OUTCOMES OF VAGINAL HYSTERECTOMY WITH DESCHAMPS NEEDLE TECHNIQUE VERSUS CONVENTIONAL TECHNIQUE IN WOMEN WITH NON-DESCENT UTERUS

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Abstract

Background: vaginal hysterectomy (VH) in patients with non-descent uterus for benign gynecological diseases is challenging. Various techniques were used to ease and improve the intervention to obtain the best outcomes for the patients. One of those techniques was deschamps (aneurysm) needle technique.

The aim and objective: to compare the feasibility, safety and efficacy of using Deschamps needle technique versus conventional technique in cases with Non-descent vaginal hysterectomy (NDVH).

Subjects and Methods: A Pilot prospective randomized clinical trial was conducted at gynecology department Ain shams university maternity hospital during the period from 2021 to 2023.

Results: Regarding demographic and uterine data, there were non statistically significant difference between the groups under the study. Both total operative and pedicle securing times were statistically less significant in the deschamps group compared to the conventional one. The mean intraoperative blood loss showed a statistically insignificant difference between the groups as well as the pre, postoperative Hb & HCT values, blood transfusion, hospital stay and mortality also. The post operative pain was lower in deschamps group where patient developed less pain and need to postoperative analgesia. Complications such as bladder injury, urine retention, UTI, postoperative pyrexia showed a statistically insignificant difference between the study groups.

In Conclusion: compared to conventional clamping technique, VH using deschamps ligature needle technique represented a safe, less time consuming, and minimally-invasive technique in women with benign non-descent uteri.

Keywords: Vaginal hysterectomy, Deschamps Ligature Needle, conventional technique, Non-descent Uterus.

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)(1,2).

One of the most common surgical procedures in gynaecological practice is hysterectomy. In spite of the development of alternative treatments, the incidence of hysterectomy doesn't appear to be declining (3).

Abdominal, vaginal, laparoscopic, or combined approaches are the routes for hysterectomy. Traditional abdominal hysterectomy (AH) is one of the most common gynaecological surgical procedures in the treatment of benign gynaecological diseases. However, AH as the most invasive procedure, is associated with some limitations such as abdominal trauma, intraoperative and postoperative complications, and slow postoperative recovery (4-8).

Compared with traditional open gynaecological surgeries, minimally invasive gynaecological surgery as Vaginal hysterectomy (VH) provides less postoperative pain, more rapid recovery, and shorter hospital stay. So, VH is the method of choice for removal of the uterus in patients with benign gynaecological diseases (8-12).

Vaginal hysterectomy in the absence of uterine descent may not be easy and challenging. Placing conventional sutures on vascular pedicles deep in the pelvis can be challenging, particularly with the limited vaginal access (13-17).

The most common complications are ureteral, bowel and bladder injuries, hemorrhage, and infection. The overall rate of unintended major surgical procedures accompanying or following vaginal hysterectomy is 3 to 5 percent (18-21).

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, in order to achieve adequate haemostasis. It offers a broad range of surgical advantages. Its principal use is to compress aneurysm or blood vessels in hard-to-reach sites and place ligatures around them (22-25).

Aim of the study:

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

PATIENTS AND METHODS

A Pilot prospective randomized clinical trial was conducted at gynecology department Ain shams university maternity hospital.

All candidates for vaginal hysterectomy and free of these exclusion criteria were assessed by a senior consultant, and scored according to "the modified Sheth scoring system (2014) (7). for procedural difficulty. Selected patients were randomized into two groups:

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

Group 2: women who underwent VH using conventional technique.

Inclusion criteria: patients aged between 40 years to 70 years old, Uterine size less than 12 weeks, Presence of benign cause for the hysterectomy e.g. fibroid uterus, perimenopausal bleeding not responding to medical treatment or complex endometrial hyperplasia without atypia and absence of significant scarring in the pelvis from previous surgeries with absence of uterine descent.

Exclusion criteria: presence of suspected or known gynaecological malignancy, Uterine size more than 12 weeks, Endometriosis(known by previous subjective medical or surgical history), Presence of adnexal mass, Cervix flushed with the vagina.ie: thinned out cervix and Presence of significant scarring or severe endometriosis in the pelvic area.

All patients underwent the following: Every participant in this study gave their informed permission after undergoing a through clinical evaluation that included history taking, general and abdominal examination, vaginal examination, pelvic transvaginal ultrasound, routine preoperative laboratory investigations, Papanicolau (PAP) smear, endometrial biopsy and Preoperative senior anaesthetist assessment. Patients were followed within 36-72 hours during hospital stay, after one week of discharge at out-patient 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 underwent non-descent vaginal hysterectomy using either of two technique, 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 study received approval from the Research Ethical Committee of Ain Shams University (FMASU MD47/2022). The study was registered at pan African clinical trials.gov (PACTR202401560488 4906). Informed and written consent was obtained from all participants.

Statistical analysis:

Data were analyzed using Statistical package for Social Science (SPSS) version 27.0., Quantitative data were expressed as mean± standard deviation (SD) or Median (IQR) when indicated. Qualitative data were expressed as frequency and percentage. The following tests were used ,Independent-samples t-test of significance was used when comparing between two means, Chi-square (X2) test of significance was used in order to compare proportions between two qualitative parameters, Mann Whitney U test: for two-group comparisons in non-parametric data, The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following: Probability (P-value). P-value <0.05 was considered significant.

RESULTS

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, X^2 = chi square, z= Mann-Whitney test
Groups were compared as regard demographic data and there were non statistically significant difference between groups (**P** value > 0.05) (table-1).

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
The pre-operative uterine volumes were comparable between both groups and the mean volume was (225.2mL vs 220.7 mL, respectively). there were non statistically significant difference in between (**P** value 0.207).

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%)	

Regarding the indications of VH, Dysfunctional Uterine Bleeding (DUB) was the most common indication for hysterectomy with 28 cases followed by adenomyosis (AUB-A) with 10 cases, fibroid uterus (AUB-L) with 10 cases and 2 others cases with endometrial hyperplasia without atypia (table-3).

Table (4): Comparison between groups as regard type of Anesthesia.

	Group		
Anesthesia	Deschamps	Conventional	P value
epidural +spinal	5(20%)	5(20%)	0.837
General	2(8%)	5(20%)	
Spinal	17(66%)	16(64%)	

Regarding type of Anesthesia (table-4). Out of 50 cases, 33 were done under spinal anesthesia, 10 under epidural anesthesia and 7 under general anesthesia.

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
There were non statistically significant differences between two groups as regard preoperative hemoglobin & hematocrit values with (**P** value were 0.280 & 0.228) Table (5).

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%)	

Data expressed as mean ± SD, proportion, t = student t test, X^2 = chi square,

Both total operative time and pedicle securing time were compared between the two groups and there were statistically significant difference between 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 391ml in the conventional group that reflected non statistically significant between two groups (**P** value 0.4292) (table-6).

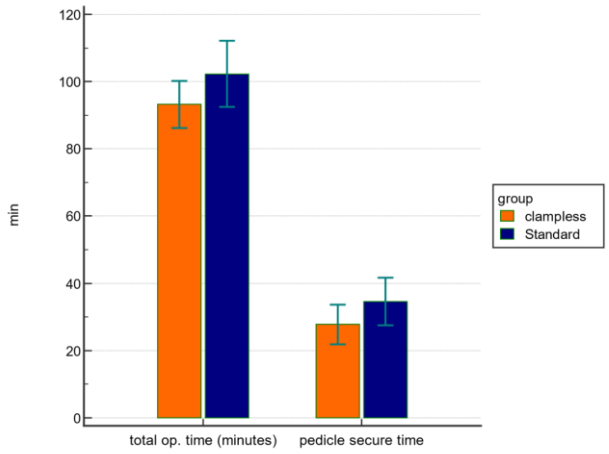

Figure (1): Bar graph between groups as regard operative time and pedicle securing time.

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, X^2 = chi square.

In this study, There were non statistically significant difference between two groups as regard pre, postoperative Hb & HCT values also neither Intra nor postoperative blood transfusion (table-7).

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 6hours	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

Both groups were compared as regard Post operative pain and there was statistically significant difference in between where the deschamps group showed less pain and less need to postoperative analgesia in contrast to the conventional group (**P** value is <0.0001) (table-8).

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

Two groups were compared regarding the duration of hospital stay and mortality and there was non statistically significant difference between the two groups with (P value 0.549) Table (9).

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, X^2 = chi square,

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 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).

DISCUSSION

Vaginal Hysterectomy using 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 vaginal hysterectomy and to determine intraoperative and postoperative outcomes of both procedures**(9).**

Conventional clamping technique is the most common used one in VH. Although, One of the main limitations of the vaginal route is that it offers relatively limited space for surgical access to vascular pedicles **(10).**

So, by adopting the aneurysm needle clampless technique, it was supposed that a maximum benefits can be obtained from many pelvic factors such as reduced vaginal space and less availability of uterus free pelvic space for operative manoeuvrability. The aneurysm needle has the advantages of being a two steps application manoeuvre, having a small smart handle, and its configuration with smaller curved needle requires much less pelvic space versus the traditional double- or single-clamping suturing techniques.

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. Also, Uterine volumes between two groups showed that there was non statistically significant difference.

In the present study, Both total operative time and pedicle securing time were compared between the two groups and there were statistically significant difference between two groups (**P value was <0.001 – P value was 0.002 respectively)**.Where total operative time (93.20±7.03 - 102.28±9.8) and pedicle securing time(27.80±5.87- 34.60±7.02) were significantly longer in the conventional group compared to the Deschamps group. Increased pedicle securing time when using conventional technique compared to deschamps technique may be attributed to due to difficulty of clamp application in non-descent uterus with narrow space and The aneurysm needle has the advantages of being a two steps application manoeuvre.

These findings were in line with ***Warda et al. (2014)*****,** a prospective clinical pilot study using clampless technique was carried out on 46 women without prolapse who requested hysterectomy for different benign diseases of the uterus. The operative time was significantly shorter in the clampless VH group (70.14 ± 7.78 min vs 79.52 ± 7.41 min, respectively) (P = 0.007) (12). Also with ***Nalini et al., (2015)***, A pilot study was done using clampless technique was carried out on 50 women without prolapse with uterine size up to 16 weeks of gestation found that *that the operating time* was lower for the deschamps ligature needle group compared with the control group (24).

The estimated intra-operative blood loss as well as peri operative 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 391ml in clamping group. There was no statistically significant difference between two groups as regard pre, postoperative Hb & HCT values also neither Intra and postoperative blood transfusion.

These findings were inconcordence with ***Warda et al. (2014)*****,** Also mean hemoglobin loss was 1g/dL with no need for blood transfusion. Mean intraoperative blood loss was insignificant between clampless group and conventional group (12). Also, in a study, A total of 50 patients were included in the study underwent NDVH where Hemorrhage requiring blood transfusion was found in 4% of cases (26)**.**

postoperative pain was significantly higher in the conventional technique group compared to the Deschamps group (**P value was < 0.001**). In the same context, the number of patients requiring extra analgesia (either as NSAIDs or opiod analgesics) was significantly larger in the conventional technique group compared to the deschamps group (**P values was 0.004**).

there were non significant statistically differences between the two groups as regard 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

Some limitations in the patient analysis were founded. First, the generalizability of our results appears low, for the moment, since a high level of expertise in aneurysm needle clampless technique is required to be successful in removal of extremely large uteri. Second, benefits of clampless surgery over traditional clamping approach in the setting of large volume uteri are still to be proven in a large number of cases.

Conclusion

Clampless VH using aneurysm needle represents a safer alternative and less minimally-invasive technique in women with benign non-descent uteri. It requires a less operative time compared with the standard VH. So, assuming that using this technique in VH is safe, effective and cheap. Thus, it could be used in low resource settings.

No conflicts of interests.

Abbreviations

AH: Abdominal hysterectomy

BMI: Body mass index

DUB: Dysfunctional uterine bleeding
NSAIDs: Non steroidal anti inflammatory
NDVH: Non-descent Vaginal hysterectomy
UTI: Urinary tract infection

References

1. Gromova, O.., Potapov, V., Khaskhachikh, D.., Gaponova, O., & Kukina, G. (2021). RECEPTOR STATUS OF THE ENDOMETRY IN HYPERPLASTIC PROCESSES IN PREMENOPAUSUAL WOMEN. Neonatology, Surgery and Perinatal Medicine, 11 (1(39), 33–38. https://doi.org/10.24061/2413-4260.XI.1.39.2021.5.

2. Hnatko, O., Skuryatina, N., & Kravchenko, O. (2013). HYSTERORESECTOSCOPY IN THE TREATMENT OF PATIENTS WITH HYPERPLASTIC PROCESSES OF THE ENDOMETRY. Neonatology, Surgery and Perinatal Medicine, 3 (2(8), 62–66. https://doi.org/10.24061/2413-4260.III.2.8.2013.10.

3. Edler KM, Tamussino K, Fülöp G, Reinstadler E, Neunteufel W, Reif P, Laky R, Aigmüller T. Rates and routes of hysterectomy for benign indications in Austria 2002–2014. Geburtshilfe und Frauenheilkunde. 2017 May;77(05):482-6.

4. Edler KM, Tamussino K, Fülöp G, Reinstadler E, Neunteufel W, Reif P, et al. Rates and routes of hysterectomy for benign indications in Austria 2002-2014. Geburtshilfe Frauenheilkd. 2017;77:482–6. [PMC free article] [PubMed] [Google Scholar]

5. Abiodun O, Ola O, Oguntoyinbo O. Audit of hysterectomy in a private missionary hospital an 8 year retrospective study. Irjmbs. 2020;20:19–23. [Google Scholar]

6. Moawad G, Liu E, Song C, Fu AZ. Movement to outpatient hysterectomy for benign indications in the United States, 2008-2014. PLoS One. 2017;12:e0188812. [PMC free article] [PubMed] [Google Scholar]

7. Abd el Gwad N, Mahmoud A, El-Sayad S, Abd El Fatah B. Body image, self-esteem and quality of sexual life among women after hysterectomy. Port Said Sci J Nurs. 2020;7:228–43. [Google Scholar]

8. Ramdhan RC, Loukas M, Tubbs RS. Anatomical complications of hysterectomy: A review. Clin Anat. 2017;30:946–52. [PubMed] [Google Scholar]

9. Multinu F, Casarin J, Tortorella L, Huang Y, Weaver A, Angioni S, et al. Incidence of sarcoma in patients undergoing hysterectomy for benign indications: A population-based study. Am J Obstet Gynecol. 2019;220:179. [PMC free article] [PubMed] [Google Scholar]

10. Karacan T, Ozyurek E, Wetherilt LS, Kiyak H, Yilmaz S, Kaya E. Safety and efficacy of using advanced electrosurgical bipolar vessel sealing during vaginal hysterectomy in morbidly obese patients: a retrospective cohort analysis. Ginekologia polska. 2017;88(10):523-9.

11. Ramdhan RC, Loukas M, Tubbs RS. Anatomical complications of hysterectomy: A review. Clinical Anatomy. 2017;30(7):946-52.

12. Warda O, Ehab S, Mostafa E, Maged E, Tarek S. Optimizing vaginal hysterectomy in women with large volume non-prolapse uteri: a novel minimally-invasive "aneurysm needle clampless technique". European Journal of Obstetrics & Gynecology and Reproductive Biology 2014; 179:1-4.

13. Sheth SS. Vaginal hysterectomy. JP Medical Ltd; 2014 May 30.

14. Talukdar B, Mahela S. Abnormal uterine bleeding in perimenopausal women: Correlation with sonographic findings and histopathological examination of hysterectomy specimens. J Midlife Health. 2016;7:73–7. [PMC free article] [PubMed] [Google Scholar]

15. Schmitt JJ, Carranza Leon DA, Occhino JA, Weaver AL, Dowdy SC, Bakkum-Gamez JN, et al. Determining optimal route of hysterectomy for benign indications: Clinical decision tree algorithm. Obstet Gynecol. 2017;129:130–8. [PMC free article] [PubMed] [Google Scholar]

16. Liu F, Pan Y, Liang Y, Zhang C, Deng Q, Li X, et al. The epidemiological profile of hysterectomy in rural Chinese women: A population-based study. BMJ Open. 2017;7:e015351. [PMC free article] [PubMed] [Google Scholar]

17. Khemani K, Junnare K, Ingole S, Shekhawat GS. Non descent vaginal hysterectomy: A study on safety, feasibility, indications and complications. Sch Int J Obstet Gynec. 2021;4:423–6. [Google Scholar]

18. Rashid A, Qamar H, Pario S. Frequency and morphology of benign histopathological lesions in total abdominal hysterectomy specimens. Prof Med J. 2020;27:481–6. [Google Scholar]

19. Moradan S, Ghorbani R, Lotfi A. Agreement of histopathological findings of uterine curettage and hysterectomy specimens in women with abnormal uterine bleeding. Saudi Med J. 2017;38:497–502. [PMC free article] [PubMed] [Google Scholar]

20. Zygouris D, Chalvatzas N, Gkoutzioulis A, Anastasiou G, Kavallaris A. Total laparoscopic hysterectomy without uterine manipulator. A retrospective study of 1023 cases. Eur J Obstet Gynecol Reprod Biol. 2020;253:254–8. [PubMed] [Google Scholar]

21. Callegari LS, Gray KE, Zephyrin LC, Harrington LB, Gerber MR, Cochrane BB, et al. Hysterectomy and bilateral salpingo-oophorectomy: Variations by history of military service and birth cohort. Gerontologist. 2016;56(Suppl 1):S67–77. [PMC free article] [PubMed] [Google Scholar]

22. Neis KJ, Zubke W, Fehr M, Römer T, Tamussino K, Nothacker M. Hysterectomy for benign uterine disease. Dtsch Arztebl Int. 2016;113:242–9. [PMC free article] [PubMed] [Google Scholar]

23. Sawke NG, Sawke GK, Jain H. Histopathology findings in patients presenting with menorrhagia: A study of 100 hysterectomy specimen. J Midlife Health. 2015;6:160–3.

24. Nalini NS, Singh B, Harsh VS. Clampless non descent vaginal hysterectomy: "A novel art"." International Journal of Reproduction, Contraception, Obstetrics and Gynecology 2015; 4(3): 726.

25. Aarts J, Nieboer T, Tavender E, Garry R, Moi BJ (2015): Surgical approach to hysterectomy for benign gynaecological disease. Cochrane Database Systematic Reviews. Issue 8. Art. No.: CD003677.

26. Khemani K, Junnare K, Ingole S, Shekhawat GS (2021): Non descent vaginal hysterectomy: A study on safety, feasibility, indications and complications. Sch Int J Obstet Gynec. 2021;4(11):423-6.