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Comparing Surgical Stress after Total Abdominal Hysterectomy (TAH) and Non-Descent Vaginal Hysterectomy (NDVH)

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Abstract
Background: Vaginal hysterectomy offers fewer complications, enhanced sexual satisfaction, faster recovery, and lower costs compared to LAVH and some laparoscopic surgeries. Often performed electively for non-life-threatening conditions, hysterectomy generally has a low mortality rate and minimal complications with modern techniques. Surgical decisions should be symptom-driven, aiming for high success in symptom resolution without causing additional difficulties. Regardless of the surgical approach, hysterectomy is a safe and effective procedure with minimal risks and excellent outcomes.
Methods: In this prospective, randomized trial, 20 women with noncancerous uterine conditions requiring a hysterectomy and a uterine size of less than 12 weeks were included. The participants were divided into two groups: TAH and NDVH. Each patient underwent a thorough medical evaluation, including history, physical examination, laboratory tests, and imaging studies.
Results: The TAH group had a shorter operation time, but NDVH patients experienced quicker recovery, earlier activity, and shorter hospital stays. NDVH also resulted in reduced pain, lower analgesic demand, and faster return to normal activities. TAH was associated with more acute pain and significant scarring, with no differences in blood loss or complications.
Conclusion: NDVH is a safer, more practical, and less invasive option compared to TAH. It results in less tissue damage, faster recovery, and fewer complications, making it the preferred method when feasible**.**

Keywords: Surgical Stress; Total Abdominal Hysterectomy; Non-Descent Vaginal Hysterectomy.

Introduction

The uterus is surgically removed during a hysterectomy, which is typically done by a gynecologist. Out of the three options, the most frequent are abdominal (TAH) and laparoscopically assisted, whereas the last one may need a shorter hospital stay (1). When performing a hysterectomy, laparotomy is the surgical procedure of choice. No one disputes, however, that vaginal hysterectomy improves convalescence and reduces hospital stay by reducing intra- and postoperative problems (2).

If the hysterectomy is being performed for benign reasons, the surgeon's training and experience, the size and shape of the vagina and uterus, the extent of extrauterine disease, the need for concurrent procedures, the available hospital technology, devices, and support, the case's urgency or scheduled status, and the informed patient's preference can all play a role in determining the surgical route. When compared to open abdominal hysterectomy, "minimally invasive" surgical methods including vaginal and laparoscopic procedures usually result in shorter hospital stays and postoperative recovery periods due to the lack of a big abdominal incision (3).

The well-documented benefits of minimally invasive hysterectomy techniques over abdominal hysterectomy warrant their use whenever possible. Among the less intrusive methods, the vaginal route is favoured. For individuals who do not qualify for or are able to have a vaginal hysterectomy, laparoscopic hysterectomy is an excellent substitute for open abdominal hysterectomy. Although less intrusive methods of hysterectomy are better, open abdominal hysterectomy is still a viable surgical choice for some individuals (4).

The degree of tissue damage directly correlates to the intensity of the inflammatory response triggered by acute trauma or major surgery. Tissue damage and inflammatory response are inversely linked to changes in C-reactive protein (CRP) and the cytokine interleukin-6 (IL-6) (5). Compared to VH and LH, the authors discovered that AH causes a more pronounced inflammatory response and surgical trauma (6).

Examining the differences and similarities in surgical stress after total abdominal hysterectomy (TAH) and non-descent vaginal hysterectomy (NDVH) was the driving force for this research.

Patients and methods

Twenty women enrolled between January 2019 and December 2019 in this prospective, randomised trial conducted at Benha University Hospital. The gynaecological outpatient clinic was the source for patient recruitment.

The patients' written informed consent was acquired. An explanation of the study's goal and a secret code number were given to each subject. The research did not proceed until it had received approval from the Research Ethics Committee at Benha University's Faculty of Medicine.

Inclusion criteria where hysterectomy is recommended for women whose uterus size is less than 12 weeks and who have benign uterine disease.

Exclusion criteria where the following conditions are considered contraindicated for this procedure: patients with preexisting medical conditions, recent trauma or systemic infections, uterovaginal descent greater than first degree, genital cancer, acute pelvic inflammatory disease, uterine size greater than 12 weeks, history of pelvic surgery, body mass index (BMI) greater than 35 kg/m2, narrow vagina, and the need for another concurrent surgery.

Grouping: women were selected and randomly divided into two equal groups: Group NDVH (n=10) and Group TAH (n=10).

All studied cases were subjected to: Detailed history taking, including [Demographic information (age, marital status, parity, previous surgeries, medical history, family history), menstrual history (age of menarche, menstrual cycle regularity, duration of menstrual bleeding, amount of menstrual bleeding, dysmenorrhea or menorrhagia), symptoms (pelvic pain, urinary symptoms, bowel symptoms, vaginal bleeding or discharge), surgical history (previous gynecological surgeries, previous abdominal or pelvic surgeries). **Full clinical examination including:** General examination [vital signs (blood pressure, heart rate, respiratory rate, temperature, general appearance and weight], abdominal examination including [inspection, auscultation and palpation] and pelvic examination including [external genitalia, vaginal examination and rectovaginal examination]. **Routine laboratory investigations including: [**Complete blood count, liver function, kidney function test, fasting & random blood glucose level, electrolytes, coagulation profile and urinalysis]. **Imaging studies including** [preoperative endometrial biopsy, transvaginal ultrasound, pelvic ultrasound and magnetic resonance imaging (MRI)].

Techniques of procedures:

In NDVH group: An incision was made all the way around the cervix at the cervicovaginal junction. The procedure included elevating the bladder, opening the vesico-uterine pouch anteriorly, and opening the Douglas pouch posteriorly. Clamping, cutting, and ligation of the uterosacral cardinal ligaments, uterine vessels, round ligaments, ovarian ligaments, and fallopian tubes followed. And lastly, the vaginal cuff and peritoneum were sealed.

In TAH group: via the incision made by Pfannenstiel During the procedure of an extrafascial complete hysterectomy, the following ligaments were clamped, cut, and ligated: round, ovarian, fallopian tubes, uterine, cardinal, and uterosacral. The abdominal wall, vaginal cuff, and peritoneum (both parietal and visceral) were subsequently stitched together.

Every operation was performed by the same surgical team using general anaesthesia and endotracheal intubation. Prior to surgery, all ladies were given the same intravenous antibiotic prophylaxis and medicine. In both groups, an intraperitoneal drain was left in place, either as a folly's catheter in NDVH or a protovac in TAH, and diathermy was the only method employed for haemostasis.

IL-6 levels assessment:

Before surgery and again 3, 24, and 72 hours after the procedure, blood samples were taken from every participant. Serum was extracted and kept at a temperature of -70°C. We used a quantitative sandwich immunoassay using an ELISA kit from Biosupply UK to evaluate the levels of IL-6 in the blood. Comparing IL-6 levels before and after surgery in the TAH and NDVH groups was the main laboratory result.

The main clinical outcome measures were:

From the moment of skin or vaginal incision closure, the total operating time was recorded. Subjective estimations of surgical blood loss were made by comparing the quantity and weight of gauze towels used, with the weight difference in grammes converted to millilitres of blood loss. We assessed the decrease in haemoglobin levels 24 hours after the surgery ended. Transfusion of blood, conversion from NDVH or TAH to relaparotomy, and visceral or intestinal damage were among the surgical consequences.

Hospitalisation was a part of the first postoperative care. Patients were categorised into five groups based on the severity of their discomfort after surgery: no pain at all (VAS = 0), mild pain (VAS 1-25), moderate pain (VAS 26-50), severe pain (VAS 51-75), and very

severe pain (VAS 76-100) (7). When the patient's temperature rose to 38 degrees Celsius in two separate readings taken at least four hours apart, this was deemed febrile morbidity. Women who participated in this research were not routinely provided analgesia after surgery, although their need for it was acknowledged. It was noted how long it took for the patient to release gas or stool after the surgery ended. Activities that required getting out of bed were timed in hours. Recovery period and postoperative vaginal length were included in the three months of remote postoperative follow-up.

Statistical analysis

Coded, inputted, and analysed using Microsoft Excel software, data was gathered from the patient's history, basic clinical examination, laboratory tests, and outcome measures. The data was then loaded into SPSS version 20.0, which stands for Statistical Package for the Social Sciences, in order to do the study. The following tests were used to determine whether there were significant differences, based on the kind of data: quantitative (represented by mean ± SD) and qualitative (represented by number and percentage). Using the Chi-square test (X2) to compare and correlate qualitative variables. Comparisons between quantitatively independent groups using a t-test. For findings to be considered significant, the P value had to be less than 0.05, and for results to be considered highly significant, it had to be less than 0.001. Statistical analysis was performed on the obtained data.

Results

Neither group differed much from the other, and most people in both categories had high parity. When it came to age, body mass index, clinical data (clinical uterine size/weeks, US uterine volume, and parity), and hysterectomy indication, there was no discernible grouping or correlation. Both groups included a significant proportion of women who were recommended for a hysterectomy due to premenstrual bleeding (PMB). There was no statistically significant difference between the two groups with respect to intra-operative problems, blood loss, or drop in haemoglobin levels (Table 1).

Table (1) Demographic, clinical data and indications of hysterectomy between TAH Group and NDVH Group

			TAH group (n=10)	NDVH group (n=10)	t	P
Age (years)			46.75±2.74	47.80±2.65	0.870	0.396
BMI (kg/m^2)			27.90±1.85	28.0±1.49	0.133	0.896
Clinical data distribution						
Clinical Uterine Size /weeks			9.0±1.49	8.30±1.63	1.000	0.331
US Uterine Volume /ml			87.50±16.54	96.60±19.55	1.123	0.276
Parity	**No**	**N**	0	1	3.02	0.31
		%	0.0%	10.0%		
	1-2	**N**	0	3		
		%	0.0%	30.0%		
	3-4	**N**	7	5		
		%	70.0%	50.0%		
	>4	**N**	3	1		
		%	30.0%	10.0%		
Indication Hysterectomy	**EH**	**N**	3	4	0.22	0.63
		%	30.0%	40.0%		
	PMB	**N**	7	6		
		%	70.0%	60.0%		

BMI: body mass index, EH: Endometrial hyperplasia PMB: peri-menopausal bleeding.

However, the TAH group had a much shorter operation time. See Table 2 for details on how the NDVH group fared in terms of activity, first flatus, length of hospital stay, and recovery time. In the first group, the pain was greater and more acute, but it was not substantially different from the second. The NDVH group had a substantially reduced demand for analgesics and a correspondingly decreased number of days on analgesics.

Table (2) Operation data and intra-operation complications between TAH Group and NDVH Group

	TAH Group	NDVH Group	t	P

			(n=10)	(n=10)		
Operation time			74.50±14.03	87.50±12.07	2.220	**0.039***
Blood loss			273.0±89.32	283.0±95.36	0.192	0.850
Hb decrease			1.10±0.35	1.13±0.37	0.167	0.869
Intra-operation	**-VE**	**N**	10	10		
complication		**%**	100.0%	100.0%	0.0	**1.0**
	+VE	**N**	0	0		
		%	0.0%	0.0%		

Hb: haemoglobin, *: statistically significant as p value <0.05.

There was a statistically significant association between scar and the TAH group (Tables 3 and 4).

Table (3)post-operation data, pain (VAS), analgesic time and needs distribution between TAH Group and NDVH Group

			TAH Group (n=10)	NDVH Group (n=10)	t	P
Post op Uterine Weight /gram			98.50±16.84	106.30±18.04	0.999	0.331
Activity /hours			17.60±6.32	5.60±1.84	5.672	**0.00****
Flatus /hours			24.0±8.02	10.10±3.12	3.762	**0.001****
Hospital stay /hours			69.60±17.70	34.80±8.85	5.558	**0.00****
Recuperation			22.80±4.84	9.80±2.29	7.660	**0.00****
Vaginal length			9.0±0.81	8.70±0.82	0.818	0.424
VAS 6h	**Mild**	**N**	2	4	0.95	0.32
		%	20.0%	40.0%		
	Moderate	**N**	8	6		
		%	80.0%	60.0%		
VAS 24h	**Mild**	**N**	2	6	3.33	0.068
		%	20.0%	60.0%		
	Moderate	**N**	8	4		
		%	80.0%	40.0%		
Analgesia days			10.50±3.25	2.10±0.70	5.046	**0.00****
Analgesia	**-VE**	**N**	0	4	5.0	**0.02***
need 6h		**%**	0.0%	40.0%		
	+VE	**N**	10	6		
		%	100.0%	60.0%		
Analgesia	**-VE**	**N**	0	6	8.57	**0.003***
need 24h		**%**	0.0%	60.0%		
	+VE	**N**	10	4		
		%	100.0%	40.0%		

VAS: visual analogue scale, *: statistically significant as p value <0.05.

There is no scar in vaginal hysterectomy **(Table 4)**

Table (4) Postoperative complications distribution between TAH Group and NDVH Group

			TAH Group (n=10)	NDVH Group (n=10)	X^2	P
Fever	**-VE**	**N**	9	9	0.0	1.0
		%	90.0%	90.0%		
	+VE	**N**	1	1		
		%	10.0%	10.0%		
Vaginal	**-VE**	**N**	7	7	0.0	1.0
spotting		**%**	70.0%	70.0%		
	+VE	**N**	3	3		
		%	30.0%	30.0%		
Infection	**-VE**	**N**	8	10	2.22	0.13

		%	80.0%	100.0%		
	+VE	**N**	2	0		
		%	20.0%	0.0%		
Scar	**-VE**	**N**	0	10	20.0	0.00**
		%	0.0%	100.0%		
	+VE	**N**	10	0		
		%	100.0%	0.0%		

*: statistically significant as p value <0.05.

Discussion

Worldwide, hysterectomy is second only to caesarean sections as the most prevalent major gynaecological surgery. Abdominal (AH), vaginal (VH), or laparoscopic hysterectomy are the three methods that may be used to treat benign uterine disorders. Worldwide, abdominal hysterectomy remains the most prevalent method, even though randomised trials have shown that vaginal and laparoscopic hysterectomies (VH and LH) result in superior clinical results and less surgical stress than anterior hysterectomy (AH) (8).

Regarding our findings, there was no significant difference in the age distribution between the TAH Group and the NDVH Group, with 46.75±2.74 and 47.80±2.65, respectively.

This confirms what Ekanayake et al. (9) discovered in a study with 10 women in the TAH group and 10 women in the NDVH group. When comparing the ages of the two groups, no statistically significant difference was found. The age range in the TAH group was 45.1-47.8 years, whereas in the NDVH group it was 45.5-49.7 years (P=0.63). Furthermore, there was no statistically significant difference in age between the three groups, as shown by Kanti et al. (10) in 60 instances of NDVH, 46 cases of LAVH, and 39 cases of TLH.

In terms of body mass index (BMI), there was no discernible variation across the groups, with 27.90±1.85 and 28.0±1.49 being the respective distributions.

These findings are consistent with those of Elmantwe and Ibrahim et al. (11) who also demonstrated that the TAH and NDVH groups were not significantly different with respect to BMI (P=0.38). In addition, Alamelu et al. (12) found that abdominal hysterectomy patients had a mean body mass index (BMI) of 23.82 kg/m², whereas those undergoing vaginal hysterectomy had a mean BMI of 23.95 kg/m². There was no discernible variation in body mass index (BMI) between the two categories.

We found no statistically significant correlation or difference between the groups, and most individuals in both were highly parity.

Since Ekanayake et al. (9). found no difference in parity (P=0.16) between the TAH, NDVH, and LAH groups, they concluded that the results were comparable. The fact that parity was not significantly different across the TAH, NDVH, and LAVH groups was also shown by Kanti et al. (10), which corroborated our findings.

The majority of women in both groups needed a hysterectomy due to PMB, and our research found no statistically significant differences or associations between the groups.

Our results were corroborated by Elmantwe and Ibrahim (11), who reported that medical treatment failure for PMB accounted for 60% of hysterectomy indications, endometrial hyperplasia (EH) for 25%, cervical intraepithelial neoplasia (CIN) for 15%, and no difference between the TAH and NDVH groups. In addition, these results are correlated with The Sarada clan The majority of hysterectomy indications were uterine fibroids, according to Murali and Kahn et al. (13) and there was no statistically significant difference between the TAH and NDVH groups.

We found no statistically significant difference in blood loss between the two groups, however the TAH group had a much shorter operation time.

On the other hand, Chen et al. (14) found that AH had a longer average operation time (VH: 95.6 ± 15.9 min, compared to 65.2 ± 10.6 min for VH; P<0.05) and lower average intraoperative blood loss (30.4± 10.5 ml for VH, 70.3 ± 18.6 ml for AH; P<0.05). We may attribute this difference to our small sample size. In addition, Balakrishnan and Dibyajyoti (15) disagreed with us because they discovered that the TAH group required substantially more time for the surgery (56.4 minutes) compared to the NDVH group (37.07 minutes), and that there was a significant difference in blood loss between the two groups (P<0.00001).

There was no statistically significant difference in the incidence of intraoperative complications between the two groups in our investigation.

By stating that the TAH and NDVH groups showed no difference in intra-operative

complications, Tiwari et al. (16) confirmed our findings.

Our data shows that the NDVH group had a much shorter hospital stay and more rapid recovery, as well as a considerably earlier onset of activity and first flatus.

Similar to our findings, Elmantwe and Ibrahim al. (11) found that the NDVH group (7-15 days) recovered faster than the TAH group (15-30 days) ($P<0.001$).

The TAH and NDVH groups, however, had similar lengths of hospital stays, as shown by Sarada Murali and Khan (17).

When it came to our job, the first group experienced more acute but not statistically significant discomfort. The NDVH group had a substantially reduced demand for analgesics and a correspondingly decreased number of days on analgesics.

Balakrishnan and Dibyajyoti discover the same thing. TAH required greater analgesia since the post-operative discomfort was reduced in NDVH (1.62 days) compared to TAH (3.72 days) ($P<0.00001$).

More importantly, our results were confirmed by Alamelu et al. (12) who demonstrated the use of the Numeric Pain rating scale to assess pain on the third day after surgery. The average score for the abdominal group was 4.11 and for the vaginal group it was 2.79. According to the Mann-Whitney test, the p-value for the difference between the two groups was less than 0.001.

There was a statistically significant association between scar and TAH group, according to our research.

After Jain and Chandrakar. (17) shown that NDVH is a scar-less alternative to TAH, they agreed with our method. Also, similar findings were shown by Sarada Murali and Khan (13), who found that compared to abdominal hysterectomy, non-descent vaginal hysterectomy is better since it is a scarless procedure with less problems.

There were a number of caveats to the present research that restrict its generalisability: its small sample size, its status as a single-center study, and the fact that different consultants used different techniques for each procedure.

Conclusion

Compared to complete abdominal hysterectomy, non-discectomy vaginal harvesting (NDVH) is more practical, safer, and comforting for the patient, and it doesn't add time to the procedure, recovery time, hospital stay, or scar. There is less tissue damage and better postoperative clinical outcomes associated with NDVH, hence it should be used instead of TAH whenever feasible.

If researchers want more precise findings, they should conduct more studies using bigger and stratified samples. To get more generalised findings, it's best to do a research that involves many centres. Research on the long-term effects of TAH and NDVH is needed. Researchers will need to investigate the psychological and sexual impacts of TAH and NDVH on women in future research.

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Author contribution

Authors contributed equally to the study**.**

Conflicts of interest

No conflicts of interest

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