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Outcomes of Vaginal Hysterectomy with Deschamps Needle Technique versus Conventional Technique in Women with Non-descent Uterus

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ABSTRACT

Background & Objective: Vaginal Hysterectomy (VH) in patients with non-descent uterus for benign gynecological diseases is challenging. Several techniques are employed to optimize patient outcomes. The Deschamps needle technique, originally designed for aneurysm control, has been adapted for use in Non-Descent Vaginal Hysterectomy (NDVH) to potentially enhance practicality, safety, and efficiency compared to conventional methods. to evaluate the practicality, safety, and effectiveness of the Deschamps needle technique compared to the conventional clamping technique in NDVH patients.

Materials & Methods: A pilot prospective randomized clinical study was conducted between 2021 and 2023 at Ain Shams University Maternity Hospital. Fifty patients aged 40 to 70 years with benign non-descent uteri were randomized into two groups: Group 1 (Deschamps needle technique) and Group 2 (conventional technique). Primary outcomes included operative time and pedicle securing time. Secondary outcomes were intraoperative blood loss, blood transfusion, postoperative pain, duration of hospital stay, and complication rates.

Results: The Deschamps needle technique significantly reduced total operative time (93.20±7.03 minutes) and pedicle securing time (27.80±5.87 minutes) compared to the conventional technique (102.28±9.8 minutes and 34.60±7.02 minutes, respectively). There was no significant difference between the groups regarding intraoperative blood loss, transfusion requirements, or postoperative hemoglobin and hematocrit levels. Postoperative pain was significantly lower in the Deschamps group. The incidence of complications, including bladder injury, urinary retention, Urinary Tract Infection (UTI), and postoperative pyrexia, showed no statistically significant differences between the groups.

Conclusion: The Deschamps needle technique for VH in non-descent uteri offers a safe, efficient, and less time-consuming alternative to conventional clamping techniques. It reduces operative time and postoperative pain without increasing complication rates, making it a viable option for resource-limited settings.

Keywords: Vaginal hysterectomy, Deschamps type, Ligature needle instrument, Non-prolapsed uterus, Uterine neoplasms

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1. Introduction

Hyperplastic processes of the endometrium are one of the most common pathologies in women of premenopausal age and, depending on the presence of cytological atypia, are divided into Non-Atypical Forms (NGE) and atypical (AGE) **(1)**.

One of the most common surgical techniques used in gynecological care is hysterectomy. The prevalence of hysterectomy does not seem to be decreasing despite the advancement of substitute therapies **(2,3).**

Hysterectomy can be performed via laparoscopic, vaginal, abdominal, or combination methods. One of the most popular gynecological surgical procedures for the treatment of benign gynecological illnesses is the traditional Abdominal Hysterectomy (AH). Nevertheless, being the most intrusive operation AH has many drawbacks, including poor recovery after surgery, intraoperative and postoperative problems, and abdominal trauma **(3-7)**.

Vaginal Hysterectomy (VH), a less invasive gynecological procedure, offers shorter hospital stays, quicker recovery, and less postoperative discomfort than typical open gynecological operations. Therefore, VH is the preferred technique for uterine excision in

individuals with benign gynecological conditions **(7-11)**.

When there is no uterine descent, VH might be difficult and difficult. Given the restricted vaginal access, it might be difficult to place traditional sutures on vascular pedicles located deep inside the pelvis **(12-16)**.

Hemorrhage, infection, ureteral, and bowel and bladder damage are the most frequent side effects. Three to five percent of VH cases are unplanned major surgical operations that occur before or after the procedure **(17-20)**.

Deschamps Ligature Needle is a specialized device that surgeons in multiple areas use to place, mobilize, and tie suture threads around blood vessels or aneurysms to achieve adequate hemostasis. It offers a broad range of surgical advantages. Its principal use is to compress aneurysms or blood vessels in hard-to-reach sites and place ligatures around them **(21-24)**.

Aim of the study:

The study sought to compare whether using the Deschamps needle technique in VH with a non-descending uterus is more feasible, safer, and efficient than conventional technique and to determine the perioperative outcomes for both procedures.

2. Materials and Methods

A pilot prospective randomized clinical study was carried out in the gynecology department of Ain Shams University Maternity Hospital.

A senior expert evaluated all VH candidates who did not meet these exclusion criteria and assigned procedural difficulty scores using "the modified Sheth scoring system (2014). **(7)**" Two groups of chosen patients were randomly assigned:

Group 1: women who underwent VH using the Deschamps (aneurysm) needle technique.

Group 2: women who underwent VH using conventional technique.

Patients aged 40 to 70 years old were eligible, with a uterine size of less than 12 weeks, a benign cause for hysterectomy, perimenopausal bleeding not responding to medical treatment, or complex endometrial hyperplasia without atypia, and no significant scarring in the pelvis from previous surgeries with absence of uterine descent.

While the exclusion criteria were existence of suspected or known gynecological cancer, uterine size greater than 12 weeks, and endometriosis; adnexal mass is present. The cervix flooded with vagina i.e. a thinned cervix and extensive scarring or severe endometriosis in the pelvis.

All patients underwent the following: every participant in this study gave their informed permission after undergoing a thorough clinical evaluation that included history taking, general and abdominal examination, vaginal examination, pelvic transvaginal ultrasound, routine preoperative laboratory investigations, Papanicolaou (PAP) smear, endometrial biopsy, and preoperative senior anesthetist assessment. Patients were followed within 36-72 hours during hospital stay, after one week of discharge at an outpatient clinic.

Sample Size Justification:

A sample size of at least 50 cases (25 cases in each group) was satisfactory to explore the most frequent outcomes. Measures of outcomes: In patients who underwent NDVH using either of two techniques, total and pedicle securing times were the primary outcomes, while blood loss, blood transfusion, bladder and rectal injuries, pain, duration of hospital stay, and SSI were the secondary outcomes.

Ethical consideration:

The Ain Shams University Research Ethical Committee approved the study (FMASU MD47/2022). Pan-African Clinical Trials.gov registered the study (PACTR2024015604884906). All participants provided written and informed permission.

Statistical analysis:

Version 27.0 of the Statistical Package for Social Science (SPSS), (IBM, USA) was utilized. When applicable, the mean and standard deviation (SD) or median (IQR) were used to represent quantitative data. Frequencies and percentages were used to express the qualitative data. The appropriate statistical methods were applied. A 95% confidence interval and a 5% acceptable margin of error were established.

3. Results

When groups were compared based on demographic information, the differences between them were not statistically significant (P-value>0.05) (Table 1).

Both groups' pre-operative uterine volumes were similar, with a mean volume of 225.2 mL compared to 220.7 mL. The difference between them was not statistically significant (P-value = 0.207) (Table 2).

In terms of VH indications, the most frequent reason for hysterectomy was dysfunctional uterine bleeding (DUB), which accounted for 28 cases. Adenomyosis (AUB-A) and fibroid uterus (AUB-L) followed with 10 and 2 cases, respectively, and endometrial hyperplasia without atypia (Table 3).

Out of fifty cases, thirty-three were performed under spinal anesthesia, ten under epidural anesthesia, and seven under general anesthesia (Table 4).

There were non-statistically significant differences between the two groups regarding preoperative

hemoglobin and hematocrit values (P values were 0.280 and 0.228) (Table 5).

Both total operative time and pedicle securing time were compared between the two groups, and there were statistically significant differences between the two groups, favoring the Deschamps group. The total operative time was (93.20±7.03) in the Deschamps group while (102.28±9.8) in the conventional group, and the pedicle securing time was (27.80±5.87) in the Deschamps group while (34.60±7.02) in the conventional group with (P-value<0.001, P-value = 0.002, respectively) (Table 6), (Figure 1).

The mean intraoperative blood loss in the Deschamps group was 351 ml and 391 ml in the conventional group, which reflected non-statistically significant differences between the two groups (P value = 0.4292) (Table 6).

In this study, there were no intraoperative or postoperative blood transfusions, and there were no statistically significant differences between the two groups in terms of pre-, post-, and postoperative hemoglobin and HCT levels (Table 7).

Both groups were compared as regards postoperative pain, and there was a statistically significant difference in between where the Deschamps group showed less pain and less need for postoperative analgesia in contrast to the conventional group (P-value<0.0001) (Table 8).

Two groups were compared regarding the duration of hospital stay and mortality, and there was no statistically significant difference between the two groups (P-value = 0.549) (Table 9).

Regarding complications, only one case in the conventional group was complicated with bladder injury (4%). One case in the Deschamps group (4%) developed early postoperative urine retention after removal of the urinary catheter; the patient was managed conservatively and improved after 24 hours. This may be attributed to postoperative pain. Two cases in the Deschamps group developed postoperative pyrexia (8%) and three cases in the conventional group (12%); lastly, after one week, one case (4%) developed UTI symptoms in the Deschamps and two cases in the conventional group (8%) (Table 10).

Table 1. Comparison between groups as regard demographic data

Demographic data		Deschamps Group (n=25)			Conventional Group (n=25)			P-value
Age (years)		50.96±4.8			48.48±5.7			0.103 [t]
Parity		Range	Median	IQR	Range	Median	IQR	0.968 [z]
		2-7	4	3-5	1-6	4	3-5	
BMI		28.54±3.1			28.33±2.4			0.795 [t]
Menstrual status	Perimenopausal	16 (64.0%)			19(76.0%)			0.355 [x2]
	Postmenopausal	9(36.0%)			6(24.0%)			
Comorbidity	HTN	4(16.0%)			4(16.0%)			1 [x2]
	DM	3(12.0%)			3(12.0%)			1 [x2]
	Epileptic	1(4.0%)			0(0.0%)			0.312 [x2]
	CLD	0(0.0%)			1(4.0%)			0.312 [x2]
	ISHD	0(0.0%)			1(4.0%)			0.312 [x2]
Previous abdominal surgery (non pelvic)		6(24.0%)			11(44.0%)			0.136 [x2]

Data expressed as mean±SD,/ range, median and IQR/ proportion, t= Student t-test, X2= Chi square, z= Mann-Whitney test

Table 2. Comparison between groups as regard uterine data

	Deschamps Group (n=25)			Conventional Group (n=25)			P-value
Uterine volume/ml	225.28±11.4			220.76±13.5			0.207 [t]
Uterine size/wks.	8.96±1.4			8.56±1.9			0.400 [t]
Sheth score	Range	Median	IQR	Range	Median	IQR	0.096 [z]
	4-10	6	5-7	4-10	6	6-8	

Data expressed as mean±SD,/ range, median and IQR, t= student t test, z= Mann-Whitney test

Table 3. Comparison between groups as regard indications of VH

	Group		P-value
Indication	**Deschamps**	**Conventional**	
AUB-A	6(24.0%)	4(16.0%)	0.494
AUB-L	5(20.0%)	5(20.0%)	
DUB	14(56.0%)	14(56.0%)	
Other	0(0.0%)	2(8.0%)	

Table 4. Comparison between groups as regard type of Anesthesia

	Group		P-value
Anesthesia	**Deschamps**	**Conventional**	
epidural +spinal	5(20%50.0% RT 8.0% CT 4.0% GT)	5(20%50.0% RT 8.0% CT 4.0% GT)	0.837
General	2(8%33.3% RT 4.0% CT 2.0% GT)	5(20%66.7% RT 8.0% CT 4.0% GT)	
Spinal	17(66%51.2% RT 88.0% CT 44.0% GT)	16(64%48.8% RT 84.0% CT 42.0% GT)	

Table 5. Comparison between groups as regard preoperative Hemoglobin & Hematocrit data

	Deschamps Group (n=25)	Conventional Group (n=25)	P-value
Pre Hb/gm	11.85±1.2	11.46±1.2	0.280 [t]
Pre HCT	35.77±3.8	34.46±3.8	0.228 [t]

Data expressed as mean±SD, t= student t test

Table 6. Comparison between groups as regard intraoperative data (operative time, pedicle securing time, blood loss and blood transfusion)

		Deschamps Group (n=25)	Conventional Group (n=25)	P-value
Total op.time (minutes)		93.20±7.03	102.28±9.8	<0.001 t
Pedicle securing time (minutes)		27.80±5.87	34.60±7.02	0.002 t
Blood Loss (ml)		351.00±162.63	391.60±195.8	0.4292 t
Intraoperative blood transfusion	0	24(96.0%)	23(92.0%)	0.6 [x2]
	1	1(4.0%)	1(4.0%)	
	2	0(0.0%)	1(4.0%)	

Table 7. Comparison between groups as regard Postoperative data Hemoglobin and Hematocrit

		Deschamps Group (n=25)	Conventional Group (n=25)	P-value
Post Hb/gm		10.19±1.1	10.04±1.3	0.666
Post HCT		30.79±3.5	30.24±4.0	0.608
Postoperative blood transfusion	0	23(92.0%)	20(80.0%)	0.3 [x2]
	1	2(8.0%)	3(12.0%)	
	2	0(0.0%)	2(8.0%)	

Data expressed as mean±SD, proportion, t= student t test, X2= chi square

Table 8. Comparison between groups as regard Pain

Variable	Deschamps Group (n=25)			Conventional Group (n=25)			P-value
	range	Median	IQR	Range	Median	IQR	P[a]
Pain after 6 hours	5-8	6	6-7	6-8	7	7-8	<0.0001
Pain after 12 hours	2-5	3	2-3	3-6	4	4-5	<0.0001
Pain after 24 hours	0-2	1	0-1	0-3	1	1-2	0.0040

Data expressed as range, median and IQR, z= Mann-Whitney test

Table (9): Comparison between groups as regard hospital stay and mortality

		Deschamps Group (n=25)		Conventional Group (n=25)			P-value
Mortality				**No mortality detected**			
Hospital stay	range	Median	IQR	Range	Median	IQR	0.5494 z
	1-3	2	1-2.25	1-7	2	1-3	

Data expressed as range, median and IQR, z= Mann-Whitney test

Table 10. Comparison between groups as regard complication data

		Deschamps Group (n=25)	Conventional Group (n=25)	P-value
Anaesthetic		No cases detected		
Post operative	Urological	0(0.0%)	1(4.0%)	0.312 x2
	GIT	No cases detected		
	Haemorrhage	1(4.0%)	3(12.0%)	0.221 x2
	Urinary retention	1(4.0%)	0(0.0%)	0.312 x2
	Pyrexia	2(8.0%)	3(12.0%)	0.637 x2
	Vaginal cuff evisceration	No cases detected		
After 1 week	Urological	No cases detected		
	GIT	No cases detected		
	Vaginal cuff evisceration	No cases detected		
	Vault prolapses	No cases detected		
	UTI	1(4.0%)	2(8.0%)	0.552 x2
	SSI	No cases detected		

Data expressed as proportion, X2= chi square

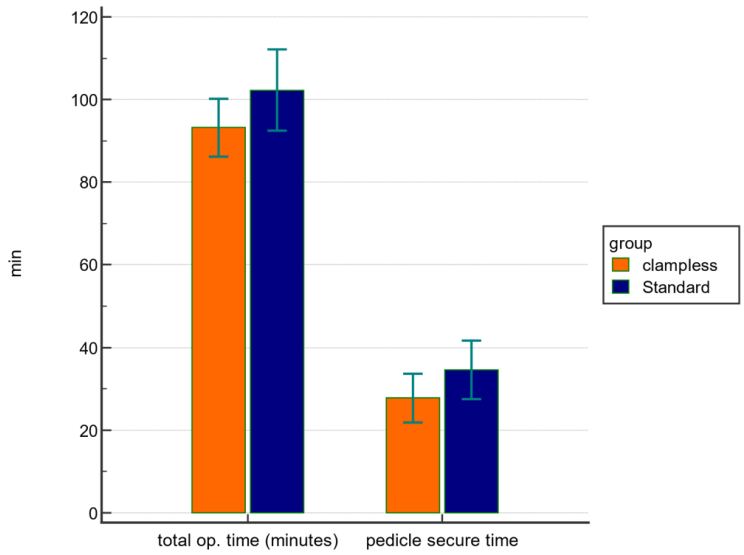


Figure 1. Bar graph between groups as regard operative time and pedicle securing time

4. Discussion

Vaginal hysterectomy using the Deschamps ligature needle technique, which, to the best of our knowledge, has not been widely used.

So, the present study was designed to compare the feasibility, safety, and efficacy of using Deschamps needle technique versus conventional technique in VH and to determine intraoperative and postoperative outcomes of both procedures **(8)**.

The most used clamping method in VH is the conventional one. However, the relatively little amount of space available for surgical access to vascular pedicles is one of the primary drawbacks of the vaginal approach **(9)**.

Therefore, it was believed that by using the aneurysm needle clampless procedure, the greatest possible benefits from a variety of pelvic parameters, including less vaginal space and less uterus-free pelvic space for surgical maneuverability, could be achieved. In comparison to the conventional double- or single-clamping suturing procedures, the aneurysm needle has the benefits of being a two-step application maneuver, having a compact smart handle, and requiring significantly less pelvic space due to its smaller curved needle design.

Demographic data were compared between the two groups where the mean age was 50.96±4.8, the mean BMI was 28.54±3.1, the median of parity was 4, the menstrual status was Perimenopausal 70% and Postmenopausal 30%, previous abdominal surgery in 33% of patients, co-morbidities were 16% HTN, 16% DM, 4% IHD 4% epileptics, 4% chronic liver disease, and there were non-statistically significant difference between groups. Additionally, the two groups' uterine volumes revealed no statistically significant difference.

In the current study, the two groups' total operational time and pedicle securing time were compared, and the two groups' differences were statistically significant (P values<0.001 and 0.002, respectively). In contrast to the Deschamps group, the traditional group's pedicle securing time (27.80±5.87-34.60±7.02) and overall operative time (93.20±7.03-102.28±9.8) were significantly greater. The difficulty of applying a clamp in a non-descent uterus with limited space and the benefit of the aneurysm needle's two-step application maneuver may be the reason for the longer pedicle securing time when utilizing the traditional procedure as opposed to the Deschamps technique.

These results were consistent with those of Warda et al., **(11)**, who conducted a prospective clinical pilot trial utilizing the clampless approach on 46 women without prolapse who sought a hysterectomy for various benign uterine illnesses. The clampless VH group's operating time was considerably lower (70.14±7.78 min vs. 79.52±7.41 min, respectively) (P-value=0.007). According to Nalini et al., **(23)**, a clampless approach pilot trial conducted on 50 women without prolapse whose uterine size was up to 16 weeks gestation revealed that the Deschamps ligature needle group required less operating time than the control group.

The estimated intraoperative blood loss as well as perioperative blood transfusion was statistically non-significant between the two groups (P-value = 0.270). The mean intraoperative blood loss in the Deschamps group was 351 ml and 391 ml in the clamping group. There was no statistically significant difference between the two groups as regard pre- and postoperative Hb and HCT values, and neither intra- nor postoperative blood transfusion.

These findings were in concordance with Warda et al., **(11)**. Also, mean hemoglobin loss was 1 g/dL with no need for blood transfusion. Mean intraoperative blood loss was insignificant between the clampless group and conventional group. Additionally, 50 patients in all had NDVH, and 4% of those patients experienced hemorrhage necessitating a blood transfusion **(25)**.

The traditional method group experienced significantly greater postoperative discomfort than the Deschamps group (P-value<0.001). In the same setting, the conventional method group had a significantly higher number of patients who needed additional analgesia (either as opioid analgesics or NSAIDs) than the Deschamps group (P-values = 0.004).

There were non-significant statistical differences between the two groups as regard to the duration of postoperative hospital stay or complications intra-operatively, early postoperative or at 1-week of postoperative follow-up.

As regard complication, only one case in conventional group was complicated with bladder injury (4%) repaired vaginally, one case in Deschamps group had postoperative urine retention resolved spontaneously after one week, two cases in Deschamps group had postoperative pyrexia (8%) in contrast to three cases in conventional group (12%), lastly after one week one case (4%) developed UTI symptoms in Deschamps group in contrast to two cases in conventional group (8%).

Limitation

The patient analysis has several limitations. First, because effective removal of very big uteri requires a high level of experience in aneurysm needle clampless approach, the generalizability of our results looks poor at this time. Second, it has yet to be demonstrated in several instances that clampless surgery is superior to the conventional clamping technique when dealing with high volume uteri.

5. Conclusion

For women who have benign non-descent uteri, clampless VH using an aneurysm needle is a less intrusive and safer option. When compared to the normal VH, it takes less operating time. Assuming that this method is safe, efficient, and affordable to use in VH. It might therefore be applied in environments with limited resources.

6. Declarations

Acknowledgments

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Ethical Considerations

This study was approved by the Research Ethics Committee of Ain Shams University (Approval No. FMASU MD47/2022). It is also registered with Pan-African Clinical Trials Registry (PACTR2024015604884906). All participants gave informed written consent prior to inclusion in the study. Confidentiality and anonymity were strictly maintained, and participants had the right to withdraw at any point without any consequence to their care.

Authors' Contributions

Mustafa Mohammed Abbas: Participated in surgical interventions and data collection. Mortada El Sayed Ahmed: Supervised surgical techniques, Contributed to conceptualization and literature review. Amr Abdel Aziz Nadim: Performed statistical analysis and manuscript editing. Waleed El Bassiouny Mohamed: Supervised surgical techniques, contributed to conceptualization, Oversaw patient recruitment and follow-up. Mohamed Soliman Hussein Soliman: Designed the study, and literature review acted as the corresponding author. Mohamed Mostafa Mokhtar: Managed data entry and preliminary analysis. All authors reviewed and approved the final version of the manuscript.

Conflict of Interest

The authors declared no conflict of interest.

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Abbreviations

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