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Original article

Retrospective Comparison of Non-descent Vaginal Hysterectomy and Total Laparoscopic Hysterectomy for Bulky Uterine Fibroids

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Abstract:

Objective: To compare perioperative consequences and costs in patients with a bulky fibroid uterus sizing ≥ 12 weeks who underwent either non-descent vaginal hysterectomy (NDVH) or underwent total laparoscopic hysterectomy (TLH) for non-descent uteri. **Patients and methods:** A retrospective analysis included 105 patients with a bulky fibroid uterus sizing ≥ 12 weeks; it was performed between January 2015 and April 2023 in Benha University Hospital. NDVH and TLH groups enrolled 56 and 49 patients respectively. **Results:** Both groups' participants were analogous as regards age, parity, pre-operative mean hemoglobin levels, hematocrit value, accompanying comorbidities, previous CS numbers and parallel indications for hysterectomy, but higher preoperative HBA1c and briefer preoperative hospital admittance (p<0.0001) were noticed in NDVH group. There was no variance between both clusters concerning operative time, blood loss, intra-operative complications, necessity for blood transfusion and rates of incidental cystotomy (p>0.05). An elevated variances (p<0.0001) inspiring consequence of NDVH involved need for general anesthesia, shorter LOS, lesser need for analgesics consumption as well as briefer demand for postoperative venous thromboembolic prophylaxis (VTE), former ambulation, to pass flatus and return to daily activity. Estimated hospital costs were lower in the NDVH group (p<0.0001). **Conclusion:** In patients with a bulky fibroid uterus who may undergo hysterectomy, NDVH is a safe and efficient choice, and the bulky fibroid uterus shouldn't deliberate any more as a frontier to execute NDVH, even more endorsing the NDVH trial as our study results are appeasing NDVH over TLH especially regarding total costs and perioperative consequences.

Keywords: non-descent vaginal hysterectomy; vaginal hysterectomy; hysterectomy; total laparoscopic hysterectomy; retrospective study; bulky uterus; fibroids.

Abbreviations:

NDVH: Non-Descent Vaginal Hysterectomy, TVH: Total Vaginal Hysterectomy, TLH: TotalLaparoscopic Hysterectomy, CS**:** Cesarean section, TAH: Total Abdominal Hysterectomy, SOGC: Society Obstetrics and Gynecology of Canada, AAGL: American Association of Gynecologic Laparoscopists, ISGE: International Society of Gynecologic Endoscopy, ACOG: American College of Obstetricians and Gynecologists, DHA: Danish Health Authority, PHBA1C: Pre-Operative Glycated Hemoglobin A 1C, LOPA: Length of Preoperative Administration, VTE: venous thromboembolism, BS: Bilateral salpingectomy, BSO: Bilateral Salpingo-Oophorectomy

Introduction:

Uterine fibroids are highly prevalent and can lead to symptoms such as abnormal uterine bleeding and pelvic pain (2-3). Hysterectomy is a usual alternative treatment for women with symptomatic uterine fibroids who have completed childbearing or when conservative treatment is failed (1-2). There are several surgical approaches to Hysterectomy, including abdominal (TAH), vaginal (TVH), laparoscopic techniques (TLH) and robotic (RH) (5-6).

Non-descent vaginal hysterectomy (NDVH) is a minimally invasive hysterectomy (MIH) that involves extirpation of a non-prolapsed uterus through the natural orifice (NOS)without the need for a laparotomy incision as TAH or multiples laparotomy cuts as in TLH and RH (7, 8). NDVH has numerous benefits over TAH, such as reduced postoperative pain, shorter hospital stays, and faster recovery (9-10). Conversely, the use of NDVH in women with bulky uterine fibroids has traditionally been limited due to fears of increased technical difficulty and risk of complications (11-12).

TLH is another MIH that involves extirpation of the uterus through small abdominal incisions. TLH has emerged as a popular alternative to TAH rather than TVH, offering benefits of MIH such as decreased blood loss, reduced postoperative pain, and shorter hospital stay (4-5,). Moreover, TLH has been increasingly utilized in patients with bulky uterine fibroids, as the laparoscopic approach enables better visualization and more precise dissection (23-24).

Despite the increasing utilization of MIH, there is limited evidence comparing the perioperative outcomes of NDVH and TLH in women with bulky uterine fibroids. A few prospective, retrospective and reviews studies have reported conflicting results, with some suggesting that neither approach is superior in terms of perioperative outcomes (33-49), while others found that TLH may be associated with better outcomes, such as reduced operative time, blood loss, length of hospital stay and costs (4&49).

Tissues extraction is another area of inadequate evidence when assessing the NDVH and TLH in women with bulky uterine fibroids larger than 280 grams. Morcellation, Hemi-section Technique, Intra-myometrial Coring, Wedge Resection, Posterior Fundal Morcellation, Cervical Amputation, Myomectomy, Pryor's Technique and Doyen Method are methods of size reduction during NDVH in women with bulky uterine fibroids of larger size (21-22). Tissues extraction in TLH could be vaginal as in NDVH or abdominal contained or uncontained, manual, or electromechanical (50-51). Cost of both procedures is also another area of restricted evidence when comparing the NDVH and TLH in women with bulky uterine fibroids, dispute that direct costs of NDVH are lower than TLH secondary to laparoscopic disposable and highly sophisticated equipment, there are some reports regarding operative room duration costs and indirect costs which were more with NDVH than TLH (59-60). Given the ongoing debate and the need for high-quality evidence, it is crucial to conduct this retrospective analysis.

Patients and methods:

A retrospective analysis included 105 patients with a bulky fibroid uterus sizing ≥ 12 weeks. This study was performed between January 2015 and April 2023 in Benha University Hospital. NDVH and TLH groups comprised 56 and 49 patients respectively. We conduct a retrospective study between January 2015 and April 2023 in which, charts of patients with bulky uterine fibroid sizing ≥ 12 weeks received either NDVH or TLH at Obstetrics and Gynecology Department of Benha University Hospital, Benha, Egypt. were checked and relevant parameters were extricated and organized. The Ethical Scientific Committee of Benha University approved this study (NO: RC.20.3.2023). Written consent from participants was unsolicited as this is a retrospective study.
Patients were included if they had bulky uterine fibroid sizing ≥ 12 weeks, non-prolapsed uteri, age ≥18 years old, accomplishing of general in TLH group or spinal anesthesia in NDVH group, accomplishing of hysterectomy via vaginal or laparoscopic route, with benign uterine illnesses and clinical follow-up till completely healed or complete ≥ 30 days postoperatively.

We omitted patients if malignancy was suspected, having a second-degree uterine decent or more after accomplishment of the anesthesia, with preceding lower abdominal surgery other than CS, with a major surgical intervention other than hysterectomy and those with incomplete medical records.

The gathered pre-operative data included age, body mass index (BMI), parity, indications for hysterectomy, comorbid medical situations, previous abdominal or vaginal surgery, length of preoperative hospital administration (LOPA) to control the comorbid situations as uncontrolled diabetes mellitus and hemoglobin (HB) concentration (CBC), as well as percentage of glycated hemoglobin A1C (HBA1C) in diabetic patients.

The gathered intra-operative consequences were a type of surgical procedure either conventional suturing or vessel sealing such in the NDVH group as well as additional procedures such as BSO, BS, cystectomy, restore of damaged visceral organ as urinary bladder, morcellation techniques to extract the uterine tissues either vaginally or through electromechanical morcellation or thought mini-laparotomy manual morcellation, operative time, type of anesthesia either general or spinal, estimated blood loss (EBL), Intra-operative complications involved major blood vessel or organ injury (including bowel, bladder and ureter) and necessity for blood transfusion.
The gathered post-operative data were the length of postoperative hospital stay (LOS), HB concentration(CBC), hematocrit value, return to theatre; pelvic or vault hematoma, vault cellulitis, vault dehiscence, vault abscess, abdominal wound status in TLH group or in conversion cases to abdominal routes involving cellulitis, seroma collection, wound dehiscence, length of wound maintenance, necessity to reoperate on wound sequels, pelvic infection, urinary tract infection, thromboembolic disease, other medical situations deterioration as well as hospital readmission. The gathered parameters of all involved patients in this study were arranged and anonymized.

We classified total costs into three divisions: admission cost, anesthesia expenses, and operation cost. Admission charges included ward fee, pre-and postoperative management expenses, and extra fees for postsurgical problems. Anesthesia expenses only involved expenses of anesthetic drugs during operation. Operation costs included operative material costs but excluded elective practice charges such as private fees and governmental salaries. We considered nearby private centers costs as a cost estimation during the time of writing this manuscript. The gathered outcome points were: 1) LOP,2) EBL, 3) Operative troubles such as blood transfusion, switching to abdominal route and the cause of shifting, bowel or visceral injuries, (4) alteration in hemoglobin(HB gm/dl) value (the alteration between preoperative and postoperative HB)(Δ HB gm/dl), 5) Early postoperative follow up involving : (a)LOS (b) Proportion of severe and very severe postoperative pain, (c) Febrile morbidity, (d) Necessity for analgesic drugs and its amounts, (e) Time to pass stool or gas from end of the operations, f) Time to get out of bed activity. 7) Time to restore to their daily activities, g) costs including admission cost, anesthesia expense, and operation cost in local Egyptian currency (LE).

We performed statistical evaluation by Medcalc easy-to-use statistical software for Windows desktop (www. medcalc.org) 2016. Continuous variables were presented as mean ± standard deviations and range, unpaired independent two samples student's ***t***-test was employed to compare usually distributed continuous variables between the NDVH and TLH groups. Categorical variables were shown as numbers and percentage and were assessed using either Fisher's exact test or Pearson's Chi-square test as inquiry methods to identify variations between the groups. Statistical significance was viewed if p was<0.05.

Results:

One hundred and five patients with bulky uterine fibroid were included in this retrospective investigation, 56 patients received NDVH, under spinal anesthesia, while 49 patients received TLH under general anesthesia.

The clinical and demographic properties of participants were reported in table (1). Patients in both groups were analogous regarding age, BMI, parity, clinical uterine size 12 to 24 weeks, Ultrasound uterine volume 280 -1200Cm3, absence of prior vaginal delivery, preoperative hemoglobin (gm/dl), preoperative HB, the accompanying preoperative medical comorbidities as well as the indication for hysterectomy. While there were variances concerning patients' proportion with uncontrolled diabetes mellitus (DM)(p<0.005) which was greater in NDVH group this is due to tendency of NDVH gynecologic surgeon performing this cases under spinal anesthesia with minimal tendency to abdominal conversion, while the LOPA to handle the medical comorbidities was too shorter in NDVH group (p<0.0001) this also could be explained as most of the cases in NDVH were in direct supervision of the same GS with his tendency against preoperative blood transfusion for preoperative HB correction in favor of intravenous iron and subcutaneous erythropoietin and the pre-Operative Glycated Hemoglobin A 1C (PHBA1C) was higher in NDVH group(p<0.004) as

presented in table (1). All this divergences could be enlightened on basis that the NDVH patients were operated vaginally where no abdominal wound was suspected and so lessening preoperative HBAIC considered unimportant and this was an innate of NDVH operator to abbreviate the preoperative as well as the postoperative hospital stay. Preoperative transfusions were more in the TLH group while preoperative IV iron and preoperative erythropoietin were significantly utilized in the NDVH group.

The intraoperative results of the participants were shown in table (2). The variations between groups concerning LOP, EBL, intraoperative sequels including visceral injuries and blood transfusion were parallel. Twelve patients were switching to laparotomy, 5 in the NDVH cluster and 6 in the TLH cluster, the cause was the inability to retrieve the uterine tissues. In all women in NDVH and TLH clusters morcellations techniques were utilized but in NDVH morcellations were exclusively vaginally but in TLH were both vaginal (45/49) and abdominal (4/49). In the NDVH arm, more patients remarkably underwent BS (p<0.0001), while in the TLH arm, considerably excess patients underwent BSO (p<0.0001). This could be returned to gynecologists' opinions toward such topics. As respects to vesical injuries there were no variances (p = 0.17) in rates between both clusters, in the NDVH cluster there were 2/59(3.7%), all were fixed by the primary gynecologist while in the TLH cluster there were 5/49 (10.3%), also fixed by the primary laparoscopic gynecologist, all patients who had an incidental cystotomy and primary repair displays sound postoperative consequence concerning these complications. Uterine weight postoperatively (gram) incidentally was significantly higher in the TLH group(p<0.0001).

Table (3) displayed an early and late postoperative consequences. Participants of NDVH showed a minor proportion with severe pain categorized at 6h and 24 h postoperative and lesser consumption of analgesia (narcotic and NSAID) (p < 0.0001) and more women with postoperative nausea & vomiting (p < 0.0001) and more blood transfers postoperatively in TLH group (p=0,008). Neither groups' participants demonstrated a significant difference concerning the decrease in 24-hour hemoglobin (p = 0.06), the decline in 24-hour hematocrit (p= 0. 08). Febrile morbidity (p=0.9), pelvic cellulitis (p=0.5), cystitis (p=0.9). The discrepancies were statistically substantial between NDVH and TLH groups concerning the time to get out of bed (p<0.0001), time to pass flatus (p<0.0001), LOS (p<0.0001), return to usual activity time (p<0.0001), wound complications (p<0.0001), reoperation for wound (p=0.004), the necessity for venous thromboembolism (VTE) prophylaxis(days) (p=0.009) and period of VTE prophylaxis(days) (p<0.0001). All these elements supportive advantage of NDVH over TLH in patients with large fibroid uteri. Postoperative uterine weight was significantly higher in the TLH group than NDVH, but this was deemed clinically insignificant.

Table (1): Demographic and clinical attributes of patients who underwent **NDVH or TLH**

Variable	NDVH (n=56)	TLH (n= 49)	Δ(95% CI)	*p* value
- Age (year)	42.6 ±5.3 (38– 50)	43.7 ± 5.5 (41– 51)	1.1 (-0.99 to 3.19)	0.29
- Parity	2.3± 1.3 (0 - 5)	2.2± 1.1(0 – 7)	-0.1 (-0.56 to 0.36)	0.67
- BMI (kg/m2)	31.4 ± 5.6 (21.5 – 44.5)	30.3 ± 6.6 (22.5 – 47.6)	-1.1 (-3.46 to 1.26)	0.35
- Clinical uterine size (weeks)	15.3 ± 4.5 (12 – 24)	15.6 ± 4.8 (12 – 24)	0.3 (-1.5 to 2.1)	0.74
- Ultrasound uterine volume Cm^3	550 ± 130 (280 – 1100)	605 ± 140 (280 – 1200)	55 (2.72 to 107.27)	0.039
- Nulliparity	5(8.9%)	10(20.4%)	11.5% (-2.14% to 25.65%)	0.094
-Absent of prior vaginal birth	12(21.4%)	15(30.6%)	9.2% (-7.42% to 25.61%)	0.28
-preoperative HB (g/dl)	11.9±2.3(10.5-13.5)	12.7±2.2(10.8-12.9)	0.8 (-0.07 to 1.67)	0.07
-preoperative hematocrit %	35.7±6.9(31.5-40.5)	38.1±6.6(32.4-38.7)	2.4 (-0.22 to 5.02)	0.07
-preoperative transfusions	4(7.1%)	15(30.6%)	23.5% (8.68% to 38.06%)	0.001
-preoperative IV iron	15(30.6%)	3(6.1%)	24.5% (9.73% to 38.09%)	0.001
-preoperative erythropoietin	14(25%)	1(2%)	23% (10.17% to 35.79%)	0.0008
- Previous pelvic surgery:				
- Cesarean section	14(25%)	11(22.4%)	2.6% (-13.83% to 18.4%)	0.75
- other	3(5.35%)	2(4.08%)	1.27% (-8.98% to 10.97%)	0.76
-virgin lower abdomen	39(69.64%)	36(73.46%)	3.82% (-13.44% to 20.4%)	0.66
- Comorbidity:				
- HTN	10(17.85%)	9(18.36%)	0.51% (-14.11% to 15.68%)	0.94
- DM	8(14.28%)	7(14.28%)	0% (-13.51% to 14.15%)	1
- uncontrolled DM	5(8.92%)	0(0%)	8.92% (0.06% to 19.24%)	0.03
-PHBA1C (%)	8.1±3.5(5.1%-17.4%)	6.3±3.6(4.9%-7.8%)	-1.8 (-3.17 to 0.42)	0.01
-LOPA (days)	4.9± 2.3(2-12)	10.5± 4.2(2-21)	5.6 (4.31 to 6.88)	0.0001
-ASA score :				
-ASA1	35(62.5%)	37(75.51%)	13.01% (-4.79% to 29.41%)	0.15
-ASA 2	9(16.07%)	12(24.48%)	8.41% (-6.93% to 23.87%)	0.28
-ASA 3	9(16.07%)	0(0%)	16.07% (5.7% to 27.8%)	0.0035
-ASA 4 .	3(5.35%)	0(0%)	5.35% (-2.72% to 14.59%)	0.1
- Indication for hysterectomy:				-
- Fibroid	56(100%)	49(100%)	0% (-7.2% to 6.4%)	1
- PMB	30(53.57%)	32(65.3%)	11.73% (-6.97% to 29.16%)	0.22
- EH	6(10.71%)	5(10.2%)	0.51% (-12.37% to 12.71%)	0.93
- Adenomyosis	14(25%)	15(30.61%)	5.61% (-11.24% to 22.44%)	0.52
-CIN	5(8.92%)	6(12.24%)	3.32% (-8.88% to 16.33%)	0.58

for bulky uterine fibroid sizing ≥ 12 weeks**.**

Abbreviations: **NDVH:** Non-Descent Vaginal Hysterectomy, **TLH:** Total laparoscopic Hysterectomy, **BMI:** Body Mass Index, **HTN:** Hypertension, **DM:** Diabetes Mellitus,**PMB:** Perimenopausal Bleeding, **EH:** Endometrial Hyperplasia, **CIN:** Cervical Intraepithelial Neoplasia. **PHBA1C:** Pre- Operative. GlycatedHemoglobin A1C, **LOPA:** Length of Preoperative Administration, **ASA:**American Society of Anesthesiologists

- Values were given as mean ± standard deviation (range) or number (percent). ***p<0.05:*** *Statistically significances*

Table (2): Comparison of intra-operative consequences and costs of women who underwent **NDVH or TLH** for bulky uterine fibroid with sizing ≥ 12 weeks**.**

Outcome	**NDVH (n=56)**	**TLH (n= 49)**	**Δ(95% CI)**	***p* value**
Total operative time (min)	140±40 (120–210)	160±65 (40-280)	20 (-0.61 to 40.61)	0.057
Operative blood loss (ml)	575 ± 160(300-1500)	545 ± 150(450 - 1500)	-30 (-90.29 to 30.29)	0.32
I.O blood transfusion	2(3.57%)	7(14.28%)	10.71% (-0.45% to 23.35%)	0.051
General anesthesia	15(26.78%)	49(100%)	73.22% (58.49% to 83.04%)	< 0.0001
Endotracheal tube	5(8.92%)	49(100%)	91.08% (78.45% to 96.13%)	< 0.0001
Spinal anesthesia	56(100%)	0(0%)	100% (90.3% to 100%)	< 0.0001
Morcellations techniques	56(100%)	49(100%)	0% (-7.2% to 6.4%)	1
Vaginal	56(100%)	45(91.8%)	8.17% (0.066% to 19.19%)	0.03
Electromechanical	0(0%)	5(10.2%)	10.2% (1.57% to 21.75%)	0.014
Estimated Costs*				
admission cost	1.985±0.345(1.5-3.5)	2.945±0.567(2K-8K)	0.96 (0.82 to 1.09)	< 0.0001
anesthesia charge	0.325±0.095(.15-.6)	2.435±0.985(1.5-3.5)	2.11 (1.84 to 2.37)	< 0.0001
operation cost	4.559±0.768(4K**-5K)	7.675±1.45(7K-9K)	3.11 (2.67 to 3.55)	< 0.0001
I.O complications				
- visceral injuries	2 (vesical) (3.57%)	5(vesical) 10.2%	6.63% (-3.67% to 18.46%)	0.17
- blood transfusion	7(12.5%)	8(16.32%)	3.82% (-9.77% to 18%)	0.57
-conversion to laparotomy	5(8.92%)	6(12.24%)	3.32% (-8.88% to 16.33%)	0.58
Concomitant procedures				
-BS	42(53%)	48(55%)	2% (-16.57% to 20.31%)	0.83
- BSO	36(46%)	38 (44%)	2% (-16.55% to 20.27%)	0.83
- others	4(7.14%)	5(10.2%)	3.06% (-8.33% to 15.39%)	0.57
-P. O uterine weight(g)	510 ± 75 (280 – 1250)	580 ± 85 (280 – 1450)	70 (39.03 to 100.96)	< 0.0001
-Uterus weight (category)				
-Large (280–600 g)	44(78.57%)	36(73.46%)	5.11%(-11.01% to 21.37%)	0.54
-Very large (>600 g)	11(19.64%)	13(26.53%)	6.89%(-9.09% to 22.93%)	0.4

NDVH: Non-Descent Vaginal Hysterectomy; **TLH:** Total laparoscopic Hysterectomy; **(95% CI)**: Point estimate difference with 95% confidence interval; **BS:** Bilateral salpingectomy; **BSO:**Bilateral Salpingo-Oophorectomy; **I.O:** intraoperative; **P.O:** postoperative; *: estimated costs were calculated in Egyptian currency (LE); **: K=1000LE; Values were given as mean ±standard deviation(range) or number (percent).;
P<0.05:*Statistically significances*

Table (3): Comparison of early and late postoperative consequences between women who underwent **NDVH or TLH** for bulky uterine fibroid sizing ≥ 12 weeks**.**

Outcome	**NDVH (n=56)**	**TLH (n= 49)**	**Δ(95% CI)**	***p* value**
Postoperative pain				
- severe at 6h	17(30.35%)	29(58.18%)	27% (8% to 44%)	0.0043
- severe at 24 h	8(14.28%)	18(36.73%)	22% (5% to 38%)	0.0081
Analgesic requirements over 24h				
-Total narcotic (mg)	17.8 ± 7.2(10-40)	32.2 ± 9.8(10-50)	14 (11 to 17)	0.0001
-Total parental NSAID (mg)	140± 45(100-300)	230 ± 70(100-350)	90 (67to112)	0.0001
Postoperative nausea & vomiting	8(14.28%)	28(57.14%)	42% (24% to 57%)	0.0001
Postoperative blood transfusion	1(1.78%)	8(16.32%)	14% (3% to 27%)	0.0082
Time to get out of bed (h)	4.7 ± 1.6(2-12)	8.3 ± 2.6(2-14)	3.6 (2.77 to 4.42)	0.0001
Time to flatus(h)	6.8 ± 2.2(3-24)	11.1 ± 3.8(1-300)	4.3 (3.11 to 5.48)	0.0001
decline in hemoglobin at (24h)	1.4 ± 0.6(0.5-1.7)	1.2± 0.5(0.7-1.9)	-0.2 (-0.41 to 0.01)	0.068
LOS (days)	0.9 ±0.5(0.5-10)	3.2± 1.9(1-12)	2.3 (1.77 to 2.82)	< 0.0001
Return to usual activity time (day)	9.6 ± 4.6(3-15)	14.9 ± 5.9(10-26)	5 (2.96 to 7.03)	< 0.0001
Resumption of coitus(days)	14.6 ±6.4(4-50)	35.5±5.8(5-60)	20.9 (18.52 to 23.27)	< 0.0001
Febrile morbidity	10 (17.85%)	9 (18.36%)	0.5% (-14% to 15%)	0.94
Vaginal spotting	12 (21.42%)	13(26.53%)	5% (-11% to 21%)	0.54
Pelvic cellulitis	4 (7.14%)	5(10.2%)	3% (-8% to 15%)	0.57
Cystitis	12 (21.42%)	11(22.44%)	1% (-14% to 17%)	0.9
Wound complications	1(1.2%)	1(1.1%)	0.1% (-8% to 7%)	0.96
Reoperation for wound	1(1.78%)	1(2.04%)	0.2% (-7% to 9%)	0.92
Need for VTE prophylaxis(days)	5(8.92%)	14(28.57%)	19.65% (4% to 34%)	0.0094
Duration of VTE prophylaxis(days)	1.1±0.4 (0.5-3)	3.8±1.5 (0.5-7)	2.7 (2.28 to 3.11)	0.0001
postoperative vaginal length(cm)	7.2±1.3(5-10)	7.4±1.4(5-10)	0.2 (-0.32 to 0.72)	0.44
Vesicovaginal fistula	2*(3.57%)	3**(6.12%)	2.55% (-6% to 13%)	0.5

Abbreviations: **NDVH:** Non-descent vaginal hysterectomy, **TLH:** Total laparoscopic Hysterectomy, **Δ(95% CI)**: Point estimate difference with 95% confidence interval, **NSAID:** Non-steroidal anti-inflammatory drugs, **VTE:** venous thromboembolism**, LOS:** length of postoperative stay in hospital

- Values were given as mean ± standard deviation or number (percent). ***P<0.05:*** *Statistically significant.*

Discussion:

The ability to extirpate the non-descent uteri vaginally is the hallmark of the real gynecologic surgeon (11,22,64). TVH is the gold stranded for benign uterine condition for uterine size up to 12 weeks or up to 280 grams according to ACOG, SOGC, ISGE, RCOG, AAGL, DHA, SGS (4,5,8,9,10,13,66) as TVH is the most cost-effective, value-based over TAH, TLH (7,34,36,37,39,42,47,48,58,59,60,61,62,64, 67,68). A pioneer in gynecologic surgery takes multiple steps in TVH beyond this edge and tried all cited contraindications with excellent success as prior pelvic surgeries include cesarean sections, larger uteri up to 3 kilograms, nulliparity, absent prior vaginal birth, morbid obesity, need for oophorectomy (11-22,63,66).

TVH and TLH shouldn't be categorized into MIH, as there are multiple levels of invasion with TLH, including Laparoscopic laparotomy cuts, large portal entry wound, prolonged carbon dioxide exposure, electrosurgical, electromechanical morcellator, prolonged general anesthesia, operative theatre occupancy, financial invasion, disrespect of evidence-based deductions, invasion of ethical practice and lastly self-estimated of GS to themselves (11,63,65,66). Gaining NDVH skills is a painful but pleasing process. NDVH involves no incisions, no sophisticated setup, avoids complications of general anesthesia and pneumo-peritoneum, and displays similar, even better consequences as of laparoscopy (11,63,65,66).

In restricted-resource countries, the vaginal route may be the merely accessible minimally invasive choice for hysterectomy. Hence, it's pertinent that Gynecologists are trained in the same (11,63,66).

Our study results were similar to what was grabbed by the latest Cochrane Review of 34 RCTS of TAH, TLH, and TVH where TVH has the best outcomes at all, as the authors stated: 'No advantages of TLH over TVH could be found; TLH had a longer LOP, and TLH had more urinary tract injuries' and they recommend TLH only when TVH is not possible and TLH has only advantages over TAH (8). In our study LOP was indifferent, this could be explained by the larger uterine sizing included in this analysis.

A meta-analysis of 24 trail comparing TLH and TVH from 2000 to 2016 shows that no difference between the 2 groups for overall, major and minor complications, risk of ureter and bladder injuries, intraoperative blood loss, and length of hospital stay(OR 95%CI involved the one value and $p>0.05$) and that TVH was associated with a significant shorter operative time and a lower rate of vaginal cuff dehiscence and conversion to laparotomy(OR 95%CI unincluded the one value and $p<0.05$) as well as non-significant differences concerning, the costs of procedure which were lower for TVH, the postoperative visual analog scale scores which was lower in TLH patients and the required analgesia which were lesser and for a shorter period in TLH patients(48). Authors of this metanalysis stated that when both procedures are feasible, TLH and TVH result in similar outcomes, and TVH is associated with greater benefits, such as shorter operative time, lower rate of vaginal dehiscence, conversion to laparotomy, and lesser costs (48).

Our results favor NDVH over TLH in the rate of severe postoperative pain, need for an analgesic, rate of postoperative nausea

& vomiting, shorter time to get out of bed, faster time to flatus, briefer LOS, quicker return to usual activity time, more rapid resumption of coitus, less need for VTE prophylaxis, shorter duration of VTE prophylaxis (OR 95%CI unincluded the one value and p<0.05). We couldn't estimate the indirect costs of both procedures like other (68) as they claimed that the indirect costs were higher in the TVH group compared to the TLH group (p < .001) in their five-year observational retrospective cohort study involving 137 patients in TLH group and 380 patients in TVH group(68). Some authors explained these strange results to what we expected by that the indirect costs were due to lost-work-productivity which were 97.7% in the TVH group and 93.6% in the TLH group(68).

Another meta-analysis assessed 252 full-text articles investigating TLH and TVH; they excluded 224 and involved only 18 trial studies of 1618 patients who met the inclusion criteria in qualitative and quantitative synthesis. They deduced that no differences in overall complications, intraoperative conversion, postoperative pain on the day of surgery and at 48 h, LOS, and recuperation time between TVH and TLH. TVH was associated with a shorter operating time and lower postoperative pain at 24 h than TLH (44). Authors of this metanalysis recommended that when both surgical approaches are feasible, TVH should remain the surgery of choice for benign hysterectomy (44).

A retrospectively propensity scores matched analysis of 1,870 TVH to 3,740 TLH at a ratio of 1:2 concluded that in patients matched by larger uterine size≥280 grams and preoperative characteristics, found that TVH is not associated with an increased composite risk of major surgical morbidity or other adverse surgical outcomes when compared to TLH (34).

Several single-arm studies found that VH in non-descent uteri weighing more than 280 g was both safe and feasible (14,15,16,18,19,). Two retrospective studies comparing TLH with TVH for uteri larger than 300 g and 500 g, respectively, verified that TVH had no greater risk of complications but was lesser cost, shorter LOP, and LOS (38,58).

A cost study reported mean total hospital costs for TVH were $7903, $10,069 for LAVH, $11,558 for TLH, and $13,429 for RH ($p$ < .0001) The Net hospital income was $1260 for TVH, while the hospital incurred losses of $-1306 for LAVH, $-4049 for TLH, and $-4564 for RH ($p$ = .03) and assumed that their criteria to determine the mode of hysterectomy increased TVH from 57% to 76% of all MIH(61).

Also, an economy related study, concluded that TVH is the value-based care and best clinical outcome relative to cost despite its underused in surgical practice in the USA due to challenges during residency training, decreasing case numbers among practicing gynecologists, and lack of awareness of evidence supporting vaginal hysterectomy. Finally, they recommended strategies to improve resident training and promote collaboration and referral among practicing physicians and increasing awareness of evidence supporting vaginal hysterectomy can improve the primary use of this hysterectomy approach(67).

Strengths involved, retrospective nature being low cost and judging actual work conditions, relatively larger sample size to get interpretations as well as comparing NDVH to TLH in patients with bulky uterine fibroids undergoing hysterectomy, focusing on surgical consequences precisely in patients with bulky uterine fibroids, challenging an actual well recognized supposed contraindication to

TVH as bulky uterine size. This in addition to addressing items unevaluated in literature as LOPA to correct associated comorbidity like uncontrolled DM, preoperative optimizations of HB through intravenous iron and subcutaneous erythropoietin rather than blood transfers, suitability of NDVH in poorly fitted group ASA3, ASA4 rather than unsuitable more invasive procedures, demonstrating that NDVH is the real value-based MIH in poorly income countries like EGYPT.

Limitations involved selections biases, reporting biases, confounders such as the surgical skill of the gynecologists both of NDVH and TLH expertise as well as an inability to generalize the results as the proficiencies of NDVH were limited and unexploited as all over the world.

Conclusions:

The main outcome is that NDVH in patients with bulky uterine fibroids is safe and feasible and more suitable as a value-based surgical procedure when compared with TLH at least in lower resource countries. Also, NDVH in patients with bulky uterine fibroids isn't associated with greater incidental cystotomy than TLH and bulky uterine fibroids shouldn't be considered anymore as a contraindication for NDVH. Gynecologists should adopt the concept of trailed NDVH as well as adapt the concept that the gynecologist should go vaginally, differentiating themselves from general and laparoscopic surgeons.

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