


**Research Article**

## Widest Uterine Grip Width Measurement Clinically to Predict the Success of the Vaginal Hysterectomy of a Very Large Fibroid Uterus

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### Abstract

**Objectives:** To find a simple clinical method to predict the success of the vaginal hysterectomy (VH) in the case of a very large fibroid uterus.

**Methods:** In an observational study, consecutive cases of hysterectomy for benign large fibroid uterus of 18 to 26 weeks size were included. Preoperatively, the widest uterine grip width was measured clinically by the below-described method. Then, the VH was attempted using the purohit technique.

**Results:** A total of thirty-two cases were studied; the widest uterine grip width measured below 15cm in 24 (75%) cases, and it was  $\geq 15$ cm in eight (25%) cases. The attempted VH was successful in 24 (75%) cases associated with the widest uterine grip width ranging between 11 and 14.5cm. The attempted VH failed in four (12.5%) of eight cases with the widest uterine grip width ranging 15-17 cm and needed conversion to abdominal hysterectomy. The vaginal hysterectomy was not feasible due to the inaccessible high-up cervix in the other four (12.5%) of eight cases with grip width ranging from 17-20cm.

**Conclusion:** The widest uterine grip width measurement of up to 14.5cm can predict the success of the vaginal hysterectomy in cases of very large uteri of 18 to 26 weeks gestation size.

**Keywords:** widest uterine grip width; very large uterus; vaginal hysterectomy by electrosurgery; feasibility of vaginal hysterectomy; predict success of trial vaginal hysterectomy; width of uterus

### Introduction

The vaginal hysterectomy has been the least invasive method of the hysterectomy for faster recovery and shorter hospital stay, and should be the preferred one over other routes of the hysterectomy for benign disease of the uterus whenever possible [1] [2][3][4]. The vaginal hysterectomy can be performed by experienced gynecologic surgeons in cases with a large uterus  $\geq 12$  weeks in size or uterine weight  $\geq 250$  grams utilizing new methodology and newer technology such as bipolar diathermy [5][6]. Previous investigators have performed the vaginal hysterectomy in cases of very large uteri  $\geq 16$  weeks in size although there is no set upper limit uterus height [5][7][8][9]. The non-descent of a large and wide uterus had often been cited as a concern of the failed attempted vaginal hysterectomy [10]. It is difficult to predict the descent of the cases of very large and wide uteri needed for a successful vaginal hysterectomy using the conventional bimanual pelvic examination, ultrasound, and other imaging techniques [11]. We, therefore, developed a simple clinical method of measuring the widest abdominal uterine grip

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width of a very large uterus above 16 weeks size of gestation and studied its relation with the success of the vaginal hysterectomy with an aim to segregate the feasible cases from non-feasible cases of a vaginal hysterectomy.

### Materials and methods

An observational study was conducted at our private hospital from January 2020 to December 2022. Consecutive candidates of the hysterectomy for a large benign fibroid uterus above 16 weeks of gestation size were included. Cases with ventrofixed uterus following previous caesarean section were excluded. Preoperatively, the widest abdominal uterine grip width of every case was measured clinically by the below-described method.

The purohit general hospital Institutional ethics committee approved the study. Each patient gave written informed consent for VH, and if needed conversion to the abdominal route.

### Purohit Technique to measure the widest uterine grip width

The examiner stood on the right side of the examination table facing the patient's feet in the supine position. The left hand was used to grasp the abdominally palpable large uterus from side to side. Loosely applied hand grip was then slid over the lateral walls of the uterus from above downwards, and from below upwards to find the widest point of uterine distension; the widest uterine grip was then fixed at that point (Figure 1, Video 1). A measuring tape was brought by the right hand. The distance between the inner sides of the terminal phalanx of the middle finger and of the thumb was measured (Figure 2, Video 1). It was expressed as the purohit widest uterine grip width.

**Video 1:** <https://youtu.be/NMJChzb7pDU>

The video Demonstrate the technique of measurement of uterine grip width (one measures 13 cm, and the other measures 15.5cm).

All cases were exposed for the vaginal hysterectomy by the Purohit technique [6]. The volume reduction manoeuvres like bisection, myomectomy, wedge, and sub-serosal morcellation [5] were used to reduce the volume of the uterus during VH. Success, failure, and conversion were noted.

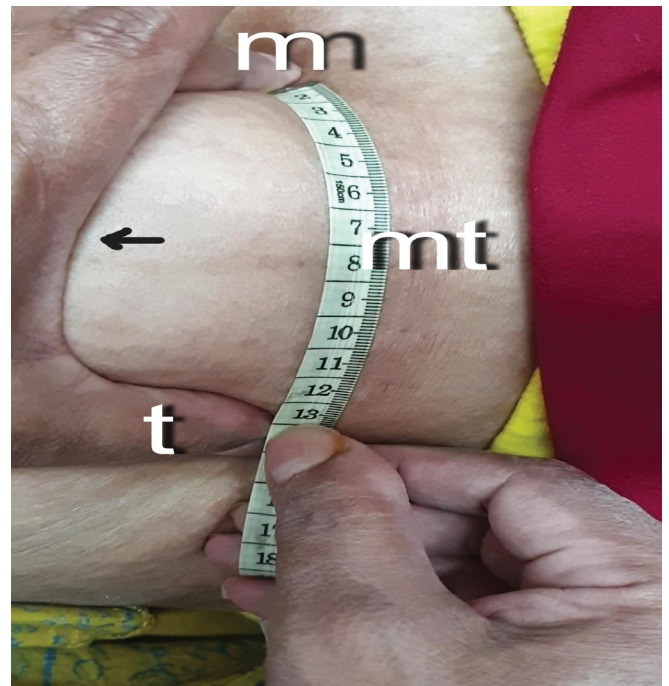
The primary outcome was to access the success of the attempted vaginal hysterectomy. Also, to find out the cut-off value for the widest uterine grip width between the successful and failed attempted vaginal hysterectomy.

### Results

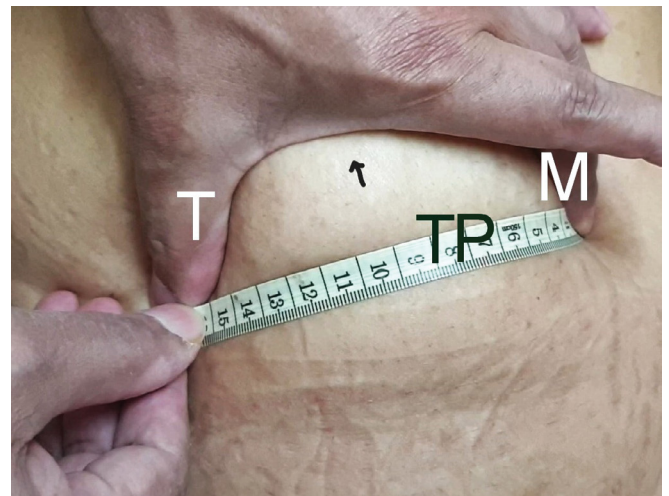
Table 1 shows patient characteristics of thirty-two cases of a very large uterus of 18 to 26 weeks sizes of gestation found during the study period. The mean uterine height

was  $20.37 \pm 2.23$  (18-26) 95% CI (19.56-21.18) weeks. The mean age was  $44.37 \pm 5.32$  (32-60) years. All women were multipara. The fibroid was the main cause of large uteri and an indication of the hysterectomy in all cases.

None of the cases had severe pelvic adhesions, endometriosis, or adnexal mass. The cervix was easily accessible during bimanual examination in 24 (75%) cases. The cervix was placed high up and palpated with difficulty in eight (25%) cases.



**Figure 1:** Show the widest uterine grip width of 13 cm measured by a tape (mt) between the medial side of the thumb (t) and middle finger (m) of the left hand. The arrow points toward the umbilicus.



**Figure 2:** Show the widest uterine grip width of 15 cm measured by a tape (TP) between the medial side of the thumb (T) and middle finger (M) of the left hand. The arrow points toward umbilicus.

**Table 1:** Patient characteristics

Patient characteristics	N=32	%
Severe pelvic adhesions	0	0
Endometriosis or adnexal mass	0	0
Previous caesarean section	1	3.12
Previous pelvic laparotomy	0	0
<b>Uterus size in weeks of gestation</b>	-	-
18	9	28.12
20	14	43.75
22	5	15.62
24	2	6.25
26	2	6.25
High up cervix palpated with difficulty	8	25
Cannonball like uteri	5	15.62

**Table 2:** shows the widest grip width, uterine height, uterine weight, and ultrasound- measured (USG) widest uterine width, success, and failure of VH

Sl. no	Clinical uterine height in weeks of gestation	Widest uterine grip width in cm	Widest uterine width in cm By USG	Specimen weight of uterus in gram	Vaginal hysterectomy completed successfully(S) or failed(F)
1	18	11	9.3	600	S
2	18	11	9	760	S
3	22	11.5	9.2	1200	S
4	18	12	9.1	850	S
5	18	12	10.9	670	S
6	18	13	9.4	820	S
7	20	13	7	840	S
8	20	13	8.4	620	S
9	18	13	9	550	S
10	20	13	8	730	S
11	20	13	8.4	900	S
12	20	13	9.5	900	S
13	20	13	8	900	S
14	18	13	10	900	S
15	18	13	10.4	800	S
16	20	13	10.5	1340	S
17	22	13	8.6	1000	S
18	20	14	9.3	650	S
19	20	14	9.6	950	S
20	22	14	9.4	1150	S
21	20	14	7.2	650	S
22	26	14	10.6	1400	S
23	20	14	8.5	700	S
24	18	14.5	8.7	670	S
25	20	15	13	870	F
26	22	15	10.5	1070	F
27	22	17	8.3	940	F

28	20	18	12	1090	F
29	26	19	15	1300	F
30	20	19	12	1000	F
31	24	20	13.5	1200	F
32	24	20	15	1500	F
Total 32	Mean	Mean	Mean	Mean	N=32
	20.37±2.23(18-26) 95% CI(19.56-21.18)	14.21 ± 2.48 ( 11-20) (95% CI -13.32-15.11 )	9.91 ± 2.00 ( 7-15 ) 95% CI (9.19-10.64)	922.5 ± 248.38 (550-1500) 95% CI(832-94-1012.05)	S=24(75%) F=8(25%)

Table 2 shows the widest grip width, uterine height, uterine weight, and ultrasonographically measured widest uterine width, success, and failure of VH.

The widest uterine grip width was below 15 (11 - 14.5) cm in 24 (75%) cases. The widest uterine grip width was  $\geq 15$  (15-20) cm in eight (25%) cases. The total mean grip width was  $14.21 \pm 2.48$  (11-20) (95% CI -13.32-15.11) cm.

In nine of nine cases (100%) with 18 weeks size uteri, the widest uterine grip width measured below 14.5cm.

In 11 of 14 cases (78.57%) with a uterus of 20 weeks in size, the widest uterine grip width measured below 14cm. In the other three cases, the widest uterine grip width was  $\geq 15$ cm. The attempted vaginal hysterectomy failed in those three cases.

In three of five cases (60%) with a uterus of 22 weeks in size, the widest uterine grip width measured below 14cm. Two of them had the widest uterine grip width of 15cm, and the attempt at the vaginal hysterectomy failed.

Two cases with a uterus of 24 weeks size had the widest uterine grip width of 20cm, and attempted vaginal hysterectomy failed in both cases.

In one of two cases (50%) with a uterus of 26 weeks in size, the widest grip width measured 14cm. The other had the widest grip width of 19cm and had failed an attempted vaginal hysterectomy. Thus, uterine height was not a reliable measure to predict the success of VH.

The vaginal hysterectomy was successfully completed in 24 (75 %) of 32 cases with a grip width of 14.5cm or below. The vaginal hysterectomy failed in four (12.5%) cases with grip width  $\geq 15$ cm, and below 17cm, and needed conversion to abdominal hysterectomy. In other four (12.5%) cases with grip width measured 17-20cm, the cervix was not accessible vaginally and thus, declared preoperatively non-feasible for the vaginal attempt of the hysterectomy, and a total abdominal hysterectomy was done. Thus, the upper cut-off value of the widest abdominal grip width for a successful vaginal hysterectomy of the large uterus was 14.5cm. The vaginal hysterectomy failed in cases with uterine grip width  $\geq 15$  cm.

The total mean uterine weight was  $922.5 \pm 248.38$  (550-1500) 95% CI (832-94-1012.05) grams.

The mean uterine weight for cases who had successful vaginal hysterectomies was  $856.25 \pm 227.97$  (550-1400) 95%CI (759.98-952.51) grams. The vaginal hysterectomy was successful in a case with a uterus weighing 1400 grams (14cm widest uterine grip width) but failed in a case with a specimen uterus weighing 870 grams (15cm widest uterine grip width). Thus, weight or height was not a reliable measure to predict the success of the vaginal hysterectomy of a very large uterus.

The ultrasonographically(USG) measured widest uterine width of cases who had the successful vaginal hysterectomy ranged 7-10.9 cm. The total mean uterine USG width of  $9.91 \pm 2.00$  (7-15) 95% CI (9.19-10.64) cm is significantly narrower statistically ( $p=0.000$ ) than the mean grip width was  $14.21 \pm 2.48$  (11-20) (95% CI -13.32-15.11) cm. It was because the grip width includes the thick abdominal wall.

However, VH failed in two (6.25%) cases who had ultrasound-determined widest uterine width of 8.3 and 10.5cm respectively; both had associated broad ligament fibroids. Thus, ultrasound-measured uterine width gave a false prediction of success in 6.25% of cases. Therefore, it is not a reliable measure to predict the success of VH in a very large uterus. However, the ultrasound-measured width is more reliable next to the grip width than the uterine height and weight to predict the success of VH.

## Discussion

**Main findings.** We found that the vaginal hysterectomy for large uteri was successfully completed when the uterine grip width remained below 14.5cm, and failed when it exceeded 15cm. The upper cut-off value of uterine grip width was 14.5cm for a successful VH of a large uterus, and it helped us preoperatively to decide the vaginal or abdominal route of hysterectomy of a large uterus of above 16 weeks size.

Experienced and skilled gynecologic surgeons can perform the vaginal hysterectomy of a very large fibroid uterus [7,8]. However, it was difficult to predict the success

of the vaginal hysterectomy of a very large uterus depending solely on the clinically determined height of the uterus, ultrasonographically measured length and width of the uterus, volume or weight [9,11] of  $\geq 18$  weeks size uteri. Ultrasound-measured uterus width greater than 10 cm is a potential risk factor for conversion to laparotomy [12]. We found one case of failed VH with 8.3cm ultrasound measured uterine width, and successful VH with 10.9cm ultrasound measured uterine widths (Table 2). Thus, there was no regular relation between ultrasound measured uterine width and the success of VH. The present study also demonstrated that the descent of a wide and short “cannonball” like a large uterus of 20 weeks size weighing 870 grams got obstructed at the brim of the pelvis and resulted in failed vaginal hysterectomy (Table 2). The widest uterine grip width of that case was 15cm (Table 2). Whereas the descent of a long “pear-shaped” uterus of 26 weeks sizes weighing 1400 grams did not get obstructed and resulted in a successful vaginal hysterectomy. The widest uterine grip width of that case was 14cm. Thus, uteri of the same uterine height had different widest grip widths and vice versa (Table 2) of large uteri.

This study demonstrated a linear relation of grip width up to 14.5cm with the success of the vaginal hysterectomy of the large uteri, and inverse relation once grip width measured  $\geq 15$  cm. Therefore, it was not the clinically determined height, weight, or ultrasound determined uterine width, but the widest uterine grip width measurement that can reliably predict the success of the attempted vaginal hysterectomy of a very large uterus in this preliminary study.

## Conclusion

The widest uterine grip width measurement up to 14.5cm would help a skilled vaginal surgeon in predicting the success of the vaginal hysterectomy in cases of very large fibroid uteri above 16 weeks in size. The vaginal hysterectomy may fail in cases with uterine grip width  $\geq 15$  cm.

## Contribution to authorship

All authors qualify for authorship.

## Disclosure of interests

All authors have nothing disclosure of interest to declare.

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## References

1. Aarts J W, Nieboer T E, Johnson N, et al. Surgical approach to hysterectomy for benign gynaecological disease. *Cochrane Database Syst. Rev* 2015; 2015(8).
2. Evelien M Sandberg , Andries R H Twijnstra , Sara R C Driessen, et al . Total Laparoscopic Hysterectomy Versus Vaginal Hysterectomy: A Systematic Review and Meta-Analysis. *J Minim Invasive Gynecol.* 2017; 24(2): 206-217.
3. Kho R M, Abr~ao M S. In search for the best minimally invasive hysterectomy approach for the large uterus: a review. *Clin Obstet Gynecol* 2017; 60: 286-295.
4. Jennifer j. Schmitt, Daniel A. Carranza leon, john A. Occhino, et al. Determining optimal route of hysterectomy for benign indications: clinical decision tree algorithm. *Obstet gynecol.* 2017 Jan; 129(1): 130-138.
5. Mistrangelo E, Febo G, Ferrero B, et al. Safety And Efficacy Of Vaginal Hysterectomy In The Large Uterus With The Liga sure Bipolar Diathermy System. *Am J Obstet Gynecol.* 2008 Nov; 199(5): 475.
6. Purohit R K. Purohit technique of vaginal hysterectomy: a new approach. *BJOG* 2003, 110(12): 1115-1119
7. Sahin Y. Vaginal hysterectomy and oophorectomy in women with 12-20 weeks' size uterus. *Acta* 2007; 86(11):1359-1369.
8. Fashokun T B, Honda V L. Vaginal hysterectomy. In: Handa V L, Van Le Linda, eds: *Telinde's Operative Gynaecology*. 12th ed. Philadelphia: Wolters Kluwer; 2015: 358-359.
9. Mohan Y, Chiu V y, Lonky Nm. Size Matters In Planning Hysterectomy Approach. *Women's Health (Lond).* 2016 Jul; 12(4): 400-403.
10. Furuhashi M., Suganuma N.: A survey of vaginal hysterectomy ending in laparotomy, *Arch Gynecol Obstet.* 2002 Dec; 267(2):57-59
11. Barbara Stoelinga, Judith Huirne.,, Martijn W Heymans et al. The estimated volume of the fibroid uterus: a comparison of ultrasound and bimanual examination versus volume at MRI or hysterectomy. *Eur J Obstet Gynecol Reprod Biol.* 2015 Jan; 184: 89-96
12. Franck Leonard, Nicolas Chopin, Bruno Borghese et al. Total laparoscopic hysterectomy: preoperative risk factors for conversion to laparotomy. *JIMG* 2005.12(4), 312-317.