



ORIGINAL ARTICLE

Total laparoscopic hysterectomy versus vaginal assisted laparoscopic hysterectomy for benign uterine conditions: A prospective trial.

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ABSTRACT... Objective: To compare the technique of total laparoscopic hysterectomy (TLH) and laparoscopic assisted vaginal hysterectomy (LAVH) in order to identify the procedure with better outcome. **Study Design:** Prospective Comparative study. **Setting:** Northwest General Hospital and Research Center and Lady Reading Hospital, Peshawar. **Period:** 1st Jan, 2018 till 31st Dec, 2022. **Methods:** All the patient presenting in out-patient department needing hysterectomy with benign pathologies, perimenopausal age group, size of the uterus ≤ 12 weeks and with no previous history of abdominal surgery were placed alternatively in to two groups. Group A included patients who were supposed to undergo Total Laparoscopic Hysterectomy, where uterus was supposed to be delivered vaginally and vault was to be repaired via intracorporeal sutures over uterine manipulator. While group B included patients who were to be operated by Hybrid laparoscopic/vaginal technique and vault was to be repaired vaginally after delivering the uterus vaginally. Data was collected, placed on SPSSR version 16.0 and data was analyzed. **Results:** 62 patients were included in this study and were placed alternatively in to each group. The demographic values of both groups showed no significant differences for age, BMI and preoperative hemoglobin levels. The higher age group presenting with dysfunctional uterine bleeding was insignificantly more common in Group A whereas fibroids were more common in group B, yet a non-significantly higher age was recorded in group B. **Conclusion:** Both Laparoscopic assisted Vaginal hysterectomy (LAVH) and Total Laparoscopic hysterectomy (TLH) are feasible options for benign uterine pathology with lesser operative time in hysterectomy performed by the TLH method. The Total laparoscopic Hysterectomy (TLH) results in lower per-operative and post-operative blood loss as compared to the Laparoscopic assisted vaginal technique (LVAH).

Key words: Laparoscopic Assisted Vaginal Hysterectomy, Total Laparoscopic Hysterectomy.

INTRODUCTION

Hysterectomy is arguably the most common procedure performed by Gynecologists around the world with nearly 70% of all women in the United States undergoing the procedure between the 4th and the 7th decades.¹ Till the advent of the 21st century, most of the procedures were performed by laparotomy, but as laparoscopic surgery has evolved, the frequency of laparoscopic hysterectomies performed has drastically increased.² The technique employed by various gynecologists has also varied over time, due to the steep learning curve of laparoscopic surgery.³ Following the first Laparoscopic Hysterectomy performed by Harry Reich in 1988, literature has witnessed many developments in the field of

gynecological surgery.⁴

Many gynecologists were inclined to modify the procedure utilizing a hybrid method known as the Laparoscopic Assisted Vaginal Hysterectomy (LAVH) that gives the ease of clearly defining important structures not directly visible to the gynecologist performing from the vaginal route.⁵⁻⁷ On the other hand, the Total Laparoscopic hysterectomy (TLH) is performed laparoscopically and only the uterus is delivered vaginally in cases where a <12 weeks equivalent uterus is excised.⁸⁻¹⁰ Further modification of repairing the vault through the vaginal route instead of intracorporeal suturing over a uterine manipulator is widely practiced.¹¹ Thus, a vaginal repair

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precludes the need for a uterine manipulator and hence reduces operative time.¹²

Earlier data when Total Abdominal hysterectomies were performed showed more blood loss and injuries to surrounding structures such as bowel and the ureters, has paved way to better vision and use of vessel sealing devices that drastically reduce blood loss and reviewed laparoscopic anatomy that has gained popularity.¹⁰ The rationale of this study was to compare the technique of TLH and LAVH to identify the procedure that has better outcome to reduce fears allied with gynecologists regarding patient outcomes and hence focus on limiting modification of the laparoscopic procedure as was previously a norm for most occasional laparoscopic gynecologists.

METHODS

This study was conducted as an Interventional trial at Northwest general Hospital and research center and MTI Lady Reading Hospital, Peshawar, KPK, Between 1st January, 2018 and 31st December 2022. Following ethical approval (1063/LRH/MTI-29.12.23) regarding the methods and the consent forms for the trial, a detailed proforma with the approved consent form was prepared. From a study performed by Fathy et al. the frequency of blood loss requiring blood transfusions was 2.06% in patients undergoing Laparoscopic hysterectomy, that required 31 patients in both groups. This was calculated by a acceptable margin of error to be 10% and a 95% confidence interval limit.

All patients presenting in the out-patient department with relevant investigations, indicating the need for hysterectomy were reviewed. Patients with benign pathologies, of perimenopausal age group and complete workup showing a size of the uterus amenable to be delivered vaginally (<12weeks), without a previous history of open abdominal procedure were included in the study and subsequently, each patient was placed alternately into either of two groups. Patients with evidence of malignancy or previous abdominal surgery and NYHA III and IV category risk were excluded from the study.

Group A included patients that were deemed to undergo a Total Laparoscopic Hysterectomy with the uterus delivered vaginally and the vault was repaired over a uterine manipulator by intracorporeal suturing technique. Whereas Group B included patients that were operated by the hybrid Laparoscopic/Vaginal technique and the vault was repaired vaginally following delivery of the uterus. Abdominal Drains were placed in both groups at the end of the procedure.

Three to four ports were used during both procedures and pneumoperitoneum was established using the Vere's needle technique and pneumoperitoneum was limited to 15mmHg. The vessel sealing device incorporated for severing pedicles was Ligasure LS10^R and the Mangeshkar uterine manipulator was used to elevate the uterus in all cases which was removed to perform the second half of the hysterectomy in Group B (Laparoscopic assisted Vaginal Hysterectomy group).

Per-operatively the size of the uterus, operative time and per-operative blood loss was observed. In the post-operative period monitoring of intake output record was observed with emphasis on urinary output and blood loss in the post-operative period. Need for blood transfusions and hospital stay were noted on the proforma as well. Postoperative complications such as wound infection, pulmonary complications and pain scores were recorded. Pain scores were documented using the visual analogue charts on the first post-operative day.

Following discharge from the hospital patients were followed-up in the outpatient department on post-operative day 10 and after one month. Age stratification and multivariate analysis was performed to avoid confounding effect of age and similar analysis was extended to bias due to indications of the surgery performed. The researcher was blinded from the inclusion of patients in either group as well as the surgeon but a written informed consent was explained to the patient

Continuous data such as age, hospital stay,

blood loss and operative time were represented as mean+ standard deviation and groups were compared using the student t test and Mann Whitney U test. Categorical data was represented as percentage and compared with the other group using the Chi square test on the SPSS^R Version 11.0. A $p < 0.05$ value was regarded as statistically significant.

RESULTS

Eighty-five patients had undergone Laparoscopic hysterectomy. Prospectively, 62 patients were enrolled to this study and were alternately placed into either of the two groups. All patients were followed up (till one month) in the out-patient department after their initial surgery, thus fulfilling the follow-up criteria of this study. The demographic values of both groups showed no significant differences for age, BMI or preoperative Hemoglobin levels. The higher age group presenting with dysfunctional uterine bleeding was insignificantly more common in Group A whereas fibroids were more common in group B, yet a non-significantly higher age was recorded in group B ($p=0.81$) (Table-I)

During surgery monitoring of the operative time by

the anesthetist and the blood loss was recorded from swabs and drains which was documented to be higher in the patients from group B which was statistically significant. Only one patient required transfusion in the operating room during surgery in group A (3.2%) whereas 5 patients (16.1%) from group B required transfusions in the operating theatre. In this study, one more patient from group A required transfusions but not owing to blood loss rather due to pre-operative relatively low Hemoglobin levels.

Two Patients (6.4%) suspected ureteric injuries in the Total Laparoscopic Hysterectomy group required urological opinions, out of which one was a handled ureter and only stenting via cystoscopy was performed whereas the other patient was a case of endometriosis ending in gut injury and complete transection of lower ureter on the left side, which needed conversion to open Hysterectomy and ureteric repair. Apart from the above conversion, 4 patients (8% in total) in the study needed conversions to open procedure, two of which were severe Endometriosis ending in injury to the rectosigmoid junction and the urinary bladder but the rate of conversion was similar between groups ($p=0.33$) (Table-II).

	Group A (TLH)	Group B (LVAH)	Significance
Age (mean) (+s.d)	43.6(+11.8)	47.1(+9.5)	0.81
BMI (Mean)(+s.d)	29.2(+4.2)	28.9(+6.9)	0.76
Parity (mean) (+s.d)	3.5(+1.2)	3.7(+1.6)	0.78
Indication for surgery			
• Fibroid uterus (%)	05(16.1%)	06(19.3%)	
• Dysfunctional uterine bleeding (%)	11(35.4%)	09(29%)	
• Endometrial Hyperplasia (%)			
• Adenomyosis (%)	06(19.3%)	06(19.3%)	
• Endometrial polyp (%)	03(9.6%)	02(6.4%)	
• Endometriosis (%)	02(6.4%)	03(9.6%)	0.51
• Endometriosis (%)	01(3.2%)	02(6.4%)	
• Ovulatory dysfunction (%)	03(9.6%)	03(9.6%)	
Pre-operative Hemoglobin (g/dl)(+s.d)	11.6(+2.1)	11.3(+1.8)	0.93

Table-I. Demographic and preoperative data

	Group A (TLH)	Group B (LVAH)	Significance
Mean Operative time (min) (+s.d)	116.3(+37.6)	143.5(+41.6)	0.03
Mean Operative Blood Loss (ml) (+s.d)	88.5(+33.3)	138(+67.7)	0.041
Ureteric injury (%)	02(6.4%)	0	0.07
Bowel injury (%)	01(3.2%)	01(3.2%)	0.92
Urinary bladder injury (%)	01(3.2%)	03(9.6%)	0.21
Conversion to open abdominal procedure (%)	03(9.6%)	02(6.4%)	0.33

Table-II. Per-operative data

	Group A (TLH)	Group B (LVAH)	Significance
Mean Post-operative blood loss(ml) (+s.d)	191.9(+83.6)	229.6(+119.2)	0.08
Urinary retention (%)	02(6.4%)	04(12.9%)	0.15
Paralytic ileus (%)	01(3.2%)	05(16.1%)	0.04
Wound infection (%)	02(6.4%)	02(6.4%)	0.28
Wound dehiscence (%)	01(3.2%)	00	0.11
Pulmonary complications (%)	02(6.4%)	01(3.2%)	0.18
Deep venous thrombosis (%)	01(3.2%)	03(3.2%)	0.09
Post-operative pyrexia (%)	04(12.9%)	06(19.3%)	
Mean Stay (Days) (+s.d)	2.1(+1.8)	4.8(+3.1)	0.12
Mean Pain score 1 st postoperative day(+s.d)	4.3(+2.5)	6.1(+3.7)	0.07
No. of cases requiring blood transfusion (%)	2(6.4%)	5(16.1%)	0.04

Table-III. Frequency of complications and postoperative outcome

In the post-operative period, the length of stay was higher in group B but this was not significant ($p=0.12$). The most significant finding of the study was the significant need for transfusions in the patients undergoing Laparoscopic assisted vaginal Hysterectomy (LVAH) with nearly 16 % of all cases in Group B requiring per-operative transfusions. This finding was also correlated to the fact that greater blood was quantified in Drains of patients from Group B (229ml vs 191 ml) but this was not significant as was the need for transfusions. ($p=0.08$).

Paralytic ileus was observed in 5 patients (16.1%) from group B which settled in the first week in all cases with nasogastric decompression and none required operative management. In contrast only one patient from group A presented with absent bowel sounds (3.2%) and the observed difference between two groups was statistically significant ($p=0.04$).

No mortality was observed in this study and the length of stay varied from 1.2 days to 12.6 days (+2.56). Pain scores for first post-operative day were compared between groups and were observed to be higher in group B but this was not significant statistically. The analgesic dose of patients could not be compared as different surgeons had varying protocols with pain management and choice of analgesic was decided by the operating surgeons.

DISCUSSION

Vaginal hysterectomy has been a choice for most

gynecologists when performing hysterectomy because of their training and the volume of hysterectomies in most institutions but it can be very challenging when dense adhesion and associated adnexal pathology exists.^{8,11} Due to the steep learning curve of laparoscopic surgery many surgeons with high volume of hysterectomies were reluctant to move to laparoscopic surgery.⁹

In the last decade literature from many parts of the world were focused on gaining concepts of the benefits of laparoscopic surgery over the conventional vaginal hysterectomy was exaggerated. For instance, in a meta-analytic study conducted by Guo et al.¹³ included 9 randomized controlled trials comprising 629 patients, concluded that the operative time was significantly higher in the LAVH group versus the vaginal hysterectomy group.

Another meta-analytic study conducted by Yi et al.¹⁴ included 23 studies that compared LAVH and total abdominal hysterectomy concluded that LVAH was associated with reduced per-operative blood loss, shorter postoperative stay, lower pain score and early resumption to daily activities. The spectrum of results in the literature supports the fact that minimally invasive surgery promotes all the above factors.

Similarly in a Randomized controlled trial conducted by Zafar et al.¹⁵ 56 patients in each group undergoing Total Laparoscopic hysterectomy (TLH) and Total abdominal hysterectomy (TAH) showed slightly increased

operative times (76.73+20.2min in TLH versus 84.7+19.9 in TAH) for the later. The postoperative hospital stay was significantly higher in the TAH group ($p=0.001$) but when comparing the postoperative stay from this study with a mean stay of 2.1(+1.8) was much higher than the stay of the TLH group in their study (1.2+0.44).

With few studies recently published with the resembling study design as this study, a study conducted by Fader et al.¹⁶ which was primarily focused on oncological outcomes following hysterectomy by TLH and LVAH revealed that of the 80 and 24 patients (respectively in groups) balanced the non-significant differences in operative times (212.5 and 183.5 minutes, respectively; $p = 0.039$).

Apart from operative times the per-operative blood loss was significantly lower in the TLH group as was observed on our study. This contradicts the results from our study where the operative times for TLH (116.3(+37.6)) were much lower than earlier studies. This could be due to the improved skill set of surgeons in this era and frequent use of more advanced vessel sealing devices that has proved benefit of modern technology and in contrast the increased operative times for LAVH are due to the lesser performance of vaginal hysterectomies with the advent of laparoscopic surgery.

In a more recent study conducted by Shin et al.¹⁷ 168 patients underwent Laparoscopic hysterectomy by TLH or the LAVH techniques and showed similar operating times respectively (112.60 ± 33.90 and 112.57 ± 31.20 minutes). The mean hospital stays and blood loss was also similar but one ureteral injury in the TLH group and one bladder injury in the LAVH group were recorded.

Their operative times were comparable to this study except that the LAVH recorded in our study took longer to complete the hysterectomy. There were two documented cases of ureteral injuries (6.4%) from the TLH group and three bladder injuries (9.6%) in the LVAH group in our study.^{18,19} There was no bowel injury in their study

as compared to this study where we observed 2 cases that documented bowel injuries that occurred due to dense pelvic adhesions in endometriosis. These differences could be due to case selection in our study and also that the study design varied.

Lee et al.²⁰ conducted a meta-analytic review to document the outcomes of vaginal hysterectomy and laparoscopic hysterectomy that included 1618 patients with observation of primary outcomes comparing vaginal hysterectomy with LVAH, TLH and laparoscopic hysterectomy unspecified due to wide variation in the laparoscopic techniques. The end point that was that Vaginal hysterectomy has lesser operating times and reduced post-operative pain as compared to laparoscopic hysterectomy. In this study the vaginal vault/stump was closed by intracorporeal/extracorporeal suturing laparoscopically but in most studies.

Vaginal hysterectomy is indicated only in benign uterine pathologies but by adding a laparoscopic approach malignant causes can be tackled with ease. The need for more standardized procedure would be early to talk of as many uterine pathologies require a procedure to be tailor made for each case. The limitations of this study were not comparing other methods to perform hysterectomy and the number of cases particularly with the same study design is lacking.

CONCLUSION

Both Laparoscopic assisted Vaginal hysterectomy (LAVH) and Total Laparoscopic hysterectomy (TLH) are feasible options for benign uterine pathology with lesser operative time in hysterectomy performed by the TLH method. The Total laparoscopic Hysterectomy (TLH) results in lower per-operative and post-operative blood loss as compared to the Laparoscopic assisted vaginal technique (LVAH). There is need for more multi-center trials and further meta-analytic reviews to justify the choice of procedure according to the indication for hysterectomy.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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3	Adil Bangash	Data Collection, Discussion writing.	
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