

# EFFICACY OF DIFFERENT ROUTES OF HYSTERECTOMY- A COMPARATIVE STUDY

<sup>1</sup>DR. PANCHANAN DAS (Professor & Head of the Department),

<sup>2</sup>DR. DIBYAJYOTI GHARPHALIA (Associate Professor),

<sup>3</sup>DR. NAVARUNA RAJA (Post Graduate Trainee),

<sup>1,2,3</sup> DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY, GAUHATI MEDICAL  
COLLEGE AND HOSPITAL, GUWAHATI, ASSAM

## **ABSTRACT**

### **Introduction**

Hysterectomy is the surgical procedure of removing the uterus. It is one of the most common gynaecological operations and second most common after caesarean section. It can be performed by abdominal route, vaginal route, by applying minimally invasive techniques, or by a combination of the later two. The route chosen depends on the pathology and size of the uterus, presence or absence of adnexal pathology, surgeon's preference and expertise, patient's body habitus and medical co-morbidities, and hospital infrastructure.

### **Methods**

The study was a hospital-based time bound prospective and observational study conducted in the Department of Obstetrics and Gynaecology at Gauhati Medical College and Hospital, Guwahati, Assam. 150 patients in the age group from 35-85 years with symptomatic benign uterine pathology excluding uterine descent and uterine size less than 16 weeks were selected randomly. All the three routes of hysterectomy: Abdominal, Laparoscopic and Non Descent Vaginal Hysterectomy were assigned 50 cases each.

Outcomes measured were operating time, intraoperative complications, requirement of blood transfusions, post-operative VAS score, post-operative mobility, post-operative complications (febrile morbidity, bowel distension, urinary retention, wound infection) and duration of hospital stay.

### **Result**

The most common age group undergoing hysterectomy was 40-49yrs with AUB-L being the most common indication. The mean operating time in NDVH ( $82.8 \pm 22.29$ ) minutes was significantly less than TAH and TLH. Post operative VAS score was significantly lower in NDVH. All the post-operative complications were significantly higher in the TAH group. Mean duration of hospital stay was least in NDVH ( $3.28 \pm 0.70$ ) days.

### **Conclusion**

From this study we have concluded that vaginal approach should be the procedure of choice for benign causes unless contraindicated, but at the end, route of hysterectomy is dependant on multiple factors and should be individualized.

### **Keywords**

Hysterectomy, Total Abdominal hysterectomy (TAH), Total Laparoscopic Hysterectomy (TLH), Non-Descent Vaginal Hysterectomy (NDVH).

## **INTRODUCTION**

Hysterectomy is one of the most commonly performed gynaecological operations.(1) The highest rate of hysterectomy is between the ages of 40 and 49 years with an average of 46.1 years.(2) It involves removal of the uterine corpus and cervix (total hysterectomy) or without the cervix (supracervical hysterectomy) as a treatment for numerous gynaecological conditions.

Hysterectomy artificially ends the reproductive function and has several positive and negative effects on women's physical and psychosocial health. It provides immediate relief from symptoms like abnormal uterine bleeding (AUB), pelvic pain, discomfort etc. It rates the highest in satisfaction scores compared with other treatments as it improves the quality of life (3) and reduces anxiety and depression.(4,5) However, it's adverse effects include urinary tract infections, urinary incontinence(6), sexual dysfunctions, depression, increased fatigue,(7,8) obesity,(9) osteoporosis, (10) coronary heart disease,(11) and loss of femininity(12).

In India, approximately 2,310,263 women undergo hysterectomy every year.(13) Thus, India being a developing country the procedure of hysterectomy should be cost effective and have minimum hospital stay.

Hysterectomy can be performed by abdominal route (laparotomy), vaginally (with or without uterine descent), by applying minimally invasive techniques (laparoscopy and robotic surgery) or a combination of the later two. The route chosen depends on factors like pathology and size of the uterus, presence or absence of adnexal pathology, surgeon's preference and expertise, patient's body habitus and medical co-morbidities, infrastructure of the hospital and urgency of need for hysterectomy.(14,15)

The abdominal route is mainly for large sized uterus with anticipated adhesions or malignancies where removal of uterus is not possible laparoscopically or through vaginal route.

Vaginal hysterectomy is conventionally done for prolapsed uterus. However, in the recent times vaginal hysterectomy for benign pathologies with non-descent uterus is gaining popularity. This procedure is known as Non-Descent Vaginal Hysterectomy (NDVH). The biggest advantage is that NDVH is done through natural orifice and leaves no scar on the patient. However, bigger size uterus and its adhesions to neighbouring structures cause hindrance to perform this procedure.

Nowadays, there are a number of different subtypes of laparoscopic hysterectomy depending on the extent of laparoscopic dissection.(17) The significance of laparoscopic hysterectomy is difficult to define as it is different for each surgeon or institute, region or country and most importantly, for each pathology. Experience of the surgeon, pathology of the condition requiring hysterectomy and infrastructure are the limiting factors for performing this procedure.

This proposed study aims to compare and evaluate the advantage and disadvantages of the three routes of hysterectomy (abdominal, laparoscopic and NDVH). Previous literature has compared either of the two approaches, but there are less documents comparing the outcome of all three approaches together.

## **AIMS AND OBJECTIVES**

To evaluate and compare the clinical results of the three routes of hysterectomy namely - Abdominal hysterectomy , Laparoscopic Hysterectomy and Non-Descent Vaginal Hysterectomy (NDVH).

## **METHODS AND METHODOLOGY**

The study was conducted in the Department of Obstetrics and Gynaecology at Gauhati Medical College and Hospital, Guwahati, Assam from April 2021- March 2022 after approval from institutional ethical

committee. It is a hospital-based time bound prospective and observational study with a total sample size of 150 (TAH 50, TLH 50, NDVH 50). Patients in the age group from 35-85 years with symptomatic benign uterine pathology requiring hysterectomy and fulfilling the inclusion and exclusion criteria were included in the study. Patients were allotted to one of the three groups depending upon their disease condition, clinical and radiological findings.

### **INCLUSION CRITERIA:**

1. Benign condition of the uterus and adnexa
2. Uterus smaller than 16 weeks size of pregnancy
3. Patient's age >35yrs and <85yrs

### **EXCLUSION CRITERIA:**

1. Genital prolapse requiring hysterectomy
2. Gynaecological malignancies

An informed written consent was obtained from patients before the procedure.

A proper detailed history, general, systemic examination and per vaginal examination was routinely done in all patients.

Patients were operated under regional or general anaesthesia

All patients were re-evaluated on OT table under anaesthesia by per vaginal examination to rule out intra-peritoneal adhesions and check mobility of the uterus. Thereafter, route and type of surgery was finalized. Operative time was calculated from the beginning of the first incision till closure of the same incision at the end of the procedure.

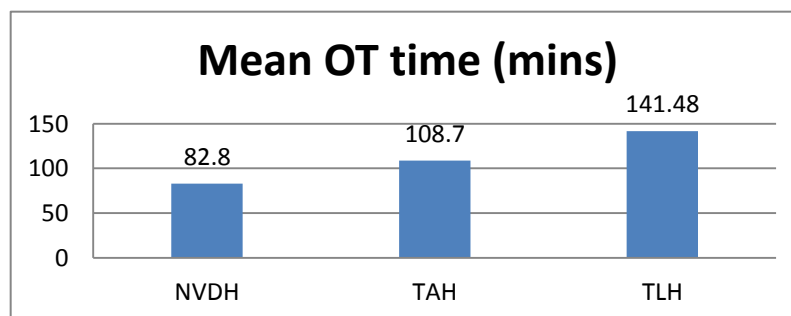
Intra-operative finding, complications or injuries if any were recorded. On post-operative day 1 hemoglobin level and VAS score was evaluated. Post-operative mobility was assessed by the ability to use washroom after catheter removal. Length of hospital stay was defined as the number of days required to stay in hospital after surgery, excluding the day of surgery.

### **RESULTS AND OBSERVATIONS**

In our study, the most common age group undergoing hysterectomy was 40-49yrs.

AUB-L was the most common indication for hysterectomy in all the three groups and was statistically significant as per Chi Square test ( $p < 0.05$ ).

FIGURE 1: SHOWING MEAN OPERATING TIME.

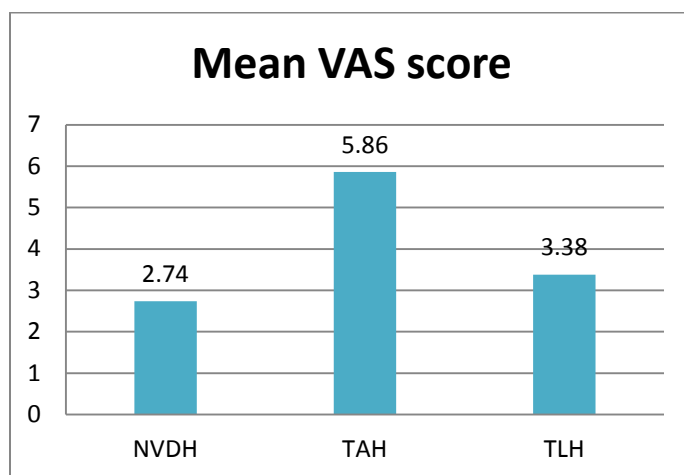


The mean operating time in NDVH, TAH and TLH group were  $82.8 \pm 22.29$  minutes,  $108.70 \pm 25.73$  minutes and  $141.48 \pm 38.47$  minutes respectively. The mean operating time was significantly less in NDVH group compared to TAH and TLH. This was statistically significant as per ANOVA test ( $p < 0.05$ ).

None of the patients in the present study had any intra-operative injury of neighbouring vital structures.

In NDVH group 2(4%) patients required blood transfusion whereas 34(68%) and 8(16%) patients required blood transfusion in TAH and TLH group respectively. The requirement of blood transfusion was significantly higher in TAH group as compared to NDVH and TLH as per Chi-Square test ( $p < 0.05$ ).

FIGURE 2: SHOWING VAS SCORE IN POST-OPERATIVE PERIOD.



The post-operative VAS score in the first 24hrs after surgery in NDVH, TAH and TLH group were  $2.74 \pm 0.66$ ,  $5.86 \pm 0.88$  and  $3.3 \pm 0.49$  respectively. The VAS score was significantly lower in NDVH group ( $p < 0.05$ ).

In NDVH group, all patients were mobilised after completion of 24hrs of surgery without any difficulty. In TAH group, 18(36%) and 32(64%) patients mobilised on day2 and day 3 with slight difficulty. In TLH group, 48(96%) mobilised on Day 2 and 2(4%) mobilised on Day3 without any difficulty.

The patients undergoing NDVH had a significantly faster post-operative mobilization than TLH and TAH group as per Chi-Square test ( $p < 0.05$ ).

In TAH group, 6(12%) patients developed fever in the immediate post-operative period whereas there were no cases in both TLH and NDVH groups. This was significant as per Chi-Square test ( $p < 0.05$ ).

In TAH group, 8(16%) patients had bowel distension but there were none in TLH and NDVH group. This was significant as per Chi Square test ( $p < 0.05$ ).

All patients had indwelling catheter and was removed once the patient was assessed to gain mobility, usually 24 hours .

In the NDVH group, 1(2%) patient developed urinary retention whereas 9(18%) and 5(10%) patients developed urinary retention in TAH and TLH group respectively in the post operative period. This was not significant as per Chi Square test ( $p > 0.05$ ).

In TAH group, 6(12%) patients developed wound infection whereas none of the patients in TLH and NDVH group. This was significant as per Chi Square test ( $p < 0.05$ ).

The mean duration of hospital stay was  $3.28 \pm 0.70$ ,  $5.46 \pm 2.83$  and  $3.68 \pm 2.2$  days in NDVH, TAH and TLH group respectively. The duration of hospital stay was significantly lower in NDVH group as compared to TLH and TAH as per ANOVA test ( $p < 0.05$ ).

## **DISCUSSION**

In the present study, mean age of the patients were  $44.06 \pm 6.91$ ,  $44.07 \pm 5.43$  and  $43.94 \pm 4.85$  years in NDVH, TAH and TLH respectively. There is no significant difference between the groups as per Chi Square test ( $p > 0.05$ ). This is similar to the studies of Somani PO et al (44), Nimbannavar H et al(41), Priyadarshini M et al(42) and Uikey P et al(1).

In our study, most common indication for hysterectomy was AUB-L (fibroid) followed by AUB-A (adenomyosis). This is similar to the studies by Nimbannavar H et al(41), Uikey P et al(1), Somani PO et al(44).

In our study, none of the cases suffered any sort of intraoperative injury to the neighbouring vital structures. This is similar to the study conducted by Uikey P et al.

**Table1: SHOWING COMPARISON OF OPERATING TIME WITH OTHER STUDIES**

SL No	STUDY	YEAR	NDVH	TAH	TLH	P Value
1	Somani PO et al(44)	2021	$57.55 \pm 10.7$ 1min	–	–	<0.001
2	Nimbannavar H et al(41)	2020	1hr30mins± 0.470	–	1hr58 mins±0 .507	0.0083
3	Priyadarshini M et al(42)	2019	$54.21 \pm 9.01$ Min	$63.44 \pm 11.9$ 4min	–	<0.001
4	Uikey P et al(1)	2018	$67.4 \pm 7.9$ mi N	$64.2 \pm 5.8$ m In	–	<0.005
5	Khandelwal K et al(40)	2016	$97 \pm 23.73$ Min	$126.5 \pm 49.8$ Min	$142.3 \pm$ 33.7min	<0.001
6	Present study	2022	$82.80 \pm 22.2$ 9 min	$108.7 \pm 25.7$ 3min	141.48 ±38.47 min	<0.005

In our study, the mean operating time in TAH Group was  $108.7 \pm 25.73$  minutes while it was  $141.48 \pm 38.47$  minutes and  $82.80 \pm 22.29$  minutes in TLH and NDVH group respectively. The mean operating time was significantly less in NDVH Group compared to TAH and TLH Group as per ANOVA test ( $p < 0.005$ ). This is comparable to the studies of Somani PO et al(44), Uikey P et al(1), Nimbannavar H et al(41), Priyadarshini M et al(42) and Khandelwal K et al(40).

In our study 2(4%), 34(68%), 8(16%) patients required post-operative blood transfusion in NDVH, TAH and TLH group respectively. In NDVH the need of blood transfusion was due to pre-existing anemia. The requirement of blood transfusion was significantly higher in TAH group compared to TLH and NDVH

group as per Chi-Square test ( $p < 0.005$ ). This is concordant to the studies of Somani PO et al(44) and Khandelwal K et al(40).

**Table 2: SHOWING COMPARISON OF VAS SCORE WITH DIFFERENT STUDIES**

SL No	STUDY	YEAR	NDVH	TAH	TLH	P Value
1	Uikey P et al(1)	2018	3.1±0.4	5.3±0.4	–	<0.0001
2	Present study	2022	2.74±0.66	5.86±0.88	3.38±0.49	<0.001

In the present study, the post-op VAS Score was significantly lower in NDVH Group compared to TAH and TLH Group as per ANOVA test ( $p < 0.05$ ). This is comparable to study done by Uikey P et al(1).

**Table 3: SHOWING COMPARISON OF POST-OPERATIVE COMPLICATIONS WITH OTHER STUDIES**

SL No	STUDY	YEAR	VARIABLE	NDVH	TAH	TLH	P Value
1	Somani PO et al(44)	2021	FEBRILE MORBIDITY	2	–	–	
			BOWEL DISTENSION	0	–	–	
			URINARY RETENTION/UTI	5	–	–	
			WOUND INFECTION	0	–	–	
2	Nimbannavar H et al(41)	2020	FEBRILE MORBIDITY	4	–	4	
			BOWEL DISTENSION/PARALYTIC ILEUS	0	–	2	
			URINARY RETENTION	–	–	–	
			WOUND INFECTION/GAPING	0	–	2	
3	Priyadarshini M et al(42)	2019	FEBRILE MORBIDITY	2	6	–	
			BOWEL DISTENSION/PARALYTIC ILEUS	0	6	–	
			URINARY RETENTION/UTI	5	10	–	
			WOUND INFECTION	0	2	–	
4	Uikey P et al(1)	2018	FEBRILE MORBIDITY	1	7	–	
			BOWEL DISTENSION	–	–	–	
			URINARY RETENTION/UTI	0	0	–	
			WOUND INFECTION	0	3	–	
5	Khandelwal	2016	FEBRILE MORBIDITY	1	3	3	

	K et al(40)		BOWEL DISTENSION/PARALYTIC ILEUS	–	–	–	
			URINARY RETENTION/UTI	1	0	2	>0.05
			WOUND INFECTION/GAPING	0	3	0	>0.005
6	Present study	2022	FEBRILE MORBIDITY	0	6	0	0.001
			BOWEL DISTENSION/PARALYTIC ILEUS	0	8	0	0.001
			URINARY RETENTION	1	9	5	0.001
			WOUND INFECTION	0	6	0	0.001

In our study, 9(18%) patients had urinary retention, 8(16%) patients had bowel distension and 6(12%) patients each had febrile morbidity and wound infection in TAH group. Urinary retention was observed in 1(2%) patient in NDVH group and 5(10%) patients in TLH group. Thus, the incidence of post-operative complications were significantly higher in TAH group compared to TLH and NDVH group as per Chi-Square test ( $p < 0.05$ ). This finding was similar to the studies of Nimbannavar H et al(41), Priyadarshini M et al(42) and Khandelwal K et al(40).

In our study the duration of hospital stay was significantly lower in NDVH Group as compared to TAH and TLH Group as per Chi-Square test ( $p < 0.05$ ). This is similar to the studies conducted by Khandelwal K et al(40), Uikey P et al(1) and Priyadarshini M et al(42).

## **CONCLUSION**

Thus from this study we have concluded that vaginal hysterectomy should be the procedure of choice. However, at the end the route of hysterectomy for a patient with benign cause will always remain multifactorial and should be individualized.

## **LIMITATIONS OF THE STUDY**

Our study was a comparative and observational study done within a short period of one year. Larger studies with more sample size and longer duration are required for proper evaluation of the efficacy of all the three routes of surgery.

## **BIBLIOGRAPHY**

1. *Uikey P, Wankhede TM, Tajne MP. The route of hysterectomy: a comparative study between abdominal hysterectomy (AH), non descent vaginal hysterectomy (NDVH), and laparoscopic assisted vaginal hysterectomy (LAVH). Int J Reprod Contracept Obstet Gynecol. 2018 Sep 26;7(10):4022–8.*
2. *Novak's Gynecology - PDF Drive [Internet]. [cited 2022 Oct 4]. Available from: <https://www.pdfdrive.com/novaks-gynecology-e19779614.html>*
3. *Accidents during laparotomy surgery: mass bleeding, secondary injuries. Obstet Gynecol. 2002;69:1207–15.*
4. *Carlson KJ. Outcomes of hysterectomy. Clin Obstet Gynecol. 1997 Dec;40(4):939–46.*

5. Singh A, Govil D. *Hysterectomy in India: Spatial and multilevel analysis*. *Womens Health*. 2021 Jun 6;17:17455065211017068.
6. Link CL, Pulliam SJ, McKinlay JB. *Hysterectomies and Urologic Symptoms: Results from the Boston Area Community Health (BACH) Survey*. *Female Pelvic Med Reconstr Surg*. 2010;16(1):37–47.
7. Goktas SB, Gun I, Yildiz T, Sakar MN, Caglayan S. *The effect of total hysterectomy on sexual function and depression*. *Pak J Med Sci*. 2015;31(3):700–5.
8. Richards DH. *A post-hysterectomy syndrome*. *Lancet Lond Engl*. 1974 Oct 26;2(7887):983–5.
9. Kirchengast S, Gruber D, Sator M, Huber J. *Hysterectomy is associated with postmenopausal body composition characteristics*. *J Biosoc Sci*. 2000 Jan;32(1):37–46.
10. Choi HG, Jung YJ, Lee SW. *Increased risk of osteoporosis with hysterectomy: A longitudinal follow-up study using a national sample cohort*. *Am J Obstet Gynecol*. 2019 Jun;220(6):573.e1-573.e13.
11. Ding DC, Tsai IJ, Hsu CY, Wang JH, Lin SZ. *Hysterectomy is associated with higher risk of coronary artery disease*. *Medicine (Baltimore)*. 2018 Apr 20;97(16):e0421.
12. Silva C de MC e, Vargens OM da C. *Woman experiencing gynecologic surgery: coping with the changes imposed by surgery 1*. *Rev Lat Am Enfermagem*. 2016 Aug 29;24:e2780.
13. Chattopadhyay S, Patra KK, Halder M, Mandal A, Pal P, Bhattacharyya S. *A comparative study of total laparoscopic hysterectomy and non-descent vaginal hysterectomy for treatment of benign diseases of uterus*. *Int J Reprod Contracept Obstet Gynecol*. 2017 Feb 19;6(3):1109–12.
14. Aarts JWM, Nieboer TE, Johnson N, Tavender E, Garry R, Mol BWJ, et al. *Surgical approach to hysterectomy for benign gynaecological disease*. *Cochrane Database Syst Rev*. 2015 Aug 12;(8):CD003677.
15. Thill M, Hornemann A, Fischer D, Diedrich K, Altgassen C. *Vaginale und abdominale Hysterektomie*. *Gynäkol*. 2008 May 1;41:328–36.
16. Sutton CJG. *The History of Hysterectomy*. In: Alkatout I, Mettler L, editors. *Hysterectomy: A Comprehensive Surgical Approach [Internet]*. Cham: Springer International Publishing; 2018 [cited 2022 Oct 4]. p. 3–28. Available from: [https://doi.org/10.1007/978-3-319-22497-8\\_1](https://doi.org/10.1007/978-3-319-22497-8_1)
17. Sparić R, Hudelist G, Berisava M, Gudović A, Buzadžić S. *Hysterectomy throughout history*. *Acta Chir Jugosl*. 2011;58(4):9–14.
18. Arun Babu S. *Te Linde's Operative Gynecology, South Asian Edition*. 2022.
19. Reiter RC, Gambone JC, Lench JB. *Appropriateness of hysterectomies performed for multiple preoperative indications*. *Obstet Gynecol*. 1992 Dec;80(6):902–5.
20. Lee NC, Dicker RC, Rubin GL, Ory HW. *Confirmation of the preoperative diagnoses for hysterectomy*. *Am J Obstet Gynecol*. 1984 Oct 1;150(3):283–7.
21. Weir E. *The public health toll of endometriosis*. *CMAJ Can Med Assoc J*. 2001 Apr 17;164(8):1201.
22. Demello AB. *Uterine artery embolization*. *AORN J*. 2001 Apr;73(4):790–2, 794–8, 800-804 passim; quiz 809–14.



23. Townsend DE, Sparkes RS, Baluda MC, McClelland G. Unicellular histogenesis of uterine leiomyomas as determined by electrophoresis by glucose-6-phosphate dehydrogenase. *Am J Obstet Gynecol.* 1970 Aug 15;107(8):1168–73.
24. Genetics and the development of fibroids - PubMed [Internet]. [cited 2022 Oct 4]. Available from: <https://pubmed.ncbi.nlm.nih.gov/11344997/>
25. Cancer statistics, 2000 - PubMed [Internet]. [cited 2022 Oct 4]. Available from: <https://pubmed.ncbi.nlm.nih.gov/10735013/>
26. Duan L, Xu X, Koebnick C, Lacey JV, Sullivan-Halley J, Templeman C, et al. Bilateral oophorectomy is not associated with increased mortality: the California Teachers Study. *Fertil Steril.* 2012 Jan;97(1):111–7.
27. Sawaya GF, Brown AD, Washington AE, Garber AM. Clinical practice. Current approaches to cervical-cancer screening. *N Engl J Med.* 2001 May 24;344(21):1603–7.
28. Agostini A, Vejux N, Bretelle F, Collette E, De Lapparent T, Cravello L, et al. Value of laparoscopic assistance for vaginal hysterectomy with prophylactic bilateral oophorectomy. *Am J Obstet Gynecol.* 2006 Feb;194(2):351–4.
29. Robert M, Cenaiko D, Sepandj J, Iwanicki S. Success and Complications of Salpingectomy at the Time of Vaginal Hysterectomy. *J Minim Invasive Gynecol.* 2015 Aug;22(5):864–9.
30. AAGL Statement to the FDA on Power Morcellation [Internet]. AAGL. 2018 [cited 2022 Oct 4]. Available from: <https://www.aagl.org/aaglnews/aagl-statement-to-the-fda-on-power-morcellation/>
31. Siedhoff MT, Wheeler SB, Rutstein SE, Geller EJ, Doll KM, Wu JM, et al. Laparoscopic hysterectomy with morcellation vs abdominal hysterectomy for presumed fibroid tumors in premenopausal women: a decision analysis. *Am J Obstet Gynecol.* 2015 May;212(5):591.e1-8.
32. Nygaard I. Laparoscopic hysterectomy: weigh harms, but do not dismiss benefits. *Am J Obstet Gynecol.* 2015 May;212(5):553–5.
33. Barron KI, Richard T, Robinson PS, Lamvu G. Association of the U.S. Food and Drug Administration Morcellation Warning With Rates of Minimally Invasive Hysterectomy and Myomectomy. *Obstet Gynecol.* 2015 Dec;126(6):1174–80.
34. Desai VB, Guo XM, Xu X. Alterations in surgical technique after FDA statement on power morcellation. *Am J Obstet Gynecol.* 2015 May;212(5):685–7.
35. Harris JA, Swenson CW, Uppal S, Kamdar N, Mahnert N, As-Sanie S, et al. Practice patterns and postoperative complications before and after US Food and Drug Administration safety communication on power morcellation. *Am J Obstet Gynecol.* 2016 Jan;214(1):98.e1-98.e13.
36. Cohen SL, Morris SN, Brown DN, Greenberg JA, Walsh BW, Gargiulo AR, et al. Contained tissue extraction using power morcellation: prospective evaluation of leakage parameters. *Am J Obstet Gynecol.* 2016 Feb;214(2):257.e1-257.e6.
37. Panda S, Behera AK, Jayalakshmi M, Narasinga Rao T, Indira G. Choosing the Route of Hysterectomy. *J Obstet Gynaecol India.* 2015 Jul;65(4):251–4.
38. Singh B, Soni S. Comparative study of different routes of hysterectomy. *Obs Gyne Rev J Obstet Gynecol.* 2018 Dec 31;4(4):89–94.
39. Route of hysterectomy: a retrospective, cohort study in English NHS Hospitals from 2011 to 2017 - Madhvani - 2019 - *BJOG: An International Journal of Obstetrics & Gynaecology* - Wiley

Online Library [Internet]. [cited 2022 Oct 4]. Available from:  
<https://obgyn.onlinelibrary.wiley.com/doi/abs/10.1111/1471-0528.15539>

40. Khandelwal K, Kabra SL, Ahmad SN, Mitra S. A comparative evaluation of clinical outcome of trans-abdominal hysterectomy, total laparoscopic hysterectomy and vaginal hysterectomy in non-descent cases. *Int J Reprod Contracept Obstet Gynecol.* 2017 Feb 23;5(7):2346–51.
41. Nimbannavar H, Chugh A, Rama A, Bal H. Comparative study of non- descent vaginal hysterectomy and total laparoscopic hysterectomy performed for benign gynaecological conditions. *Int J Reprod Contracept Obstet Gynecol.* 2021 Feb 24;10(3):993–8.
42. Priyadarshini M, Hansda R. A comparative study between total abdominal hysterectomy and non-descent vaginal hysterectomy. *Indian J Obstet Gynecol Res.* 2020 Jun 15;7(2):153–6.
43. Ebner F, de Gregorio N, Lato C, Ohly V, Janni W, Spohrs J, et al. Choosing a Surgical Access Point for Hysterectomy: A Paradigm Shift Over a 10-Year Span. *Front Med [Internet].* 2020 [cited 2022 Oct 4];7. Available from:  
<https://www.frontiersin.org/articles/10.3389/fmed.2020.569895>
44. Somani P, Singh P, Shinde M. Non-descent vaginal hysterectomy surgery associated with less complications and good prognosis. *Asian J Med Sci.* 2022 Jan 1;13(1):123–8.