

## 28 Years of Using Hysterectomy Guidelines to Determine the Feasibility of Vaginal Hysterectomy

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### Abstract

**Aim:** To report on 28 years of using the guidelines for hysterectomy to determine the feasibility of vaginal hysterectomy.

**Methods:** Patients with benign disease requiring hysterectomy were assigned type of hysterectomy by guidelines published in 1995 according to uterine size, presumed extrauterine disease, and the accessibility of the vagina. Data for consecutive hysterectomies from 1980 to 2008 were collected and assembled into a database.

**Results:** We identified 11,094 patients. The ratio of abdominal to vaginal hysterectomy was 1:92. The indications for hysterectomy were similar to the general population reported by the National Center for Health Statistics (NCHS). Uterine weights for 94.7% of patients were <280 g. Laparoscopy-assisted vaginal hysterectomy, as it was originally described and published in 1990, was used on 1264 patients to verify the presence of presumed severe extrauterine pathology. Vaginal inaccessibility that contraindicated the vaginal approach was present in 109 (1.0%) cases.

**Conclusion:** When the guidelines were followed, the vaginal approach was found feasible in 98.9% (10975/11094) of patients with benign disease. This suggests that following guidelines will increase the currently declining rates of vaginal hysterectomy, which are of concern to the American College of Obstetricians and Gynecologists (ACOG).

**Keywords:** Vaginal hysterectomy; Guidelines; Laparoscopy-assisted vaginal hysterectomy

### Introduction

For most of the 20<sup>th</sup> century in the United States, abdominal hysterectomy (AH) was performed more commonly than vaginal hysterectomy (VH) for benign disease by a ratio of 3:1 [1]. In 1989 ACOG established its first guidelines for the route of hysterectomy [2]. In 2009 ACOG further addressed the choice of the route and method of hysterectomy in Committee Opinion #444 stating: "Vaginal hysterectomy is the approach of choice, whenever feasible, based on its well documented advantages, lowers complication rates, and costs.

Laparoscopic hysterectomy (LH) is an alternative to abdominal hysterectomy for those patients in whom a vaginal hysterectomy is not indicated or feasible" [3]. ACOG has been concerned about the declining emphasis on vaginal hysterectomy (VH) as it relates to ultimate care [4]. Several factors have been implicated: 1) less emphasis on vaginal surgery in resident training programs, 2) the absence of clear guidelines for selecting appropriate candidates for VH [5], 3) physician practice style and habits [6], and 4) lack of patient knowledge about surgical options. Compounding factors may also be inappropriate decision-making [7] and reimbursement, as it is unclear why the average Medicare reimbursement for hysterectomy in 2012 was more for AH, LH, and robotic hysterectomy (RH), than VH for patients with similar indications. It is also unclear why Medicare does not require documentation of uterine size for AH, and why it reimburses more for AH, LH, and RH when the uterus is <250 g when hospital charges for these methods of hysterectomy has been shown to be less cost effective [8,9]. In 2015 at the annual meeting of the Society of Gynecologic Surgeons, ACOG presented a plan to reverse the trend of declining rates of VH. The ACOG guidelines in 1989 were a good beginning but the senior author believed more specific guidelines were needed. The guidelines presented in this paper have been endorsed by the technology assessment group at the Emergency Care Research

Institute (ECRI) [10], and the Amherst (NY) Technology Assessment Program of the HMO group [11]. The guidelines were also adopted by the Board of the Society of Pelvic Reconstructive Surgeons in 1999 [12], the National Guidelines Clearinghouse in 2000 [13], and recently by United Healthcare, the nation's largest insurer [14].

ACOG further reaffirmed the use of guidelines on the route of hysterectomy in 2011 Committee Opinion #444: "Guidelines incorporating uterine size, mobility, accessibility and pathology confined to the uterus (no adnexal pathology or known or suspected adhesions) have been proposed as selection criteria for vaginal hysterectomy [8]. In a randomized trial, when residents followed specific guidelines for selection and performance of hysterectomy, the percentage of vaginal hysterectomies for benign conditions was more than 90%. Uterine morcellation and size reduction techniques were only necessary in 11% of cases [15]. Extrauterine disease such as adnexal pathology, severe endometriosis, or adhesions may preclude vaginal hysterectomy. However, in these cases, it may be prudent to visualize the pelvis with a laparoscope before deciding on the route of hysterectomy [3]. This paper is intended to support ACOG's efforts by describing the author's 28-year experience of applying guidelines to the route of hysterectomy. This retrospective study includes all 11,094 of the authors' hysterectomy cases.

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## Material and Methods

From January 1980 to November 2008 data were collected from 3,605 women who had hysterectomies at St. John Mercy Medical Center, St Louis, Missouri (SRK); 5,189 women who had hysterectomies at Wright State University, Dayton, Ohio (SRK, SHC); and 2,300 women who had hysterectomies at Emory University, Atlanta, Georgia (SRK). These cases included each surgeons' personal patients as well as patients' from the resident clinic population. Senior resident and fellows performed 99% of the hysterectomies. Medical records departments at each facility transcribed the diagnosis and pelvic pathology reports, route of hysterectomy, uterine weight (from the pathology record), complications (from the face sheet of the medical record), hospital charges, length of stay, age, and race from the medical charts. The indications for surgery were prospectively assigned to VH, LAVH, or AH on the basis of estimated uterine size (greater or less than 280 g), presumptive risk factors suggestive of serious extrauterine disease (e.g. endometriosis, chronic pelvic inflammatory disease or a history of such, chronic pelvic pain) and vaginal accessibility.

The vagina was judged inaccessible if orthopedic conditions restricted the lithotomy position, or if the vagina was narrower than two fingerbreadths (especially at the apex of the vagina). The vagina was also deemed inaccessible in the case of virginity, but not in the case of nulliparity (n=109).

Patients with preoperative estimated uterine size less than 280 g were considered candidates for VH, regardless of the indication, provided they had no presumptive risk factors and no vaginal inaccessibility (n=10,408). Also assigned to VH were patient's whose preoperative uterine was estimated by pelvic examination, and confirmed by ultrasonography to exceed 280 g, but who could be operated upon transvaginally with morcellation, bilvalving, or intramyometrial coring provided such measures were not contraindicated (n=577) [16]. Any patient who had a presumptive risk factor suggestive of severe extrauterine disease that might contraindicate a VH was assigned to undergo Laparoscopy- Assisted VH (LAVH) [17] (n=1264). Figure 1 displays the decision tree used in this study.

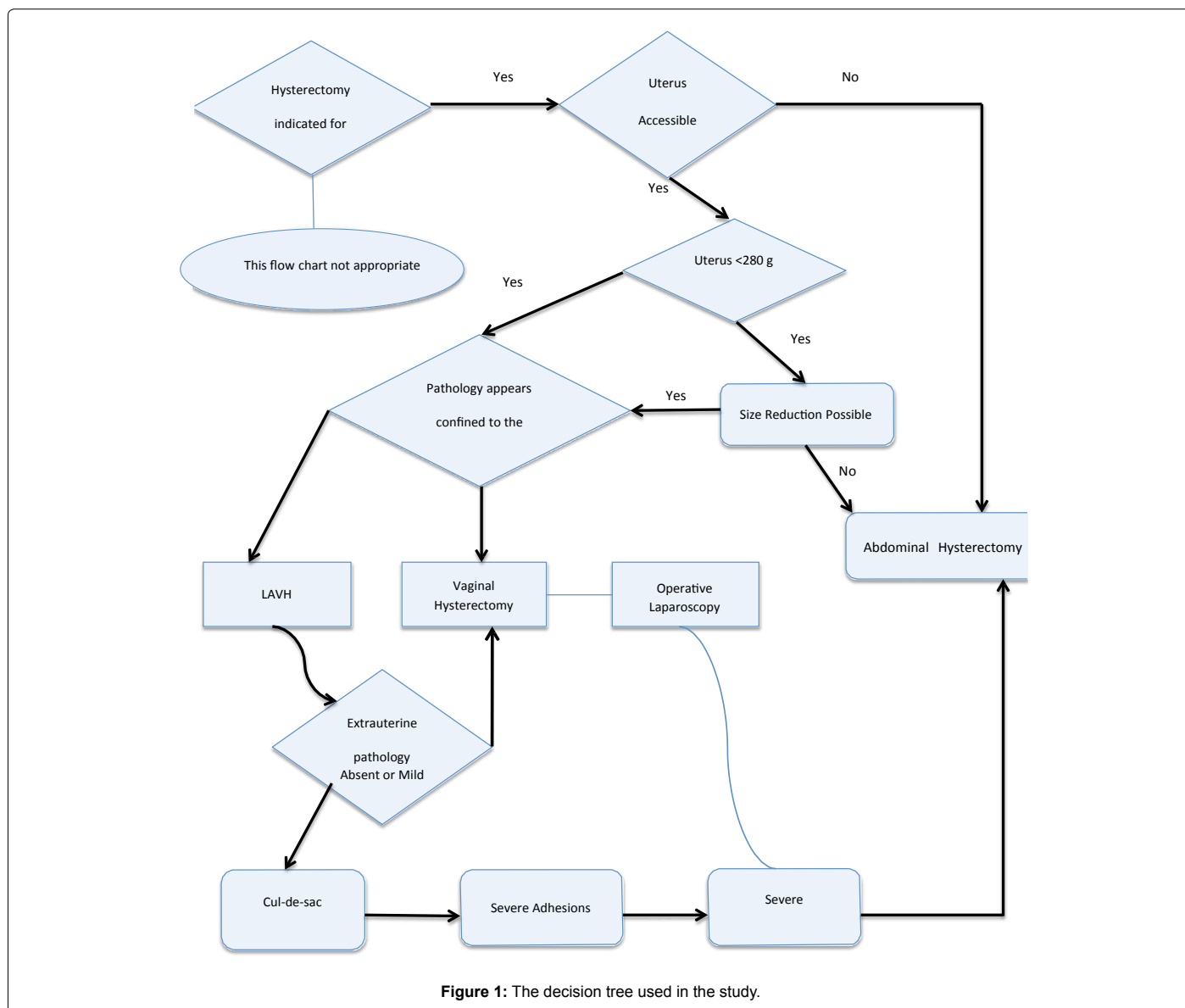
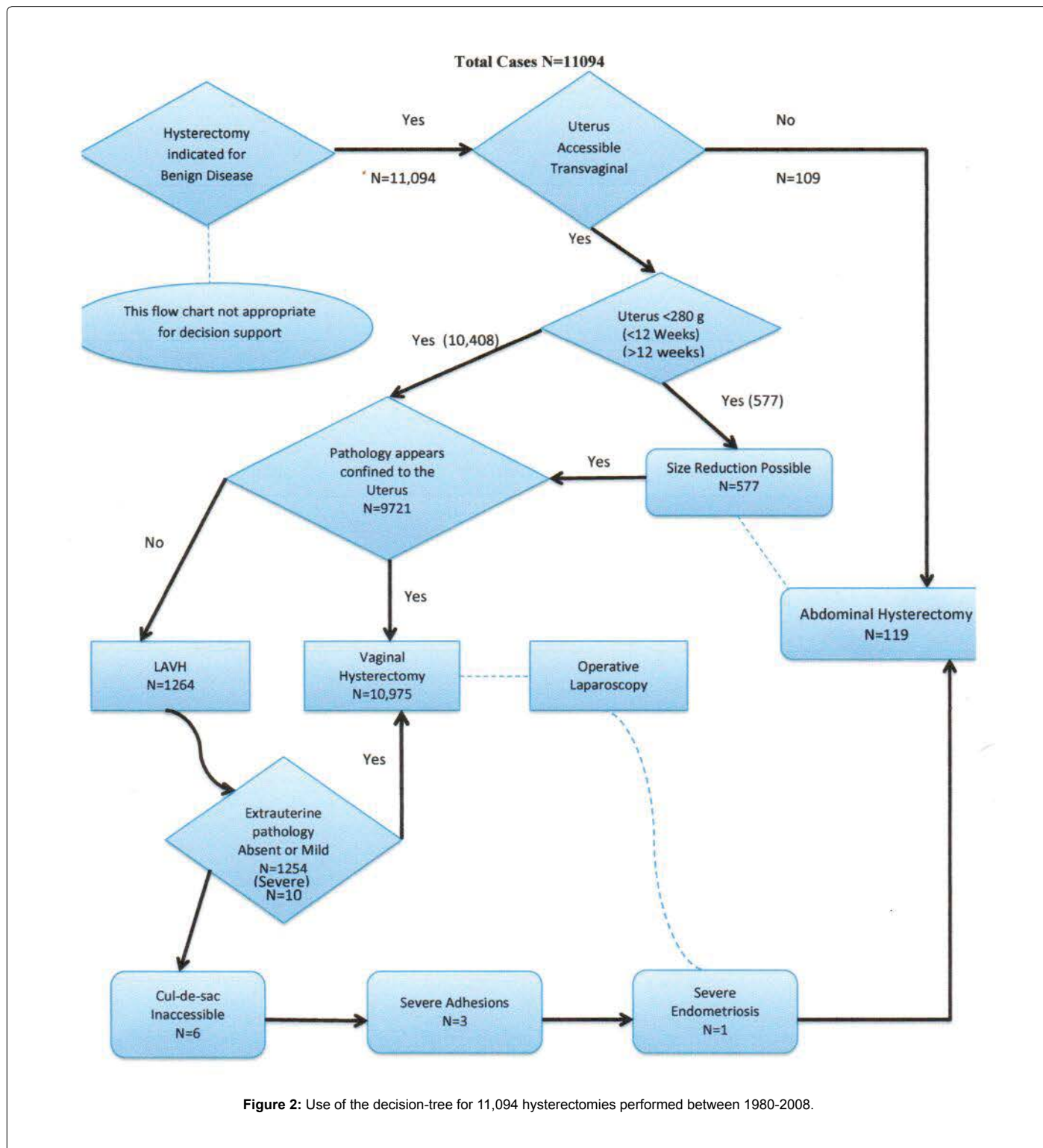


Figure 1: The decision tree used in the study.

## Results

Figure 2 demonstrates the use of the decision-tree for 11,094 hysterectomies performed between 1980-2008. Uterine weight was <280 g for 94.7% of the cases. Five hundred seventy seven (577) cases had uterine weights in excess of 280 g (5.2%). Size reduction techniques were employed and successful on uteri determined to be >280 g by exam and thought not to have pathology that might extend beyond

the uterus. When subjected to laparoscopic evaluation (laparoscopy-assisted vaginal hysterectomy (LAVH, as originally defined in 1990), only 10 of these patients had intraoperative findings that indicated the vaginal approach was not feasible. One hundred nineteen (119) cases were documented as not feasible for the vaginal approach, and of these, 109 patients had vaginal inaccessibility and 10 had significant documented extrauterine disease. The ratio of abdominal to vaginal



hysterectomy was 1:92. Because this figure is a sharp contrast to the national ratio of 3:1 [1] it is important to determine whether the patient population in the retrospective study is atypical of women undergoing hysterectomy for benign disease in the United States (Table 1).

Diagnosis	NCHS	Retrospective Study
Fibroids	31%	24%
Prolapse	24%	40%
Abnormal Bleeding	7%	14%
Endometriosis	16%	3%
Other	23%	19%

**Table 1:** Diagnoses from the National Health Survey 1965-1984 and the Retrospective Study

The NCHS data did not include the patients who were diagnosed with cancer. While there are differences between the NCHS report and the Retrospective Study, the indications for hysterectomy in the retrospective study are not sufficient to explain the sharp contrast in the ratio of abdominal to vaginal hysterectomy (Table 2).

Of the 10,985 patients who underwent vaginal hysterectomy, only 106 (0.95%) required blood transfusions. The operative cystotomy rate for vaginal hysterectomy was 1.2%. No ureteral injuries were recorded for the vaginal hysterectomy group, as each patient

3) A bituberous diameter is an obstetrical concern, so how does that affect the vaginal route in the non-pregnant patient?

4) How were the intrabdominal concerns diagnosed preoperatively and to what degree of accuracy?

The latter part of the 20th century brought about new concerns that were previously not addressed in earlier years. Included were surgical outcomes, postoperative recovery, surgical costs and decisions on the route of hysterectomy. The CDC published the first report on hysterectomy complications in the 20th century in 1982 [18]. This report provided for the first time evidence of lower complication rates for vaginal compared with abdominal hysterectomy for patients with similar indications. Gynecologic surgeons continued to use AH for the majority of hysterectomies despite well-documented new evidence that VH had distinct health and economic benefits. Furthermore, many gynecologists performing AH began to suggest that VH was not possible as justification of their use of AH, (e.g. uterus was too big), when the pathologic report did not confirm an enlarged uterus. The introduction of LH in 1989 brought about new possibilities, but the indications for this new procedure were stated to be the same as for AH [19].

Some surgeons remained reluctant to change their practice patterns, and selected AH for most hysterectomies without documenting that VH was contraindicated. We discovered this to be common occurrence during our residency years when surgeons continued to use traditional

Diagnosis	# of patients	ut. Weight g (mean g) - (range g)	Vagina inaccessible	LAVH	Severe Extrauterine Disease	Successful VH%
Leiomyomata	2656	255 (100-2928)	56	0	0	97%
Adenomyosis	913	153 (80-425)	42	0	0	95%
AUB	1551	145 (66-235)	0	0	0	100%
Uterine Prolapse	4389	149 (26-166)	0	0	0	100%
CA-in-situ, Cervix	313	100 (50-237)	3	0	0	99%
Chronic Pelvic Pain	535	122 (50-209)	4	535	3	98%
Endometriosis, HX	347	124 (40-202)	0	347	1	99%
PID, HX	390	144 (48-194)	4	382	6	96%
<b>Total</b>	<b>11094</b>	<b>127</b>	<b>109</b>	<b>1264</b>	<b>10</b>	<b>98%</b>

**Table 2:** Hysterectomies By Indication In The Retrospective Study

underwent intraoperative cystoscopy after the completion of every vaginal hysterectomy. There were no injuries to the bowel recorded. In this study, cases that might have suggested pelvic adhesions and extrauterine pathology positive identification of such extrauterine pathology occurred in 10/1,264 patients with suspected severe adhesions that might interfere with a VH and 1,254 patients underwent successful VH (99%).

## Discussion

In the early 20th century the practice of hysterectomy was uncomplicated, because abdominal hysterectomy was considered the most appropriate method of choice based on indications and contraindications established in the 1900's. These indications and contraindications suggest several questions that were infrequently asked or answered:

- 1) How big is too big and how was that determined?
- 2) How narrow should the vagina be and how was that determined?

indications and contraindications developed in the early 1900's. For many, if not most, cases when the abdomen was opened by laparotomy, the conditions that were thought to be present (e.g. adhesions) were insufficient to mandate the abdominal method, and VH would have been possible. During our residency we often concluded that a hysterectomy done abdominally, could have been performed vaginally, because it was more easily executed or it was the favoured practice of a particular surgeon.

Laparoscopic hysterectomy began to flourish in 1990's, as the new concept of minimally invasive hysterectomy surgery emerged. However, some laparoscopic surgeons discovered they could increase the numbers of VH with the laparoscope. Johns et al reported in 1991 27% of VH doubled to 51% as surgeons found the intraoperative use of the laparoscope identified more cases that were performed vaginally [20].

In our personal consecutive combined series of 11,094 hysterectomies, the vaginal approach was found to be feasible in 98% (10,975/11,094) of cases of benign disease when the guidelines were

followed. If the feasibility of the vaginal approach can be documented by using the guidelines, more surgeries will be performed with the vaginal method.

It has been suggested that feasibility studies in women with benign disease supports the technical advantages of the robot, particularly in patients with presumed adhesions from prior surgery, inflammation, or endometriosis [21]. The results of this study call into question if presumed severe extrauterine pathology is discovered as frequently as suggested when LAVH was used to verify whether or not such conditions really contraindicated VH. Would the robot really be required on most cases where vaginal hysterectomy can be determined feasible, when adhesions, inflammation, or endometriosis are not documented, are minimal or just presumed? Severe extrauterine pathology was not discovered as frequently as presumed when LAVH was used to verify whether or not these conditions really contraindicated VH. Thus, with the proper use of these guidelines, the vaginal approach appears to be feasible for most indications requiring hysterectomy. Therefore, it is difficult to justify the exuberant uptake of robotic surgery. To suggest the robot may be needed because of suspected severe adhesions and their extent, without objective proof, may represent surgical decision-making driven more by surgical preference or industry promotion of these methods. This study suggests that RH might be overused in approximately 23% of cases.

Cost analysis has consistently demonstrated that vaginal hysterectomy is the most cost-effective route. Review of the database did not record hospital costs for the entire period from 1980 to 2008. Therefore, analysis of this parameter could not be performed for the entire 11,904 case study. However, cost savings using this guideline-directed approach for the route of hysterectomy have been published, [8] and revealed that for every 1,000 hysterectomies a cost savings of \$1,184,000 was predicted with an additional 1,020 bed days saved.

It is concluded that AH, LH, and later RH might be frequently overused for presumed, severe extrauterine pathologic disease without verifying the presence or absence of such concerns. Significant factors associated with the overuse of AH, LH, and RH also appear to be the lack of documenting actual uterine size.<sup>7</sup> The feasibility of the vaginal approach can only be accurately determined if vaginal accessibility is determined, and if uterine size is accurately assessed with preoperative ultrasonography that describes the relationship between ultrasonic volume and actual weight of the uterus [22]. Eighty percent of hysterectomies for leiomyomata are usually performed by AH, but 97% of our cases were performed vaginally. Abnormal uterine Bleeding (AUB) is a frequent indication for AH, LH, and RH, but we performed 100% of AUB cases vaginally. The concern of severity and the extent of extrauterine disease were verified with LAVH, and severe extrauterine pathology was also not discovered as frequently as many presume. In fact, greater than 95% of women with concerns about severe extrauterine pathology were not confirmed, and the vaginal route was discovered feasible and VH was successfully performed.

It is possible that surgical decision-making for hysterectomy is driven more by subjective factors referred to as "practice style" [23-25] than by documented feasibility. To answer these questions, we looked to our data and the surgical decision-making when the algorithm was followed for choosing the route of hysterectomy.

Where guidelines based on the severity of the pathologic disorder have been adopted at centers in the United States, (7,8) France [26], the United Kingdom [27], and Italy [28], the majority of patients underwent successful VH without AH or LH assistance.

Important strengths of this analysis included the prospectively developed protocol that directed the analysis, the very large sample size, and the fact that these data are relatively recent and come from a real-world setting. The retrospective study does have important limitations. The effect of confounding variables, such as age differences, pre-existing conditions, and concomitant surgeries, were not analyzed. These variables could have affected the type of hysterectomy selected, costs, complications, and length of stay. We did not assess the total number of hysterectomies at each institution. In addition, this study represents the work of only two surgeons, but others have used the guidelines with similar success [29].

The field of gynecology has been remiss in failing to establish specific clinical guidelines for selecting the appropriate route of hysterectomy, and the wide acceptance of laparoscopic and robotic techniques has made the decision more complex. Informed decision-making requires that surgeons know the expected outcome of each procedure and the desirability of each outcome. Good surgical practice dictates that the severity of the pathologic condition be the primary criterion for selecting the route of hysterectomy, not subjective factors such as the surgeon's experience or practice. This study has shown that a successfully completed hysterectomy in and of itself does not really reflect appropriate management.

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