

Results of Extension of Classic Indications of Vaginal Hysterectomy for Benign Uterine Conditions

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Rezumat

Rezultatele extinderii indicațiilor clasice ale histerectomiei vaginale pentru patologie uterină benignă

Obiective: compararea rezultatelor a două abordări chirurgicale; una dintre acestea constă în respectarea indicațiilor și contra-indicațiilor clasice ale histerectomiei vaginale (VH), iar cealaltă presupune lărgirea indicațiilor VH și reducerea contra-indicațiilor prin utilizarea VH în cazurile cu dimensiuni mari ale uterului, la nulipare și la paciente cu istoric de operație cezariană.

Material și metodă: Studiul prospectiv a inclus 816 paciente cu patologie uterină benignă. La 465 de paciente s-au aplicat indicațiile clasice ale VH, iar la 351 VH a fost utilizată ca primă alegere, încercându-se surmontarea contra-indicațiilor clasice ale VH.

Rezultate: Prin extinderea indicațiilor clasice ale VH s-au obținut beneficii importante și anume reducerea timpului operator și scurtarea duratei de spitalizare. Nu s-au înregistrat diferențe semnificative în ceea ce privește sângerarea intra- și post-operatorie sau complicațiile majore.

Concluzii: Extinderea indicațiilor clasice ale VH aduce beneficii importante fără o creștere a incidenței complicațiilor majore.

Cuvinte cheie: histerectomie vaginală, histerectomie abdominală, histerectomie minim invazivă

Abstract

Objective: to compare the results of two surgical approaches: one is to apply vaginal hysterectomy (VH) for non-prolapsed uterus respecting classic indications and contraindications and the other is to extend the indications of VH and decrease the contraindications by performing VH for large uterus, in nulliparous and in women with history of C section.

Study Design: 816 women with benign uterine pathology were included in this prospective study. In 465 were applied classic indications of VH and in 351 VH was applied as first choice, trying to overcome classic contraindications of VH.

Results: By extending classic indications of VH important benefits were obtained such as decreasing the operation time and shorter hospital stay. No differences were registered between the two arms of the study regarding intra and post-operative bleeding or major complications.

Conclusions: extending classic indications of VH has important benefits without an increase in major complications occurrence.

Abbreviations: AECS - abdominal excision of the cervical stump; AH - abdominal hysterectomy; LAVH - laparoscopically assisted vaginal hysterectomy; STAH- subtotal abdominal hysterectomy; TLH - total laparoscopic hysterectomy; VECS - vaginal excision of the cervical stump; VH - vaginal hysterectomy

Key words: vaginal hysterectomy, abdominal hysterectomy, minimally invasive hysterectomy

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Introduction

As in all branches of surgery, there is a growing concern of the gynecologic community to perform minimally invasive

surgery. Until the emergence of laparoscopy, gynecologists had two approaches for removal of the uterus: vaginal and laparotomy. Classically, VH was reserved for cases of uterine prolapse. The overwhelming majority of other gynecological and obstetrical conditions requiring hysterectomy were resolved by AH.

Especially after the emergence and development of laparoscopy, numerous studies comparing the results of the approach route for hysterectomy have appeared.

The last Cochrane meta-analysis on comparing different routes of hysterectomy (1) includes 34 randomized trials and 4495 patients and concludes that:

- benefits of VH vs. AH are faster recovery, lower incidence of febrile morbidity and reduced hospitalization;
- benefits of LH vs. AH are: faster recovery, less intraoperative bleeding;
- LH vs. AH disadvantages are the higher frequency of urinary tract injury (bladder and ureters) and longer duration of operation;
- LAVH vs TLH benefits are: reduced incidence of febrile episodes and a shorter operation time;
- no benefits of LH vs. VH, but the operative time and intraoperative bleeding are greater with LH.

Based on these comparative studies, the main gynecological professional organisations have issued recommendations on the best way of approach to hysterectomy. Thus, the American College of Obstetricians and Gynecologists (2), American Association of Gynecologic Laparoscopists (3), Society of Obstetricians and Gynecologists of Canada (SOGC) (4) and U.S. Department for Health & Human Service, Agency for Healthcare Research and the Quality recommended as first choice the vaginal hysterectomy, followed as second choice by laparoscopy. Laparotomy is a choice only when minimally invasive approaches are not applicable.

In some countries there are national programs that promote non-laparotomic hysterectomy. Thus, the study FINHYST 2006, analyzing the 5279 hysterectomies performed in Finland in 12 months found a rate of 44% VH, 32% LH and 24% AH, with a total rate of 76 % minimally invasive

hysterectomy versus only 42% in 1996 (5). This dramatic development of the minimally invasive techniques is explained by the existence of a national program of surgical training. Also the emergence of laparoscopy has led to an increase in the rate of VH.

In Romania, although no national studies are available, it can be argued, based on information from professional events and from publications, that AH is the most common approach in the vast majority of cases. Only a few centers, most of them of general surgery, have a policy of promoting minimally invasive hysterectomy using laparoscopic hysterectomy (6,7).

Objective

The objective of this prospective study was to examine the results of certain methods proposed to extend the classic indications of VH, in order to implement the recommendations of international gynecologic professional societies recommendations.

According to Kovac, traditional contra-indications for vaginal approach to hysterectomy are those in *Table 1*. (8)

Methods

Study design

We prospectively compared two groups of patients: in one arm of the study the surgical team has aimed to extend the classic indications of VH, while in the other arm classic relative and absolute contraindications were respected in the choice of type of hysterectomy.

All patients were operated in the Gynecology Department of the University Emergency Central Military Hospital "Dr. Carol Davila" Bucharest. This is the surgical gynecological department with the highest rate of vaginal hysterectomy on non-prolapsed uterus in Romania, a vaginal surgery training center and also has experience in high performance laparoscopic surgery and modern technology (laser, CUSA, harmonic scalpel).

The study includes the 816 hysterectomies performed for

Table 1. Classic contraindications of VH (8)

Absolute contraindications	A. Uterus is too big (> 280 g).
	B. Vagina is too narrow <ul style="list-style-type: none"> • Pubic arch < 90° • Bituberous diameter < 8 cm.
	C. The uterus is too high or it does not descend
	D. Intraabdominal conditions contraindicating the vaginal approach: <ul style="list-style-type: none"> • Adhesions • Endometriosis • Adnexal pathology • Chronic pelvic pain • History of C section
Relative contraindications	A. Nulliparous
	B. History of pelvic surgery (other than C section)
	C. Moderately enlarged uterus
	D. Indication of oophorectomy

benign pathology at the Gynecology Clinic of the University Emergency Central Military Hospital "Dr. Carol Davila" Bucharest. The study took place between January and December 2007, being a prospective study.

All the operations were performed by 2 surgical teams, each of them consisting of three surgeons. We will name them from now on Team 1 and Team 2.

The two groups were as follows:

- Group 1 - 351 patients operated by the Team 1;
- Group 2 - 465 patients operated by the Team 2.

For the Group 1, Team 1 promoted minimally invasive surgery trying to surpass the classic contraindications of VH, also through the use of laparoscopy.

For Group 2 VH was applied with respect of classic indications and contraindications of the vaginal approach.

The inclusion criterion were the preoperative indication of hysterectomy for benign pathology.

10 patients were excluded from the study, in which, intraoperatively, malignant disease was discovered, unsuspected prior to surgery

Methods used for the VH extension of indications in Group 1 were as follows:

- use of VH in cases with uterus above 280 g;
- use of VH for nulliparous women;
- use of VH in patients with history of C section;
- use of VH in patients with adnexal pathology, with or without laparoscopic assistance.

The Groups were comparatively analyzed in terms of:

1. The demographic characteristics (age, parity, type of birth - vaginal or C - section, surgical indications, associated pathology);
2. Operative data (type of anesthesia, surgery time, incidents / accidents, postoperative decrease of Hb - Δ Hb);
3. Postoperative data (hospitalization time, complications).

The techniques that were used are as follows:

- classic extra fascial total abdominal hysterectomy (AH), subtotal abdominal hysterectomy (STAH) and abdominal excision of the cervical stump (AECS);
- vaginal hysterectomy technique (VH) and vaginal excision of the cervical stump (VECS);
- laparoscopically assisted vaginal hysterectomy (LAVH).

All patients were evaluated preoperatively and prepared according to a protocol.

Clinical data (age, BMI, parity/path of birth), associated diagnoses, preoperative Hb value, preoperatively estimated uterine weight were registered.

Preoperative assessment of uterine weight was performed using a calculation formula for the uterine volume:

$$\text{Uterine weight (g)} = 50.0 + 0.71 \times \text{volume (cm}^3\text{)}.$$

The uterine volume is obtained by using ultra sound measured dimensions, as follows (9):

$$\text{Uterine volume (cm}^3\text{)} = \text{length (cm)} \times \text{width (cm)} \times \text{anterior-posterior diameter (cm)} \times 0.52$$

(Kung and Chang 1996).

Postoperative data recorded: the hysterectomy route and simultaneous interventions, the duration of surgery, type of anesthesia, intraoperative incidents/accidents, uterus weight (postoperatively) and Hb value 24 hours after surgery (bleeding being expressed as the difference between the post- and preoperative Hb- Δ Hb).

Patients gave their verbal consent to the participation in the study, a procedure considered sufficient by the Hospital Ethics Committee.

For statistical analysis we used SPSS17.0 software (IBM Corporation, USA).

Results

There are no statistically significant differences of the main demographic parameters between groups - *Table 2*.

Regarding the main diagnosis (the one which established the indication for hysterectomy) distribution in the two groups showed no statistically significant differences - *Table 3*.

Using the afore mentioned methods of extension of the classic indication of VH Team 1 performed VH in 64.67% and minimally invasive hysterectomy (VH+LVAH+VECS) in 77.78% of all cases operated for benign pathology - *Table 4*.

Team 1 has been associated with a probability of approx. 14 times higher to perform VH than Team 2 -OR = 13.939 (95% CI: 9756-19914) (*Fig. 1*).

The comparison of the main operative parameters is shown in *Table 5*. The mean duration of surgery and the mean duration of hospital stay were significantly lower in Group 1; no significant statistical differences were registered regarding uterus weight extracted by the two teams and intraoperative bleeding.

Due to the high percentage of VH made by Team 1, Team 2 was associated with a probability four times higher than Team 1 to use general anesthesia OR = 4.000 (95% CI: 2943 - 5437) (*Fig. 2*).

Team 1 made VH to 56% of all nulliparous patients (14/25) and to 69.23% of patients with a history of cesarean (27/39).

Table 2. Demographic characteristics of the two groups

	Team 1 - 351 (43%)	Team 2 - 465 (57%)	P
Average age (years)	47.50±7.52	49.21±9.46	NS
BMI (kg/m ²)	26.82±2.59	26.83±2.48	NS
Births			
Nulliparous	25 (7.12%)	39 (8.38%)	NS
Vaginal	287 (81.76%)	371 (79.78%)	NS
C-section	39 (11.11%)	55 (11.82%)	NS
Preop. Hb (g/dl)	11.39±1.48	11.88±1.27	NS

Table 3. Distribution of main diagnoses in the two groups

	Group 1 (351)	Group 2 (465)	P
Leiomyoma	288	354	NS
Prolapse	16	29	NS
Endometrial hyperplasia	8	15	NS
Abnormal uterine bleeding in menopause	7	14	NS
Cervical dysplasia	12	20	NS
Cervical stump dysplasia	2	4	NS
Adnexal tumor	15	24	NS
Others	3	5	NS

Table 4. Distribution of hysterectomy techniques performed by the two teams

	VH	AH	LAVH	VECS	AECS	STAH
Team 1 (351)	227 (64.67%)	78 (22.22%)	43 (12.25%)	3 (0.85%)	0	0
Team 2 (465)	76 (16.34%)	367 (78.92%)	0	5 (1.075%)	3 (0.645%)	17 (3.65%)

Table 5. The main operative parameters

	Team 1 - 351 (43%)	Team 2 - 465 (57%)	P
Duration of the surgery (min.)	77.34±21.53	86.98±17.51	<0.001
ΔHb (g%)	1.74±0.34	1.78±0.35	NS
Uteruses weight (g)	271.04±122.30	274.13±144.04	NS
Duration of the hospitalization (days)	4.30±0.714	5.18±0.791	<0.001

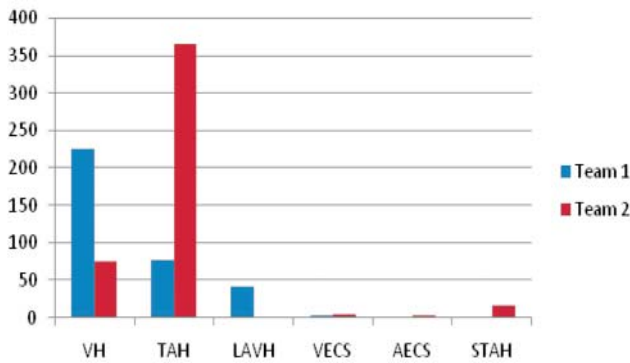


Figure 1. Distribution of hysterectomy techniques performed by the two teams

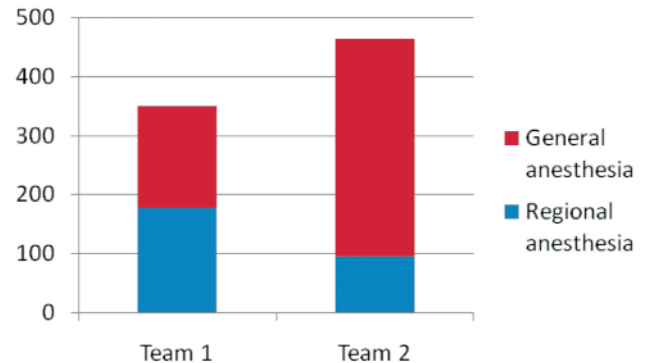


Figure 2. Distribution of anesthetic techniques in the two groups

Team 2 used the VH only in patients with a history of vaginal delivery.

Team 1 was associated with a probability of about 15 times greater than Team 2 to perform VH in nulliparous patients and in those with a history of caesarean - OR15.875, 95%, CI: 9735-19837. Fig. 3 shows the prevalence of VH depending on the route of delivery.

The incidence of major intra- and postoperative complications (bleeding, inadvertent injuries of digestive or urinary tract) was low, so that statistically significant data could not be obtained. Complications are shown in Table 6. Conversion to laparotomy was not considered a complication. There was one case of conversion of a VH made by Team 1.

Regarding the analysis of correlations between the analyzed parameters, the results are the following:

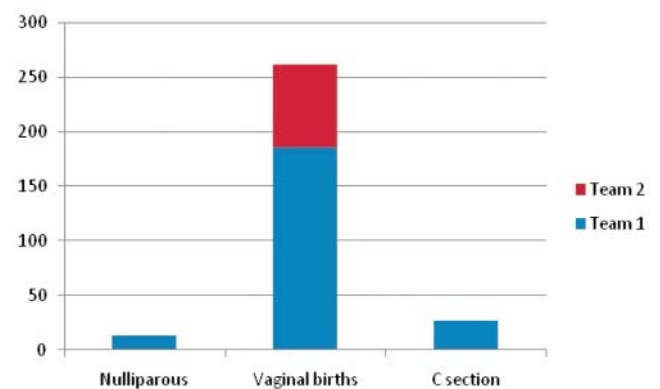


Figure 3. The prevalence of VH depending on the route of delivery in the two teams

Table 6. Major complications of hysterectomies performed by the two teams

Complication	Team 1		Team 2	
	AH	VH	AH	VH
Hemorrhage	0	2	1	0
Bladder injury	1	2	2	0
Ureteral injury	0	0	1	0
Intestinal injury	0	0	1	0

- Uterus weight was significantly correlated (correlation coefficient = 0.156, $p < 0.001$) with the duration of surgery;
- Durations of surgery was also significantly correlated with:
 - BMI (correlation coefficient = 0,131; $p < 0,01$);
 - Age (correlation coefficient = 0,155; $p < 0,01$);
 - Uterus weight (correlation coefficient - 0.156, $p < 0,001$);
 - Δ Hb (correlation coefficient = 0,128; $p < 0,01$);
 - Duration of hospitalization (correlation coefficient = 0.308, $p < 0.001$).

We considered useful to compare separately the attitudes and results of the two teams in cases of uterine fibroids, the large uterus being the situation in which the extension of classic indications for uterine size is very effective.

Team 1 has operated 64.23% of uterine fibroids by VH, unlike Team 2, which used VH only in 11.28% of cases of fibroids ($p < 0.001$) - Table 7.

Team 2 used AH to 85.02% of fibroids as opposed to Team 1 that used the same intervention to 21.18% of all fibroids ($p < 0.0001$).

Team 1 operated by minimally invasive hysterectomy (VH +LVAH) 185 (VH) + 42 (LAVH) =227 cases, which means 81% of all uterine fibroids.

In terms of large uterus esweighing more than 280 g (weight above 280 g the upper limit of indication of VH according to classic recommendations), the distribution of cases is shown in the Table 8.

Team 1 operated by minimally invasive hysterectomy (VH

+ LAVH +VECS) 67.98% of the uterus weighing over 280 g.

The maximum weight of a uterus removed vaginally, by the Team 1, was 680 g.

Discussion

ACOG established that VH is optimally indicated for women with a mobile uterus, its size being not greater than a 12 weeks pregnancy (280 grams) (10).

ACOG criteria for the approach to hysterectomy are:

1. Surgical indication.
2. Anatomical condition of the patient.
3. Data justifying the chosen approach.
4. Preference (after an informed consent) of the patient.
5. Surgeon experience.

According to ACOG about 70% of hysterectomies could be performed vaginally and only 30% should be AH. However, in the U.S. in 1999 63.8% of hysterectomies were performed by abdominal approach and only 23.6% were VH, the current rate of global approach to hysterectomy being 3:1 in favor of the abdominal route. Losses arising from the excessive use of AH that could be performed vaginally are considerable: in the U.S. 1000 VH save \$ 1.2 million and 1,020 days of hospitalization, frequency of complications being reduced by 20%.

After 20 years (in November 2009) ACOG, and its Committee on Gynecologic Practice recommends VH as the safest and most cost-effective method to remove the uterus for benign indications. Without changing the eligibility criteria for VH issued in 1989 it is emphasized that the surgeon may decide, depending on his or hers technical abilities to use VH even in the presence of apparent contraindications. (2)

S.R. Kovac, one of the greatest experts in vaginal surgery has dedicated much of his career in redefining VH indications from the perspective of modern. Kovac dismantled one by one most of these traditional contraindications, based on scientific evidence of large personal series. For example, oophorectomy was possible during VH in 99% of 966 patients (11).

Two factors predict a limited accessibility in VH: the

Table 7. Hysterectomies for leiomyoma in the two groups

Type of hysterectomy	Team				p	Total
	Team 1		Team 2			
VH	185	64.23%	40	11.28%	0.001	225
AH	61	21.18%	301	85.02%	0.0001	362
LAVH	42	14.58%	0	0	NC	42
STAH	0	0	13	3.67%	NC	13
Total	288	100%	354	100%		642

Table 8. Hysterectomies for uterus above 280 g

	Cases with uterus > 280g	Type of hysterectomy			
		AH	VH	LAVH	*STAH
Team 1	156	50 (32%)	77 (49.35%)	29 (18.5%)	0
Team 2	224	218	0	0	6

immobility and high situation of the uterus, and a narrow vagina of less than two fingers at the level of the apex (12). Nulliparity or narrow pubic arch are no more considered absolute contraindications to VH. The presence of one of these situations is not equivalent to inaccessibility in all cases. If there are serious doubts that any associated abdominal pathology could make it difficult or impossible to extract the uterus vaginally, Kovac recommended exploratory laparoscopy in the Guidelines to determine route of hysterectomy. (8)

Conclusions

The comparative analysis of the two groups led to the following conclusions:

- Extending the classic indications of VH (to include nulliparous women, prior caesarean section or associated adnexal pathology and certain uteruses over 280 g achieves a 64.67% rate of VH and a minimally invasive hysterectomy total rate of 77.78% (VH+LAVH+VECS);
- On comparable groups and in the same conditions, overcoming certain classical VH contraindications and the use of laparoscopy for VH led to an increase of 60.3% in the rate of minimally invasive hysterectomy;
- Significantly better results were obtained in terms of duration of surgery and length of hospital stay;
- Expanding VH classic indications does not lead to an increase in complications. There have been no differences between the two groups in terms of intra- and postoperative bleeding (estimated by Δ Hb) and immediate complications. Performing more VH with extended indications significantly decreased the use of general anesthesia, with 30.35% more regional anesthesia.

These results validate the methods proposed for extension of the indication of VH and make them suitable to implement in order to attain the recommendations of the international professional societies regarding the approach to hysterectomy for benign pathology.

Given the indisputable advantages of minimally invasive hysterectomies, especially the vaginal hysterectomy, and the recommendations of the international professional association

recommendations we consider necessary to promote these techniques among Romanian gynecologists. The alternative laparoscopic surgery is more expensive, unavailable to all gynecological surgery departments, while VH entails no special costs for any regular gynecological department.

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