

# Indications of diagnostic hysteroscopy, a brief review of the literature

Angelos Daniilidis · A. Pantelis · K. Dinas ·  
T. Tantanasis · P. D. Loufopoulos · S. Angioni · F. Carcea

Received: 12 June 2011 / Accepted: 25 July 2011 / Published online: 11 August 2011  
© Springer-Verlag 2011

**Abstract** Plenty of authors propose outpatient hysteroscopy as the gold standard diagnostic method for the evaluation of endometrial pathology. This statement has been strengthened in the recent years due to the wide use of smaller diameter hysteroscopic devices, which have made the dilation of the cervix and the use of anesthesia unnecessary. The main purpose of this paper is to summarize the indications of diagnostic hysteroscopy. In this review, we used the most recent publications in MEDLINE and Cochrane Library in order to specify the indications of diagnostic hysteroscopy and the experience that have been obtained till today in the management of certain pathological uterine conditions. The key words we used were diagnostic hysteroscopy, abnormal uterine bleeding, infertility, endometrial cancer. Hysteroscopy provides an accurate method of evaluation and direct visualization of the endometrial cavity and moreover directed biopsy and sampling of suspected lesions. Last years with the continuous development in the hysteroscopy devices, plenty of women benefit surgical hysteroscopy techniques for uterine

abnormalities. Hysteroscopy is useful for the diagnosis in patients with abnormal uterine bleeding, with endometrial cancer and in infertile women. Hysteroscopy has the unique advantage of combining a thorough procedure with great diagnostic accuracy. The only disadvantage is that hysteroscopy requires specific teaching and training and has a long learning curve.

**Keywords** Diagnostic hysteroscopy · Abnormal uterine bleeding · Infertility · Endometrial cancer

## Introduction

Diagnostic hysteroscopy is an accurate and less invasive method for the evaluation of common gynecological disorders such as premenopausal or postmenopausal abnormal uterine bleeding (AUB), endometrial hyperplasia, endometrial cancer, and infertility. Although hysteroscopy as an invasive method is available for the past two decades, the management and the investigation of the uterine pathology till recently, involved dilatation and curettage (D&C) of endometrial cavity under general anesthesia for the majority of gynecologists. A variety of innovations in hysteroscopic instrumentation and techniques, provide accurate evaluation and direct visualization of the endometrial cavity and moreover directed biopsy and sampling of suspected lesions with great safety. The introduction of smaller diameter hysteroscopes has allowed diagnostic hysteroscopy to become an outpatient procedure. Other methods, less invasive, for evaluating the female reproductive tract with a prevalent use are the transvaginal ultrasonography (TVS) with saline infusion sonography or without saline infusion into the endometrial cavity, hysterosalpingography (HSG), and the blind endometrial sampling with pipelle. The main advantage of hysteroscopy is that it combines a more

---

A. Daniilidis · A. Pantelis · K. Dinas · T. Tantanasis ·  
P. D. Loufopoulos · F. Carcea  
2nd Department of Obstetrics and Gynecology,  
Aristotle University of Thessaloniki,  
Evosmos, Greece

S. Angioni  
Department of Obstetrics and Gynecology,  
University Hospital Don Calabria,  
Cagliari, Italy

A. Daniilidis (✉)  
Department of Obstetrics and Gynecology,  
Aristotle University of Thessaloniki,  
9 Smirnis, 56224,  
Evosmos, Thessaloniki, Greece  
e-mail: angedan@hotmail.com

reliable method with greater diagnostic accuracy because of direct visualization. The only disadvantage of hysteroscopy is that it acquires specific teaching and training and has a longer learning curve.

The main purpose of this paper is to summarize the indications of diagnostic hysteroscopy according to the current literature and papers published in MEDLINE and Cochrane library.

### **Hysteroscopy in patients with abnormal uterine bleeding**

AUB is probably the most common abnormal condition in gynecological practice especially for women over the age of 45 years old. It also affects almost 25% of reproductive aged women. Plenty of diagnostic techniques (such as TVS, TVS with saline solution infusion, D&C, and endometrial biopsy) have been widely used in order to evaluate women with AUB. In recent years, hysteroscopy has been widely used as an outpatient office procedure in combination with direct biopsy after visualization of the endometrial cavity. Plenty of authors till today have managed to demonstrate the great potential of hysteroscopy as the gold standard method for the investigation of women with such pathology. Barati et al. have announced that in a sum of 147 women with AUB and normal TVS, 32 of them (21.8%) were hysteroscopically abnormal, and cervical canal polyp has been described as the commonest lesion that has been misdiagnosed by TVS [1]. Endometrial or cervical polyps can be treated better by hysteroscopy since D&C has proved to be less effective [2]. A few years earlier, Refaie et al. evaluated 112 pre- and postmenopausal women with AUB in order to assess if an outpatient hysteroscopy affects the decision making of treatment. The authors concluded that half of the women had abnormal uterine cavities with most common findings the submucous myomas and endometrial polyps and that hysteroscopic investigation of AUB could lead to the most appropriate treatment, without unnecessary major surgical intervention [3]. Bettocchi et al. have proved the efficacy of office hysteroscopy treatment in benign intrauterine pathologies in menopausal women. He has enrolled in his study a sum of 925 menopausal women with AUB in a period of 5 years and divided them into two investigation groups according to the endometrial thickness (group 1 <4 mm, group 2 >4 mm). The conclusion was that the diagnostic value of hysteroscopy yielded 99–100% specificity and sensitivity respectively for both groups [4]. In an attempt of some authors to summarize the results of diagnostic hysteroscopy, a systematic review has been published by H Van Dongen et al. In this study, 17 articles in a meta-analysis have been enrolled and it has been proposed that diagnostic hysteroscopy for women with AUB

is both accurate and feasible in the detection of intrauterine anomalies with a success rate estimated approximately at 96.9% (SD 5.2%, range 83–100%) [5].

Summarizing, we can assume that the most frequent hysteroscopic findings in patients with AUB are the submucous myomas, polyps, and endometrial hyperplasia, either benign or malignant, in about 60–70% of the cases. Moreover, diagnostic hysteroscopy as a method is even more valuable and with greater success rates, in the identification of AUB in perimenopausal and postmenopausal women with no specific risk of cancer progression.

### **Hysteroscopy in patients with endometrial cancer**

The most common type of pelvic malignancy still remains the endometrial cancer. This type of malignancy causes abnormal genital bleeding usually as a first symptom in most of the cases, thus, the early investigation of such symptom is of great importance for woman's survival and progress. Unfortunately, some of women with endometrial adenocarcinoma remain asymptomatic. Endometrial hyperplasia is deemed as a precursor of endometrial cancer. The most important sign of endometrial cancer or endometrial hyperplasia is the endometrial thickness in an ultrasound exam. Unfortunately, ultrasound exam has very low specificity in the differentiation of the type of endometrial hyperplasia as soon as directed biopsy of the suspected uterus still remains a prerequisite for an appropriate control. An endometrial thickness greater than 4 mm requires further evaluation in postmenopausal women with AUB [6–8]. Hysteroscopy not only can clearly and accurately display the appearance of endometrial cancer but also demonstrates any possible involvement of the lower uterine segment and cervix. Cordeiro and her colleagues summarized hysteroscopic findings in 245 postmenopausal women with increased endometrial thickness in TVS and compared the diagnostic outcomes regarding the presence or absence of AUB [9]. In this study, the investigators suggested that sensitivity, specificity, positive predictive, and negative predictive value of hysteroscopy for endometrial carcinoma was 94.1%, 98.95%, 88.9%, and 99.5%, respectively. Also, the concordance between hysteroscopic findings and histological diagnosis was 89.9%. The specificity and negative predictive value of hysteroscopy for diagnosing cancer were similar to other authors [10].

In all this continuing debate about the value and the accuracy of hysteroscopy in the diagnosis of serious endometrial disease (cancer and hyperplasia), plenty of answers have been given by a systematic quantitative review that has been announced by JT Clark and co partners. In this review, 65 papers have been isolated and the results were the following: The overall sensitivity and

specificity of hysteroscopy for endometrial cancer was 86.4% and 99.2%, respectively. The variation in sensitivity was much greater than the variation in specificity of diagnostic hysteroscopy in endometrial disease (cancer and hyperplasia), and finally concluded that as a method, diagnostic hysteroscopy is safe with low incidence of serious complications, with high accuracy in diagnosing endometrial cancer rather than excluding it, and with high accuracy in diagnosing endometrial disease (cancer and hyperplasia) mainly in postmenopausal women rather than in premenopausal [11].

Another great debate enrolls the hypothesis of dissemination of cancer cells after diagnostic hysteroscopy in women with endometrial cancer. Some investigators have proposed that distention of the endometrial cavity with saline solution or CO<sub>2</sub> during the hysteroscopic procedure can, under certain circumstances, disseminate endometrial cancer cells to the abdominal cavity and change both the prognosis and the course of treatment. There are several conflicted arguments and concerns about this hypothesis. On the one hand, it is well-known that all examination methods (bimanual examination, D&C, and even hysterectomy) may lead to migration of endometrial cancer cells through the fallopian tubes to systemic circulation and peritoneal cavity without increasing the incidence of metastasis. Tanizawa et al. in 1,040 women with endometrial cancer examined by hysteroscopy, found no significant differences in the presence of intraperitoneal tumor cells compared to patients evaluated by a different method [12]. Taddei et al. demonstrated that hysteroscopy evaluation of the extent of endometrial carcinoma could lead to an individualized therapeutic program and have a beneficial effect on survival rates [13]. Nagele et al. in a prospective randomized self-controlled study showed that there was no significant difference in the spreading of endometrial cells after hysteroscopy either by the use of natural solution or by the use of CO<sub>2</sub> for uterine distention. Only transtubal dissemination has occurred in about 25% of the patients [14]. Finally, de Sousa Damiao et al., after they have diagnosed endometrial cancer in 72 women, concluded that the hysteroscopic evaluation of endometrial cancer, if it is performed under low pressure of CO<sub>2</sub>, does not cause spread of malignant endometrial cells into the peritoneal cavity [15]. On the other hand, Takac et al., after a retrospective study on 146 patients with endometrial cancer, emphasized that hysteroscopy significantly increases the risk of positive peritoneal cytology in women with endometrial cancer in comparison with D&C [16]. Revel et al. only a few years earlier have mentioned an increased risk of peritoneal contamination by malignant cells after hysteroscopy but with no evidence for these women to face worse prognosis comparing to patients who have undergone other diagnostic procedures [17]. Polyzos and his colleagues very recently analyzed nine clinical trials with 1,015 women with

histologically proven endometrial carcinoma who either underwent or not preoperative hysteroscopy evaluation. Hysteroscopy resulted in a significantly higher rate of malignant peritoneal cytology compared to no hysteroscopy, especially if the distention medium was isotonic sodium chloride and if the inflated media pressure reached or exceeded 100 mmHg [18].

To summarize, it seems that there is a slightly higher percentage of positive peritoneal cytology in women with endometrial cancer who have been evaluated preoperatively with hysteroscopy under high pressure (>100 mmHg) probably due to a transtubal reflux of endometrial cells into the peritoneal cavity. These cells although appear a functional viability, in clinical practice, they seem to disappear in a short time and do not affect the patient's overall outcome. In cases that endometrial cancer is suspected, decrease of intrauterine pressure (less than 80 mmHg) possibly provides security for these patients in order to be evaluated preoperatively with diagnostic hysteroscopy with no negative influence to their prognosis [19] (Table 1).

### Hysteroscopy in infertile patients

According to the WHO guidelines, HSG is recommended to all infertile women in order to be evaluated properly for the uterine malformations that are responsible for infertility problems [20]. The goal of uterine cavity evaluation is to detect uterine malformations such as polyps, myomas, or uterine septums that can negatively influence the embryo implantation [21]. There is an ongoing debate regarding the value of routine hysteroscopy before an *in vitro* fertilisation (IVF) attempt. Hysteroscopic examination seems to be superior in the evaluation of these patients than HSG [21]. Barati et al. have enrolled in a study women with unexplained infertility and women with infertility because of uterine factor. He investigated them either by TVS and HSG, or by TVS, HSG, and hysteroscopy. There was a 38.8% positive finding in office hysteroscopy despite of normal TVS and HSG. He concluded that office hysteroscopy should be a part of routine work in the evaluation of infertile women [22]. Kumar and his colleagues compared the diagnostic efficacy of HSG and hysteroscopy in assessment of uterine factor in infertile women in a 2-year study in which 60 patients were subjected to HSG and hysteroscopy as well. They have showed specificity of HSG as 90% and false negative value as 40%. They have mentioned the significant role of HSG as a screening procedure but it must be supplemented by hysteroscopy although it is an observer-dependent technique [23]. Koskars et al. evaluated hysteroscopically 556 women with difficulty to conceive after 1 year of unprotected intercourse and

**Table 1** Summary of studies regarding endometrial cancer investigations and hysteroscopy

Hysteroscopy in endometrial cancer	Summary of publication—Findings.	Year of study	Number of women	Type of publication
Tanizawa O et al.	No significant differences in the presence of intraperitoneal tumor cells.	1991	1,040	Observational
Taddei GL et al.	Hysteroscopic evaluation of endometrial cavity and cervical canal in women with endometrial adenocarcinoma has beneficial effects on woman's survival rates.	1994	235	Observational
Fay TN et al.	Hysteroscopic assessment of endometrial cavity efficient in the detection of pathological intrauterine lesions but only moderately successful determining physiological endometrial changes.	1999	83	Multicenter randomized double-blind control trial.
Nagele F et al.	No significant difference in the spreading of endometrial malignant cells either by CO <sub>2</sub> or N/S as a distention media for hysteroscopy.	1999	30	Prospective randomized self-controlled study
Clark TJ et al.	The diagnostic accuracy of hysteroscopy is high for endometrial cancer and moderate for endometrial disease.	2002	26,346	Systemic quantitative review
Revel A et al.	An increased risk of peritoneal contamination of malignant cells after hysteroscopy but with no evidence for the patients to face worsen prognosis.	2004		Systemic review
Takac I et al.	Diagnostic hysteroscopy significantly increases the risk of positive peritoneal cytology but not the risk of adnexal, abdominal or retroperitoneal lymph node metastases in women with endometrial cancer.	2007	146	Retrospective randomized trial
De Sousa Damiao et al.	If hysteroscopy is performed under a low pressure of CO <sub>2</sub> , no spread of endometrial cells occur into the peritoneal cavity.	2009	76	Prospective longitudinal study
Polyzos NP et al.	Hysteroscopy resulted in a significantly higher rate of malignant peritoneal cytology especially if the distention medium was N/S and the inflated media pressure exceeded 100 mmHg.	2010	1,015	Systematic review and meta-analysis

**Table 2** Summary of studies regarding infertility investigations and hysteroscopy

Hysteroscopy in infertility	Summary of publication—Findings	Year of study	Number of women	Type of publication
Valle RF	Hysteroscopy before IVF more superior than HSG	1980	142	Observational
Barati M et al.	There was a 38.8% positive finding in office hysteroscopy despite of normal TVS and HSG in infertile women.	2009	107	Observational
Kumar et al.	Mentioned the significant role of HSG as a screening procedure but it must be supplemented by hysteroscopy although it is an observer-dependent technique.	2003	60	Observational retrospective
Koskas et al.	Evaluated hysteroscopically 556 women incapable to conceive and found that first line office hysteroscopy for infertility shows abnormal findings ranged from 30% to more than 60%	2010	556	Clinical study
Bosteels et al.	Removal of endometrial polyps doubles the pregnancy rate compared with diagnostic hysteroscopy and polyp biopsy in women who undergo IUI. Diagnostic hysteroscopy in the cycle preceding subsequent IVF attempt almost doubles the pregnancy rates	2010	1,410	Systemic review
El-Toukhy et al.	Remarkable evidence of benefit from hysteroscopy in increasing the chance of pregnancy in a subsequent IVF cycle.	2008	1,691	Meta analysis



found that first-line office hysteroscopy for infertility showed abnormal findings which ranged from 30% at women 30 years old to more than 60% at women more than 42 years old. Thus, they have proposed an additional argument that office hysteroscopy must be part of first-line exams in infertile women regardless of age [24]. Very recently, Bosteels et al. revealed a systemic review about the effectiveness of hysteroscopy in subfertile women without other gynecological symptoms. The investigators detected that removal of endometrial polyps doubles the pregnancy rate compared with diagnostic hysteroscopy and polyp biopsy in women who undergo IUI. They also mentioned the lack of randomized controlled trials on hysteroscopic treatment of intrauterine adhesions and also that diagnostic hysteroscopy in the cycle preceding subsequent IVF attempt almost doubles the pregnancy rates in women with at least two failed IVF attempts in comparison with women starting IVF immediately [25]. In order to reveal the impact of hysteroscopy in patients with two or more failed IVF cycles, El-Toukhy et al. have announced a systemic review and meta-analysis in 2008 in which 1,691 women divided into two groups participated; one of hysteroscopy and one control group. According to the authors, there was a remarkable evidence of benefit from hysteroscopy in increasing the chance of pregnancy in a subsequent IVF cycle [26].

According to the experience of all these authors, there were lesions detected by hysteroscopy in about 30% of subfertile women reported as normal by HSG and about 50% of subfertile women reported as normal in transvaginal ultrasound. It is clear that diagnostic hysteroscopy not only defines intrauterine lesions such as polyps, submucous myomas, and adhesions, with great accuracy, but also it makes them amenable to surgery by operative hysteroscopy instead of many traditional surgical approaches (Table 2). Nevertheless, for women with recurrent IVF failure, there is some evidence of benefit from hysteroscopy and increasing the success of embryo transfer in subsequent IVF cycle.

**Conflict of interest** The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

## References

- Barati M, Masihi S, Moramezi F, Salemi S (2008) Office hysteroscopy in patients with abnormal uterine bleeding and normal transvaginal ultrasonography. *Int J Fertil Steril* 4:175–178
- Cravello L, Stolla V, Bretelle F, Roger V, Blanv B (2000) Hysteroscopic resection of endometrial polyps: a study of 195 cases. *Eur J Obstet Gynecol Reprod Biol* 93:131–134
- Refaie A, Anderson T, Cheah S (2005) Out-patient hysteroscopy: findings and decision making for treatment of abnormal uterine bleeding in pre- and post-menopausal women. *Mid East Fertil Soc Journ*
- Bettocchi S, Nappi L, Ceci O, Santoro A, Fattizzi N, Nardelli C et al (2004) The role of office hysteroscopy in menopause. *J Am Assoc Gynecol Laparosc* 11:103–106
- van Dongen H, de Kroon CD, Jakobi CE, Trimbos JB, Jansen FW (2007) Diagnostic hysteroscopy in abnormal uterine bleeding: a systematic review and meta-analysis. *BJOG* 114:664–675
- Bree RL, Bowerman RA, Bohm-Velez M, Benson CB, Doubilet PM, DeDreu S et al (2000) US evaluation of the uterus in patients with postmenopausal bleeding: a positive effect on diagnostic decision making. *Radiology* 216:260–264
- Dijkhuizen F, Mol BWJ, Brolman HAM, Heintz APM (2000) The accuracy of endometrial sampling in the diagnosis of patients with endometrial carcinoma and hyperplasia. *Cancer* 89:1765–1772
- Smith-Bindman R, Kerlikowske K, Feldstein VA, Subak L, Scheidler J, Segal M et al (1998) Endovaginal ultrasound to exclude endometrial cancer and other endometrial abnormalities. *J Am Med Assoc* 280:1510–1517
- Cordeiro A, Condeco R, Leitao C, Sousa F, Coutinho S, do Carmo S et al (2010) Office hysteroscopy after ultrasonographic diagnosis of thickened endometrium in postmenopausal patients. *Obstet Gynecol Surv* 2:95–96
- Fay TN, Khanem N, Hosking D (1999) Out-patient hysteroscopy in asymptomatic postmenopausal women. *Climacteric* 2:263–267
- Clark TJ, Voit D, Gupta JK, Hyde C, Song F, Khan KS (2002) Accuracy of hysteroscopy in the diagnosis of endometrial cancer and hyperplasia: a systematic quantitative review. *JAMA* 288:1610–1621
- Tanizawa O, Miyake A, Suqimoto O (1991) Re-evaluation of hysteroscopy in the diagnosis of uterine endometrial cancer. *Nippon Sanka Fujinka Gakkai Zasshi Jun* 43:622–626
- Taddei GL, Moncini D, Scarselli G, Tantini C, Bargelli G (1994) Can hysteroscopic evaluation of endometrial carcinoma influence therapeutic treatment? *Ann N Y Acad Sci* 734:482–487
- Nagele F, Wieser F, Deery A, Hart R, Magos A (1999) Endometrial cell dissemination at diagnostic hysteroscopy: a prospective randomized cross-over comparison of normal saline and carbon dioxide uterine distention. *Hum Reprod* 14:2739–2742
- de Sousa Damiao R, Lopes RG, Dos Santos ES, Lippi UG, da Fonseca EB (2009) Evaluation of the risk of spreading endometrial cell by hysteroscopy: a prospective longitudinal study. *Obstet Gynecol Int* 397079
- Takac I, Zegura B (2007) Office hysteroscopy and the risk of microscopic extrauterine spread in endometrial cancer. *Gynecol Oncol* 107:94–98
- Revel A, Tsafirir A, Anteby SO, Shushan A (2004) Does hysterectomy produce spread of endometrial cancer cells? *Obstet Gynecol Surv* 59:280–284
- Polyzos NP, Mauri D, Tsioras S, Messini CI, Valachis A, Messinis IE (2010) Intraperitoneal dissemination of endometrial cancer cells after hysteroscopy: a systematic review and meta-analysis. *Int J Gynecol Cancer* 20:261–267
- Koutlaki N, Dimitraki M, Zervoudis S, Skafida P, Nikas I, Mandratzi J et al (2010) Hysteroscopy and endometrial cancer. *Gynecol Surg* 7:335–341
- Rowe PC, Hargreave T, Mellows H. WHO Manual for the standardized investigation and diagnosis of the infertile couple (1993) The Press Syndicate of the University of Cambridge, Cambridge, UK
- Valle RF (1980) Hysteroscopy in the evaluation of female infertility. *Am J Obstet Gynecol* 137:425–431
- Barati M, Zargar M, Masihi S, Borzoo L, Cheraghian B (2009) Office hysteroscopy in infertility. *Int J Fertil Steril* 3:17–20
- Kumar S, Awasthi RT, Gokhale N (2003) Assessment of uterine factor in infertile women: hysterosalpingography vs. hysteroscopy. *MJAFI* 60:39–41

24. Koskas M, Mergui JL, Yazbeck C, Uzan S, Nizard J (2010) Office hysteroscopy for infertility: a series of 557 consecutive cases. *Obstet Gynecol Int* 168096:1–4
25. Bosteels J, Weyers S, Puttemans P, Panayiotidis C, Van Herendael B, Gomel V et al (2010) The effectiveness of hysteroscopy in improving pregnancy rates in subfertile women without other gynaecological symptoms: a systematic review. *Hum Reprod Update* 16:1–11
26. El-Toukhy T, Sunkara SK, Coomarasamy A, Grace J, Khalaf Y (2008) Outpatient hysteroscopy and subsequent IVF cycle outcome: a systematic review and meta-analysis. *Reprod Biomed Online* 16:712–719