective randomized study. *Hum Reprod.*, 14(12):2996-9.

- 21- Long CY, Fang JH, Chen WC, Su JH and Hsu SC (2002): Comparison of total laparoscopic hysterectomy and laparoscopically assisted vaginal hysterectomy. *Gynaecol Obstet Invest.*, 53: 214-19.
- 22- O'Hanlan KA, Dibble SL, Garnier AC and Reuland M (2007): Total Laparoscopic Hysterectomy: Technique and Complications of 830 Cases. *JSLs.*, 11(1): 45-53.
- 23- Celik C, Abali R, Tasdemir N, Aksu E, Caliskan H, Akkus D *et al* (2014): Total Laparoscopic Hysterectomy Compared with Abdominal Hysterectomy; Clinical Outcomes. *J Clin Anal Med.*, 5(6):490-3.
- 24- Ribeiro SC, Ribeiro RM Santos, NC and Pinotti JA (2003): A randomized study of total abdominal, vaginal and laparoscopic hysterectomy. *Int J Gynaecol Obstet.*, 83(1):37-43.
- 25- Naik R, Jackson KS, Lopes A, Cross P and Henry JA (2010): Laparoscopic assisted radical vaginal hysterectomy versus radical abdominal hysterectomy a randomized phase II trial: perioperative outcomes and surgicopathological measurements. *BJOG.*, 117(6): 746-51.
- 26- Ghezzi F, Uccella S, Cromi A, Siesto G, Serati M, Bogani G *et al.* (2010): Postoperative pain after laparoscopic and vaginal hysterectomy for benign gynecologic disease: a randomized trial. *Am J Obstet Gynecol.*, 203(2): 118.e1-118.e8.
- 27- Balci O (2014): Comparison of Laparoscopic and Abdominal Hysterectomy. *Turk J Obstet Gynecol.*, 11(4):224-7.
- 28- Pather S, Loadsman JA, Mansfield C, Rao A, Arora V, Philp S *et al.* (2011): Perioperative outcomes after total laparoscopic hysterectomy compared with fast-track open hysterectomy - a retrospective casecontrol study. *ANZJOG.*, 51(5): 393-6.
- 29- Kondo W, Bourdel N, Marengo F, Botchorishvili R, Pouly JL, Jardon K *et al.* (2011): Is laparoscopic hysterectomy feasible for uteri larger than 1000 g? *Eur J Obstet Gynecol Reprod Biol.*, 58(1):76-81.