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Comparative Study of Laparoscopically Assisted Vaginal Hysterectomy and Non-Descended Vaginal Hysterectomy

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Abstract

Background: *This study explores the nuances of surgical approaches for hysterectomy, focusing on Laparoscopic Assisted Vaginal Hysterectomy (LAVH) and Non-Descent Vaginal Hysterectomy (NDVH). Hysterectomy, the removal of the uterus, is a common gynecologic surgery, often involving additional procedures like oophorectomy and salpingectomy. While abdominal hysterectomy is prevalent, there is a growing interest in minimally invasive techniques like LAVH. The study compares the efficacy, complications, and patient recovery experiences of LAVH, combining laparoscopic and vaginal methods, with the traditional NDVH, which relies solely on vaginal access.*

Aim of the study: *This study aims to compare the efficacy, complications, and patient recovery experiences of LAVH and NDVH.*

Methods: *In a prospective comparative study at BSMMU, Dhaka, 30 hysterectomy patients from July 2007 to December 2007 were divided into the LAVH and NDVH groups. Inclusion criteria involved dysfunctional bleeding, fibroid uterus (≤2 weeks), or adenomyosis signs, while exclusion criteria included uterine prolapse and other conditions. Joel-Cohen's transvaginal hysterectomy technique or laparoscopically assisted vaginal hysterectomy (LAVH) under spinal or general anesthesia was performed based on randomization. Data analyzed various parameters, including operative time, blood loss, uterus weight, postoperative pain, and complications. Statistical analysis employed SPSS, reporting results using mean±SD for continuous and frequency/percentage for categorical parameters. Student's t-test determined significance (P<0.05).*

Result: *The study compares age, parity, comorbidities, uterine sizes, operation times, blood loss, and clinical outcomes between Laparoscopy-Assisted Vaginal Hysterectomy (LAVH) and Non-descent Vaginal Hysterectomy (NDVH) in 30 patients. LAVH shows higher <40 age group representation (60%), lower mean age (42.4±3.9), and a trend toward increased parity in the 2-4 range (73.33%). Comorbidity distribution reveals differences in hypertension (HT) and diabetes prevalence. Uterine sizes exhibit insignificant variations. LAVH has longer operation times (145.3±30.5 minutes) and higher blood loss (92.35±10.26 ml) compared to NDVH (81.7±10.2 minutes, 60.50±17.02 ml). Clinical outcomes differ in 3rd-day haemoglobin levels and analgesic requirements. Overall, the findings highlight nuanced distinctions, emphasizing the importance of comprehensive evaluation.*

Conclusion: *This study compared laparoscopically assisted vaginal hysterectomy (LAVH) and non-descended vaginal hysterectomy (NDVH), finding that LAVH had a longer operation time but reduced the need for postoperative analgesics. No significant differences were observed in pain levels, disappearance, or discharge day. The prolonged LAVH operation time suggests NDVH is a viable alternative, especially where laparoscopic expertise is limited. The study underscores the importance of considering surgical proficiency and resources when choosing between these hysterectomy methods in a given geographical area.*

Keywords: *Hysterectomy, LAVH (Laparoscopic Assisted Vaginal Hysterectomy), NDVH (Non-Descent Vaginal Hysterectomy) and Visual analog scale.*

Introduction

Hysterectomy involves surgically removing the uterus and cervix, with supracervical hysterectomy sparing the cervix. Additional procedures may include oophorectomy, salpingectomy, and removal of surrounding structures [1]. It is a common major abdominal surgery among gynecologic surgeons, influenced by various factors like surgical indications, training, uterine size, pelvic pathologies, and patient preference [2]. Laparoscopic-assisted vaginal hysterectomy (LAVH) is gaining popularity, although it is associated with longer operating times and increased intraoperative injuries compared to abdominal hysterectomy [3]. Approximately 70-85% of hysterectomies are performed abdominally, and only 30% are done vaginally. The demand for minimally invasive surgery, early recovery, absence of abdominal scars, and cost-effectiveness is increasing. Vaginal hysterectomy meets these criteria effectively [4]. The perceived challenges of vaginal hysterectomy, such as larger uteri, endometriosis, pelvic inflammatory disease, previous surgeries, and a narrow vagina, may complicate the procedure [4]. While vaginal hysterectomy is quicker than abdominal and LAVH, it is technically more complex. Laparoscopy can assist in vaginal surgery for cases involving suspected adnexal disease, endometriosis, narrow vagina, or uterine size exceeding 12 weeks gestation. Some studies compared short-term results and recovery experiences of vaginal hysterectomy with laparoscopically assisted vaginal hysterectomy [5,6]. LAVH, combining laparoscopic and vaginal techniques, demonstrates advancements in surgical technology, while NDVH relies solely on vaginal access. Both approaches aim to address conditions requiring hysterectomy, such as uterine fibroids, endometriosis, or malignancies. This study aims to compare the efficacy, complications, and patient recovery experiences of LAVH and NDVH.

Methodology and Materials

This prospective comparative study took place at the Department of Obstetrics and Gynecology in BSMMU, Dhaka, Bangladesh, spanning from July 2007 to December 2007, following approval from the institutional Ethics Committee. The research focused on 30 patients admitted for hysterectomy during this period, who were divided into two groups: Group A (LAVH) and Group B (NDVH), each consisting of 15 patients. Thorough history taking and clinical examinations were conducted for all participants. Subsequently, routine and specific investigations were carried out, and based on randomization, patients underwent either LAVH or NDVH. Monitoring ensued, and comprehensive data were gathered for subsequent analysis.

Inclusion Criteria

Patients exhibit dysfunctional uterine bleeding, possess a fibroid uterus of size ≤12 weeks, or demonstrate signs of adenomyosis.

Exclusion Criteria

Participants with uterine prolapse, endometriosis, extensive pelvic adhesions, adnexal masses, vaginal stenosis, or invasive cervical carcinoma will be excluded from the study.

Operational Definition

A transvaginal hysterectomy was carried out using the technique outlined by Joel-Cohen14, performed under spinal anaesthesia. Concurrently, a laparoscopically assisted vaginal hysterectomy (LAVH) was conducted

with the patient under general anaesthesia. The initial stages of the hysterectomy involved electrocoagulation and transection of the bilateral round ligaments; for patients opting to retain their adnexa, the fallopian tube and ovarian ligament were transected. Conversely, those opting for a salpingo-oophorectomy had their infundibulopelvic ligaments isolated, ligated, and transected. Identification of bilateral uterine arteries and the opening of the vesicouterine peritoneum facilitated the subsequent hysterectomy process. The vaginal component of the procedure commenced with anterior and posterior colpotomy, followed by the transaction of vesicocervical, cardinal, and uterosacral ligaments. Once the uterine vessels and adnexal collaterals were secured, the uterus was extracted, and the vault was subsequently repaired.

Data Analysis

The research focused on examining various parameters related to hysterectomy procedures. The factors investigated included the indication for hysterectomy, the type of hysterectomy performed (either LAVH or NDVH), operative time, estimated blood loss, weight of the uterus, postoperative pain measured through the visual analogue scale (VAS) and the need for analgesia, as well as both intraoperative and postoperative complications. Standard statistical methods were employed to analyze the outcomes of each surgical procedure. The collected data were organized and presented in tables or graphs based on their relationships. Detailed descriptions accompanied each table and graph to ensure clear comprehension. Statistical analysis was carried out using the Statistical Package for Social Science (SPSS) program on the Windows platform. Continuous parameters were reported as mean±SD, while categorical parameters were presented as frequency and percentage. Group comparisons for continuous parameters were conducted using Student's t-test, with a significance level set at $P<0.05$ to denote statistical significance.

Result

The age distribution comparison between LAVH and NDVH groups is in Table 1. Where, in the <40 age group, LAVH has a higher percentage (60%) compared to NDVH (33.33%), and though not statistically significant (p=0.35), variations in the >45 age group are observed. The mean age for LAVH is 42.4±3.9, slightly lower than NDVH (44.2 ± 4.0). Table 2 presents the parity distribution; it shows that in the 2-4 parity range, LAVH has a higher percentage (73.33%) than NDVH (60.00%). While not statistically significant (p=0.095), this suggests a trend toward increased parity in the LAVH group. In the 5-7 parity range, LAVH has a lower percentage (13.33%) than NDVH (40.00%). Regarding comorbidities in patients undergoing LAVH and NDVH groups. The comorbidity distribution indicates that hypertension (HT) is present in 6.67% of the LAVH group and 13.33% of the NDVH group. Diabetes is reported in 13.33% of both LAVH and NDVH groups. Additionally, the combination of HT and DM is observed in 6.67% of the NDVH group. Asthma and hypothyroidism each have a prevalence of 6.67% in the NDVH group, while there are no reported cases in the LAVH group for these specific comorbidities. The uterine sizes indicate that for sizes less than eight weeks, LAVH has a percentage of 42.90%, while NDVH has a lower percentage at 25.00%. However, the p-value (0.442) suggests that this difference is insignificant. In the 9-12 weeks category, LAVH has a slightly lower percentage (57.10%) compared to NDVH (75.00%), but again, the p-value indicates no significant difference (Table 4). Table 5 presents the operation times as none of the LAVH cases fall below 90 minutes, whereas 73.33% of NDVH cases have an operation time within this range (p-value <0.001). In the 90-120 minutes category, LAVH has a lower percentage (6.67%) than NDVH (26.67%). Conversely, for operation times exceeding 120 minutes, 93.33% belong to the LAVH group, while no cases in the NDVH group exceed this threshold. The mean operation time for LAVH is substantially longer at 145.3±30.5 minutes compared to NDVH at 81.7±10.2 minutes (Table 5). According to blood loss where none of the LAVH cases falls within the 30-60 ml range, while 20.00% of NDVH cases do (p-value <0.001). In the 61-90 ml range, LAVH has a higher percentage (66.67%) than NDVH (60.00%). For the 91-120 ml range, LAVH has a slightly higher percentage (33.33%) than NDVH (20.00%). Notably, no cases in either group experienced blood loss in the 121-180 ml range. The mean blood loss for LAVH is 92.35 ± 10.26 ml, considerably higher than NDVH at 60.50±17.02 ml (Table 6). Table 7 compares clinical outcomes between Laparoscopy-Assisted Vaginal Hysterectomy (LAVH) and Non-descent Vaginal Hysterectomy

(NDVH) for 30 patients. While 3rd-day pain scores are similar, NDVH exhibits significantly higher 3rd-day haemoglobin levels (p<0.001). LAVH has a slightly longer hospital stay (p=0.25), with comparable pain resolution days (p=0.837). Notably, LAVH requires significantly less analgesics (p=0.005). These findings emphasize nuanced differences in clinical outcomes, underscoring the need for comprehensive evaluation.

Table 1. *Age distribution of the study population based on groups (N=30).*

Age (years)	LAVH (N=15)		NDVH (N=15)		p-value
	n	%	n	%	
≤40	9	60.00	5	33.33	0.35
40-45	2	13.33	2	13.33	
>45	4	26.67	8	53.33	
Mean ± SD	42.4 ± 3.9		44.2 ± 4.0		

Table 2. *Comparison of parity according to two groups (N=30).*

Parity	LAVH (N=15)		NDVH (N=15)		p-value
	n	%	n	%	
2-4	11	73.33	9	60.00	0.095
5-7	2	13.33	6	40.00	
8-10	2	13.33	0	0.00	

Table 3. *Patients comorbidities.*

Comorbidities	LAVH (N=15)		NDVH (N=15)	
	n	%	n	%
Hypertension (HT)	1	6.67	2	13.33
Diabetes (DM)	2	13.33	2	13.33
HT+DM	0	0	1	6.67
ASTHMA	0	0	1	6.67
HYPO-THYROIDISM	0	0	1	6.67

Table 4. *Comparison of size of uterus between groups (N=30).*

Size of uterus (weeks)	LAVH (N=15)		NDVH (N=15)		p-value
	n	%	n	%	
<8	6	42.90	4	25.00	0.442
9-12	9	57.10	11	75.00	

Table 5. *Comparison of operation time between groups (N=30).*

Operation time (minutes)	LAVH (N=15)		NDVH (N=15)		p-value
	n	%	n	%	
< 90	0	0.00	11	73.33	<0.001
90-120	1	6.67	4	26.67	
>120	14	93.33	0	0.00	
Mean ± SD	145.3 ± 30.5		81.7 ± 10.2		

Table 6. *Comparison of blood loss during surgery.*

Range (in ml)	LAVH (N=15)		NDVH (N=15)		p-value
	n	%	n	%	
30-60	0	0.00	3	20.00	<0.001
61-90	10	66.67	9	60.00	
91-120	5	33.33	3	20.00	
121-150	0	0.00	0	0.00	
151-180	0	0.00	0	0.00	
Mean blood loss (ml)	92.35±10.26		60.50±17.02		

Table 7. *Clinical outcome of the study population (N=15).*

Outcome	LAVH (N=15)	NDVH (N=15)	p-value
Pain VAS on 3rd POD (0-10 cm)	4.1 ±1.74	5.2 ± 0.85	0.124
Level of Hb on 3rd postoperative day(gm/dl)	10.02 ± 0.4	10.9 ± 0.4	<0.001
Day of discharge	5.51 ± 3.22	4.6 ± 0.7	0.25
Day of disappearance of pain	5.11 ± 2.89	4.79 ± 0.6	0.837
Total amount of analgesics needed (mg)	181.1 ± 67.6	244.1 ± 40.12	0.005

Discussion

The surgical technique employed for performing hysterectomy is a crucial factor influencing postoperative morbidity in patients. Numerous prior studies have compared different hysterectomy approaches to establish a consensus on the optimal route [7]. Minimally invasive surgeries have been shown to offer advantages over abdominal hysterectomy in terms of acceptability, shorter hospital stays, and quicker return to work. However, these procedures require specialized skills that can be acquired over time [7,8]. NDVH is advantageous for its scarless nature compared to LAVH but is unsuitable for large uteri removal [9]. LAVH holds an advantage over NDVH, as it enables the removal of significantly larger uteri without a large abdominal incision, especially in the presence of pelvic pathology, adnexal mass, adhesions, and endometriosis when performed by a skilled surgeon [10,11]. In our tertiary care rural setup, we strive to provide the best possible treatment for rural females within the available resources. A total of 30 patients aged between 35- and 60-years undergoing hysterectomy were included and divided into two groups: fifteen underwent NDVH, and fifteen underwent LAVH. In our study, 60% of the LAVH group were aged ≤40 years and 53.33% of the NDVH group were aged >45 years, with mean ages of 42.4 years for the LAVH group and 44.2 years for the NDVH group, similar to other studies [12]. The mean parity was 5 in both groups, consistent with the study by Sarda et al. [11]. Consequently, LAVH was found to be more feasible for large uteri, potentially attributed to the surgeon's selection criteria for the operating procedure. This finding aligns with Shin et al.'s study, where LAVH was also deemed feasible for larger uteri [13]. The mean operating time was significantly shorter in the NDVH group (81.7±10.2 min) compared to LAVH (145.3±30.5 min) ($P < 0.001$). Intraoperative blood loss was significantly greater in the LAVH group (92.35±10.26 mL) than in the NDVH, with minimal blood loss observed in the NDVH group (60.50±17.02 mL). Similar studies by Sarada, Christian Schindlbeck, and Roy et al. supported the idea that NDVH required less operative time and exhibited minimal blood loss compared to TLH and LAVH [11,14-16]. Bladder injury occurred during vaginal entry into the peritoneum, diagnosed per-operatively, and repaired. The reported incidence of ureteral injuries is 0-2%, and the risk of bladder injuries ranges from 0.8-2%, consistent with the present study [11-15] [13,15-18]. In the vaginal hysterectomy group, more than two-thirds (68.7%) required four suture materials, while the remaining 31.3% needed three suture materials. In the LAVH group, 57.1% of patients required four suture materials, and the rest required 3, with the difference not being significant (p=0.510). One patient in the

LAVH group experienced a bladder injury, leading to a switch to abdominal hysterectomy. Regarding postoperative outcomes, the LAVH group exhibited a significantly lower haemoglobin level than the NDVH group on the third postoperative day ($p < 0.005$). No differences were observed between the groups regarding pain Visual Analog Scale (VAS) scores on the third postoperative day, day of discharge, and day of pain disappearance (Table 7). In the LAVH group, the mean±SD of analgesics was 181.1±67.6 mg; in the NDVH group, it was 244.1±40.12 ($p = 0.00\%$). This finding is similar to a Bangladeshi study by Khanam et al. in 2011 [12]. Only 15% of women in the LAVH group experienced fever after the operation, as opposed to none in the NDVH group, though the difference was not significant.

Limitations of the Study

Like all studies conducted in a hospital setting, the current investigation is not immune to certain constraints. The study's limitations are duly acknowledged, given its focus on a tertiary care center. Consequently, the findings of this hospital-based study may not be directly applicable to the broader general population. Additionally, it is important to note that the distribution of subjects across the three surgical routes was not uniform.

Conclusion and Recommendations

This study was to assess and compare the outcomes of laparoscopically assisted vaginal hysterectomy (LAVH) and non-descended vaginal hysterectomy (NDVH). The results revealed that LAVH had a significantly longer operation time than NDVH. Moreover, the LAVH group exhibited a noteworthy reduction in the need for postoperative analgesics. However, no statistically significant differences were observed between the two groups concerning variables such as pain visual analogue scale (VAS), the day of pain disappearance, and the day of discharge. Given the prolonged operation time associated with LAVH, NDVH may represent a viable alternative, particularly in regions where surgeons may have limited proficiency in laparoscopic techniques. This finding suggests that these two hysterectomy methods should be carefully considered, considering the available surgical expertise and resources in a given geographical area.

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