International Journal Dental and Medical Sciences Research
Volume 4, Issue 6, Nov-Dec 2022 pp 380-387 www.ijdmsrjournal.com ISSN: 2582-6018

Comparative Analysis of Different Types of Hysterectomy

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Submitted: 20-11-2022 Accepted: 30-11-2022

ABSTRACT
Background and objectives:Hysterectomy is one of the most frequently performed surgery by obstetrician-gynecologists next to caesarean section. By the age of 60 yrs, nearly one in three women will have udergone hysterectomy. The most common indications for hysterectomy (some indications are overlapping) are symptomatic uterine leiomyomas (51.4%), Abnormal uteine bleeding (41.7), endometriosis (30%) and prolapse (18.2). In India, the incidence of hysterectomy is about 4-6% of adult women out of which 90% are performed for benign indications.Several routes of hysterectomy have been explored and debated in search for the optimum one which would aid in the ease of operation with minimal complications and best cosmetic results in Indian set-ups. The objective of this study was to evaluate and compare different types of Hysterectomy- VH, TAH, LAVH / VALH, TLH and their advantages and disadvantages.
Methods:A total of 200 patients between 40 to 70 years having AUB due to fibriods,endometrial hyperplasia,prolapsed uterus and PID were included in the study. The investigations required to certain the aetiology and also other routine investigations were carried out.
Results:The average age recorded for all hysterectomies was 43.95 years and the average BMI was 25.85. By comparing all methods, the most common indications for hysterectomy were fibroids (49%), AUB (26.5%),adenomyosis (7%). Other causes are, CIN, endometrial hyperplasia, endometriosis.The hospital stay was the longest for AH (5.12 days) and the shortest for TLH (3.54). For VH the average hospital stay was 3.66 days, and for LAVH 3.66 days. The shortest operating time was for VH (54.7 minutes) and the longest for TLH (125 minutes). For AH the average operating time was AH 72.8 minutes and for LAVH 74.7 minutes. The lowest average hemoglobin decrease for LAVH was 0.70 g/dl, for AH 1.63 g/dl, whereas for VH it was 1.29 g/dl, and for TLH 0.82 g/dl. The lowest complication rate was recorded for LAVH and the highest for AH. The complication rate for VH was slightly higher than TLH and slightly lower than LAVH. The two well established laparoscopic techniques for hysterectomy (LAVH and TLH) showed a lower complication rate than VH and AH. The intraoperative complication rate for hysterectomies operations was 11%. The highest intraoperative complication rate occurred at abdominal hysterectomy (5%) and the lowest at LAVH (1.5%). The highest incidence of postoperative complications was recorded by TAH (7.5%) and the lowest by LAVH (4%) followed by TLH (3.5%).

I. INTRODUCTION

Hysterectomy is one of the most frequently performed surgery by obstetrician-gynecologists next to caesarean section. By the age of 60 yrs, nearly one in three women will have udergone hysterectomy. In India, the incidence of hysterectomy is about 4-6% of adult women out of which 90% are performed for benign indications. In most of these women hail form rural areas, belong to the working class and are financially challenged. Keeping this demographic profile of Indian population in mind , it is important that the procedure of hysterectomy for Indian population should be cost-effective and with minimal duration of hospital stay. Several routes of hysterectomy have been explored and debated in search for the optimum one which would aid in the ease of operation with minimal complications and best cosmetic results in Indian set-ups. Hysterectomies are performed vaginally, Laparoscopically (Total Laparoscopic Hysterectomy, Laparoscopically Assisted Vaginal Hysterectomy) or abdominally3. Selection of the route of hysterectomy for benign causes can be influenced by the size and shape of the vagina and uterus; accessiblity to the uterus; extent of extrauterine disease; the need for concurrent procedures; surgeon training and experience; average hospital stay, technology, devices, and support; whether the case is emergent

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Volume 4, Issue 6, Nov-Dec 2022 pp 380-387 www.ijdmsrjournal.com ISSN: 2582-6018

or schedueld; and preference of the informed patient.

Recent reviews have suggesged that whenever feasible Vaginal Hysterectomy should be preferred over Total abdominal Hystrectomy & when Vaginal Hystrectomy is not possible, Laparoscopic Hysterectomy(TLH or LAVH) is the approach of choice. TLH and LAVH are recent advance in the field of gynaecological surgery in which whole operation is done laparoscopically as against VH. Although minimally invasive approaches to hysterectomy are preferred route, open Sis to work towards a decision that optimises a procedure‘s advantages and mnimizes its disadvantages.

Compared with abdominal hysterectomy, vaginal and laparoscopic hysterectomy was associated with shorter operating time and hospital stay. The systematic rewiew concluded that vaginal hysterectomy has the best outcomes of there three routes6.

More recently, a meta-analysis was performed that included only RCTs comparing total laparoscopic hysterectomy and vaginal hysterectmy for benign disease6. This study involved 5 studies (not included in the Cochrane Review) and 332 patients. This meta-analysis confirms previous findings that total laparoscopic hysterectomy takes longer to perfrom than vaginal hysterectomy (on average by 30 minutes), and similary, found no significant difference in the rate of any complications, short term or long-term, between vaginal hysterectomy and laparoscopic hysterectomy.

II. OBJECTIVES

1. To discuss the selection of route of hysterectomy for benign causes depending on the size and shape of the vagina and uterus; accessibility to the uterus ; extent of extrauterine disease; the need for concurrent procedures; surgeon training and experience; average case volume; available hospital technology, devices, and support; whether the case is emergent or scheduled; and preference of the informed patient.
2. To discuss the relative advantages and disadvantages of the approaches to hysterctomy in context of the patient‘s values and prefrences which will maximize benefits and minimize risks given the specific clinical situation.

III. MATERIAL AND METHOD

This Tertiary Care Hospital based prospective cohort study was conducted during 1stSEPTEMBER 2020 to 31stAUGUST 2022 in HITECH MEDICAL COLLEGE AND HOSPITAL for a period of 2 years. Total of 200 patients (50 patients in each group) were included in this study and were divided into 4 groups according to the route of hysterectomy.

GROUP A: maximum of 50 patients undergoing VH.
GROUP B: maximum of 50 patients undergoing TLH
GROUP C: maximum of 50 patients undergoing TAH.
GROUP D: maximum of 50 patients undergoing LAVH.

INCLUSION CRITERIA:

- Patients with informed consent.
- Age between 40-70 years.
- AUB with failure of medical management. (i.e. Refractory AUB)
- Patients with symptomatic fibroid.
- AUB with endometrial hyperplasia.
- Patients with prolapsed uterus.
- Chronic pelvic pain and PID (Refractory to conservative treatment)

EXCLUSION CRITERIA:

Patients refusing for Hysterectomy. Patients with fertility requirement. Advanced malignant cancer.

IV. RESULTS

Observation and Discussion: The study was a prospective cohort study with total number of 200 patients. Of these, 50 patients were recruited to study group A, who underwent VH. In the group B 50 patients were included who underwent TLH. Group C 50 patients were included who underwent TAH. Group D 50 patients were included who underwent LAVH, who met all the inclusion criteria

PRE-OPERATIVE CHARACTERISTICS

TABLE 1: MEAN AGE OF SUBJECTS

TYPE OF SURGERY	MEAN AGE IN YRS
VH	44±6.21
TLH	43±5.45
TAH	42±2.24
LAVH	43±4.45

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Mean age in VH group (study group A): 44±6.21yrs (mean ± 2 SD), maximum age being 62 years and minimum being 35 years. Mean age in TLH group (study group B): 43 ± 5.45 (mean ± 2 SD), maximum age being 55 years and minimum being 32 years. Mean age in TAH group (study group C): 42 ± 2.24yrs (mean ± SD).Mean age in LAVH group (study group D): 43 ± 4.45yrs ((mean ± SD).

TABLE 2: HISTORY OF MEDICAL ILLNESS

MEDICAL ILLNESS	VH (n=50)		TLH (n=50)		TAH (n=50)		LAVH (n=50)	
NO DISEASE	30	60%	36	72%	30	60%	36	72%
HTN	11	22%	7	14%	11	22%	7	14%
DM	5	10%	1	2%	5	10%	1	2%
HTN + DM	0	0	3	6%	0	0	3	6%
RHD	1	2%	1	2%	1	2%	1	2%
HTN + HYPOTHYROIDISM	2	4%	2	4%	2	4%	2	4%
RHD+HTN	1	2%	0	0	1	2%	0	0

There were 30 cases in the VH and TAH group and 36 cases in the TLH and LAVH group without any medical/surgical disorders. There were no statistically significant differences among all the groups TABLE 2 shows most common disease associated is HTN which is 22% inVH and TAH group and 14% in TLH and LAVH group. Other common illnesses associated are DM, DM & HTN and HYPOTHYROIDISM

TABLE 3: PREVIOUS H/O ANY SURGERY

PREVIOUS SURGERY	VH (n=50)	TLH (n=50)	TAH (n=50)	LAVH n=50)
PREVIOUS 2CS	0	1 (2%)	2 (4%)	4 (8%)
PREVIOUS 1CS	1 (2%)	3(6%)	2 (4%)	4 (8%)
NO SURGERY	49 (98%)	46 (92%)	46 (80%)	42 (84%)

As per TABLE 3 there was 1 case of previous 2CS in VH group. There were 3 cases of previous CS and one previous 2 CS in TLH group. In TAH group there were 2 cases with h/o previous 1 CS and 2 cases with h/o previous 2 CS. In LAVH group there were 4 cases with h/o previous 1 CS and 4 cases with h/o previous 2CS. In cases of any previous surgery , chances of injury to bladder is more while performing VH, so TLH and LAVH is preferred. In cases with previous 2 CS where laparoscopic surgery is difficult due to adhesion, TAH is preferred.

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TABLE 4: INDICATIONS FOR SURGERY

DIAGNOSIS	VH (n=50)	TLH (n=50)	TAH (n=50)	LAVH (n=50)
FIBROID	22 (44%)	26(52%)	30 (60%)	20 (40%)
AUB/DUB	13 (26%)	12 (24%)	13 (26%)	15 (30%)
ADENOMYOSIS	3(6%)	5(10%)	2(6%)	3(6%)
CIN	2(4%)	1 (2%)	0	1(2%)
CHRONIC CERVICITIS	6(12%)	1(2%)	4(8%)	8(14%)
ENDOMETRIAL HYPERPLASIA	4(8%)	2(4%)	1(2%)	2 (4%)
ENDOMETRIOSIS	0	3(6%)	0	1 (2%)

As shown in TABLE 4 most common indications for hysterectomy are Fibroid which is 44% cases in VH group, 52% in TLH group, 60% in TAH group and 40% LAVH group. Other common indications are AUB/DUB (malignancy being excluded in all the cases by D&C and endometrial biopsy), 26% inVH group,24% in TLH group, 26% in TAH group and 30% in LAVH group).Adenomyosis, CIN, Endometrial hyperplasia, Endometriosis. All cases of EH presented as Perimenopausal and postmenopausal bleeding, endometrial biopsy done and all are cases of EH without any atypia.

TABLE 5: INTRAOPERATIVE COMPLICATIONS

INTRA OP COMPLICATIONS	VH (n=50)	TLH (n=50)	TAH (n=50)	LAVH (n=50)	TOTAL	ANOVA test	df	P value
NO	45	46	40	47	178	3.095	3	0.377
BLADDER INJURY	05	01	02	01	09			
BOWEL INJURY	00	01	06	01	08			
URETERIC INJURY	00	02	02	01	05			
TOTAL	50	50	50	50	200			

As per TABLE 5 no complications was seen in 89% cases. There were 5 cases(10%) of superficial bladder injury in VH group which was repaired in layers by converting it to laparotomy. Whereas, 4 cases (8%) of intraoperative injuries were seen in TLH group which includes two bladder injury (4%) one suspected bowel injury (2%) and 2 cases of ureteric injuries (4%). 6 cases (12%) had intraoperative injury in TAH group which includes 2 (4%) case of bladder injury, 6(12%) cases of bowel and 2 (4%) ureteric injury. 3 cases (6%) had intraoperative injury in LAVH group which includes 1 (2%) case of bladder injury, 1(2%) case of bowel injury and 1 (2%) case of ureteric injury. Most of the above injury cases had h/o previous CS. Repair was done by converting it to laparotomy.Ureteric injury is more common while performing laparoscopic surgery as compared to VH. But comparing both the groups

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using ANOVA test, p value is 0.377 (<0.05 is significant) which is not significant.

POST OPERATIVE EVENTS:

TABLE 6: POST OP COMPLICATIONS

COMPLICATIONS	TYPE OF SURGERY				ANOVA test	df	P value
	VH	TLH	TAH	LAVH			
NO COMPLICATION	40	43	35	42	6.121	4	0.190
UTI	6	2	1	5			
FEVER	3	0	6	2			
RTI	1	2	1	1			
ABD DISTENSION	0	3	7	0			

As shown in TABLE 6 , 40 out of 50 patients in VH, 43 out of 50 patients in TLH group, 35 cases out of 50 patients in TAH group and 42 out of 50 patients in LAVH group did not develop any complications postoperatively. 6 (12%) patients in VH and 2 (4%) patients in TLH groups had UTI. 1patient in TAH group and 5patients in LAVH group and UTI. Post operatively fever was seen more in VH and TAH group (6% and 12% respectively). Other complications like RTI, abdominal distension etc are seen more in patients who had undergone TAH followed by laparoscopic surgery. Comparing post-operative complications of both the group using Pearson‘s chi-square test, p value is 0.190, which is not significant

TABLE 7: MEAN DURATION OF STAY IN HOSPITAL

TYPE OF SURGERY	MEAN DURATION OF STAY (DAYS)	p value (ANOVA test)
VH	3.66 ± 0.12	0.628
TLH	3.54± 0.21	
TAH	5.12±0.12	
LAVH	3.66 ± 0.12	

Mean duration of hospital stay in VH group is 3.66± 0.129 days (MEAN±2SD), in TLH group is 3.54±0.210 days (MEAN±SD),5.12±0.12 (MEAN±SD) and in LAVH group is 3.66 ± 0.12 (MEAN±SD). While calculating p value using unpaired t test p value is 0.628. So duration of hospital stay is comparable in both the groups.

V.DISCUSSION

The study was a cross sectional study which involved 200 patients. Of these 50 patients were recruited to study group A, who underwent vaginal hysterectomy. The other 50 patients were allotted to study group B who underwent total laparoscopic hysterectomy. Another 50 patients were allotted to study group C who underwent TAH. 50 more patients allotted to study group D who underwent LAVH. The aim is to compare the different complication rates and outcomes and their associations with the operation route. Different factors seem to influence the decision for the desired hysterectomy procedure.

INTRA OPERATIVE COMPLICATIONS: In our study, most commonly occurring intraoperative complications were urinary bladder lesions (9 cases). They occurred in 5cases of VH (42.9%) and in 2 of AH (28.6%) and 1 case of LAVH (Table 5).Injury to the intestine occurred in 1 case of TLH, in 6 cases ofTAH and once at LAVH in our study. All complications were managed by laparotomy by experts. A study conducted by Raxita Patel et al showed that bladder injury was found in 1 case of VH and 2 cases of LH group, bowel injury in 1 case of LH which was managed by expert laparotomy. 2 patients of LH and 4 of NVH group had vaginal bleeding but it was minimal and did not require any surgical management. Intra operative complication is higher in VH and TAH group than in LH group as evident from Table 5.

The lowest complication rate was recorded for LAVH (6%) and the highest complication rate for TAH (20%). The complication rate for VH was 10%, which is higher than for TLH (8%) and LAVH (6%) group. The two well established laparoscopic techniques for hysterectomy (LAVH and TLH) showed a lower complication rate than VH and AH due to the development of laparoscopic instruments, techniques and continuoussurgical training by training module. Moreover, increased surgeon experience with the laparoscopic technique has resulted in a low complication rate.

POST OPERATIVE COMPLICATIONS: As shown in Table 6, various post-operative complications noted among all the groups during hospitalization like fever, UTI, RTI, abdominal distension etc.complication. In this study the highest incidence of major and minor complications was recorded for AH (7.5%) and the lowest incidence for LAVH (4%) and TLH (3.5%). In this study fever accounted for 5% compared to 8% in the Raxitapatel et al study.Post-operative complications were more in TAH group but the difference between the two is not statistically significant.

DURATION OF HOSPITALISATION:

Mean duration of hospital stay in VH group is 3.6 days, in TLH group is 3.5days, in TAH group 5.1 days and 3.6 days as described in Table 24 & Figure 14.The difference is not statistically significant. The duration of hospitalization is comparable with the studies done by S.Taylor et al, PradeepGarg et al , Singh Abha et al and Raxita Patel et al. LAVH and TLH had the advantage of a shorter hospital stay (3 days) in comparison to AH and VH (6 and 5 days, respectively). In comparison to our study; Raxita Patel et al 2014 study agrees with our results that LH has a shorter hospital stay than VH and AH. The shorter hospital stay is one of the factors explaining the increase in the numbers of laparoscopic procedures compared to AH.

The number of laparoscopic operations is increasing steadily in our department whereas the number of VH and AH is decreasing steadily. The literature shows that the number of AH started to decrease by 6-7% after the development of the first laparoscopic hysterectomy by Harry Reich 1988. This study agrees with the benefits of LH over AH and VH over AH (Raxita Patel et all, K K Roy et al). However in both the groups, longer days of hospitalization needed where complications occurred and laparotomy was done, or any post-operative complications developed.

VI.CONCLUSION

Patients with uterine myomas, endometriosis, additional adnexal pathology and high BMI benefit from the laparoscopic access route in comparison to AH and VH. Patients with prolapse, a higher parity score and a low preoperative score benefit from VH compared to LH and AH. VH is a safe natural orifice route for patients with a large number of vaginal deliveries and a low uterine weight. LAVH and TLH are minimally invasive methods showing the lowest intraoperative and postoperative complication rate especially for patients with a high preoperative score and a high uterine weight. Laparoscopic hysterectomies showed the lowest hemoglobin decline and the shortest hospital stay and therefore should be the method of choice if VH is not possible. The ACOG, despite a minimal significant difference, still consider VH to be the method of choice, followed by LH. AH should be performed when LH is not possible. To sum up, the decision for the route of hysterectomy is dependent on the surgeon‘s experience and the indication for the operation. Shared decision-making and consent between the surgeon and patient is highly recommended. This decision should be individualized for each patient case to find the best route for hysterectomy.

VII. SUMMARY:

Background and aim: The aim of this study is to compare the data of patients and the operating parameters of the four different surgical techniques of hysterectomy (VH = vaginal hysterectomy, AH = abdominal hysterectomy, TLH = total laparoscopic hysterectomy, LAVH = laparoscopic-assisted vaginal hysterectomy).

Methods: A total of 200 patients underwent a hysterectomy in the period from September 2019 to August 2021 for benign uterine disease.

Material: The data were retrospectively collected from patients‘ records and analyzed. The evaluated data included patient‘s age, BMI, parities, former operations, indications of operation, duration of hospital stay, operating time, weight of uterus, hemoglobin fall and intra- and postoperative complications.

Statistical analysis: A statistical analysis was used to examine differences within the five groups concerning the analyzed parameters. Demographic and surgical data were analyzed by ANOVA, Pearson‘s chi-square test etc.

Results: The average age recorded for all hysterectomies was 43.95 years and the average BMI was 25.85. By comparing all methods, the most common indications for hysterectomy were fibroids (49%), AUB (26.5%),adenomyosis (7%). Other causes are, CIN, endometrial hyperplasia, endometriosis. The hospital stay was the longest for AH (5.12 days) and the shortest for TLH (3.54). For VH the average hospital stay was 3.66 days, and for LAVH 3.66 days. The shortest operating time was for VH (54.7 minutes) and the longest for TLH (125minutes). For AH the average operating time was AH 72.8 minutes and for LAVH 74.7 minutes. The lowest average hemoglobin decrease for LAVH was 0.70 g/dl, for AH 1.63 g/dl, whereas for VH it was 1.29 g/dl, and for TLH 0.82 g/dl. The lowest complication rate was recorded for LAVH and the highest for AH. The complication rate for VH was slightly higher than TLH and slightly lower than LAVH. The two well established laparoscopic techniques for hysterectomy (LAVH and TLH) showed a lower complication rate than VH and AH. The intraoperative complication rate for hysterectomies operations was 11%. The highest intraoperative complication rate occurred at abdominal hysterectomy (5%) and the lowest at LAVH (1.5%). The highest incidence of postoperative complications was recorded by TAH (7.5%) and the lowest by LAVH (4%) followed by TLH (3.5%)

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