

METHODS OF LAPAROSCOPIC HYSTERECTOMIES

COMPARATIVE STUDY BETWEEN DIFFERENT METHODS OF LAPAROSCOPIC HYSTERECTOMIES

By

Shafiek, M.; Al-Bromboly, W.; El-Beheidy, T. and Ibrahim, E.

Obstetrics and Gynecology Department

Faculty of Medicine, Zagazig University

ABSTRACT

Background: Hysterectomy is the most common of all gynaecological operations. Until the late 1980, there were two available approaches for hysterectomy: abdominal or vaginal, then laparoscopy developed. **Objectives:** To compare the clinical results of three minimally invasive laparoscopic hysterectomy techniques: Laparoscopic Assisted Supracervical Hysterectomy(LASH) (Laparoscopic Assisted Vaginal Hysterectomy (LAVH) and Total Laparoscopic Hysterectomy (TLH). **Patients and methods:** A prospective, randomized study was performed at Cytogenetic and Endoscopic Unit, Obstetrics and Gynecology Department, Faculty of Medicine, Zagazig University Hospitals between March 2007 and May 2010. A total of 60 women indicated to undergo hysterectomy for benign uterine disease were randomly assigned to three different groups (20 LASH, 20 LAVH and 20 TLH). Outcome measures, including operating time, blood loss, rate of complications, consumption of analgesics and length of hospital stay were assessed and compared between groups. **Results:** Laparoscopic assisted supracervical hysterectomy had the shortest operating time (84.4 ± 13.1 minutes) and smallest drop in hemoglobin. Also, no operative or postoperative complications occurred in this group and took the least analgesic dose. Laparoscopic assisted vaginal hysterectomy had the longest operating time (104.1 ± 10.4 minutes) and this may be due to changing patient position from Trendelenburg to lithotomy and doing under water examination at the end of the procedure, but LAVH showed acceptable drop in hemoglobin, complications, and need to analgesia and hospital stay. Total laparoscopic hysterectomy had acceptable operating time but largest drop in hemoglobin. Also, urinary complications in the form of bladder injury occurred in this group. Also, this group took more analgesia and more hospital stay, but there was no statistically difference between the last 2 groups in complication rate, hemoglobin deficit, and need to analgesia. **Conclusion:** Based on our results, in women with non-malignant diseases of the uterus, LASH seems to be the preferred laparoscopic hysterectomy technique for gynaecological surgeons, but follow up of the cervical changes must be done annually either by colposcopy or by pap smear, but if the patients need to remove the cervix for difficulty in follow up or for fear of malignancy, both other types of laparoscopic hysterectomy must be offered for her and if we exclude the only one complicated case in TLH group, there will be no statistically difference between TLH and LAVH.

INTRODUCTION

Hysterectomy is the second most common major surgical procedure performed on women after caesarean section⁽¹⁾.

In India, the incidence of hysterectomy is 4-6% out of which 90% are performed for benign indications⁽²⁾.

While, the incidence of hysterectomy in the Western countries is 10-20% with the highest rate in the

United States and the lowest in Norway and Sweden. There are various possible approaches to hysterectomy for benign disease of uterus; Abdominal Hysterectomy (AH), Vaginal Hysterectomy (VH) and Laparoscopic Hysterectomy (LH). Laparoscopic approach may be used either to facilitate the ease of vaginal delivery of uterus as in Laparoscopy Assisted Vaginal Hysterectomy (LAVH) or it may be carried out

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completely till final detachment of uterus from pelvic wall i.e. Total Laparoscopic Hysterectomy (TLH). Although Laparoscopic Hysterectomy (LH) takes longer time, its proponents have emphasized several advantages over abdominal hysterectomy in terms of intraoperative blood loss, less postoperative morbidity, rapid recovery time, shorter hospital stay, fewer febrile episodes and early return to normal activities⁽³⁾.

Various studies reported till date have compared either abdominal hysterectomy with vaginal and laparoscopic hysterectomy or vaginal with laparoscopic hysterectomy⁽⁴⁾.

A very few studies compare various techniques of hysterectomy by a same surgeon to enable a decision on a best route for gynaecologist⁽⁵⁾.

The aim of the present study was to compare intra- and post-operative morbidity associated with three laparoscopic hysterectomy procedures (LASH, LAVH and TLH) in patients with similar characteristics and indications.

PATIENTS AND METHODS

This was a prospective study performed at Cytogenetic and Endoscopic Unit, Obstetrics and Gynecology Department, Faculty of Medicine, Zagazig University Hospitals, between March 2007 and May 2010. A total number of 60 women scheduled to undergo a hysterectomy for benign uterine disease were enrolled in the study and randomly assigned to three groups: Laparoscopic Assisted Supracervical Hysterectomy (LASH) (n = 20), Laparoscopic Assisted Vaginal Hysterectomy (LAVH) (n = 20) and Total Laparoscopic Hysterectomy (TLH) (n = 20). Patients were included in this study only if they were undergoing hysterectomy for a benign

disease, thus only a subset of all hysterectomies performed at our department during this period. All study participants provided informed consent.

Patients were excluded from this study if they had contraindications to laparoscopy including severe prior multiple abdominal surgeries, underlying medical condition that could be worsen by pneumoperitoneum or the Trendelenburg position. Additionally, patients were excluded if they had a suspected or confirmed malignant disease or uterine size greater than 16 week gestational size measured by examination and ultrasound.

All patients underwent the same standard preparation prior to surgery including laboratory investigations (CBC, hepatitis marker, liver enzyme, serum creatinine, PT, PTT, RBS, urine analysis and ECG), also consultation of medical consultant if there was previous history of medical problem.

Fractional curettage was done to all patients. All the operations were performed under general anaesthesia with endotracheal intubation, antibiotic prophylaxis (2 gm cephalosporin) and low molecular weight heparin were given to all patients at time of introduction of anaesthesia. Prior to surgery, we evaluate the patient age, BMI, parity and history of prior intra-abdominal surgery.

Intra- and post-operative evaluations including the duration of the operation (from first incision to last suture), uterine weight, frequency of intraoperative complications, conversion rate and estimated blood loss (by calculating Hb deficit after 24 hours postoperatively).

Postoperatively, we evaluate the need to analgesics according to patient needs, we give only 100 mg diclofenac

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sodium (NSAID) and if the patient complains, we give her 100 mg pethedine, hospital stay also evaluated, 1 gm cephalosporin was given after 12 hours till patient postoperatively prior to discharge on the 2nd day, examination and evaluation of vital signs were done to all patients. Also, instructions were given to them written on paper which were oral prophylactic antibiotic and mild analgesics.

For laparoscopic hysterectomy, for ports were made, a 10 mm umbilical port for laparoscope, two 5 mm ports for accessory instrument in left and right iliac fossa and one extra port 10 mm in the suprapubic region.

All pedicles were coagulated and transected laparoscopically using Ligasure instrument. After visualization of the ureter, we use Karl Storz Carlmont Ferrand manipulator for mobilization of the uterus.

In group A (LASH), after coagulating the uterine vessels, we use the laparoscopic loop to separate the uterus from the cervix and remove the uterus using morcellator of Wizap type.

In group B (LAVH), after coagulating the uterine vessels, we change patient's position to lithotomy to complete the operation from the vagina.

In group C (TLH), after coagulating and transecting the uterine vessels, we use Ligasure instrument to coagulate and cut the Macherodent and uterosacral ligament. Then, we cut the uterus with the cervix laparoscopically. Here, the uterus is removed either vaginally or by the use of morcellator.

RESULTS

During the study period 60 cases underwent laparoscopic hysterectomy due to benign uterine lesion (table 1).

The observed difference in age, BMI, parity of percentage of patients with preoperative laparoscopic surgery were not statistically significant. There were four main indications for hysterectomy in our study population; fibroid uterus, dysfunction uterine bleeding, endometrial hyperplasia and suspected adenomyosis listed in table (2).

Table (3) compares the outcome measures evaluated during surgery. There was significant difference in the operating time among the 3 groups with shortest time observed in group A and longest time in group B. group (A) LASH took 84.4 ± 13.1 min, group (B) LAVH 104.1 ± 10.4 min while group (C) TLH took 91.7 ± 21.6 min.

As regard the time measured from skin incision to closing the last stretch. there is no significant difference in the uterine weight among 3 groups. The decrease in haemoglobin on the first day postsurgery did not significantly differ among the 3 groups but group (A) showed the least amount of deficit while group (C) showed the largest amount of deficit.

Only 2 out of 60 patients required whole blood transfusion. One patient in LAVH (group B) experienced intraoperative blood loss and one patient in the TLH (group C) for the same reason. Nevertheless, the difference among the groups were not significant.

There is only one case of intraoperative complication which is bladder injury which occurred in group (C). Total Laparoscopic Hysterectomy (TLH) in patient which was a case of DUB and previous laparotomy was done as "cesarean section". During pushing the bladder flap downwards, the injury occurred and immediate laparotomy was done and repairing of

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the bladder injury and completing hysterectomy.

Ureteric injury noticed in the 5th day postoperatively when the patient complaint from watery discharge which is urinefarous in odour. IVP was done which discover very small ureteric fistula near the bladder wall. Consultation of urosurgeon was done and cystoureteroscopy was done to the patient with introduction of double J stent which is removed after 4 weeks and the patient is good this was occurred in group (B) (table 4).

All patients took non-steroidal analgesic drug in the form of diclofenac sodium 100 mg (injection) and if the patient is still complaining from pain we gave here 100 mg pethadine.

The lowest mean consumption of analgesics was observed in the first group (A) and the largest consumption of analgesics observed in group C and this is statistically different (table 5).

There was significant difference in the hospital stay among the 3 groups, the shortest hospital stay occurred in groups A and B, but group C was the longest.

The hospital stay in all patients was only 24 hours postoperatively except in the complicated case of bladder injury where this case require hospitalization for 1 week and if we exclude this case the time consumed postoperatively will be non significant (table 6).

Table (1): The preoperative demographic data for all of our patients

	A (n = 20)	B (n = 20)	C (n = 20)	F	p
Age (years)					
Mean ± SD	44.7 ± 2.4	52 ± 5.4	49.9 ± 5.4	2.48	0.09 (NS)
Range	40-62	42-62	41-61		
Parity					
< 3	12 (60%)	9 (45%)	10 (50%)	X ² = 0.93	0.62
> 3	8 (40%)	11 (55%)	10 (50%)		
Prior surgery					
One laparotomy	5 (25%)	3 (15%)	5 (25%)	X ² = 1.16	0.88
2 laparotomies	1 (5%)	2 (10%)	2 (10%)		
No	14 (70%)	15 (75%)	13 (65%)		
BMI (kg/m²)					
Mean ± SD	24.7 ± 2.7	24 ± 3.2	24.8 ± 2.8	F = 0.4	0.66
Range	21.5-31.1	20.2-32	19.7-30.1		

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Table (2): Indications

	A		B		C	
	No	%	No	%	No	%
Fibroid	5	25	7	35	7	35
Hyperplasia	5	25	11	55	9	45
DUB	6	30	0	0	2	10
Suspected adenomyosis	4	20	2	10	2	10

$X^2 = 10.66$
 $p = 0.09$

Table (3): Operative findings

	A	B	C	F	p
Operative time (minutes)					
Mean ± SD	84.4 ± 13.1	104.1 ± 10.4	91.7 ± 21.6	7.97	0.001 (S)
Range	65-112	87-125	55-134		
Uterine weight (gm)					
Mean ± SD	299.2 ± 45.1	316.5 ± 74.2	286.7 ± 75.3	1.05	0.36
Range	230-400	233-550	180-455		
HB deficit (gm/dl)					
Mean ± SD	1.46 ± 0.28	1.59 ± 0.39	1.62 ± 0.37	1.25	0.29
Range	0.95-1.98	0.9-2.3	1.1-2.3		

Table (4): Operative and postoperative data

	A		B		C		X ²	p
	No	%	No	%	No	%		
Transfusion	0	0	1	5	1	5	1.03	0.59
Conversion	0	0	0	0	1	5	2.03	0.36
Bladder injury	0	0	0	0	1	5	2.03	0.36
Ureteric injury	0	0	1	5	0	0	2.03	0.36

Table (5): Need to analgesics

	A		B		C		X ²	p
	No	%	No	%	No	No		
NSAID	20	100	20	100	20	100	0	1
Pethedine	4	20	10	50	20	100	26.6	< 0.001

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Table (6): Hospital stay

	Stay Mean ± SD (range)
A	1 ± 0
B	1 ± 0
C	2.95 ± 2.76 (1-7)

F = 9.96
p < 0.001

DISCUSSION

It is difficult to determine which approach to laparoscopic hysterectomy is almost beneficial, therefore the 3 laparoscopic methods were evaluated. Up till now, to our knowledge no one do prospective study among the 3 methods, all other studies compare only between 2 groups of them.

For the operation time, our study showed that there is statistical deference among the 3 groups as the laparoscopic supracervical hysterectomy (group A) showed the least operation time (84.4 +-13.1 min) while laparoscopic assisted vaginal hysterectomy (group B) showed the longest time (104+_10.4 min) due to time consuming during changing the position of the patient from trendelenburg to lithotomy position, vaginal part of the surgery and reinsufflation and under water examination which take some time but TLH group (C) took about (91.7+_21.6 min). This result is not in agreement with **Drahonovsky et al.**⁽⁵⁾ who do similar study between laparoscopic assisted vaginal hysterectomy (LAVH) and total laparoscopic hysterectomy (TLH) which showed that LAVH took shorter operation time than TLH and **Mueller et al.**⁽⁶⁾ agrees with the result of **Drahonovsky et al.**⁽⁵⁾ and showed that LASH took shorter time than TLH.

For the hemoglobin deficit, our study stated that group A (LASH)

showed the least deficit (1.46 +_ 0.28 g/dl)while total laparoscopic hysterectomy showed the largest deficit (1.6 +_0.37 g/dl)and LAVH showed deficit of hemoglobin about(1.59+_0.39 g/dl)and this is statistically not significant.

This result is not in agreement with the results of **Drahonovsky et al.**⁽⁵⁾ who stated that total laparoscopic hysterectomy showed smaller amount of Hb deficit(1.6 g/dl) than laparoscopic assisted vaginal hysterectomy grouping which the HB deficit was (1.7 g/dl) this also is non significant.

While **Mueller et al.**⁽⁶⁾ accepted our results as they showed in their study that LASH has less amount of Hb deficit (1.5 g/dl) than TLH in cases of liomyoma which was (1.6 g/dl)in the first day post surgery.

In our prospective study, in the first group (LASH), no cases was taken blood transfusion but one case in group B (LAVH) was taken one unit of blood and this is due to haemorrhage from the descending cervical artery which took some time to be secured using ligasure instrument.

In group C (TLH), there is one case also taking blood transfusion due to bleeding from uterine artery.

This transfusion rate is minimal and **Drahonovsky et al.**⁽⁵⁾ also gave blood to 2 cases for their study which was LAVH.

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Also, **Mueller et al.**⁽⁶⁾ had one case that was taken blood which was TLH and this is in agreement with our study.

Also in our study, one case from 60 is transformed to laparotomy, this case had history of previous laparotomy which was cesarean section and during pushing bladder flab downwards. The bladder was opened and immediate laparotomy was done and the injured part is identified and repair was done.

Drahonovsky et al.⁽⁵⁾ showed that TLH showed the largest conversion rate among the 3 groups as 6 cases converted to laparotomy from 111 cases while incases of LAVH 3 cases only converted to laparotomy from 85 cases.

In the study of **Mueller et al.**⁽⁶⁾, there was no conversion rate in either group LASH and TLH and this is not in agreement with our study.

For the hospital stay, in our study, group A (LASH) stay only one day postoperatively and the recovery was rapid also in LAVH group (B) the recovery was rapid took only one day also postoperatively, but in group (C) TLH, one case took 2 days for recovery and another case took 7 days as there was urinary complication which necessitate hospital stay. So, if we exclude the 2 cases, there were no significant difference among 3 groups, but due to these 2 cases TLH showed the longest hospital stay duration and this is in agreement with the study of **Mueller et al.**⁽⁶⁾ as the study showed the least hospital stay with group LASH and longest stay in the group of TLH. While **Drahonovsky et al.**⁽⁵⁾ study is not in agreement with our study as LAVH group showed the longest hospital stay duration and TLH group showed least hospital stay duration.

The need for non-steroids is equal in all groups as all patients in the 3 groups were taken diclophenac sodium 100 mg injection in the early postoperative period but the need for narcotic was not needed in all patients, but the TLH group showed the largest number of cases who need narcotic while LSCH group showed the least number of cases who need narcotic.

Drahonovsky et al.⁽⁵⁾ showed agreement with our study as TLH group took larger dose of narcotic than LAVH group.

Morelli et al.⁽⁷⁾ stated in his study that not statistically difference in the complication rate and postoperative recovery period between Total Laparoscopic Hysterectomy (TLH) and LASH.

This study was done on one hundred and forty one patients who complained of symptomatic leiomyoma and abnormal uterine bleeding non-responding to medical treatment.

The results of **Morelli et al.**⁽⁷⁾ are not in agreement with the results of our study as we found significant difference in both postoperative stay and intraoperative complication between the TLH group and LASH group as TLH took longer mean period of hospital stay, but LASC took only 24 hours, but the longer duration in TLH group only occurred in 2 cases, one case converted to laparotomy due to bladder injury and the 2nd due to presence of drains which necessitate staying for another day and if we exclude these two cases, our results will be as the results of Morelli.

Also for the complication rate in our study, the complication rate more in TLH than LASH, while **Morelli et al.**⁽⁷⁾ showed that no significant difference between the 2 groups.

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In 2006, a Cochrane review evaluated 27 randomized controlled trials involving 3643 patients in an attempt to determine the desired approach to hysterectomy. While supracervical hysterectomy was excluded, all trials compared at least one hysterectomy approach to another for patients undergoing surgery for benign gynecologic disease.

Ultimately, 16 trials compared laparoscopic with abdominal hysterectomy, four compared laparoscopic with vaginal hysterectomy. Major outcomes were as follows:

Urinary tract injuries are in patients undergoing LH, no differences were found between vaginal hysterectomy and LH with respect to intraoperative injury or bleeding, conversion to laparotomy, duration of hospital stay, or return to normal activity.

When comparing a laparoscopic approach with abdominal and vaginal hysterectomy, no differences were noted in occurrences of pelvic hematoma, vaginal cuff infection, urinary tract infection, pneumonia, or thromboembolic events. No differences were found for long-term fistula formation, urinary dysfunction, sexual dysfunction, or patient satisfaction.

Return to work activities were slower post abdominal hysterectomy vs laparoscopic or vaginal hysterectomy.

Total laparoscopic hysterectomy was associated with the longest operating room time, when compared to laparoscopic-assisted vaginal hysterectomy, abdominal or vaginal hysterectomy and this agree with our study⁽⁷⁾.

The study of **Roy et al.**⁽⁸⁾ showed that TLH took significantly longer time (105 ± 23 minutes) than LAVH (89 ± 21 minutes), and this results are not in

agreement with our study which showed that LAVH group took longer operation time than TLH group.

But, if the mean blood loss was 290 ± 124 in TLH and 302 ± 130 in LAVH, this means that TLH group showed less blood loss than LAVH group and this is not in agreement with our study that state the opposite.

The study of **Roy et al.**⁽⁸⁾ also found no statistically difference between TLH and LAVH groups in the postoperative stay. While our study showed that there was statistically difference in the postoperative stay where the group of TLH showed higher rate in the hospital stay and in the complication.

In a study done by **Mousa et al.**⁽⁹⁾ in Royal Victoria Hospital, Montreal Canada, they stated that there were no statistically differences in the hospital stay between LASH group and TLH group. Also, no statistical difference in the Hb deficit between the 2 group; 1st postoperative day and this is agreed with our result concerning Hb deficit only, but our result is not agreed with Mousa result's regarding hospital stay as in our result the length of hospital stay is more in group TLH than in LASH group.

Also, the study of **Mousa et al.**⁽⁹⁾ showed that LASH group needs more narcotics than TLH group and this not agreed with our result regarding need for narcotics as our result stated that TLH group needs more narcotics than LSHG.

In the study of **Mousa et al.**⁽⁹⁾, no statistically difference between LASH and TLH regarding major and minor complication. Also in our result, no statistically difference but there was one major complication in TLH group which was bladder injury which require conversion to laparotomy.

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CONCLUSION

In women with non-malignant diseases of the uterus, LASH seems to be the preferred laparoscopic hysterectomy technique for gynaecological surgeons, but follow up of the cervical changes must be done annually either by colposcopy or by pap smear, but if the patients need to remove the cervix for difficulty in follow up or for fear of malignancy, both other types of laparoscopic hysterectomy must be offered for her and if we exclude the only one complicated case in TLH group, there will be no statistically difference between TLH and LAVH.

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الملخص العربى

المقدمة:

يعتبر العامل الرحمى من العوامل المهمة المسببة للعقم لدى السيدات وهو يمثل حوالى ١٥ - ٢٠% من أسباب عقم السيدات.

فى العقود الأخيرة تعتبر تقنيات الإخصاب المساعد العديدة والحديثة من أهم الوسائل التى تساعد الأزواج الذين يعانون من العقم وبالرغم من هذا إلا أن نتيجة هذه التقنيات ما زالت غير مرضية.

من هنا يأتى دور المنظار الرحمى الضوئى فى تشخيص الأسباب الرحمية العضوية للعقم لدى السيدات مثل وجود التصاقات وأورام ليفية وعيوب خلقية داخل تجويف الرحم وغيرها من العوامل المسببة للعقم.

هذا الدور غاية فى الأهمية قبل إجراء الحقن المجهرى والإخصاب الخارجى والتلقيح الصناعى وذلك لمعرفة مدى تقبل الرحم للجنين والوقوف على أسباب عدم نجاح العملية.

الهدف من الدراسة:

هو تقييم أهمية فحص التجويف الرحمى للسيدة بواسطة المنظار الرحمى الضوئى وتشخيص ما إذا كان هناك أمراض عضوية داخل الرحم ومدى صلاحية الرحم وذلك قبل إجراء الحقن المجهرى أو الإخصاب الخارجى أو التلقيح الصناعى.

خطوات البحث:

سوف تشمل الدراسة ٦٠ سيدة من اللاتى يعانين من العقم واللاتى سوف تخضعن للحقن المجهرى أو الإخصاب الخارجى أو التلقيح الصناعى.

ستخضع جميع الحالات للفحص بالمنظار الرحمى الضوئى وذلك لتحضير المريضة قبل الحقن المجهرى أو الإخصاب الخارجى أو التلقيح الصناعى وذلك تحت التحكم البصرى.

سوف يتم استخدام محلول ملهى فى البداية لملاً التجويف الرحمى حتى يصبح الضغط داخل الرحم ١٠٠ : ١٥٠ ملمتر زئبقى بعد ذلك سيتم عمل منظار رحمى تشخيصى لكل سيدة وسوف يتم تسجيل النتائج وحصرها فى جداول ثم تحليلها إحصائياً.