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Original Research Article

Comparison of perioperative outcomes of different routes of hysterectomies- total abdominal, vaginal and laparoscopic, in a tertiary care hospital in Karachi, Pakistan

Sarah Rehman[1], Munazza Akhtar[2], Mahnoor Niaz[1], Muhammad Mussab Khakwani[1], Saif Ullah Khan[1], Muhammad Bin Hammad[1], Uzma Chishti[2]*

[1]Medical College, [2]Department of Obstetrics and Gynecology, Aga Khan University, Karachi, Pakistan

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***Correspondence:**
Dr. Uzma Chishti,
E-mail: uzma.chishti@aku.edu

ABSTRACT

Background: This study was conducted to compare the perioperative findings among women undergoing hysterectomy by abdominal (TAH), vaginal (VH) and laparoscopic (TLH) routes.
Methods: A 5-year cross-sectional survey was conducted at the Aga Khan University Hospital from January 2015-December 2020 to compare perioperative outcomes of the different routes of hysterectomies. Medical record review of 385 patients who underwent hysterectomy for benign conditions were reviewed and analysed, out of which 195 (50.6%) underwent TAH, 96 (24.9%) VH and 94 (24.4%) were operated laparoscopically. Patients with uncontrolled medical comorbid, history of 2 or more abdominal surgeries and uterine size of more than 14 weeks were excluded from the study.
Results: revealed significant difference between the mean hospital stay of patients with TAH having the highest mean stay in days (TAH=4.8±1.01, VH=4.4±0.7 and TLH=3.9±0.82 in days; p<0.01) TLH took comparatively significantly longer operating time than TAH (p=0.0005) and VH groups (p=0.004) however, median estimated blood loss was significantly lower in women who underwent TLH as compare to TAH [median (25^{th}-75^{th} percentile); 100 (50-200)] versus 300 (200-500); p<0.01] and VH [100 (50-200)] versus 250 (100-400); p<0.01]. The incidence of post-operative complications was less than 3% and these were observed in women underwent TAH.
Conclusions: VH and TLH have lesser complications and hospitalization days as compared to TAH, making these 2 methods superior. Informed decision making by patient and surgeon's training together can account for choosing the best method of hysterectomy suitable to the patient.

Keywords: Complications, Hysterectomy, Length of stay, Routes of hysterectomy

INTRODUCTION

Hysterectomy is one of the most performed gynecological surgeries. The common indications for this are, benign diseases of uterus, affecting women health and quality of life.[1,2] There are different routes to perform this procedure which includes abdominal, vaginal, and laparoscopic. The decision of the route is subjected to multiple factors, like, indication of hysterectomy, uterine size, associated pathologies, patients' choice and last, but not the least, surgeon's training and preference.[3]

Despite the advancement in laparoscopic techniques, abdominal route is still the most widely used approach worldwide. Approximately 428,523 hysterectomies were performed for benign indications yearly in the United States between years1998 and 2011.

Amongst these, 54.2% were abdominal, 16.7% vaginal, and 8.6% laparoscopic hysterectomies. Similarly, in the United Kingdom 62% of hysterectomies were performed abdominally, 32% vaginally, and 6% laparoscopically.[4]

The literature comparing abdominal and vaginal hysterectomy determined that the vaginal route was the favored method as, it was associated with shorter hospitalization, less operative and post-operative complications, faster recovery, and early mobilization in comparison to abdominal hysterectomy.[5-7]

However, trends are changing and more of laparoscopic route is being in practice for hysterectomy worldwide. Several studies have shown that laparoscopic hysterectomy is a safe and effective method. It has low complication rates, less blood loss and post-operative pain. The other benefit of this procedure is shorter hospital stay and quicker return to normal activities as well.[8,9]

Rates of various complications with hysterectomy have been reported in the range from 0.5% to 43%.[5] The most common complications of hysterectomy can be categorized as infectious, venous thromboembolic, genitourinary (GU) and gastrointestinal (GI) tract injury, bleeding, and vaginal cuff dehiscence.[10]

As there are no studies on comparisons of outcomes of hysterectomy techniques in Pakistan recently, this study aimed to compare the perioperative outcomes of women undergoing hysterectomy by these routes in a tertiary care hospital.

METHODS

Study design and setting

A cross-sectional survey using hospital records at the Aga Khan University Hospital for past 5 years, from 2015-2020 was conducted to compare the different routes of hysterectomies to assess perioperative outcomes.

Population

Record review of all the women who underwent hysterectomy for benign conditions during the study period. Benign condition will be confirmed by attending physician on examination, radiological evidence (e.g., ultrasound) and histopathology bases. Patients with uncontrolled medical comorbid, history of 2 or more abdominal surgeries and uterine size of more than 14 weeks were excluded from the study.

Sampling methodology and sample size

Purposive sampling was done. The calculated sample size was 357 by using Epi software.

Outcome variables

Independent variables were pre-operative patient characteristics which include mean age of the patient, parity, uterine size (cm) on ultrasound, preoperative hemoglobin, comorbid such as HTN/DM, dependent variables were intraoperative and postoperative outcomes which includes stay in hospital (days), operating time (in minutes) and estimated blood loss during surgery (ml).

Intraoperative complications like hemorrhage, bowel and urinary tract injury, conversion to laparotomy in cases of VH or TLH were also noted. Post-operative complications within 30 days of surgery were noted. These include fever, time to pass flatus (hours), time to mobilize from bed (hours), postoperative hemoglobin, urinary tract infection, wound infection, and venous thromboembolism.

Data collection and analysis

A structured proforma was used to collect the data from hospital's electronic medical record and review of documentation in files, after approval from institute's ethical review committee. Statistical analysis was done by SPSS.20.0 software.

RESULTS

A total of 394 patient's files were selected during the data collection period. Only 385 records were included as a part of our study. The rest were excluded due to the presence of long-standing comorbidity in the patients. The participants were divided into three groups based on the route of hysterectomy. Out of 385 records, 195 (50.6%) underwent TAH, whereas VH and TLH had 96 (24.9%) and 94 (24.4%), as shown in Figure 1.

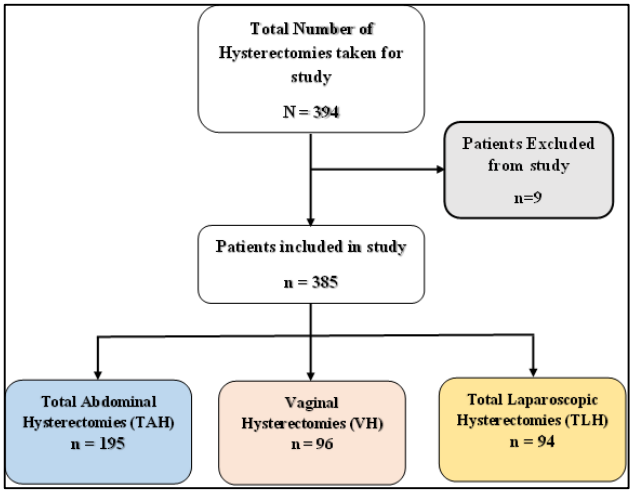

Figure 1: Flow chart of total number of patients undergoing hysterectomy that were included within the study.

The mean age of the participants was 49.49±10.45 years, with patients having a higher mean age of 57.80±11.77 for those that underwent vaginal hysterectomy. Almost 42% (163/385) of the participants undergoing hysterectomy had hypertension whereas about one-third (21%) had diabetes. 70.9% of the study population was multiparous (parity 2-5), 12.7% grant multiparous (parity:

6-9) and 16.4% were primiparous. Baseline characteristics of the patients among the groups is presented in Table 1. Uterine size was significantly more in TAH groups as compared to VH and TLH (p<0.05). The patients underwent vaginal hysterectomy had smallest mean uterine size. Pre-operative mean hemoglobin was significantly low in women underwent TAH than VH and TLH (p=0.0005). In terms of benign uterine conditions, most of the patients having uterine prolapse underwent VH 90% whereas 49.7% of study population who had a fibroid underwent TAH. Patient with endometrial hyperplasia 10.6% and dysfunctional uterine bleeding 35.1% underwent TLH. Majority of the patients with endometriosis had TAH 14.9%.

Table 1: Baseline characteristics of the patients among the groups.

Variables	TAH (n=195)	VH (n=96)	TLH (n=94)	P value
Age of patient (years)	45.5±7.0*†	57.8 0±11.77‡	49.2±10.2	0.0005
Comorbid				
Hypertension	64 (32.8%)*†	55 (57.3%)	44 (46.8%)	0.0005
Diabetic mellitus	37 (19%)*	29 (30%) ‡	15 (16%)	0.010
Mean parity	3.2±3.07*	4.1±1.87‡	3.09±1.63	0.0005
Uterine size (mm)				
AP	107.0±30.8*†	74.6±18.2	81.4±15.4	0.0005
Transverse	64.5±26.7*†	41.9±1 8.2	48.0±12.6	0.0005
Craniocaudal dimension	74.4±31.3*†	46.5±13.7	54.4±15.1	0.0005
Preoperative hemoglobin	11.5±1.4*†	12.3±1.3	11.9±1.2	0.0005
Previous abdominal surgeries				
0	115 (59%)*†	74 (77.1%)	79 (84%)	
1-2	60 (30.8%)	21 (21.9%)	15 (16%)	0.0005
3-5	20 (10.3%)	1(1%)	0 (0%)	
Uterine prolapse	1 (0.5%)	86 (90%)	1 (1.1%)	-
Uterine fibroids	97 (49.7%)*†	2 (2.1%) ‡	21 (22.3%)	0.0005
Endometrial hyperplasia	11 (5.6%)*†	0 (0%)	10 (10.6%)	0.005
Endometriosis	29 (14.9%)*†	1 (1%)	6 (6.4%)	0.0005
Adenomyosis	3 (1.5%)	0 (0%)	1 (1.1%)	0.477
Dysfunctional uterine bleed	34 (17.4%)*†	4 (4.1%)‡	33 (35.1%)	0.0005
Other	16 (8.2%)	3 (3.1%)‡	11 (11.7%)	0.0005

Results are reported as mean±SD and n (%)
Multiple comparison: TAH versus VH; *p<0.05; TAH versus TLH: †p<0.01; AV versus TLH: ‡<0.05

Table 2: Comparison of intra and post-operative outcome among groups.

Outcomes	TAH (n=195)	VH (n=96)	TLH (n=94)	P value
Operating time (In minutes)	137.9±58.1†	141.5±52.0‡	169.7±63.1	0.00005
Length of stay in hospital (days)	4.8±1.0*†	4.3±0.7‡	3.9±0.8	0.0005
Post-operative hemoglobin	9.9±1.3*†	10.4±1.2	10.7±1.2	0.0005
Time to pass flatus (hours)	45.6±16.9: †	44.7±14.6: ‡	37.5±14.2	0.001
Time to mobility/out-of-bed activity (hours)	29.5±11.6	27.2±8.2	30.5±10.7	0.120
Complications				
Urinary tract injury	2 (1.0%)	2 (2.1%)	0 (0%)	0.367
Laparotomy in cases of VH or TLH	-	9 (9.4%)	3 (3.2%)	0.080
Fever	5 (2.6%)	2 (2.1%)	0 (0%)	0.303
Urinary tract infection	2 (1.0%)	1 (1.0%)	0 (0%)	0.614
Wound infection	2 (1.0%)	0 (0%)	0 (0%)	0.376
Venous thromboembolism	0 (0%)	0 (0%)	1 (1.1%)	0.212
Bowel injury	0 (0%)	0 (0%)	0 (0%)	NA

TLH took comparatively significantly longer operating time, approximately 28-32 minutes more as compared to TAH and VH which was statistically significant (p=0.00005) as presented in Figure 2.

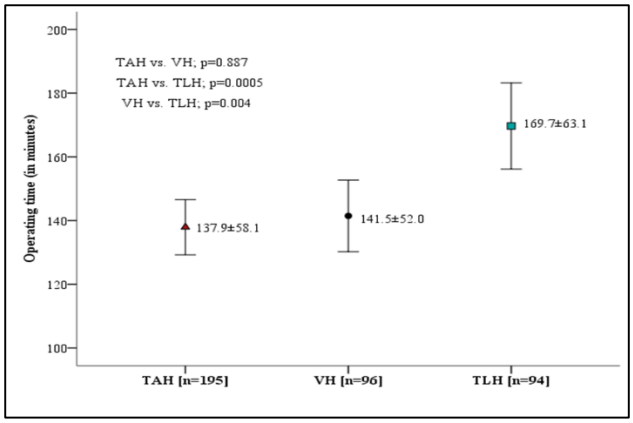

Figure 2: Comparison of mean operative time among groups.

Median estimated blood loss was substantially lower in women underwent TLH as compared to TAH [median (25^{th}-75^{th} percentile); 100 (50-200)] versus 300 (200-500); p<0.01] and VH [100 (50-200)] versus 250 (100-400); p <0.01] (Figure 3).

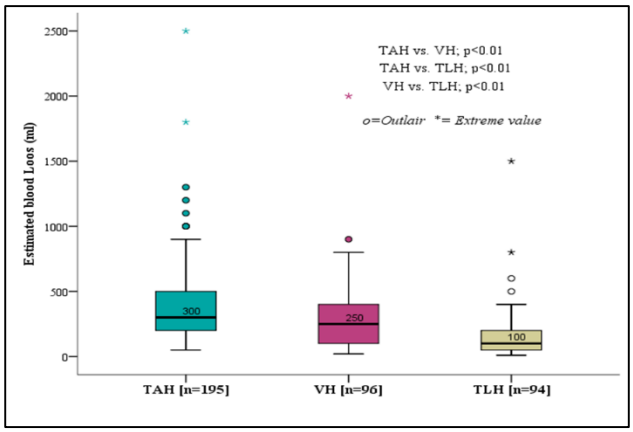

Figure 3: Comparison of median estimated blood loss among groups.

No incidences of bowel injury were observed in our study, whereas the number of individuals suffering from a urinary tract injury was also rare. Incidence of conversion to laparotomy was 9.4% and 3.2% in VH and TLH respectively but difference was not statistically significant (p=0.080) as shown in Table 2. There was significant difference between the mean hospital stay of patients (TAH=4.8±1.01, VH=4.4±0.7 and TLH=3.9±0.82 in days; p<0.01). Patients undergoing TAH had a slightly lower post-operative hemoglobin values compared to VH (9.9±1.3 versus 10.4±1.2 p=0.011) and TLH (9.9±1.3 versus 10.7.9±1.2; p=0.0005). Overall, the incidence of post-operative complications was less than 3% and these were observed in women underwent TAH.

The mean time to pass flatus was statistically significant among groups but mean time of mobility was not statistically significant among three groups (Table 2).

DISCUSSION

Hysterectomy is the most common gynecological procedure performed and it remains the ideal solution for several benign gynecological diseases affecting social and physical health of woman.[11] It has an imperative role in improving the quality of life when other alternative measures fail.

The results of the present study showed that during the past five years, 394 patients underwent hysterectomy in our institution. Of those, 50.4% had abdominal, 24.9% had laparoscopic and 24.4%% had vaginal hysterectomy. The type of surgery depends on the experience of the operating surgeon and on underlying pathology in accordance with the optimal option for a given patient underlying specific circumstances.

Baseline characteristics of the patients undergoing hysterectomy during the study period were compared, such as age**,** comorbidity, uterine size, and the indication for hysterectomy. The overall mean age of the participants was 49.49±10.45 years in our study, with patients having a higher mean age of 57.80±11.77 for those that underwent vaginal hysterectomy. This contrasts with the study conducted by Panda et al, where the mean age of patients who underwent abdominal, vaginal, and laparoscopic hysterectomy was lesser than our study population i.e., 40.84 years, 41.44 years, and 44.57 years respectively.[12] BMI were comparable in all three groups in this study. The same has been reported by a study conducted by Ercan et al, where mean BMI was 26.1, 26.6 and 26.2 in the laparoscopic, abdominal, and vaginal groups respectively. A high mean parity was associated with all types of hysterectomies, for average parity of 3 to 4. Uterine size measured in AP, transverse, and craniocaudal dimension was found highest in those undergoing TAH. This is consistent with the study done in Turkey which also showed higher uterine size in those undergoing TAH, although the value was not statistically significant (p=0.079) within their study.[13] The same has been found in the study by Aboulfotouh et al, where the size of the uterus was significantly smaller in the laparoscopic group compared to the abdominal group.[14] The probable reason could be the selection criteria by the gynecologists since many prefer performing laparoscopic hysterectomy on small uteri.

In the present study, the most frequent indication for hysterectomy was leiomyoma. The most common route used was TAH, followed by TLH, which was mainly used to treat dysfunctional uterine bleeding at our tertiary care hospital. VH was mainly performed for uterine prolapse. This was also demonstrated by another study done by Dorsey et al.[15] Those undergoing TAH were also found to have a greater number of histories of previous abdominal surgeries in comparison to VH and TLH.[16]

The operating time is shortest in TAH as compared to TLH and VH contrary to Lee et al who found VH to have

the shortest operating time within their systemic review and meta-analysis.[6] Çetin et al analysed 233 hysterectomies comparing TAH, VH, TLH.[13] In their study operating time was shortest for VH for a mean time of 82.2±22.4 ($p<0.0001$). A short TAH operating time within our hospital could be attributed to the technique and skills of the surgeons.

TAH was also found to have the longest post-operative length of stay in hospital as compared to TLH ($p=0.0005$). Similar findings were found by Çetin et al although the finding was not significant within their study ($p= 0.075$).[13]

Mean estimated blood loss was minimal in TLH as compared to other routes of hysterectomy. The amount of blood loss was inferred with values of post-operative hemoglobin, which is lowest in TAH and highest in TLH. Time to pass flatus post operatively was found to be shortest in those who underwent TLH for a mean of 37.5±14.2 hours, whereas there was no difference in mobilization amongst all groups.

Our study found 9 cases of VH and 3 cases of TLH that needs conversion to laparotomy. Conversion was associated with adhesions due to previous surgeries and large uterine size, as suggested in the literature also.[17]

No cases of urinary tract or bowel injury were reported in our study in any route of hysterectomy which is consistent with the result of study conducted by Malik et al whereas post-operative fever, urinary tract infection, and wound infection were found more common in TAH as compared to VH.[18] This is in contradiction to the study done by Carrubba et al which showed that route of hysterectomy was not related to infection.[19] None of these complications were found in TLH patients. Venous thromboembolism was observed in one patient that underwent TLH.

VH had similar lengths of hospital stay and few rates of complications, but it remains underutilized in our institute for pathologies other than uterine prolapse. This could be due to the fact that history of previous surgeries, obesity and larger sized uterus was still considered as relative contraindication to this route of hysterectomy.[20,21]

CONCLUSION

In conclusion, VH and TLH have shown to have lesser complications and hospitalization days as compared to TAH in this study, making these two methods superiors to the latter. To increase their use, improvement in terms of surgical training, advances in equipment, development in surgical techniques and training is required.

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