Arch Gynecol Obstet (2010) 282:383–388
DOI 10.1007/s00404-010-1437-x

GENERAL GYNECOLOGY

Office hysteroscopy: current trends and potential applications: a critical review

Charalambos Siristatidis · Charalambos Chrelias · George Salamalekis · Dimitrios Kassanos

Received: 28 January 2010 / Accepted: 9 March 2010 / Published online: 27 March 2010

Abstract Office hysteroscopy is an excellent method of identifying and treating intracavitary uterine lesions. It has become easy to learn and perform; as an aid of modern technological applications, it is safe, accurate, provides immediate results under direct visualisation, and offers the additional benefit of histological confirmation and the discomfort of patients is minimal. We applied an extended literature search to explore the special features and details of the technique itself, as it evolved since it first appeared 30 years back. Our initial goal was to examine potential changes/improvements of the modality, in terms of the instrumentation used and the technique itself, the indications of use, its incorporation in daily practice, and patients' and clinicians' acceptability.

Keywords Office hysteroscopy · "No-touch" technique · Indications · Patients' acceptability

Introduction

Passive diagnostic and surgical attitudes represent repetitive platitudes of the past. In gynaecology, the present is indicative of the future. Minimally invasive modalities tend to replace more extended ones, offering the same, and in many cases better, diagnostic and therapeutic results. Hysteroscopy is one of the very best examples. Being associated with minimal patient discomfort, excellent visualisation and very low complication and failure rates [1], it is currently acknowledged as the 'gold standard' investigation of the intrauterine abnormalities [2]. Operatively, resectoscopy remains the standard surgical approach in the treatment of big intrauterine lesions, with the first experiences of treating myomas to be published almost 30 years ago [3].

Since, operative advances, both in technology and technique, have enabled treating most of such lesions through the office setting, using miniaturised instruments and combining the non-use of speculum, tenaculum, analgesia or anaesthesia [4–6]. Office hysteroscopy in its present form avoids most traumatic uterine manoeuvres leading to a less painful and better-tolerated procedure [7, 8].

International literature is being continually filled up by reports concerning new instruments and indications/applications of the technique, tempting our scientific curiosity to try to discover through them if there is any space left for future potential applications of the modality.

The "office setting" and the "no-touch" technique

The term "office setting" is referred to the performance of hysteroscopy, either diagnostic or operative, in an outpatient basis. Improvements, both in technology and technique, such as the use of saline as distension medium, the availability of high-resolution mini-endoscopes [9], and the atraumatic insertion of the instruments [4], have led to the development of the current form of the modality. The 'no-touch' or vaginoscopic approach is referred to the insertion of the scope to the vagina, cervical canal and uterine cavity without using the speculum, tenaculum, analgesia or anaesthesia. This approach is significantly faster to perform than the conventional one, with similar

Ch. Siristatidis (✉)
36 Imathias str., Thrakomakedones, 13676 Athens, Greece
e-mail: harrysiri@yahoo.gr

C. Chrelias · G. Salamalekis · D. Kassanos
Third Department of Obstetrics and Gynaecology,
"Attikon" Hospital, University of Athens Medical School,
Rimini 1 str., Chaidari, 12462 Athens, Greece

values in pain scores [10]; the former is sometimes better tolerated [11, 12]. The awake patient's discomfort and anaesthetic requirements are very low or even zero [4, 13]. In addition, it can be offered to patients who otherwise would require general anaesthesia, such as virgins or older women with stenotic vaginas [14].

As a technique in an outpatient basis, we believe that it has been sufficiently improved.

The "see and treat" technique: the new philosophy

The pioneers and developers of the "no-touch" technique made a further logical step: to integrate the operative into the diagnostic part. Thus, the new clinical philosophy was born: the "two in one". The new generation hysteroscopes carry the advantages of a 5-French operative channel, which enables the simultaneous diagnosis and treatment of endo-uterine pathologies [6, 15]. Easy performance and excellent surgical results have been demonstrated. And, apart from the classic mechanical instruments, bipolar electrosurgical equipment (Versapoint System) has been introduced, so that larger benign intrauterine pathologies can be treated [5]. Studies report excellent results in terms of its feasibility, safety and effectiveness [16–18]. Benefits include savings in time (comparable to that of transvaginal sonography), anaesthetic and analgetic drugs, personnel, surgery room, and hospital costs. Additionally, if bigger (e.g. polyps >1.5 cm) or deeper (e.g. intracavitary myomas type 1 or 2) pathologies are found, they can be re-scheduled to treat in the operative room after proper patient's consultation and preoperative investigations [19].

In our view, this constitutes the logical completion of the previous theory. The lack of pain helps intracavitary lesions to be removed or cut, at their initial discovery. This is due to the absence of innervation of the endometrium itself and the intrauterine lesions; thus, the contact of any instrument is painless. On the contrary, myometrium is very sensitive; this is the point that differentiates the two layers and adds to safety of both the diagnostics and therapeutics of the technique.

Pain

Pain used to represent the main restricted factor for the broad use of the technique. Topical, intravenous or oral anaesthetics have been used to alleviate pain during office hysteroscopy: lidocaine spray [20], prilocaine plus lidocaine cream [21], oral drotaverine with mefenamic acid, paracervical block with 1% lignocaine [22], and tramadol [23] are some of the examples. However, our literature search failed to find substantial evidence for the routine use of local analgesia, sometimes recommended only in selected patients [24].

Diameter of the scopes

Instrument final diameter is considered the main factor influencing pain, together with the operative time spent [7]. Patient parity, menopausal status, diameter of the lesions and surgeons' experience remain conflicting factors [1, 25, 26]. Interestingly, reports consider that the introduction or withdrawal of the vaginal speculum causes the greatest discomfort [8]; the "no-touch" approach can undoubtedly eliminate such a discomfort.

Practically, patients' tolerance and acceptability would be higher the smaller the diameter [8] and the better visualisation during the procedure would be. The latter is connected to the less traumatic manoeuvres passing the scope through the cervical canal [1, 25]. The 4.2 mm final diameter (including an external sheath for the instruments) or 4.7 mm (including an external sheath for the irrigation system) are considered today to be most suitable. As for the diagnostic tool only, a final diameter is little more than 2 mm. We do not think that these final diameters used today can change, as they depend upon the start diameter of the lens, which cannot be less than 1.9 mm. Fibre optics have been proven inferior to the lens systems of the rigid hysteroscopes in terms of optical quality, visualisation and accuracy, providing lower success rates at much higher cost [27, 28]. They have been traditionally used in flexible scopes, which do not have the advantage of carrying instruments. On the other hand, we have to mention the recent remarkable advances of companies resulting in the construction of 3 mm semi-rigid fibre scopes carrying 5.4 and 6.6 mm continuous flow sheaths (Olympus), and of a fibre-optic instrument with a disposable operative sheath (Gynecare Versascope).

In an effort to minimise pain, Bettocchi et al. [6] invented a different shape/profile of the scope: the oval. In this way the shape of the scope is adjusted to the oval shape of the cervical canal.

Perhaps in the future a microlens of <1 mm could be structured, so that the final diameter of the scope could reach or be less than 3 mm. Important efforts have been reported: Jacobs et al. [29] described a 2.67 mm outer diameter with straight zero-degree scope, 70-degree vision field and two working channels, 1.2 and 0.55 mm, allow suction-irrigation and introduction of a 1.0 mm biopsy forceps.

In addition, mini-resectoscopes have been tested. Papalampros et al. [30] described a 16-Fr gauge mini-resectoscope, which appeared to be efficient and acceptable for hysteroscopic surgery, not requiring general anaesthesia.

Limits, in terms of size and position, have been turned upwards: endometrial polyps or small (<3 cm) type 0 or 1 submucous fibroids.

Further issues with the technique

So far, rigid scopes seem to be a one-way route for the future of the modality, as they have the additional advantage for carrying the instruments.

Steps of the technique include:

1. the discovery of the external cervical os,
2. the entrance into the cervical canal: using a scope with an oval profile, it has to be rotated by 90 degrees in order to adjust the profile of the scope to the opening of the external cervical os,
3. the passage through the canal: as the angle of the scope view is usually offset from the axis by 30°, in order to correctly align the scope to the axis of the cervix, the appearance of the canal at 6 and 12 o'clock positions (anteverted or retroverted uterus), respectively,
4. the inspection of the intrauterine cavity by rotation of the body of the scope by 90° (right and left) for the examination of the tubal ostia, and
5. the pulling back of the scope at the level of the internal cervical os in order to get a panoramic view of the uterus.

Through this process, pain and discomfort can reach a very low or even zero level [6, 14, 15]. However, small up-and-down and side-to-side yet necessary motions can cause discomfort, together with a little but often painful mucosal trauma of the angular tip of the scope guided through the cervical canal [31].

As for the operative part, techniques for safely removing polyps, diagnosing and cutting uterine septae and synechiaes and slicing intracavitary fibroids have been reported [5, 6, 14]. The latter constitutes a matter of continuous debate among experienced hysteroscopists, especially for type 1 and type 2 fibroids. A comprehensive review of surgical techniques concluded that the 'cold loop' technique seems to represent the best option [32]. There are techniques, though, reported for the office setting e.g. the slicing of the fibroid in multiple parts, or more than one time with or without the use of GnRH analogues. Most of them depend on the intramural extension of the fibroid, aiming to transform an intramural to a totally intracavitary lesion, thus avoiding a deep cut into the myometrium.

As for the biopsy technique (grasp vs. punch), reports are in favour of the first, as it can provide the pathologist with the necessary amount of tissue for histologic examination [33].

Distension media

Currently, normal saline (N/S 0.9%) is the most-used distension medium of the uterine cavity, usually instilled from a 500 ml bag wrapped in a pressure bag connected to a manometer and pumped to 120–200 mmHg [34]. This medium is safer than the colloidal ones. When compared to CO_2, it offers all the advantages of the CO_2 hysteroscopy, but also gives the possibility to operate the lesions found [35]. A higher incidence of bradycardia during CO_2 hysteroscopy was attributed to the mechanical and biochemical effects of the gas [8]. In addition, the role of an electronic pump for irrigation and aspiration has to be emphasised, which keeps the intrauterine pressure (together with patient's discomfort) low, while improving the hysteroscopic view [5].

The only grey area found in the literature had to do with the possibility of cancer cell dissemination through the transtubal fluid leakage. The assumption is logical: the medium through the high-intrauterine pressure could spread cancer cells in the peritoneal cavity through the tubes. Reports disagree that the fluid leakage is linked to cancer cell dissemination, in cases of endometrial cancer. Furthermore, they suggest that when cancer is suspected, the reduction of the pressure of the pump to 40 mmHg appears to be safe [36, 37].

Energy used for the operative part

Apart from the mechanical instruments, bipolar energy has been widely used. Versapoint is the most common 5-Fr electrode. As it can be used through the working channel, it does not require cervical dilatation. It could be considered as a safe alternative to the resectoscope, being associated with shorter operating time and lower complication rates, comparatively [5, 38]. There are still some worries, though, on the safety and efficacy of bipolar energy used during surgery as compared to monopolar [39].

It appears that for the moment, there are no other solutions like laser or harmonic shears (Ultracision) to be used during office hysteroscopy. Perhaps the latter, as a safe high-frequency ultrasound energy source, could be used as a substitute for the electrosurgery of the endometrium. Of course, adjustments in frequencies and amplitudes of vibration and coaptation, together with new coagulation temperature limits are necessary.

Broad use: learning curve

Despite the technological progress, the human factor remains the cornerstone of any technical improvement.

Continuous training, thus, is mandatory. Office hysteroscopy is a technique that has been available for over three decades. Whereas nearly 100% of urologists utilise office cystoscopy to evaluate bladder pathology, it is estimated that less than 20% of gynaecologists utilise office hysteroscopy to evaluate intrauterine pathology. A perceived lack of patients who would benefit from the procedure, expensive capital equipment with poor reimbursement, and a lack of expertise in performing the procedure were reported to constitute the main reasons [40].

A phenomenally logical excuse could be related to the outpatient character of the technique, requiring, thus, a high level of expertise. For the latter, a long and often hard training should be the only option. New reports explode this myth as a high level of experience is not considered a prerequisite to performing hysteroscopy [14]. Both the advances in instrumentation and the multiplicity of certified centres offering training constitute encouraging factors for young clinicians to learn. Office hysteroscopy is no longer a technique of and for the few; in many countries it is included in the basic training programme of the residents. As for the diagnostic part, it has become easy to perform. Very few complications are reported and most of them are entry-related [41]. As for the operative part, complications are related to surgeons' experience and type of the procedure. Appropriate patient's selection, recognition of limitations in experience and skills, and adequate instrumentation and support staff can minimise them.

Limit indications

As experience with instruments and applications grow, indications for the use of office hysteroscopy are rising dramatically.

Classic applications include its practice in the gynaecologist's office and the removal of polyps <1 cm, myomas type 0 and 1, synechiaes, intrauterine devices and septae [42, 43].

Hysteroscopy also contemplates in the evaluation of intrauterine abnormalities [2], tubo-ovarian structures [44] and chronic pelvic pain [45], detection of adenomyosis [46], sterilisation [47] and ablation [48]. There are also interesting reports concerning the use of hysteroscopy in the cauterisation of the cervical stump after subtotal hysterectomy [49], removal of retained trophoblastic tissue [50] and treatment of hematometra with intact outflow tract and in cases of virgin patients [51].

In gynaecological oncology, office hysteroscopy serves as a conclusive diagnostic tool in menopausal women on tamoxifen [52], in the diagnosis and follow-up of cases with endometrial hyperplasia [53], in ruling out, although not detecting, cervical involvement in endometrial carcinoma [54], and in the diagnosis and treatment of atypical adenomyomas [55] and endometrial adenocarcinoma in human non-polyposis colon cancer [56].

In the infertility work-up and the assisted reproduction the role and contribution of office hysteroscopy has always been a matter of strong debate. On one hand, as intracavitary anomalies are reported to be more frequent among the infertile population (from 38 [57] to 60% [58]); it is believed that they impair the success of fertility treatments. A systematic review of randomised and non-randomised studies showed evidence of benefit from outpatient hysteroscopy in improving pregnancy rates in IVF cycles [59]. On the other, the technique is suggested only in women whose ultrasonograms are abnormal [60]. To quote the latter, a recent systematic review failed to reveal robust data to support a generalised practice the effectiveness of hysteroscopic surgery in subfertile women with polyps, fibroids, septate uterus or intrauterine adhesions [61]. A possible explanation for this disagreement could be based on the fact that the endometrial factor is not included in the current recognised causes of infertility. In our view, individualisation should be the norm. And as office hysteroscopy causes minimal or no damage to the endometrium at its current form, it could be applied in all cases, even during the initial investigation of all infertile couples.

On the other hand, there are limits. Big lesions (more than 2 cm myomas or polyps) seem unsafe to be treated in an office setting. Patients with PID or with a history or active cardiovascular disease need cautious consultation. In suspicion of endometrial hyperplasia and cancer, selective biopsies in a thickened or a bleeding endometrium cannot completely and accurately set the proper diagnosis [62]. Perhaps, in the future, continued improvement in optics technology may allow direct histologic examination in situ without the need for tissue sampling.

Comparing and probably replacing conventional methods

Blind biopsy and curettage and transabdominal or transvaginal ultrasonography with or without saline solution infusion constitute plausible targets for replacement, as first-line procedures to evaluate the endometrium. Hysteroscopy is well accepted today to offer greater diagnostic accuracy as compared to them, demonstrating fewer false-positive and false-negative results and higher sensitivity rates [63].

The important issue raised from studies is the ability of the clinician to perform targeted biopsies under direct visualisation [64]. We believe that this is the ideal approach in the investigation of normal and/or abnormal endometrium, even in asymptomatic patients.

Additionally, office hysteroscopy may replace tubal assessment current methods, such as hysterosalpingography. Routine passage of imaging systems through the tubal ostia may also become a common adjunct to laparoscopy in evaluating tubal condition and, especially, function.

Conclusions

The technique of office hysteroscopy in its current form has intruded in the area of very low cost outpatient procedures. It does not require additional expensive instruments, medication and anaesthesia, extra personnel or programmed operative theatre. The results of this review show that there is enough space for improvement of the modality, in terms of its broader use from the young gynaecologists as a first-line diagnostic and therapeutic tool, its import as such in private practices, next to the ultrasound and the colposcope, the improvement of the technical characteristics of the instruments, and the extension of the already augmented list of its indications of use.

Conflict of interest statement None.

References

1. Campo R, Molinas CR, Rombauts L et al (2005) Prospective multicentre randomized controlled trial to evaluate factors influencing the success rate of office diagnostic hysteroscopy. Hum Reprod 20:258–263
2. van Dongen H, de Kroon CD, Jacobi CE, Trimbos JB, Jansen FW (2007) Diagnostic hysteroscopy in abnormal uterine bleeding: a systematic review and meta-analysis. BJOG 114:664–675
3. Neuwirth RS (1978) A new technique for and additional experience with hysteroscopic resection of submucous fibroids. Am J Obstet Gynecol 131:91–94
4. Bettocchi S, Selvaggi L (1997) A vaginoscopic approach to reduce the pain of office hysteroscopy. J Am Assoc Gynecol Laparosc 4:255–258
5. Bettocchi S, Ceci O, Di Venere R et al (2002) Advanced operative office hysteroscopy without anaesthesia: analysis of 501 cases treated with a 5 Fr. bipolar electrode. Hum Reprod 17:2435–2438
6. Bettocchi S, Ceci O, Nappi L et al (2004) Operative office hysteroscopy without anesthesia: analysis of 4,863 cases performed with mechanical instruments. J Am Assoc Gynecol Laparosc 11:59–61
7. Cicinelli E, Parisi C, Galantino P et al (2003) Reliability, feasibility, and safety of minihysterosocpy with a vaginoscopic approach: experience with 6,000 cases. Fertil Steril 80:199–202
8. De Angelis C, Santoro G, Re ME, Nofroni I (2003) Office hysteroscopy and compliance: mini-hysteroscopy versus traditional hysteroscopy in a randomized trial. Hum Reprod 18: 2441–2445
9. Campo R, Van Belle Y, Rombauts L, Brosens I, Gordts S (1999) Office mini-hysteroscopy. Hum Reprod Update 5:73–81
10. Sharma M, Taylor A, di Spiezio Sardo A et al (2005) Outpatient hysteroscopy: traditional versus the 'no-touch' technique. BJOG 112:963–967
11. Garbin O, Kutnahorsky R, Göllner JL, Vayssiere C (2006) Vaginoscopic versus conventional approaches to outpatient diagnostic hysteroscopy: a two-centre randomized prospective study. Hum Reprod 21:2996–3000
12. Sagiv R, Sadan O, Boaz M et al (2006) A new approach to office hysteroscopy compared with traditional hysteroscopy: a randomized controlled trial. Obstet Gynecol 108:387–392
13. Guida M, Di Spezio Sardo A, Acunzo G et al (2006) Vaginoscopic versus traditional office hysteroscopy: a randomized controlled study. Hum Reprod 21:3253–3257
14. Di Spiezio Sardo A, Taylor A, Tsirkas P et al (2008) Hysteroscopy: a technique for all? Analysis of 5,000 outpatient hysteroscopies. Fertil Steril 89:438–443
15. Bettocchi S, Nappi L, Ceci O, Selvaggi L (2003) What does 'diagnostic hysteroscopy' mean today? The role of the new techniques. Curr Opin Obstet Gynecol 15:303–308
16. Fernandez H, Gervaise A, de Tayrac R (2000) Operative hysteroscopy for infertility using normal saline solution and a coaxial bipolar electrode: a pilot study. Hum Reprod 15:1773–1775
17. Garuti G, Cellani F, Colonnelli M, Grossi F, Luerti M (2004) Outpatient hysteroscopic polypectomy in 237 patients: feasibility of a one-stop "see-and-treat" procedure. J Am Assoc Gynecol Laparosc 11:500–504
18. Garuti G, Centinaio G, Luerti M (2008) Outpatient hysteroscopic polypectomy in postmenopausal women: a comparison between mechanical and electrosurgical resection. J Minim Invasive Gynecol 15:595–600
19. Bettocchi S, Nappi L, Ceci O et al (2005) Hysteroscopy and menopause: past and future. Curr Opin Obstet Gynecol 17:366–375
20. Wieser F, Kurz C, Wenzl R et al (1998) Atraumatic cervical passage at outpatient hysteroscopy. Fertil Steril 69:549–551
21. Zullo F, Pellicano M, Stigliano CM et al (1999) Topical anesthesia for office hysteroscopy. A prospective, randomized study comparing two modalities. J Reprod Med 44:865–869
22. Sharma JB, Aruna J, Praveen Kumar et al (2009) Comparison of efficacy of oral drotaverine plus mefenamic acid with paracervical block and with intravenous sedation for pain relief during hysteroscopy and endometrial biopsy. Indian J Med Sci 63:244–252
23. Floris S, Piras B, Orrù M et al (2007) Efficacy of intravenous tramadol treatment for reducing pain during office diagnostic hysteroscopy. Fertil Steril 87:147–151
24. Yang J, Vollenhoven B (2002) Pain control in outpatient hysteroscopy. Obstet Gynecol Surv 57:693–702
25. Rullo S, Sorrenti G, Marziali M et al (2005) Office hysteroscopy: comparison of 2.7- and 4-mm hysteroscopes for acceptability, feasibility and diagnostic accuracy. J Reprod Med 50:45–48
26. Litta P, Cosmi E, Saccardi C et al (2008) Outpatient operative polypectomy using a 5 mm-hysteroscope without anaesthesia and/or analgesia: advantages and limits. Eur J Obstet Gynecol Reprod Biol 139:120–124
27. Unfried G, Wieser F, lbrecht A, Kaider A, Nagele F (2001) Flexible versus rigid endoscopes for outpatient hysteroscopy: a prospective randomized clinical trial. Hum Reprod 16:168–171
28. Chang CC (2007) Efficacy of office diagnostic hysterofibroscopy. J Minim Invasive Gynecol 14:172–175
29. Jacobs VR, Paepke S, Schwarz-Boeger U et al (2005) Development of a thinner and more flexible type of minihysteroscope with a controlled 90-degree bendable tip for vision-guided endometrium biopsy. J Minim Invasive Gynecol 12:426–431
30. Papalampros P, Gambadauro P, Papadopoulos N et al (2009) The mini-resectoscope: a new instrument for office hysteroscopic surgery. Acta Obstet Gynecol Scand 88:227–230
31. Valle RF (1988) Future growth and development of hysteroscopy. Obstet Gynecol Clin North Am 15:111–126

32. Di Spiezio Sardo A, Mazzon I, Bramante S et al (2008) Hysteroscopic myomectomy: a comprehensive review of surgical techniques. Hum Reprod Update 14:101–119
33. Bettocchi S, Di Venere R, Pansini N et al (2002) Endometrial biopsies using small-diameter hysteroscopes and 5F instruments: how can we obtain enough material for a correct histologic diagnosis? J Am Assoc Gynecol Laparosc 9:290–292
34. Nagele F, Bournas N, O'Connor H et al (1996) Comparison of carbon dioxide and normal saline for uterine distension in outpatient hysteroscopy. Fertil Steril 65:305–309
35. Perez-Medina T, Bajo JM, Martinez-Cortes L, Castellanos P, Perez de Avila I (2000) Six thousand office diagnostic-operative hysteroscopies. Int J Gynaecol Obstet 71:33–38
36. Solima E, Brusati V, Ditto A et al (2008) Hysteroscopy in endometrial cancer: new methods to evaluate transtubal leakage of saline distension medium. Am J Obstet Gynecol 198:214
37. Lavie O, Gemer O, Ben-Arie A (2008) Office hysteroscopy and the risk of microscopic extrauterine spread in endometrial cancer. Gynecol Oncol 110:266–267
38. Colacurci N, De Franciscis P, Mollo A et al (2007) Small-diameter hysteroscopy with Versapoint versus resectoscopy with a unipolar knife for the treatment of septate uterus: a prospective randomized study. J Minim Invasive Gynecol 14:622–627
39. Garuti G, Luerti M (2009) Hysteroscopic bipolar surgery: a valuable progress or a technique under investigation? Curr Opin Obstet Gynecol 21:329–334
40. Isaacson K (2002) Office hysteroscopy: a valuable but underutilized technique. Curr Opin Obstet Gynecol 14:381–385
41. Jansen FW, Vredevoogd CB, van Ulzen K et al (2000) Complications of hysteroscopy: a prospective, multicenter study. Obstet Gynecol 96:266–270
42. Hamou J, Salat-Baroux J, Siegler AM (1983) Diagnosis and treatment of intrauterine adhesions by microhysteroscopy. Fertil Steril 39:321–326
43. Campo V, Campo S (2007) Hysteroscopy requirements and complications. Minerva Ginecol 59:451–457
44. Gordts S, Campo R, Rombauts L, Brosens I (1998) Transvaginal salpingoscopy: an office procedure for infertility investigation. Fertil Steril 70:523–526
45. Di Spiezio Sardo A, Guida M, Bettocchi S et al (2008) Role of hysteroscopy in evaluating chronic pelvic pain. Fertil Steril 90:1191–1196
46. Molinas CR, Campo R (2006) Office hysteroscopy and adenomyosis. Best Pract Res Clin Obstet Gynaecol 20:557–567
47. Arjona JE, Miño M, Cordón J et al (2008) Satisfaction and tolerance with office hysteroscopic tubal sterilization. Fertil Steril 90:1182–1186
48. Glasser MH (2009) Practical tips for office hysteroscopy and second-generation "global" endometrial ablation. J Minim Invasive Gynecol 16:384–399
49. Pontrelli G, Landi S, Siristatidis C et al (2007) Endometrial vaporization of the cervical stump employing an office hysteroscope and bipolar technology. J Minim Invasive Gynecol 14:767–769
50. Jiménez JS, Gonzalez C, Alvarez C et al (2009) Conservative management of retained trophoblastic tissue and placental polyp with diagnostic ambulatory hysteroscopy. Eur J Obstet Gynecol Reprod Biol 145:89–92
51. Di Spiezio Sardo A, Di Carlo C, Salerno MC et al (2007) Use of office hysteroscopy to empty a very large hematometra in a young virgin patient with mosaic Turner's syndrome. Fertil Steril 87:417
52. Garuti G, Cellani F, Grossi F et al (2002) Saline infusion sonography and office hysteroscopy to assess endometrial morbidity associated with tamoxifen intake. Gynecol Oncol 86:323–329
53. Arslan S, Aytan H, Gunyeli I et al (2005) Office hysteroscopic evaluation of endometrium: can we hit the target? Arch Gynecol Obstet 271:200–202
54. Avila ML, Ruiz R, Cortaberria JR, Rivero B, Ugalde FJ (2008) Assessment of cervical involvement in endometrial carcinoma by hysteroscopy and directed biopsy. Int J Gynecol Cancer 18:128–131
55. Di Spiezio Sardo A, Mazzon I, Gargano V et al (2008) Hysteroscopic treatment of atypical polypoid adenomyoma diagnosed incidentally in a young infertile woman. Fertil Steril 89:456
56. Lécuru F, Le Frère Belda MA, Bats AS et al (2008) Performance of office hysteroscopy and endometrial biopsy for detecting endometrial disease in women at risk of human non-polyposis colon cancer: a prospective study. Int J Gynecol Cancer 18:1326–1331
57. Hinckley MD, Milki AA (2004) 1,000 office-based hysteroscopies prior to in vitro fertilization: feasibility and findings. JSLS 8:103–107
58. Lorusso F, Ceci O, Bettocchi S et al (2008) Office hysteroscopy in an in vitro fertilization program. Gynecol Endocrinol 24:465–469
59. 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
60. de Sá Rosa e de Silva AC, Rosa e Silva JC, Cândido dos Reis FJ, Nogueira AA, Ferriani RA (2005) Routine office hysteroscopy in the investigation of infertile couples before assisted reproduction. J Reprod Med 50:501–506
61. Bosteels J, Weyers S, Puttemans P (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
62. Lasmar RB, Barrozo PR, de Oliveira MA, Coutinho ES, Dias R (2006) Validation of hysteroscopic view in cases of endometrial hyperplasia and cancer in patients with abnormal uterine bleeding. J Minim Invasive Gynecol 13:409–412
63. Brooks PG (2007) Is the management of abnormal uterine bleeding, is office hysteroscopy preferable to sonography? The case for hysteroscopy. J Minim Invasive Gynecol 14:12–14
64. Ceci O, Bettocchi S, Pellegrino A et al (2002) Comparison of hysteroscopic and hysterectomy findings for assessing the diagnostic accuracy of office hysteroscopy. Fertil Steril 78:628–631