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Endometrial polyps. An evidence-based diagnosis and management guide

Salvatore Giovanni Vitale[a], Sergio Haimovich[b], Antonio Simone Laganà[c], Luis Alonso[d], Attilio Di Spiezio Sardo[e], Jose Carugno[f,*], From the Global Community of Hysteroscopy Guidelines Committee

[a] Department of General Surgery and Medical Surgical Specialties, University of Catania, Catania, Italy
[b] Hillel Yaffe Medical Center, Technion-Israel Technology Institute, Hadera, Israel
[c] Department of Obstetrics and Gynecology, "Filippo Del Ponte" Hospital, University of Insubria, Varese, Italy
[d] Centro Gutenberg, Endoscopy Unit, Malaga, Spain
[e] Department of Public Health, University of Naples "Federico II", Naples, Italy
[f] Department of Obstetrics, Gynecology and Reproductive Sciences, Minimally Invasive Gynecology Division, University of Miami, Miller School of Medicine, 1321 NW 14th Street Suite 201, Miami, FL 33136, USA

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ABSTRACT

Objective: To provide an updated practice guideline for the management of patients with endometrial polyps.
Materials and Methods: A committee of six expert researchers draw the recommendations according to AGREE II Reporting Guideline. An electronic search was performed querying the following databases MEDLINE (accessed through PubMed), Scopus, PROSPERO, EMBASE, CINAHL, Cochrane Library (including the Cochrane Database of Systematic Reviews), Scielo.br, Google Scholar, from inception to May 2020. A combination of text-words and Medical Subject Headings (MeSH) regarding endometrial polyps, diagnosis, management and treatment was used. Trials were assessed for methodologic rigor and graded using the United States Preventive Services Task Force classification system.
Recommendations: Transvaginal ultrasonography (TVUS) should be the imaging modality of choice for the detection of endometrial polyps in woman of fertile age (level B). Its accuracy increases when color-doppler, 3D investigation and contrast are used (level B). Dilation and Curettage (D&C) should be avoided for the diagnosis and management of polyps (level A). In office hysteroscopy showed the highest diagnostic accuracy in infertile patients with suspected endometrial polyps (level B). Polyps might alter endometrial receptivity, and embryo implantation reducing pregnancy rates (level C). Hysteroscopic polypectomy is feasible and safe with negligeble risk of intrauterine adhesion formation (level B). Polypectomy does not compromise reproductive outcomes from subsequent IVF procedures but the removal of polyps as a routine practice in sub-fertile women is not currently supported by the evidence (level B). Cost-effectiveness analysis suggest performing office polypectomy in women desiring to conceive (level B). Saline infused sonohysterography is highly accurate in detecting polyps in asymptomatic postmenopausal women (level B). Postmenopausal women with vaginal bleeding and suspected endometrial polyp should be offered diagnostic hysteroscopy with hysteroscopic polypectomy if endometrial polyps are present (level B). In-office hysteroscopy has the highest diagnostic accuracy with high cost-benefits ratio for premalignant and malignant pathologies of the uterine cavity (level B). Due to risk of malignancy, histopathological analysis of the polyp is mandatory (level B). Blind D&C should be avoided due to inaccuracy for the diagnosis of focal endometrial pathology (level A). Expectant management is not recommended in symptomatic patients especially in postmenopausal women (level B). In case of atypical hyperplasia or carcinoma on a polyp, hysterectomy is recommended in all post-menopausal patients and in premenopausal patients without desire of future fertility (level B). Asymptomatic endometrial polyps in postmenopausal women should be removed in case of large

* Corresponding author.
E-mail address: jac209@med.miami.edu (J. Carugno).

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diameter (> 2 cm) or in patients with risk factors for endometrial carcinoma (level B). Excision of polyps smaller than 2 cm in asymptomatic postmenopausal patients has no impact on cost-effectiveness or survival (level B). Removal of asymptomatic polyps in premenopausal women should be considered in patients with risk factors for endometrial cancer (level B).

Contents

Introduction

Endometrial polyps are focal intrauterine endometrial neoplasm that may be single or multiple. Their size varies from few millimeters to several centimeters, and their morphology may be sessile with large or small implantation base or pedunculated [1]. Endometrial polyps consist of three elements: endometrial glands, stroma, and blood vessels [2]. Known risk factors for the development of endometrial polyps are advanced age, hypertension, obesity, and tamoxifen use among others [3–5]. Endometrial polyps may be asymptomatic [6], and when causing symptoms, the most common clinical manifestations include abnormal (including postmenopausal) uterine bleeding [7] and less commonly infertility [8,9]. Malignant transformation is rare, and occurs in 0%–12.9% of cases, based on large cohort analysis [10,11].

However, there are several conditions related to the presence of endometrial polyps in which a lack of agreement in the literature is evident. More specifically, the presence of endometrial polyps in infertile women, the management of endometrial polyps before assisted reproduction techniques as well as the clinical impact of the presence of asymptomatic endometrial polyps needs a consensus. Moreover, the role of hysteroscopy in the diagnosis of premalignant and malignant endometrial polyps, and identifying the hysteroscopic technique of choice for polypectomy remains under investigation.

The purpose of this report is to provide a practical and updated guideline for the diagnosis and management of endometrial polyps, with a focus on the impact on fertility and risk of malignancy in both premenopausal and postmenopausal patients.

Identification and assessment of evidence

The following search methodology was used for screening and identification of articles for this practice guideline; eight electronic databases including MEDLINE (accessed through PubMed), Scopus, PROSPERO, EMBASE, CINAHL, Cochrane Library (including the Cochrane Database of Systematic Reviews), Scielo.br, Google Scholar were searched for all researches regarding endometrial polyps from the inception of each database to May 2020. The following text-words and Medical Subject Headings (MeSH) terms were used: "endometrial polyps", "endometrial neoplasms" (MeSH Unique ID: D016889), "endometrial malignancy", "diagnosis (Unique ID: D003933) of endometrial polyps", "management (Unique ID: D019468) of endometrial polyps", "treatment (Unique ID: D013812) of endometrial polyps", "'intrauterine surgery (Unique ID D013514)", "endometrial neoplasms AND infertility (Unique ID: D007246)", "endometrial polyps AND infertility (Unique ID: D007246)".

The study search was not restricted to the English language. Members of the scientific committee who were fluent in languages other than English evaluated relevant publications in a foreign language and provided, after English translation, related information to the committee. The reference lists of all identified researches were checked to identify studies not captured by electronic searches. All studies were assessed for methodologic rigor and graded according to the United States Preventive Services Task Force classification system (Table 1).

Stakeholders' involvement and applicability

These recommendations were created based on expert opinion aiming to help the general gynecologist treating the average patient. They should not be considered rigid guidelines and were not constructed to replace clinical judgment.

Recommendations were based on the best available evidence, where possible, and where such evidence was not available, upon consensus of the expert panel. They are likely to change as we gain more knowledge of the disease.

Table 1
Assessment of evidence for the GCH Practice Guideline.

Evidence was reviewed and evaluated for quality using criteria outlined by the U.S. Preventive Services Task Force
- **I** Evidence obtained from at least one properly designed randomized controlled trial.
- **II-1** Evidence obtained from well-designed controlled trials without randomization.
- **II-2** Evidence obtained from well-designed cohort or case-control analytic studies, preferably from more than one centre or research group.
- **II-3** Evidence obtained from multiple time series with or without the intervention. Dramatic results in uncontrolled experiments also could be regarded as this type of evidence.
- **III** Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.

Based on the highest level of evidence found in the data, recommendations are provided and graded according to the following categories:
- **Level A**: Recommendations are based on good and consistent scientific evidence.
- **Level B**: Recommendations are based on limited or inconsistent scientific evidence.
- **Level C**: Recommendations are based primarily on consensus and expert opinion.

According to AGREE II Reporting Guideline criteria, the development of this guideline involved experts on the ultrasonographic, hysteroscopic, infertile and oncologic management of endometrial polyps. Prior to its publication, external reviewers, expert on the aforementioned fields, rigorously reviewed these practice guidelines.

Risk factors, clinical presentation and natural history

Increasing age, hypertension, hyperestrogenism, and tamoxifen use are recognized as common risk factors for the growth of endometrial polyps [4,5]. The risk of developing endometrial polyp increases from menarche to the end of the reproductive age [12]. It is still unclear the de-novo incidence of endometrial polyps during menopause [4,5,12–14].

Among the most common conditions causing hyperestrogenism, obesity, polycystic ovary syndrome, late menopause, estrogen secreting gonadal stromal tumors and chronic liver disease are the most frequent associated with endometrial polyps formation. Indeed, Class II studies reported elevated incidence and prevalence of benign and also premalignant endometrial polyps in women with the above listed conditions [3,4,13,14].

Patients receiving tamoxifen therapy are at specific risk for the development of polyps, with Class I and II studies showing a prevalence between 30 % and 60 % [15–17].

To date, the available evidence regarding the correlation between hormonal therapy and endometrial polyps is unclear. A higher prevalence of endometrial polyps in women using hormonal therapy is reported by selected studies [18,19], whereas others do not show such increase. Moreover, a three-fold risk for the incidence of endometrial polyps is found with the use of tibolone by postmenopausal women [20]. A protective effect of progestogens should be considered while analyzing hormone therapy [21]. The use of the levonorgestrel-releasing intrauterine devices as a treatment for endometrial polyps has been proposed in a class II study, showing promising results producing spontaneous regression of the polyps [22].

Endometrial polyps can be asymptomatic or cause abnormal uterine bleeding, post-coital spotting, and/or infertility [23]. The majority (up to 40 %) of premenopausal women with endometrial polyps complaint of abnormal uterine bleeding, this is referred as “AUB-P” in the PALM–COEIN classification, endorsed by the International Federation of Gynecology and Obstetrics (FIGO) [24,25]. It is important to note that the severity of the symptoms do not correlate with the number, size or location of the polyps. Infertility and subfertility have been associated to untreated endometrial polyps in level I studies and Cochrane reviews [26–28]. Evidence suggest that over 63 % of women were able to conceive after hysteroscopic polypectomy [24,27,28].

Polyps and infertility

Diagnosis of the patient with endometrial polyp with desire of fertility

The prevalence of endometrial polyps for asymptomatic infertile women undergoing diagnostic hysteroscopy before in-vitro fertilization (IVF) is reported to range between 6 and 32 % [29–31]. The accuracy of hysterosalpingography (HSG) for detecting polyps in women who desire to conceive is low in several class II studies (pooled sensitivity of 21 %) in particular, these studies discourage the use of HSG as first diagnostic tool [32,33]. Compared to 2D ultrasonography (TVUS), 3D TVUS with color-flow Doppler shows a higher diagnostic accuracy by enhancing endometrial and sub-endometrial vascularization indices [34,35]. For achieving the higher diagnostic accuracy, due to thinned endometrium, ultrasonographic examination should be carried out during the proliferative phase of a menstrual cycle [34]. Some studies suggested that combining endometrial echogenicity, thickness, and volume with 3D TVUS is better than single measurements with 2D TVUS for detecting endometrial polyps [36]. Indeed, TVUS has a reported wide sensitivity range from 19 % to 96 % and a specificity between 53%–100%, with a positive predictive value (PPV) from 75 % to 100 %, and negative predictive value (NPV) from 87 % to 97 % for the diagnosis of endometrial polyps when compared to hysteroscopy and targeted biopsy. A paucity of level I evidence, as well as studies with small sample size, could explain this broad spectrum of data. In a single, large, level II-2 study the reported sensitivity, specificity, PPV, and NPV of TVUS was 86 %, 94 %, 91 % and 90 %, respectively [37–46].

Hysteroscopy-guided biopsy of the lesion is the most common term of comparison for other techniques used to diagnose endometrial polyps as it offers the highest sensitivity and specificity. Diagnostic hysteroscopy alone (without additional biopsies) allows a subjective assessment of the size and characteristic of the lesion with reported sensitivity of 58%–99%, specificity of 87%–100%, PPV of 21%–100%, and NPV of 66%–99% when compared to hysteroscopy with guided biopsy [37,38,40,47–52].

A possible effect of polyps on embryo implantation impairment and endometrial receptivity disruption has been hypothesized. A case-control study investigated the effect of endometrial polyps identified by hysteroscopy, analyzing the expression of HOXA10 and HOXA11, molecular markers of endometrial receptivity. When endometrial polyps were detected, a marked decrease in HOXA10 and HOXA11 messenger RNA levels were measured, which could lead to impaired implantation. These findings might justify performing polypectomy in infertile women, suggesting a molecular mechanism to support the clinical findings of reduced pregnancy rates in women with endometrial polyps [53].

Recommended Guidelines for the diagnosis of endometrial polyps in patients with infertility

Based on the available evidence, we promote the following recommendations:

- TVUS should be used as the diagnostic modality of choice for the detection of endometrial polyps in woman of reproductive age (level B).
- The diagnostic accuracy of TVUS is increased when color-doppler, 3D investigation and contrast are used (level B).
- Dilation and Curettage (D&C) or other blind intrauterine procedures should be avoided for the diagnosis and management of patients with endometrial polyps (level A).
- In office diagnostic hysteroscopy showed the highest diagnostic accuracy and should be performed in infertile patients with suspected endometrial polyps (level B).
- Endometrial polyps might alter endometrial receptivity, impairing embryo implantation and reducing pregnancy rates (level C).

Management of the patient with endometrial polyps with desire of fertility

The correlation between endometrial polyps and infertility has been deeply investigated and, to date, is still controversial. A class I study, including 215 subjects, evaluated the impact of hysteroscopic polypectomy on infertility and subfertility when performed before intrauterine insemination (IUI) [54]. Subjects randomized to hysteroscopic polypectomy doubled the chances of becoming pregnant when compared to those in the control group, who did not undergo polypectomy. Those findings have been confirmed by non-randomized class II studies showing that hysteroscopic endometrial polypectomy improved IUI outcomes. The benefits were not clearly observed for clinical pregnancy, live birth, or implantation rate of women who underwent in vitro fertilization (IVF)/intracytoplasmic sperm injection (ICSI) cycles after hysteroscopic polypectomy. A class II study showed a significant increase of pregnancy rates after resection of polyps located at the uterotubal junction rather than other areas of the uterine cavity [55]. Other two class II studies showed no benefit for hysteroscopic polypectomy [54,56–59].

Although the available evidence linking hysteroscopic polypectomy to IVF and embryo transfer (ET) success rates is conflicting, investigations regarding the appropriate timing of ET after polypectomy should be assessed to further deepen the current evidence. In a nonrandomized study of 487 patients, there was no difference when ET was performed after one, two to three, or more than three subsequent cycles in implantation (42.4 %, 41.2 %, 42.1 %), clinical pregnancy (48.5 %, 48.3 %, 48.6 %), spontaneous pregnancy loss (4.56 %, 4.65 %, 4.05 %), and live birth (44.0 %, 43.6 %, 44.6 %) rates, leading to the consideration that patients can undergo ovarian stimulation after their next cycle without affecting IVF-ET outcomes [26–28,54,56–60]. However, cost-analysis data confirmed the positive impact of removing polyps in infertile women. A 2017 cost-analysis systematic review found that office or operative hysteroscopic polypectomy was both clinically significant and cost-effective when performed before intrauterine insemination or in vitro fertilization over a range of plausible pregnancy rates and procedural costs. Indeed, the procedure saved euros 15,854 ($17,813) and euros 6644 ($7465), respectively, from the average cost related to ongoing pregnancy for both IVF and ICSI treated women [61].

The rate of intrauterine adhesion formation after hysteroscopic polypectomy is considered negligible, since the myometrium is not incised. A class I study reported no adhesions after hysteroscopic polypectomy [62,63].

On the one hand, to date there is no robust evidence on the efficacy of removing endometrial polyps in sub-fertile women to support the routine practice of surgical intervention for endometrial polyps that are incidentally found during infertility/subfertility work-up. On the other hand, the procedure is minimally invasive and hysteroscopic polypectomy provides an opportunity for histological diagnosis. A Cochrane analysis showed that, for women with endometrial polyps incidentally diagnosed during IVF, pregnancy outcomes were similar after hysteroscopic polypectomy followed by vitrified-warmed embryo transfer [26–28,33].

When endometrial malignancy arising from the polyp is suspected, appropriate investigations and treatment should be performed without undue delay and in accordance with local guidelines [33].

Recommended Guidelines for the management of endometrial polyps in patients with infertility

Based on the available evidence, we promote the following recommendations:

- Hysteroscopic polypectomy is a feasible and safe intervention with no risk for intrauterine adhesions formation after the procedure (level B).
- Performing hysteroscopic polypectomy does not compromise reproductive outcomes from subsequent IVF techniques. To date, insufficient data are available to justify the removal of polyps as a routine practice in sub-fertile women. (level B).
- The large amount of class II studies and the cost-effectiveness of the procedure suggest that removing endometrial polyps in women desiring fertility is a safe and cost-effective procedure (level B).

Polyp and malignancy

Diagnosis of the patient with endometrial polyp and suspected malignancy

As data concerning hysteroscopic polypectomy in subfertile women are still lacking, the management of endometrial polyps due to malignancy risk is ascertained. Scientific evidence provided from two recent meta-analyses showed that the prevalence of premalignant and malignant lesions in patients with endometrial polyps is estimated between 3.4 % and 4.9 % in postmenopausal and 1.1 % in premenopausal women [64,65]. The risk is higher in the presence of abnormal uterine bleeding [prevalence ratio (PR) 1.47], showing a higher risk of malignancy among symptomatic (5.14–12.3%) than asymptomatic women (1.89 2.1 %), menopausal status (PR 1.67), age >60 years (PR 2.41) diabetes mellitus (PR 1.76), hypertension (PR 1.50), obesity (PR 1.40) and tamoxifen use (PR 1.53) were significantly associated with malignancy. However, polyp size, parity and paired hyperestrogenism were not associated with increased risk of malignancy [64–68].

The diagnostic tools utilized for the diagnosis of endometrial polyps during menopause are similar to those used in premenopausal women. A class I study showed that overall sensitivity rates were 70.0 % for transvaginal ultrasound and 89.6 % for saline contrast sonohysterography, while the overall specificity rates were 50.0 and 80.7 %, respectively [69]. Considering its pooled sensitivity of about 90 %, saline contrast sonohysterography showed reliability for the diagnosis of endometrial polyps, and it could be considered as a validated strategy to stratify women with postmenopausal bleeding for further diagnostic work-up and treatment with hysteroscopy [37].

The risk of hyperplasia and cancer in polyps with an endometrial thickness ≥ 10.8 mm on TVUS was found 5.5-fold higher in a class II study, confirming that a thickened endometrium in postmenopausal women should be further investigated, ideally with hysteroscopic-guided biopsy [70]. Due to the elevated risk of malignancy, hysteroscopy with histopathological analysis of the specimen is mandatory in all symptomatic postmenopausal women [70].

The use of blind D&C or blind endometrial biopsy should be avoided due to reported inaccuracy in diagnosing endometrial polyps. Indeed, when compared to targeted biopsy performed during hysteroscopy, low sensitivity (between 8% and 46 %) and low NPV (around 7%–58%) are reported by class II studies, despite a specificity and PPV of 100 [71–74]. Moreover, the histopathological diagnosis could be complicated by the polyp fragmentation caused by this technique [75]. A 2016 meta-analysis confirmed the lower predictive values in detecting malignancies in postmenopausal women with active bleeding, related to target hysteroscopic sampling [76].

Recommended Guidelines for the diagnosis of endometrial polyps in patients with suspected endometrial cancer

Based on the available evidence, we promote the following recommendations:

- Saline contrast sonohysterography is highly accurate in detecting endometrial polyps in asymptomatic postmenopausal patients (level B).
- Postmenopausal patients with vaginal bleeding and a suspected endometrial polyp should undergo diagnostic hysteroscopy with hysteroscopic polypectomy if an endometrial polyp is visualized. (level B).
- In-office hysteroscopy has the highest diagnostic accuracy with high cost-benefits ratio for premalignant and malignant pathologies of the uterine cavity (level B).
- Histopathological analysis of the polyp is mandatory due to risk of malignancy (level B).
- Blind techniques and D&C should be avoided due to their inaccuracy in detecting polyps and malignancies (level A).

Management of the patient with endometrial polyps and suspected malignancy

Hysteroscopic polypectomy is an effective and safe diagnostic and therapeutic intervention for the management of the patient with endometrial polyps. There are several available methods to remove polyps during hysteroscopy;

To date, the method of choice should be selected according to the operator's preference taking into consideration the cost [79–83].

Hysteroscopy with the use of bipolar electrosurgical removal of polyps is worldwide available at a reasonably low cost. Visualization and direct polyp removal are reported to be effective and reduce the risk of recurrence associated with the use of mechanical instruments (i.e. grasping forceps or scissors). Other instruments include the mini-resectoscope system, which can also be used in the in-office setting, hysteroscopic tissue removal systems, and the diode laser. Recently, class I and II studies confirmed the cost-effectiveness of mini-resectoscopes, tissue removal and diode laser for hysteroscopic endometrial polypectomy in the office setting [79–81,84]. The use of intrauterine tissue retrieval systems showed both clinical and surgical benefits over resectoscopic resection. However, intrauterine tissue retrieval systems are not widely available in low resource settings [77,78].

However, comparative data are still not robust enough to state the superiority of a hysteroscopic technique over the others [79,82,84–86].

Only few studies assessing the effect of polypectomy on symptoms are available. In a class I study on this subject, 150 women diagnosed with endometrial polyp were randomized to hysteroscopic removal or expectant management for six months. There was no difference in the volume of menstrual blood loss between the groups, although intermenstrual spotting, was significantly improved by polyp removal [87].

In class II studies, the recurrence of histologically confirmed benign endometrial polyps on long-term follow-up (9 years) after hysteroscopic polypectomy is about 3%. However, in cases of multiple polyps and hyperplastic polyps, the recurrence rate could reach up to 10 % [88–90]. Further long-term, high-quality studies are required to establish more accurate recurrence rates [86,88–90].

The risk of malignancy of endometrial polyps in women with abnormal uterine bleeding or postmenopausal bleeding is not related to the size of the lesions. As shown by a recent meta-analysis and a class II study, in post-menopausal women, the risk of malignancy was similar regardless the size of the polyp. (66, 68)

The presence of abnormal uterine bleeding is associated to a significant elevated risk of atypical hyperplasia or carcinoma in post-menopausal women (4.15–5.14 % vs. 1.89–2.30 %) [91]. However, data are too scarce to establish a robust conclusion, therefore a watchful waiting approach for postmenopausal asymptomatic polyps should be carefully discussed with the patient. Considering the low financial cost, minimal surgical risk and discomfort associated with hysteroscopic polypectomy, the resection of the lesion should always be considered.

When areas of atypical hyperplasia or carcinoma were found in the polyps, a class II study revealed that in 88 % of women residual atypical endometrial hyperplasia or carcinoma was present in the hysterectomy specimen, mostly (55.6 %) as multifocal lesions [92]. The incidence of endometrial carcinoma in the surrounding endometrium after complete resection of a polyp with atypical hyperplasia is around 30 % in class II studies. This supports the current recommendation that, in these cases, it is advisable to perform hysterectomy and bilateral salpingo-oophorectomy, in patients not desiring future fertility [92,93].

For women diagnosed with endometrial polyps without the presence of atypia or cancer, although hysterectomy eliminates the risk of recurrence of endometrial polyps, it is considered a major surgical procedure, with significantly greater costs and potential morbidity. To date, no comparative study evaluating conservative management versus hysterectomy for the treatment of endometrial polyps is available.

Recommended Guidelines for the management of endometrial polyps in patients with suspected malignancy

Based on the available evidence, we promote the following recommendations:

- Regardless of the size of an endometrial polyp, expectant management is not recommended in symptomatic postmenopausal women due to the risk of malignancy (level B).
- Hysteroscopic polypectomy is safe with a low recurrence rate and provides improvement of the symptoms (level B).
- Different sources of energy (bipolar surgery, mechanical tissue removal, diode laser) can be used during hysteroscopic polypectomy with similar surgical outcomes (level B).
- When atypical endometrial hyperplasia or carcinoma is found on a polyp, hysterectomy with bilateral salpingo-oophorectomy is recommended in post-menopausal and in premenopausal patients without desire of future fertility (level B). (The

management of the patient with atypia or endometrial cancer is outside of the scope of this guidelines and should be managed as per oncologic criteria).

Incidentally diagnosed endometrial polyps

The hysteroscopic excision of asymptomatic endometrial polyps in post-menopausal patients has slipped into clinical practice as a routinary approach aiming to avoid the potential risk of endometrial cancer. However, there is no data supporting the benefit to recommend the removal of all polyps in postmenopausal patients as a cancer prevention strategy. Evidence from class II studies found that the size of the polyp should be considered relevant, whereas only a mean diameter > than 1.8 cm was associated to histopathological abnormalities (atypical hyperplasia, hyperplasia on polyp, intraglandular adenocarcinoma) in about the 2% of the patients. The removal of small, fibroglandular polyps was reported neither cost-effective nor lifesaving in postmenopausal asymptomatic women. However, the presence of known comorbidities that expose women to an increased risk for endometrial cancer (hypertension, obesity, diabetes mellitus, and tamoxifen use) should be considered when recommending polypectomy. Class II and III studies have found a significant increased risk in patients with obesity, polycystic ovarian syndrome, polyp size > 2.2 cm and when multiple polyps are present [94].

Recommended Guidelines for the management of endometrial polyps in patients with suspected malignancy

- Asymptomatic endometrial polyps in postmenopausal women should be removed in case of large diameter (> 2 cm) or in patients with known risk factor for endometrial carcinoma (level B).
- The removal of small polyps (< 2 cm) in postmenopausal asymptomatic patients is not cost-effective (level B).
- The resection of asymptomatic polyps in young women should be considered whereas a common risk factor or an increased (> 2.2 cm) diameter is present (level B).

Recommendations for future research

Endometrial polyps represent a frequent gynecologic pathology encountered in daily clinical practice. There are some areas that require additional high-quality data to better understand and manage this pathology.

We propose the following considerations for future research:

- To conduct randomized trials to evaluate the impact of the presence of endometrial polyps on endometrial receptivity in infertile women diagnosed with asymptomatic endometrial polyps.
- Comparison between different hysteroscopic instrumentation for the removal of endometrial polyps;
- Long-term studies evaluating the recurrence rate of endometrial polyps after hysteroscopic removal;
- Large prospective studies including asymptomatic postmenopausal women diagnosed with endometrial polyps.

Synopsis

Endometrial polyps are a common gynecologic pathology encountered in clinical practice. An evidence-based diagnosis and management is mandatory to ensure adequate patient's care.

Note

This work is currently not being submitted to any other journal for consideration for publication and has not been previously presented in any form.

It was determined that this work was exempted of IRB approval.

Authors contribution

Vitale, Salvatore Giovanni MD PhD. Literature search, writing and editing.

Haimovich, Sergio MD PhD. Literature search, writing and critical analysis.

Laganà, Antonio Simone MD PhD. Writing, editing and critical analysis.

Alonso, Luis MD. Writing, editing and critical analysis.

Di Spiezio Sardo, Attilio MD PhD Writing, editing and critical analysis.

Carugno Jose MD Literature seacrh, writing, editing and critical analysis.

Declaration of Competing Interest

The authors have no conflicts of interest to disclose in reference to this manuscript

References

[1] Di Spiezio Sardo A, Calagna G, Guida M, Perino A, Nappi C. Hysteroscopy and treatment of uterine polyps. Best Pract Res Clin Obstet Gynaecol 2015;29 (7):908–19.
[2] Nijkang NP, Anderson L, Markham R, Manconi F. Endometrial polyps: pathogenesis, sequelae and treatment. SAGE Open Med 2019;7: 2050312119848247.
[3] Nappi L, Indraccolo U, Di Spiezio Sardo A, Gentile G, Palombino K, Castaldi MA, et al. Are diabetes, hypertension, and obesity independent risk factors for endometrial polyps? J Minim Invasive Gynecol 2009;16(2):157–62.
[4] Bakour SH, Gupta JK, Khan KS. Risk factors associated with endometrial polyps in abnormal uterine bleeding. Int J Gynaecol Obstet 2002;76(2):165–8.
[5] Cohen I, Azaria R, Bernheim J, Shapira J, Beyth Y. Risk factors of endometrial polyps resected from postmenopausal patients with breast carcinoma treated with tamoxifen. Cancer 2001;92(5):1151–5.
[6] Hamani Y, Eldar I, Sela HY, Voss E, Haimov-Kochman R. The clinical significance of small endometrial polyps. Eur J Obstet Gynecol Reprod Biol 2013;170 (2):497–500.
[7] Pergialiotis V, Prodromidou A, Siotos C, Frountzas M, Perrea D, Vlachos GD. Systemic hypertension and diabetes mellitus as predictors of malignancy among women with endometrial polyps: a meta-analysis of observational studies. Menopause 2016;23(6):691–7.
[8] Al Chami A, Saridogan E. Endometrial polyps and subfertility. J Obstet Gynaecol India 2017;67(1):9–14.
[9] Tohma YA, Onalan G, Esin S, Sahin H, Aysun D, Kuscu E, et al. Are There Any Predictors of Endometrial Premalignancy/Malignancy within Endometrial Polyps in Infertile Patients? Gynecol Obstet Invest 2019;84(5):512–8.
[10] Hase S, Mitsumori A, Inai R, Takemoto M, Matsubara S, Akamatsu N, et al. Endometrial polyps: MR imaging features. Acta Med Okayama 2012;66 (6):475–85.
[11] Lieng M, Istre O, Qvigstad E. Treatment of endometrial polyps: a systematic review. Acta Obstet Gynecol Scand 2010;89(8):992–1002.
[12] Bakour SH, Khan KS, Gupta JK. The risk of premalignant and malignant pathology in endometrial polyps. Acta Obstet Gynecol Scand 2000;79(4):317–20.
[13] Kilicdag EB, Haydardedeoglu B, Cok T, Parlakgumus AH, Simsek E, Bolat FA. Polycystic ovary syndrome and increased polyp numbers as risk factors for malignant transformation of endometrial polyps in premenopausal women. Int J Gynaecol Obstet 2011;112(3):200–3.
[14] Zheng QM, Mao HI, Zhao YJ, Zhao YJ, Wei X, Liu PS. Risk of endometrial polyps in women with endometriosis: a meta-analysis. Reproductive biology and endocrinology: RB&E. 2015;13:103.
[15] Ceci O, Bettocchi S, Marello F, Di Venere R, Pellegrino AR, Laricchia L, et al. Hysteroscopic evaluation of the endometrium in postmenopausal women taking tamoxifen. J Am Assoc Gynecol Laparosc 2000;7(2):185–9.
[16] Cohen I, Bernheim J, Azaria R, Tepper R, Sharony R, Beyth Y. Malignant endometrial polyps in postmenopausal breast cancer tamoxifen-treated patients. Gynecol Oncol 1999;75(1):136–41.
[17] Gardner FJ, Konje JC, Bell SC, Abrams KR, Brown LJ, Taylor DJ, et al. Prevention of tamoxifen induced endometrial polyps using a levonorgestrel releasing

intrauterine system long-term follow-up of a randomised control trial. Gynecol Oncol 2009;114(3):452–6.
[18] Kinay T, Ozturk Basarir Z, Firtina Tuncer S, Akpinar F, Kayikcioglu F, Koc S. Prevalence of endometrial polyps coexisting with uterine fibroids and associated factors. Turk J Obstet Gynecol. 2016;13(1):31–6.
[19] Dreisler E, Sorensen SS, Lose G. Endometrial polyps and associated factors in Danish women aged 36-74 years. Am J Obstet Gynecol 2009;200(2)1–6 147.
[20] Perez-Medina T, Bajo-Arenas J, Haya J, Sanfrutos L, Iniesta S, Bueno B, et al. Tibolone and risk of endometrial polyps: a prospective, comparative study with hormone therapy. Menopause 2003;10(6):534–7.
[21] Oguz S, Sargin A, Kelekci S, Aytan H, Tapisiz OL, Mollamahmutoglu L. The role of hormone replacement therapy in endometrial polyp formation. Maturitas 2005;50(3):231–6.
[22] Chowdary P, Maher P, Ma T, Newman M, Ellett L, Readman E. The role of the mirena intrauterine device in the management of endometrial polyps: a pilot study. J Minim Invasive Gynecol 2019;26(7):1297–302.
[23] Lieng M, Qvigstad E, Sandvik L, Jorgensen H, Langebrekke A, Istre O. Hysteroscopic resection of symptomatic and asymptomatic endometrial polyps. J Minim Invasive Gynecol 2007;14(2):189–94.
[24] Munro MG, Critchley H, Fraser IS. Research and clinical management for women with abnormal uterine bleeding in the reproductive years: more than PALM-COEIN. BJOG 2017;124(2):185–9.
[25] Munro MG, Critchley HO, Broder MS, Fraser IS, Disorders FWGoM. FIGO classification system (PALM-COEIN) for causes of abnormal uterine bleeding in nongravid women of reproductive age. Int J Gynaecol Obstet 2011;113(1):3–13.
[26] Bosteels J, Kasius J, Weyers S, Broekmans FJ, Mol BW, D'Hooghe TM. Hysteroscopy for treating subfertility associated with suspected major uterine cavity abnormalities. Cochrane Database Syst Rev 2013;1:CD009461.
[27] Bosteels J, Kasius J, Weyers S, Broekmans FJ, Mol BW, D'Hooghe TM. Hysteroscopy for treating subfertility associated with suspected major uterine cavity abnormalities. Cochrane Database Syst Rev 2015;2:CD009461.
[28] Bosteels J, van Wessel S, Weyers S, Broekmans FJ, D'Hooghe TM, Bongers MY, et al. Hysteroscopy for treating subfertility associated with suspected major uterine cavity abnormalities. Cochrane Database Syst Rev 2018;12:CD009461.
[29] Fatemi HM, Kasius JC, Timmermans A, van Disseldorp J, Fauser BC, Devroey P, et al. Prevalence of unsuspected uterine cavity abnormalities diagnosed by office hysteroscopy prior to in vitro fertilization. Hum Reprod 2010;25(8):1959–65.
[30] Karayalcin R, Ozcan S, Moraloglu O, Ozyer S, Mollamahmutoglu L, Batioglu S. Results of 2500 office-based diagnostic hysteroscopies before IVF. Reprod Biomed Online 2010;20(5):689–93.
[31] Hinckley MD, Milki AA. 1000 office-based hysteroscopies prior to in vitro fertilization: feasibility and findings. JSLS 2004;8(2):103–7.
[32] Taskin EA, Berker B, Ozmen B, Sonmezer M, Atabekoglu C. Comparison of hysterosalpingography and hysteroscopy in the evaluation of the uterine cavity in patients undergoing assisted reproductive techniques. Fertil Steril 2011;96(2)349–52 e2.
[33] Nieuwenhuis LL, Hermans FJ, Bij de Vaate AJM, Leeflang MM, Brolmann HA, Hehenkamp WJ, et al. Three-dimensional saline infusion sonography compared to two-dimensional saline infusion sonography for the diagnosis of focal intracavitary lesions. Cochrane Database Syst Rev 2017;5:CD011126.
[34] Fang L, Su Y, Guo Y, Sun Y. Value of 3-dimensional and power Doppler sonography for diagnosis of endometrial polyps. J Ultrasound Med 2013;32(2):247–55.
[35] Ahmadi F, Zafarani F, Haghighi H, Niknejadi M, Vosough Taqi Dizaj A. Application of 3D ultrasonography in detection of uterine abnormalities. Int J Fertil Steril 2011;4(4):144–7.
[36] La Torre R, De Felice C, De Angelis C, Coacci F, Mastrone M, Cosmi EV. Transvaginal sonographic evaluation of endometrial polyps: a comparison with two dimensional and three dimensional contrast sonography. Clin Exp Obstet Gynecol 1999;26(3-4):171–3.
[37] Vroom AJ, Timmermans A, Bongers MY, van den Heuvel ER, Geomini P, van Hanegem N. Diagnostic accuracy of saline contrast sonohysterography in detecting endometrial polyps in women with postmenopausal bleeding: systematic review and meta-analysis. Ultrasound Obstet Gynecol 2019;54(1):28–34.
[38] Fadl SA, Sabry AS, Hippe DS, Al-Obaidli A, Yousef RR, Dubinsky TJ. Diagnosing Polyps on Transvaginal Sonography: Is Sonohysterography Always Necessary? Ultrasound Q 2018;34(4):272–7.
[39] Bittencourt CA, Dos Santos Simoes R, Bernardo WM, Fuchs LFP, Soares Junior JM, Pastore AR, et al. Accuracy of saline contrast sonohysterography in detection of endometrial polyps and submucosal leiomyomas in women of reproductive age with abnormal uterine bleeding: systematic review and meta-analysis. Ultrasound Obstet Gynecol 2017;50(1):32–9.
[40] Radwan P, Radwan M, Kozarzewski M, Polac I, Wilczynski J. Evaluation of sonohysterography in detecting endometrial polyps - 241 cases followed with office hysteroscopies combined with histopathological examination. Wideochir Inne Tech Maloinwazyjne 2014;9(3):344–50.
[41] Alcazar JL, Galan MJ, Minguez JA, Garcia-Manero M. Transvaginal color Doppler sonography versus sonohysterography in the diagnosis of endometrial polyps. J ultrasound Med 2004;23(6):743–8.
[42] Nass Duce M, Oz U, Ozer C, Yildiz A, Apaydin FD, Cil F. Diagnostic value of sonohysterography in the evaluation of submucosal fibroids and endometrial polyps. Aust N Z J Obstet Gynaecol 2003;43(6):448–52.
[43] Fleischer AC, Shappell HW. Color Doppler sonohysterography of endometrial polyps and submucosal fibroids. J ultrasound Med 2003;22(6):601–4.
[44] Kamel HS, Darwish AM, Mohamed SA. Comparison of transvaginal ultrasonography and vaginal sonohysterography in the detection of endometrial polyps. Acta Obstet Gynecol Scand 2000;79(1):60–4.
[45] Cohen JR, Luxman D, Sagi J, Yovel I, Wolman I, David MP. Sonohysterography for distinguishing endometrial thickening from endometrial polyps in postmenopausal bleeding. Ultrasound Obstet Gynecol 1994;4(3):227–30.
[46] Cicinelli E, Romano F, Anastasio PS, Blasi N, Parisi C. Sonohysterography versus hysteroscopy in the diagnosis of endouterine polyps. Gynecol Obstet Invest 1994;38(4):266–71.
[47] Chui YK, Bhal PS. Role of hysteroscopy in the detection and extraction of endometrial polyps: results of a prospective study. Am J Obstet Gynecol 2002;186(5)1104 author reply.
[48] de Godoy Borges PC, Dias R, Bonassi Machado R, Borges JB, Spadoto Dias D. Transvaginal ultrasonography and hysteroscopy as predictors of endometrial polyps in postmenopause. Womens Health (Lond) 2015;11(1):29–33.
[49] Timmermans A, van Dongen H, Mol BW, Veersema S, Jansen FW. Hysteroscopy and removal of endometrial polyps: a Dutch survey. Eur J Obstet Gynecol Reprod Biol 2008;138(1):76–9.
[50] Wortman M. "See-and-Treat" hysteroscopy in the management of endometrial polyps. Surg Technol Int 2016;28:177–84.
[51] Ahmadi F, Rashidy Z, Haghighi H, Akhoond M, Niknejadi M, Hemat M, et al. Uterine cavity assessment in infertile women: sensitivity and specificity of three-dimensional Hysterosonography versus Hysteroscopy. Iran J Reprod Med 2013;11(12):977–82.
[52] Makris N, Kalmantis K, Skartados N, Papadimitriou A, Mantzaris G, Antsaklis A. Three-dimensional hysterosonography versus hysteroscopy for the detection of intracavitary uterine abnormalities. Int J Gynaecol Obstet 2007;97(1):6–9.
[53] Rackow BW, Jorgensen E, Taylor HS. Endometrial polyps affect uterine receptivity. Fertil Steril 2011;95(8):2690–2.
[54] Perez-Medina T, Bajo-Arenas J, Salazar F, Redondo T, Sanfrutos L, Alvarez P, et al. Endometrial polyps and their implication in the pregnancy rates of patients undergoing intrauterine insemination: a prospective, randomized study. Hum Reprod 2005;20(6):1632–5.
[55] Yanaihara A, Yorimitsu T, Motoyama H, Iwasaki S, Kawamura T. Location of endometrial polyp and pregnancy rate in infertility patients. Fertil Steril 2008;90(1):180–2.
[56] Isikoglu M, Berkkanoglu M, Senturk Z, Coetzee K, Ozgur K. Endometrial polyps smaller than 1.5 cm do not affect ICSI outcome. Reprod Biomed Online 2006;12(2):199–204.
[57] Kalampokas T, Tzanakaki D, Konidaris S, Iavazzo C, Kalampokas E, Gregoriou O. Endometrial polyps and their relationship in the pregnancy rates of patients undergoing intrauterine insemination. Clin Exp Obstet Gynecol 2012;39(3):299–302.
[58] Lass A, Williams G, Abusheikha N, Brinsden P. The effect of endometrial polyps on outcomes of in vitro fertilization (IVF) cycles. J Assist Reprod Genet 1999;16(8):410–5.
[59] Pereira N, Amrane S, Estes JL, Lekovich JP, Elias RT, Chung PH, et al. Does the time interval between hysteroscopic polypectomy and start of in vitro fertilization affect outcomes? Fertil Steril 2016;105(2)539–44 e1.
[60] Munro MG. Uterine polyps, adenomyosis, leiomyomas, and endometrial receptivity. Fertil Steril 2019;111(4):629–40.
[61] Mouhayar Y, Yin O, Mumford SL, Segars JH. Hysteroscopic polypectomy prior to infertility treatment: a cost analysis and systematic review. Eur J Obstet Gynecol Reprod Biol 2017;213:107–15.
[62] Deans R, Abbott J. Review of intrauterine adhesions. J Minim Invasive Gynecol 2010;17(5):555–69.
[63] Taskin O, Sadik S, Onoglu A, Gokdeniz R, Erturan E, Burak F, et al. Role of endometrial suppression on the frequency of intrauterine adhesions after resectoscopic surgery. J Am Assoc Gynecol Laparosc 2000;7(3):351–4.
[64] Uglietti A, Buggio L, Farella M, Chiaffarino F, Dridi D, Vercellini P, et al. The risk of malignancy in uterine polyps: a systematic review and meta-analysis. Eur J Obstet Gynecol Reprod Biol 2019;237:48–56.
[65] Bel S, Billard C, Godet J, Viviani V, Akladios C, Host A, et al. Risk of malignancy on suspicion of polyps in menopausal women. Eur J Obstet Gynecol Reprod Biol 2017;216:138–42.
[66] Namazov A, Gemer O, Ben-Arie A, Israeli O, Bart O, Saphier O, et al. Endometrial polyp size and the risk of malignancy in asymptomatic postmenopausal women. J Obstetrics Gynaecol Canada 2019;41(7):912–5.
[67] Ricciardi E, Vecchione A, Marci R, Schimberni M, Frega A, Maniglio P, et al. Clinical factors and malignancy in endometrial polyps. Analysis of 1027 cases. Eur J Obstet Gynecol Reprod Biol 2014;183:121–4.
[68] Sasaki LMP, Andrade KRC, Figueiredo A, Wanderley MDS, Pereira MG. Factors associated with malignancy in hysteroscopically resected endometrial polyps: a systematic review and meta-analysis. J Minim Invasive Gynecol 2018;25(5):777–85.
[69] Bingol B, Gunenc MZ, Gedikbasi A, Guner H, Tasdemir S, Tiras B. Comparison of diagnostic accuracy of saline infusion sonohysterography, transvaginal sonography and hysteroscopy in postmenopausal bleeding. Arch Gynecol Obstet 2011;284(1):111–7.
[70] Ghoubara A, Sundar S, Ewies AAA. Predictors of malignancy in endometrial polyps: study of 421 women with postmenopausal bleeding. Climacteric 2018;21(1):82–7.

[71] Gimpelson RJ, Rappold HO. A comparative study between panoramic hysteroscopy with directed biopsies and dilatation and curettage. A review of 276 cases. Am J Obstet Gynecol 1988;158(3 Pt 1):489–92.
[72] Bettocchi S, Ceci O, Vicino M, Marello F, Impedovo L, Selvaggi L. Diagnostic inadequacy of dilatation and curettage. Fertil Steril 2001;75(4):803–5.
[73] Svirsky R, Smorgick N, Rozowski U, Sagiv R, Feingold M, Halperin R, et al. Can we rely on blind endometrial biopsy for detection of focal intrauterine pathology? Am J Obstet Gynecol 2008;199(2)1–3 115.
[74] Pasqualotto EB, Margossian H, Price LL, Bradley LD. Accuracy of preoperative diagnostic tools and outcome of hysteroscopic management of menstrual dysfunction. J Am Assoc Gynecol Laparosc 2000;7(2):201–9.
[75] van Hanegem N, Breijer MC, Slockers SA, Zafarmand MH, Geomini P, Catshoek R, et al. Diagnostic workup for postmenopausal bleeding: a randomised controlled trial. BJOG 2017;124(2):231–40.
[76] van Hanegem N, Prins MM, Bongers MY, Opmeer BC, Sahota DS, Mol BW, et al. The accuracy of endometrial sampling in women with postmenopausal bleeding: a systematic review and meta-analysis. Eur J Obstet Gynecol Reprod Biol 2016;197:147–55.
[77] Smith PP, Middleton LJ, Connor M, Clark TJ. Hysteroscopic morcellation compared with electrical resection of endometrial polyps: a randomized controlled trial. Obstet Gynecol 2014;123(4):745–51.
[78] AlHilli MM, Nixon KE, Hopkins MR, Weaver AL, Laughlin-Tommaso SK, Famuyide AO. Long-term outcomes after intrauterine morcellation vs hysteroscopic resection of endometrial polyps. J Minim Invasive Gynecol 2013;20(2):215–21.
[79] Ceci O, Franchini M, Cannone R, Giarre G, Bettocchi S, Fascilla FD, et al. Office treatment of large endometrial polyps using truclear 5C: feasibility and acceptability. J Obstet Gynaecol Res 2019;45(3):626–33.
[80] Rovira Pampalona J, Degollada Bastos M, Mancebo Moreno G, Ratia Garcia E, Buron Pust A, Mateu Prunonosa JC, et al. Outpatient hysteroscopic polypectomy: bipolar energy system (Versapoint(R)) versus mechanical energy system (TRUCLEAR system(R)) - preliminary results. Gynecol Obstet Invest 2015;80(1):3–9.
[81] Ansari SH, Bigatti G, Aghssa MM. Operative hysteroscopy with the Bigatti shaver (IBS (R)) for the removal of placental remnants. Facts Views Vis Obgyn 2018;10(3):153–9.
[82] Bigatti G, Ansari SH, Di W. The 19 Fr. Intrauterine Bigatti Shaver (IBS(R)): a clinical and technical update. Facts Views Vis Obgyn 2018;10(3):161–4.
[83] Nappi L, Sorrentino F, Angioni S, Pontis A, Litta P, Greco P. Feasibility of hysteroscopic endometrial polypectomy using a new dual wavelengths laser system (DWLS): preliminary results of a pilot study. Arch Gynecol Obstet 2017;295(1):3–7.
[84] Dealberti D, Riboni F, Cosma S, Pisani C, Montella F, Saitta S, et al. Feasibility and Acceptability of Office-Based Polypectomy With a 16F Mini-Resectoscope: A Multicenter Clinical Study. J Minim Invasive Gynecol 2016;23(3):418–24.
[85] Dealberti D, Riboni F, Prigione S, Pisani C, Rovetta E, Montella F, et al. New mini-resectoscope: analysis of preliminary quality results in outpatient hysteroscopic polypectomy. Arch Gynecol Obstet 2013;288(2):349–53.
[86] Yang JH, Chen CD, Chen SU, Yang YS, Chen MJ. Factors influencing the recurrence potential of benign endometrial polyps after hysteroscopic polypectomy. PLoS One 2015;10(12):e0144857.
[87] Lieng M, Istre O, Sandvik L, Engh V, Qvigstad E. Clinical effectiveness of transcervical polyp resection in women with endometrial polyps: randomized controlled trial. J Minim Invasive Gynecol 2010;17(3):351–7.
[88] Ciscato A, Zare SY, Fadare O. The significance of recurrence in endometrial polyps: a clinicopathologic analysis. Hum Pathol 2020.
[89] Gu F, Zhang H, Ruan S, Li J, Liu X, Xu Y, et al. High number of endometrial polyps is a strong predictor of recurrence: findings of a prospective cohort study in reproductive-age women. Fertil Steril 2018;109(3):493–500.
[90] Jimenez-Lopez JS, Miguel AG, Tejerizo-Garcia A, Munoz-Gonzalez JL, Lopez-Gonzalez G. Effectiveness of transcervical hysteroscopic endometrial resection based on the prevention of the recurrence of endometrial polyps in post-menopausal women. BMC Womens Health 2015;15:20.
[91] Lee SC, Kaunitz AM, Sanchez-Ramos L, Rhatigan RM. The oncogenic potential of endometrial polyps: a systematic review and meta-analysis. Obstet Gynecol 2010;116(5):1197–205.
[92] Elyashiv O, Sagiv R, Kerner R, Keidar R, Menczer J, Levy T. Hysterscopic Resection of Premalignant and Malignant Endometrial Polyps: Is it a Safe Alternative to Hysterectomy? J Minim Invasive Gynecol 2017;24(7):1200–3.
[93] Jacobs I, Tibosch R, Geomini P, Coppus S, Bongers MY, van Hanegem N. Atypical endometrial polyps and the incidence of endometrial cancer: a retrospective cohort study. BJOG 2020.
[94] Elfayomy AK, Soliman BS. Risk factors associated with the malignant changes of symptomatic and asymptomatic endometrial polyps in premenopausal women. J Obstet Gynaecol India 2015;65(3):186–92.