

# Cost-Effectiveness of Office Hysteroscopy for Abnormal Uterine Bleeding

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## ABSTRACT

**Background and Objectives:** Office diagnostic hysteroscopy allows physicians to directly view the endometrial cavity, tubal ostia, and endocervical canal without taking the patient to the operating room (OR). We sought to determine whether office hysteroscopy performed to evaluate abnormal uterine bleeding decreases the need for hysteroscopy performed in the OR and the associated financial and risk implications.

**Methods:** One hundred thirty patients who underwent office diagnostic hysteroscopy between January 2009 and March 2012 at 2 outpatient clinics in an academic university setting were identified. Records were reviewed from paper charts and electronic medical records. Hospital charts for patients who required hysteroscopy in the OR were reviewed as well. Charge estimates were obtained from our billing department. These results were analyzed for review of the data.

**Results:** Seventy-five of the 130 women who underwent diagnostic office hysteroscopy for abnormal bleeding did not need to undergo hysteroscopy in the OR. This represents estimated savings of \$1498 per patient (95% confidence interval, \$1051–\$1923) in procedure charges. Among the 55 women who underwent OR hysteroscopy, there was 71% agreement between findings on hysteroscopy in the office and in the OR.

**Conclusion:** Office hysteroscopy is a useful diagnostic tool that can help decrease the rate of diagnostic hysteroscopy in the OR under anesthesia when used in a select patient population.

**Key Words:** Abnormal uterine bleeding, Office hysteroscopy, Polyps, Fibroids, Cost-effectiveness.

## INTRODUCTION

Beginning in 2009, the University of Florida Women's Health Center adopted office flexible diagnostic hysteroscopy as an additional tool to investigate uterine pathology. Office hysteroscopy is a minimally invasive procedure that has been shown to be highly accurate in diagnosing abnormalities of the endometrial cavity, tubal ostia, and endocervical canal.<sup>1</sup> It offers a method for directly visualizing uterine pathology without the need for general anesthesia and the use of an operating room (OR), thereby decreasing procedure times and lowering risks and costs.<sup>2</sup> The advent of small-diameter, flexible hysteroscopes has offered another layer of success in assessing abnormal uterine bleeding in the outpatient setting because of its increased tolerability and safety and decreased need for anesthesia compared with the use of rigid hysteroscopes.<sup>3</sup>

Office hysteroscopy is comparable with surgical inpatient hysteroscopy but offers reduced anesthesia risks and decreased overall costs.<sup>4</sup> One study from 1996 reported significant cost savings with office hysteroscopy when the cost of office hysteroscopy was compared with the charges for hysteroscopy in the OR in 2 groups of patients.<sup>5</sup> However, office hysteroscopy remains underused in today's practice. It is not clear whether adopting routine office hysteroscopy reduces the need for hysteroscopy in the OR and whether this results in cost savings. Therefore, we completed an audit of office diagnostic hysteroscopy at the University of Florida Women's Health Center over 3 consecutive years. We sought to study the cost-effectiveness of office diagnostic hysteroscopy performed to evaluate abnormal uterine bleeding and whether this tool decreased the need for hysteroscopy performed in the OR. An analysis comparing the cost-effectiveness of office hysteroscopy relative to hysteroscopy under anesthesia in the OR was conducted.

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**MATERIALS AND METHODS**

This study was approved by the University of Florida Institutional Review Board. Between January 2009 and March 2012, 141 office diagnostic hysteroscopies were performed at either of our 2 outpatient clinics, and 135 charts were available for review. Per our inclusion criteria, we included any patient who underwent office diagnostic hysteroscopy for the indication of abnormal uterine bleeding during this time frame. Subjects were excluded if the office hysteroscopy was performed for other indications. Of 141 office diagnostic hysteroscopies, 130 were performed to evaluate abnormal uterine bleeding. Patients with abnormal findings on office hysteroscopy or those in whom hysteroscopy under anesthesia was deemed necessary were taken to the OR to obtain better visualization, remove identified pathology, and/or perform dilation and curettage. Data on the number of patients who required inpatient hysteroscopy as well as indications for the additional procedure were recorded.

Demographic data collected included age, body mass index, tobacco use, gravidity, parity, prior vaginal deliveries, and prior cesarean deliveries. We also recorded menopausal status; prior cervical procedures such as loop electrosurgical excision procedure, cervical conization, or cryosurgery; preprocedural hormone use; endometrial biopsy and results; office hysteroscopy indications, findings, and any reported complications; OR hysteroscopic findings and complications; pathologic results; and additional procedures performed, if any.

Subjects were identified using the Current Procedural Terminology code 58555 for diagnostic hysteroscopy. Records were reviewed from paper charts and electronic medical records.

**Technique**

A 3.5-mm flexible hysteroscope with normal saline as the distension medium was used for all procedures. Flexible hysteroscopy was performed under sterile conditions. Because of the flexibility, maneuverability, and small diameter of the instrument, the hysteroscope produces minimal to no trauma to the cervical canal; therefore, a tenaculum, cervical dilation, and/or anesthesia were not required.

**Statistical Methods**

Descriptive statistics are provided as proportions or means with standard deviations. In terms of the proportion of subjects who did not require repeat hysteroscopy in the OR, we used point estimates and 95% confidence inter-

**Table 1.**  
Cost Breakdown

Item	Office Hysteroscopy	Operating Room Hysteroscopy
Physician fee	\$1356	\$1356
Anesthesia fee	\$0	\$1190
Hospital fee	\$0	\$2400
Total	\$1356	\$4946

**Table 2.**  
Subject Demographics

Demographic	Mean	SD
Age (y)	47	10
BMI (kg/m <sup>2</sup> )	32	8.7
Gravidity	3	1.5
Parity	2	1.2

BMI, body mass index.

vals. For the purpose of this study, we used procedure charges to represent cost as opposed to reimbursements, as the latter varies on the basis of payer status and fluctuates over time. In terms of cost comparisons, we used the charges listed in **Table 1**. Note that we were interested in inferring cost differences to our target population of future patients, treating the actual subjects as a sample of typical patients.

**RESULTS**

**Table 2** summarizes the demographics of the subjects. The mean age of patients undergoing diagnostic hysteroscopy was 46.7 years (range, 18–81 years). The mean gravidity was 2.5 (range, 0–7), and the mean parity was 2.1. The average body mass index was 31.5 kg/m<sup>2</sup> (range, 18–57 kg/m<sup>2</sup>), and 19 patients (15%) reported histories of tobacco use. Ninety-four patients (72%) had histories of vaginal deliveries, 24 (19%) had histories of cesarean delivery, 8 (6%) had histories of both cesarean and vaginal deliveries, and 20 (15%) were nulliparous. Among women using hormonal preparations, 14 (11%) were using combined oral contraceptives, 14 (11%) were using oral medroxyprogesterone acetate, 3 (2%) were using norethindrone, 2 (<2%) were using depot medroxyprogesterone acetate, and 5 (4%) were using hormone-replacement therapy (21% of postmenopausal women) at the time of office hysteroscopy. Three patients had histories of loop electrosurgical excision procedures, 1 patient reported a

**Table 3.**

Summary of Office Hysteroscopic Findings (n = 130)

Finding	Frequency
Normal	47 (36%)
Polyp	42 (32%)
Fibroid	20 (15%)
Thickened endometrium	10 (8%)
Polyp and fibroid	7 (5%)
Polyp vs fibroid	1 (1%)
Septum	2 (2%)
Cavity not visualized	1 (1%)

history of cone biopsy, and 3 patients reported histories of cryosurgery.

The indications for office diagnostic hysteroscopy during the study period included abnormal uterine bleeding in premenopausal women in 106 patients (82%), postmenopausal bleeding in 24 patients (18%), and other indications in 5 patients. Of the 5 patients in the latter group, 2 had diagnostic hysteroscopies performed to remove intra-uterine devices, 2 hysteroscopies were performed for hysteroscopic sterilization, and 1 hysteroscopy was performed to evaluate a uterine mass.

Nine patients had incomplete procedures. Of these, there was inadequate visualization in 8 (6%), and the cavity could not be accessed in 1 (<1%), because of severe cervical stenosis. Complications were reported in 2 (<2%) patients, with 1 patient feeling light-headed postprocedurally and one patient in whom uterine perforation was suspected.

**Table 3** summarizes the findings on office hysteroscopy for the 130 patients with abnormal uterine bleeding.

Of the 130 office diagnostic hysteroscopies performed for abnormal bleeding, 55 (42%) required subsequent hysteroscopy in the OR under anesthesia. Indications for obtaining an OR hysteroscopy included the inability to adequately assess the uterine cavity or the need to further evaluate pathology found in the outpatient setting. Further breakdown demonstrated that 19 of the 24 postmenopausal patients (79%) and 36 of the 106 premenopausal patients (34%) required OR hysteroscopies. OR hysteroscopy demonstrated normal cavities in 12 subjects, polyps in 29 subjects, fibroids in 3 subjects, polyps and fibroids in 9 subjects, and thickened endometrium in 2 subjects. These findings agreed with office hysteroscopic findings in 39 subjects (71%), with 6 subjects demonstrating normal

cavities in both procedures, 26 subjects demonstrating polyps, 1 subject demonstrating fibroids, and 1 subject demonstrating thickened endometrium.

**Cost Comparison**

Table 1 provides an outlook on cost comparison between office and OR hysteroscopy. We compared the costs for 2 strategies, treating our experience as a random sample to make an inference about the relative cost per patient. Our first strategy entailed sending all patients to the OR to undergo inpatient hysteroscopy. This would cost an estimated \$4946 per patient. The second strategy entailed conducting office hysteroscopy and then referring the patient for hysteroscopy in the OR only if needed. This would cost \$1356 for those avoiding the inpatient procedure and \$6302 for those needing both. Of the 130 subjects in the study, 75 (57.7%) underwent office hysteroscopy only, and 55 (42.3%) underwent both inpatient and office hysteroscopy. With exact 95% confidence, the true rate for the office-only procedure ranged from 48.7% to 66.3%. The estimated cost per patient for the second strategy was  $57.7\% \times (\$1356) + 42.3\% \times (\$6302) = \$3448$ . With 95% confidence, the cost per patient ranged from \$3023 to \$3893. In comparison with the cost for the first strategy, this represents estimated savings of \$1498 per patient (95% confidence interval, \$1051–\$1923).

**DISCUSSION**

Numerous studies have demonstrated the success rates of diagnostic hysteroscopy in the office setting to be as high as 98.4%.<sup>6</sup> Additionally, its safety and tolerability among patients over other modalities and the quicker recovery associated with it compared with OR hysteroscopy have also been shown.<sup>7-9</sup>

Minimal to no pain has proved to be a benefit of using a thin and flexible hysteroscope for office diagnostic hysteroscopy. Failure rates associated with hysteroscopy are due predominantly to pain.<sup>10</sup> Studies have demonstrated that office flexible hysteroscopy is feasible without the use of anesthesia because it is well tolerated among patients, reducing risks and costs.<sup>11,12</sup> These factors translate into cost savings, faster recovery, fewer anesthesia-related complications, and decreased time commitment for patients, in addition to decreased time out of the office for physicians.

Our study shows that 75 OR hysteroscopies (58%) were avoided through the initial use of office diagnostic hysteroscopy. This demonstrates that office hysteroscopy is a

useful diagnostic tool that can decrease the need for diagnostic hysteroscopy in the OR when used in a select patient population. When hysteroscopy in the OR is warranted, the ability to determine if the cavity is amenable to ablation or resectoscopic procedures before going to the OR is an important advantage to office hysteroscopy, as is the ability to counsel patients more appropriately before the procedure. Additionally, office hysteroscopy helps prepare the physician for pathology that will be encountered in the OR, particularly in terms of the allotted time and the required tools for the planned operative hysteroscopy.

Office hysteroscopy is most beneficial in patients who will not be taken to the OR if the results of office hysteroscopy are negative for pathology. From our experience, a significant number of postmenopausal women required OR hysteroscopy for various reasons. It may be reasonable to perform hysteroscopy along with a formal dilation and curettage in these patients in the OR, particularly when there is a high concern for malignancy. It is not clear from our study why these patients required OR hysteroscopy, but we propose that this is likely due to physician concern regarding the increased predisposition of this age group to malignancies of the endometrial cavity and endocervical canal.<sup>13</sup>

In addition to the faster recovery associated with office flexible hysteroscopy, previous studies from overseas health care systems have associated office hysteroscopy with lower treatment costs compared with the inpatient form of service.<sup>3,9</sup> Our study demonstrated a significant cost savings of \$1498 per patient. Our findings may not be extrapolated to other international health care systems.

In the case that OR hysteroscopy is essential to the diagnosis, office hysteroscopy helps acquaint and prepare the physician for the pathology that will be encountered in the OR. By demonstrating the intracavitary lesions to the patient in real time during office hysteroscopy, this serves as an excellent educational tool for the patient and allows adequate counseling during the informed decision-making process. Just as important, our audit suggests that the provision of diagnostic hysteroscopy in an office setting provides a significant benefit to patients and the health care system at large.

The study results provide motivation for further research in which both office and inpatient hysteroscopy are performed on all subjects to assess the sensitivity and specificity of the office procedure. The limitation of our study is that there are no comparative data on hysteroscopic findings in subjects who did not undergo hysteroscopy in the

OR. Costs associated with false-negative results on inpatient procedures could not be assessed. The retrospective nature of this study limits the ability to account for other factors, such as emotional distress and additional loss of work or family time due to double procedures.

## CONCLUSIONS

This study demonstrates that office diagnostic hysteroscopy can decrease the need for the more costly alternative in the OR. When clinically appropriate, office hysteroscopy has the ability to decrease the need for OR hysteroscopies under anesthesia and to increase OR availability for other procedures and services. Our study also suggests that the procedure is most beneficial for premenopausal women because their likelihood of intrauterine malignancies is less than that of postmenopausal women. In the presence of normal findings, major pathology is not likely to be missed with office hysteroscopy because of its high accuracy as demonstrated by this and other studies.<sup>14,15</sup>

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