ORIGINAL RESEARCH ARTICLE

Effects of different hysteroscopic polypectomy techniques on postoperative recovery and quality of life among women with endometrial polyps

DOI: 10.29063/ajrh2026/v30i16.6

Yan Jiang[*]*, Biao Yang ,Yun Li and Yan Wang*

Department of Obstetrics and Gynecology, Maanshan 17th Metallurgical Hospital, Maanshan 243000, Anhui, China.

***For Correspondence**: Email*: Dove_868@163.com*; Phone: 15655569309

Abstract

This retrospective study aimed to compare the effects of two hysteroscopic procedures—cold knife resection (HCK) and electrosurgical resection (HER)—on postoperative recovery and quality of life in patients with endometrial polyps (EMP). A total of 120 patients were included, with 53 in the HCK group and 67 in the HER group. The study assessed operative time, intraoperative bleeding, hospital stay, endometrial thickness recovery, complications, recurrence, and quality of life using Short Form 36 Health Survey Questionnaire (SF-36) scores. Results showed that HER had shorter operative times, less bleeding, and quicker recovery, but HCK led to better endometrial thickness recovery. Both procedures were similarly effective in treating EMP, with no significant difference in complication or recurrence rates. At six months postoperatively, HER patients reported significantly better quality of life scores. Multivariate regression identified HER as an independent factor for favorable postoperative quality of life. We conclude that while both methods are safe and effective, HER is superior for faster recovery and improved quality of life. In contrast, HCK appears to be more suitable for women with fertility concerns due to better endometrial preservation. Individualized treatment selection based on patient needs is recommended. *(Afr J Reprod Health 2026; 30 [16]: 71-80).*

Keywords : endometrial polyps; hysteroscopic procedures; postoperative recovery; quality of life

Résumé

Cette étude rétrospective visait à comparer les effets de deux procédures hystéroscopiques — la résection au couteau froid (HCK) et la résection électrochirurgicale (HER) — sur la récupération postopératoire et la qualité de vie des patientes atteintes de polypes de l'endomètre (EMP). Un total de 120 patientes a été inclus, dont 53 dans le groupe HCK et 67 dans le groupe HER. L'étude a évalué le temps opératoire, les pertes sanguines peropératoires, la durée d'hospitalisation, la récupération de l'épaisseur endométriale, les complications, les récidives et la qualité de vie à l'aide du questionnaire SF-36 (Short Form 36 Health Survey Questionnaire).Les résultats ont montré que la HER était associée à un temps opératoire plus court, à des pertes sanguines moindres et à une récupération plus rapide, tandis que la HCK permettait une meilleure récupération de l'épaisseur endométriale. Les deux procédures ont présenté une efficacité comparable dans le traitement des EMP, sans différence significative en termes de taux de complications ou de récidive. Six mois après l'intervention, les patientes du groupe HER ont rapporté des scores de qualité de vie significativement plus élevés. L'analyse de régression multivariée a identifié la HER comme un facteur indépendant associé à une qualité de vie postopératoire favorable.Nous concluons que, bien que les deux méthodes soient sûres et efficaces, la HER est supérieure pour favoriser une récupération plus rapide et une meilleure qualité de vie. En revanche, la HCK semble être plus adaptée aux femmes ayant des préoccupations liées à la fertilité en raison d'une meilleure préservation de l'endomètre. Une sélection individualisée du traitement en fonction des besoins des patientes est recommandée. *(Afr J Reprod Health 2026; 30 [16]:71-80).*

Mots-clés: Polypes de l'endomètre ; procédures hystéroscopiques ; récupération postopératoire ; qualité de vie

Introduction

Endometrial polyps (EMP) represent a common gynaecological disease, characterised by benign lesions resulting from localised hyperplasia of the endometrium.[1] The aetiology of this disease is multifactorial, with elevated levels of oestrogen and inflammation representing key triggers.[2] EMP presents as single or multiple smooth swellings in the uterine cavity, ranging in size from a few millimetres to several centimetres.[3] Epidemiological studies have demonstrated that the prevalence of EMP is approximately 25%, predominantly observed in peri- and post-

menopausal women[4]. EMP has a significant impact on a woman's reproductive health. In addition to affecting the uterus, EMP can also lead to a range of symptoms, including abnormal vaginal bleeding, menstrual changes, and excessive vaginal discharge.[5, 6] These symptoms can occur in both premenopausal and postmenopausal women, making EMP a common cause of abnormal uterine bleeding.[7] More seriously, although the vast majority of EMPs are benign, postmenopausal women and those with bleeding symptoms are at a slightly higher risk of endometrial polyp malignancy.[8] This further complicates the disease and underscores the urgency of treatment.

At the present time, the increased popularity of hysteroscopic technology has led to a notable enhancement in the accuracy of EMP diagnosis and treatment.[1] As a fibre-optic endoscope, hysteroscopy permits direct observation of the uterine cavity and the capture of real-time images, thereby facilitating rapid and accurate diagnosis and treatment of intrauterine diseases such as endometrial polyps.[9] Hysteroscopic cold knife (HCK) and hysteroscopic electrosurgical resection (HER) represent two of the most commonly performed hysteroscopic procedures.[10, 11] HCK offers several advantages, including reduced trauma, bleeding, and recovery time due to the direct removal of polyps. However, it necessitates a higher level of expertise on the part of the operator.[12] In contrast, HER employs an electrosurgical ring for the removal of polyps, a relatively straightforward procedure that may nevertheless increase the risk of postoperative complications, including uterine adhesions and infections.[13] The two surgical procedures had a notable impact on patients' postoperative recovery and quality of life. However, further investigation is required to ascertain the precise distinction in outcomes.

In light of the potential repercussions of EMP on women's health and the pivotal role of hysteroscopic surgery in the management of EMP, the present study aspires to undertake a comparative and analytical examination of the consequences of two surgical methodologies, HCK and HER, on the postoperative recovery and quality of life of EMP patients. The objective of the study is to analyse the clinical data of 120 EMP patients who underwent hysteroscopic surgery in Maanshan 17th Metallurgical Hospital during the period from January 2022 to April 2024. The study investigated the differences between the two surgical methods in terms of perioperative indexes, clinical efficacy, postoperative complications, endometrial thickness recovery, postoperative recurrence rate and quality of life. We believe that the results of the study will provide clinicians the scientific basis for choosing surgical treatment options for EMP, so as to promote rapid postoperative recovery and improve the quality of life of patients.

Methods

Patient population

This was a retrospective study. A total of 126 patients with EMP who underwent hysteroscopic surgery at Maanshan 17th Metallurgical Hospital between January 2022 and April 2024 were initially reviewed. After screening, 120 patients were finally included in the analysis. All clinical data were collected retrospectively from the hospital's electronic medical record system and nursing records. Patients were divided into two groups according to the surgical procedure they received: the HCK group (n=53) and the HER group (n=67).

Inclusion and exclusion criteria

Inclusion criteria were as follows: (a) age ≥ 18 years; (b) clinically diagnosed with EMP; (c) underwent hysteroscopic surgery; (d) had complete clinical data available for review. Exclusion criteria were as follows: (a) severe organ dysfunction; (b) concurrent severe gynecological diseases, such as cervical cancer or ovarian cancer; (c) pregnant or lactating; (d) severe mental illness that precluded effective communication.

Surgical procedures

All patients underwent a comprehensive preoperative evaluation. Patients were required to fast for at least six hours before surgery, and routine vaginal irrigation and disinfection were performed. All procedures were performed with the patient in the lithotomy position.

HCK: A hysteroscope was introduced into the uterine cavity via the vagina and cervix under ultrasound or laparoscopic guidance to assess the shape of the cervix and uterine cavity and to determine the location and size of the polyp. The polyp was then excised under direct visualization using a spatula or scissors attached to the hysteroscope. During the procedure, careful attention was paid to avoid damage to the surrounding normal endometrium.

HER: Following localization of the polyp via hysteroscopy, an electrosurgical cutting loop was used to excise the polyp along its border under direct visualization. The high-frequency electric current generated heat, allowing rapid coagulation and excision of polyp tissue. After resection, the uterine cavity was re-examined to ensure complete removal and absence of bleeding or residual tissue. In cases of persistent bleeding, electrocoagulation was performed using a rollerball electrode or cutting ring.

Data collection and outcome measures

All data were retrospectively collected from the hospital's electronic medical record system and nursing records. To ensure data accuracy and completeness, all clinical information was independently extracted and double-checked by two trained research assistants. Any discrepancies were resolved by cross-referencing with original medical charts and consultation notes. Collected information included patient demographics, medical history, surgical details, postoperative complications, and follow-up outcomes. Baseline characteristics recorded included age, body mass index (BMI), history of miscarriage, disease duration, number of polyps, and polyp diameter. Surgical indicators comprised operative time, intraoperative bleeding, and length of hospital stay. Follow-up data were obtained from outpatient records and telephone follow-up notes documented in the electronic medical system.

Clinical efficacy was evaluated based on symptom improvement after surgery and was classified as follows: marked effect (complete resolution of symptoms and complete polyp removal), effective (significant symptom improvement and removal of most polyps), and ineffective (no symptom improvement or worsening, with incomplete polyp removal). The overall effective rate was calculated as the proportion of patients achieving marked effect or effective outcomes. Endometrial thickness was measured via transvaginal ultrasound at baseline and at 3 and 6 months postoperatively, corresponding to the time of ovulation, and polyp recurrence was recorded at the same time points. Quality of life was assessed using the Short Form 36 Health Survey Questionnaire (SF-36) preoperatively and at 3 and 6 months postoperatively [14]. The SF-36 consists of 36 items covering eight domains: physical functioning, bodily pain, general health, vitality, role physical, role emotional, mental health, social functioning, and emotional well-being, with a total score ranging from 0 to 100.

Statistical analysis

Statistical analyses were performed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation (SD) and compared between groups using the independent samples t-test. Categorical variables were presented as frequencies and percentages (%) and compared using the chi-square test or Fisher's exact test, as appropriate. Repeated-measures analysis of variance (ANOVA) was used to evaluate changes in endometrial thickness and SF-36 scores over time (preoperative, 3 months, and 6 months postoperatively), with surgical method as the between-subject factor. The sphericity assumption was assessed using Mauchly's test, and the Greenhouse–Geisser correction was applied when necessary. To identify factors associated with postoperative quality of life, multivariate logistic regression analysis was performed. The dependent variable was a favorable quality of life outcome, defined as an SF-36 score ≥ 74 at 6 months postoperatively (the median SF-36 score at 6 months was 74 across all 120 patients). Independent variables included surgical method (with HCK as the reference) and established demographic confounders (age and BMI). We additionally constructed a supplementary model further adjusting for perioperative indicators (operative time, intraoperative bleeding, and

hospital stay) to explore potential mechanistic pathways, acknowledging that these variables may lie on the causal pathway between surgical method and quality of life outcomes. Results were reported as odds ratios (ORs) with 95% confidence intervals (CIs). All statistical tests were two-sided, and a P value < 0.05 was considered statistically significant.

Ethical approval

This study was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the Ethics Committee of Ma'anshan 17th Metallurgical Hospital (approval number:PJ-L021) on November 16, 2024.

Results

Baseline characteristics

A total of 120 patients were included, with 53 undergoing HCK and 67 undergoing HER. As shown in Table 1, no significant differences were observed between the two groups in terms of age, BMI, history of abortion, disease duration, polyp number, or polyp diameter (all P>0.05), indicating that the two groups were comparable at baseline.

Perioperative outcomes

The HER group demonstrated significantly shorter operative time, reduced intraoperative blood loss, and shorter hospital stay compared with the HCK group (all P<0.05), as summarized in Table 2. These findings suggest that HER is associated with higher surgical efficiency and less perioperative burden.

Clinical efficacy

The overall effective rate was 86.8% in the HCK group and 92.5% in the HER group, with no statistically significant difference between the two groups (P=0.298), indicating comparable primary treatment efficacy (Table 3).

Postoperative complications and recurrence

As shown in Table 4, the overall complication rate was 9.4% in the HCK group and 13.4% in the HER group, with no statistically significant difference between the two groups (P=0.498). Regarding recurrence, the HCK group had a recurrence rate of 9.4%, while the HER group had a rate of 6.0%; this difference was not statistically significant (P=0.506, Fisher's exact test).

Endometrial thickness recovery

Endometrial thickness was comparable between the two groups preoperatively (P=0.663). Repeated-measures ANOVA revealed a significant effect of time (F_{time}=753.4, P_{time}<0.001), a significant interaction ($F_{interaction}$=3.1, $P_{interaction}$=0.048) and a significant effect of the overall between-group difference (F_{group}=7.9, P_{group}=0.006). Post-hoc analysis showed that at 3 and 6 months postoperatively, endometrial thickness was significantly greater in the HCK group than in the HER group (P=0.007 and P<0.001, respectively), as illustrated in Figure 1. These results suggest that HCK may be more favorable for endometrial preservation.

Quality of life

Preoperative SF-36 scores were similar between the two groups (P=0.727). Repeated-measures ANOVA showed significant effects of time (F_{time} =165.5, P_{time}<0.001), group (F_{group}=17.6, P_{group} <0.001), and interaction ($F_{interaction}$=7.3, $P_{interaction}$ <0.001), indicating that the two groups exhibited different trends in quality of life recovery over time. Although no significant difference was observed at 3 months postoperatively (P=0.072), the HER group showed significantly higher SF-36 scores at 6 months (76.4±8.4 vs. 68.4±9.5, P<0.001), as shown in Figure 2.

Multivariate logistic regression analysis

To further assess the independent impact of surgical approach on postoperative quality of life, a multivariate logistic regression analysis was performed. The dependent variable was a favorable quality of life outcome, defined as an SF-36 score ≥ 74 at 6 months postoperatively (based on the median score). As shown in Table 5, Model 2 (adjusted for age and BMI) demonstrated that HER was significantly associated with favorable quality

Table 1: Basic characteristics of the women

Characteristic	HCK (n = 53)	HER (n = 67)	*P*
Age (years)(mean and SD)	42.4 ± 10.4	45.7 ± 12.9	0.126
BMI (kg/m²)	22.9 ± 1.4	23.1 ± 1.2	0.283
History of abortion, n(%)			0.409
No	19 (35.8)	29 (43.3)	
Yes	34 (64.2)	38 (56.7)	
Course of disease, n(%)			0.581
<6 months	28 (52.8)	32 (47.8)	
≥6 months	25 (47.2)	35 (52.2)	
Polyp number, n(%)			0.298
Single polyp	7 (13.2)	5 (7.5)	
Multiple polyps	46 (86.8)	62 (92.5)	
Polyp diameter, n(%)			0.414
<2 cm	16 (30.2)	25 (37.3)	
≥2 cm	37 (69.8)	42 (62.7)	

HCK, hysteroscopic cold knife; HER, hysteroscopic electrosurgical resection

Table 2: Comparison of perioperative indexes

Outcome	HCK (n = 53)	HER (n = 67)	*P*
Operative time (min)	19.3±3.6	16.7±3.5	<0.001
Intraoperative bleeding (mL)	28.6±2.9	27.3±2.7	0.012
Hospital stay (days)	3.1±0.6	2.1±0.5	<0.001

HCK, hysteroscopic cold knife; HER, hysteroscopic electrosurgical resection

Table 3: Comparison of surgical treatment effect

Outcome	HCK (n = 53)	HER (n = 67)	*P*
Total	46 (86.8)	62 (92.5)	0.298
Marked effect	37 (69.8)	51 (76.1)	
Effective	9 (17.0)	11 (16.4)	
Ineffective	7 (13.2)	4 (6.0)	

Table 4: Postoperative complications and polyp recurrence

Outcome	HCK (n = 53)	HER (n = 67)	*P*
Complications, n(%)	5 (9.4)	9 (13.4)	0.498
Infection	2 (3.8)	4 (6.0)	
Cervical adhesion	1 (1.9)	4 (6.0)	
Cervical stenosis	2 (3.8)	1 (1.5)	
Recurrence, n(%)	5 (9.4)	4 (6.0)	0.506[a]
3 months	2 (3.8)	1 (1.5)	
6 months	3 (5.7)	3 (4.5)	

[a]Fisher's exact test

HCK, hysteroscopic cold knife; HER, hysteroscopic electrosurgical resection.

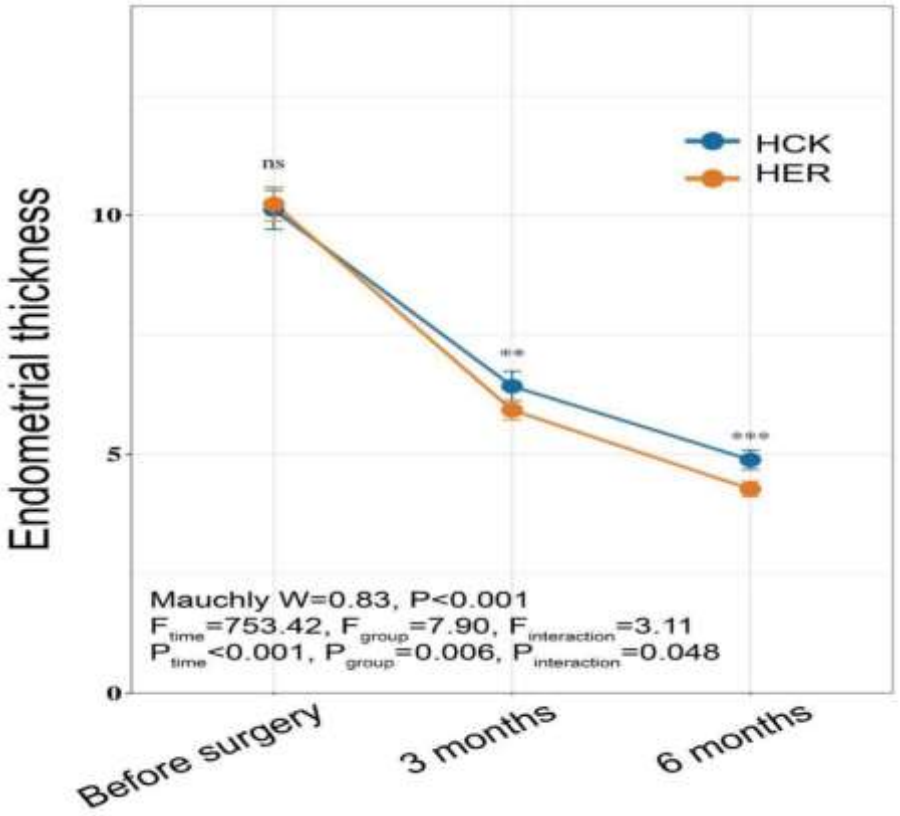

Figure 1: Endometrial thickness over time in patients undergoing HCK versus HER

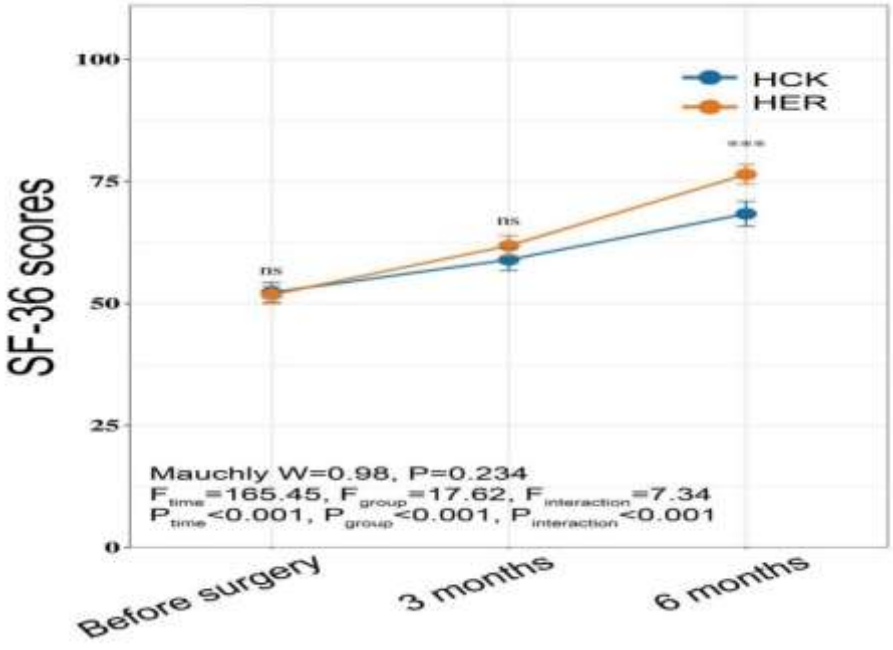

Figure 2: Changes in quality of life (SF-36 scores) over time in patients undergoing HCK versus HER

of life (OR = 5.1, 95% CI: 2.2–11.7, P<0.001). In Model 3, additionally adjusting for perioperative indicators (operative time, intraoperative bleeding, and hospital stay), the effect estimate attenuated but remained significant (OR = 6.1, 95% CI: 1.6–22.9, P=0.008). The consistency of significant associations across models with varying degrees of adjustment strengthens the robustness of our primary finding that HER is independently associated with improved quality of life

Discussion

EMP is a prevalent gynaecological ailment with a multifaceted pathogenesis, which not only impacts the reproductive health of patients but also gives rise to a plethora of discomforting symptoms and even the potential for malignant transformation[15, 16]. The selection of an optimal surgical intervention is therefore of paramount importance in clinical practice. This retrospective study comparatively analysed the clinical outcomes of HCK and HER in 120 EMP patients, with a focus on perioperative indices, clinical efficacy, postoperative complications, endometrial thickness recovery, recurrence, and quality of life. Three main findings emerged: HER offered superior perioperative efficiency and better six-month quality of life, whereas HCK resulted in greater endometrial thickness recovery, suggesting better endometrial preservation. The findings elucidate the distinct advantages of each technique, providing a evidence-based reference for individualised surgical decision-making.

Baseline characteristics were well-balanced between the HCK and HER groups, with no significant differences in age, BMI, abortion history, disease duration, polyp number, or diameter. This homogeneity eliminates confounding by baseline variables and ensures the reliability of intergroup comparisons of surgical outcomes. In terms of perioperative performance, HER demonstrated significant superiority over HCK, with shorter operative time, reduced intraoperative bleeding, and a shorter hospital stay. This finding aligns with the inherent technical characteristics of HER: the high-frequency electric current enables rapid coagulation and excision of polyp tissue, streamlining the surgical process and minimising iatrogenic trauma to surrounding vascular structures.[17,18] The abbreviated hospital stay associated with HER not only alleviates the economic and psychological burden on patients but also reduces the risk of hospital-acquired infections, which is consistent with the principles of enhanced recovery after surgery (ERAS) in gynaecological practice.[19,20] Both surgical modalities achieved high overall effective rates, with no statistically significant intergroup difference, confirming that both HCK and HER are effective in resolving clinical symptoms and resecting polyps.[21] This consistency in primary therapeutic efficacy is attributable to the direct visualisation afforded by hysteroscopy, which ensures accurate targeting and resection of polyp lesions regardless of the surgical instrument used.[9,22] Notably, the trend toward a higher effective rate in the HER group may be related to the thorough coagulation of polyp stalks during electrosurgical resection, which reduces the risk of residual polyp tissue.

In the present study, the postoperative complication rate was 9.4% in the HCK group and 13.4% in the HER group, with no significant intergroup difference, a finding that differs from some previous reports.[23] One possible explanation for this discrepancy is the strict adherence to surgical protocols and standardised postoperative care in our study population, as well as the relatively high level of surgical proficiency of the operating physicians. HER is traditionally associated with a higher risk of thermal injury-related complications such as uterine adhesion and cervical stenosis, but modern electrosurgical equipment with adjustable power settings and precise operational techniques can effectively mitigate this risk [24,25]. Together, these factors likely account for the low and comparable complication rates observed in both groups, underscoring the safety of both hysteroscopic approaches when performed by experienced clinicians. In terms of polyp recurrence, the HCK group had a recurrence rate of 9.4% and the HER group 6.0%, with no significant difference (P=0.506), but the trend toward a lower recurrence rate in the HER group is clinically noteworthy. This may be explained by the more radical resection of the polyp basal layer and adjacent superficial myometrium during HER, which eliminates the hyperplastic endometrial

tissue that gives rise to polyps and thus reduces the potential for recurrence.[26,27] In contrast, HCK prioritises the preservation of normal endometrial tissue, which may leave residual hyperplastic foci and increase the risk of recurrence.[28]

A key finding of this study is that HCK is superior to HER in terms of endometrial thickness recovery. This difference is rooted in the distinct tissue injury mechanisms of the two techniques: HER relies on thermal energy for resection and coagulation, which can cause irreversible damage to endometrial basal cells.[29] In contrast, HCK achieves mechanical resection of polyps without thermal energy, minimising damage to the endometrial basal layer and preserving the structural and functional integrity of the endometrium, which is conducive to rapid endometrial regeneration. This advantage of HCK is of great clinical significance for reproductive-age patients with fertility requirements, as a well-preserved endometrium is a critical prerequisite for successful embryo implantation and pregnancy.[30] Quality of life is a core endpoint for evaluating the clinical benefit of surgical interventions for benign gynaecological diseases.[31,32] In this study, repeated-measures ANOVA revealed significant effects of time, group, and their interaction on SF-36 scores, indicating divergent trends in quality of life recovery between the two groups. Although no significant intergroup difference was observed at 3 months postoperatively, the HER group had significantly higher SF-36 scores at 6 months postoperatively. Multivariate logistic regression analysis further confirmed that HER is an independent factor associated with a favourable quality of life outcome at 6 months postoperatively, after adjusting for age, BMI, operative time, intraoperative bleeding, and hospital stay. The delayed emergence of this benefit — significant at 6 months but not at 3 months — suggests that the quality-of-life advantage of HER accumulates over time as patients complete their early recovery and return to normal activities. The superior medium-term quality of life in the HER group is a comprehensive result of its advantages in perioperative recovery: shorter operative time and less intraoperative bleeding reduce acute postoperative discomfort, while a shorter hospital stay enables patients to return to normal life and work more quickly. In addition, the trend toward a lower recurrence rate in the HER group reduces the psychological stress of patients related to disease recurrence and the need for reoperation, which further contributes to the improvement of long-term quality of life.

Strengths and limitations

Strengths: This study provides a comprehensive comparison of HCK and HER, simultaneously evaluating perioperative outcomes, endometrial preservation, recurrence, and quality of life. The use of repeated-measures ANOVA and progressive multivariate adjustment strengthens the robustness of our findings.

Limitations: First, this single-centre retrospective study had a limited sample size, potentially affecting generalisability and precision of effect estimates. Second, the 6-month follow-up was insufficient to assess long-term recurrence and reproductive outcomes. Third, unmeasured confounders (e.g., hormonal status, underlying uterine diseases) cannot be completely excluded despite multivariate adjustment. Fourth, cost-effectiveness was not evaluated.

Implications: Clinically, HER is preferable for patients prioritising rapid recovery, while HCK suits those with fertility concerns. Healthcare institutions should ensure availability of both techniques to enable individualised selection. Future prospective multicentre studies with extended follow-up and cost-effectiveness analyses are warranted.

Conclusion

In conclusion, both HCK and HER are safe and effective for the treatment of EMP, with distinct clinical advantages. HER is associated with higher surgical efficiency, faster perioperative recovery, and better medium-term quality of life, making it the preferred option for patients prioritising rapid recovery and improved quality of life, especially postmenopausal patients without fertility requirements. HCK, on the other hand, is superior in preserving endometrial function and promoting endometrial thickness recovery, which is particularly beneficial for reproductive-age patients

with fertility requirements. Clinicians should comprehensively consider the patient's age, fertility status, polyp characteristics, and clinical needs to select the most appropriate surgical method, thereby maximising therapeutic efficacy and patient satisfaction.

Contribution of authors

Jiang Yan conceived and designed the study, supervised the project, and critically revised the manuscript. Yang Biao and Li Yun were responsible for data collection, data verification, and patient follow-up. Wang Yan performed the statistical analysis and contributed to data interpretation. Jiang Yan and Yang Biao drafted the initial manuscript. All authors contributed to the interpretation of the data, reviewed and approved the final version of the manuscript, and agree to be accountable for all aspects of the work.

Conflict of interests

The authors declare no competing interests.

Funding

No funding was received for this study.

Acknowledgements

The authors gratefully acknowledge the support of all medical staff and patients who contributed to this study.

Data availability

The data supporting this study are available from the corresponding author upon reasonable request.

References

1. Vitale SG, Haimovich S, Laganà AS, Alonso L, Di Spiezio Sardo A, Carugno J and From the Global Community of Hysteroscopy Guidelines Committee.Endometrial polyps. An evidence-based diagnosis and management guide. *Eur J Obstet Gynecol Reprod Biol*. 2021;260:70–7. doi:10.1016/j.ejogrb.2021.03.017
2. Yan C, Xing C, Wei T, Zhou H, Wang H, Liu T and Gao J. Impact of estrogen and progesterone receptor expression on the incidence of endometrial polyps. *Biomark Med*. 2023;17:881–7. doi:10.2217/bmm-2023-0411
3. Huang X and Wang F. Imperatorin remits malignant progression of endometrial cancer by silencing E2F1/SLC3A2. *Letters in Drug Design & Discovery.* 2025;22(6):100084. doi:10.1016/j.lddd.2025.100084
4. Berceanu C, Cernea N, Căpitănescu RG, Comănescu AC, Paitici Ş, Rotar IC, Bohîlţea RE and Olinca MV. Endometrial polyps. *Rom J Morphol Embryol*. 2022;63:323–34. doi:10.47162/RJME.63.2.04
5. Lebduska E, Beshear D and Spataro BM. Abnormal Uterine Bleeding. *Med Clin North Am*. 2023;107:235–46. doi:10.1016/j.mcna.2022.10.014
6. Raz N, Feinmesser L, Moore O and Haimovich S. Endometrial polyps: diagnosis and treatment options - a review of literature. *Minim Invasive Ther Allied Technol*. 2021;30:278–87. doi:10.1080/13645706.2021.1948867
7. Clark TJ and Stevenson H. Endometrial Polyps and Abnormal Uterine Bleeding (AUB-P): What is the relationship, how are they diagnosed and how are they treated? *Best Pract Res Clin Obstet Gynaecol*. 2017;40:89–104. doi:10.1016/j.bpobgyn.2016.09.005
8. Markatos C, Biniari G, Karageorgos V, Chepurny OG, Venihaki M, Holz GG, Tselios T and Liapakis G. Two GnRH-mitoxantrone conjugates, Con-3 and Con-7, target endometrial cancer cells. *Current Molecular Pharmacology*. 2025. doi:10.2174/0118761429343090250121052955
9. Huchon C, Drioueche H, Koskas M, Agostini A, Bauville E, Bourdel N, Fernandez H, Fritel X, Graesslin O, Legendre G, Lucot JP, Panel P, Raiffort C, Giraudet G, Bussières L and Fauconnier A. Operative Hysteroscopy vs Vacuum Aspiration for Incomplete Spontaneous Abortion: A Randomized Clinical Trial. *JAMA*. 2023;329:1197–205. doi:10.1001/jama.2023.3415
10. Yong J, Wan Y, Ye M, Yi S, Zeng F, Sun X, Song J, Wang X, Zeng X and Xiao S. Comparative analysis of the clinical efficacy and reproductive outcomes of the hysteroscopic tissue removal system (MyoSure) and hysteroscopic electroresection in the treatment of benign intrauterine lesions. *Int J Gynaecol Obstet*. 2023;163:115–22. doi:10.1002/ijgo.14863
11. Han Y, Yao R, Zhang Y, Yang Z, Luo H, Wang X, Du A, Zhang Y and Zhu Y. Hysteroscopic resection of type 3 fibroids could improve the pregnancy outcomes in infertile women: a case-control study. *BMC Pregnancy Childbirth*. 2022;22:522. doi:10.1186/s12884-022-04828-3
12. Triantafyllidou O, Korompokis I, Chasiakou S, Bakas P, Kalampokas T, Simopoulou M, Tzanakaki D, Kalampokas E, Panagodimou E, Xepapadaki M, Christopoulos P, Valsamakis G and Vlahos NF.

Impact of Hysteroscopic Polypectomy on IVF Outcomes in Women with Unexplained Infertility. *J Clin Med*. 2024;13:4755. doi:10.3390/jcm13164755
13. Deutsch A, Sasaki KJ and Cholkeri-Singh A. Resectoscopic Surgery for Polyps and Myomas: A Review of the Literature. *J Minim Invasive Gynecol*. 2017;24:1104–10. doi:10.1016/j.jmig.2017.08.645
14. Brazier JE, Harper R, Jones NM, O'Cathain A, Thomas KJ, Usherwood T and Westlake L. Validating the SF-36 health survey questionnaire: new outcome measure for primary care. *BMJ*. 1992;305:160–4. doi:10.1136/bmj.305.6846.160
15. Carbonnel M, Pirtea P, de Ziegler D and Ayoubi JM. Uterine factors in recurrent pregnancy losses. *Fertil Steril*. 2021;115:538–45. doi:10.1016/j.fertnstert.2020.12.003
16. Miao L, Chen B, Li L, Ma B, Yang G and Jing L. Role of TPD52 in Endometrial Cancer: Impact on EMT and the PI3K/AKT and ERK/MAPK Signaling. *Protein & Peptide Letters*. 2025;32:718–730. doi:10.2174/0109298665400400251003013958
17. Rex DK, Anderson JC, Pohl H, Lahr RE, Judd S, Antaki F, Lilley K, Castelluccio PF and Vemulapalli KC. Cold versus hot snare resection with or without submucosal injection of 6- to 15-mm colorectal polyps: a randomized controlled trial. *Gastrointest Endosc*. 2022;96:330–8. doi:10.1016/j.gie.2022.03.006
18. Kalinderis M, Kalinderi K, Athanasiadis A and Kalogiannidis I. Electrosurgery: understanding of basic principles, safe practices and applications in gynecologic surgery. *Minerva Obstet Gynecol* 2024; 76(4):376-385. doi:10.23736/S2724-606X.23.05308-3
19. Marchetti M, Pan TL, Delfrati S, Gill S, Yates E, Meschini T, Vilches JC, Santía MC, Ramirez PT and Nelson G. Enhanced Recovery After Surgery (ERAS) in gynecologic surgery: hot topic debates at the 2025 ERAS World Congress. *Int J Gynecol Cancer* 2026; 36(4):104552. doi:10.1016/j.ijgc.2026.104552
20. Grube M, Weiss M, Walter CB, Neis F, Hoffmann S, Andress J, Kommoss S, Brucker SY and Krämer B. Electrosurgery and Other Technical Advancements in Minimally Invasive Gynecological Surgery - An Update. *Surg Technol Int* 2022; 40:190-196. doi:10.52198/22.STI.40.GY1544
21. Moss A and Nalankilli K. Standardisation of polypectomy technique. *Best Pract Res Clin Gastroenterol*. 2017;31:447–53. doi:10.1016/j.bpg.2017.05.007
22. Breitkopf DM and Green IC. Key Innovations in the Development of Hysteroscopy. *J Minim Invasive Gynecol* 2025; 18:S1553-4650(25)00999-9. doi:10.1016/j.jmig.2025.12.018
23. Yang L, Wang L, Chen Y, Guo X, Miao C, Zhao Y, Li L and Zhang Q. Cold scissors versus electrosurgery for hysteroscopic adhesiolysis: A meta-analysis. *Medicine (Baltimore)* 2021; 100(17):e25676. doi:10.1097/MD.0000000000025676
24. Ortigão R, Weigt J, Afifi A and Libânio D. Cold versus hot polypectomy/endoscopic mucosal resection-A review of current evidence. *United European Gastroenterol J*. 2021;9:938–46. doi:10.1002/ueg2.12130
25. Liu Y, Xie X, Xue P, Yuan F, Qi Y, Wang H, Wang P, Lv G, Song K, Yang Z, Zhang YN and Yan L. Cold scissors ploughing technique versus electrosurgical excision for hysteroscopic adhesiolysis: a multicenter randomized controlled trial. *Int J Surg* 2025; 111(2):2002-2009. doi:10.1097/JS9.0000000000002182
26. Whitfield AM, Burgess NG, Bahin FF, Kabir S, Pellisé M, Sonson R, Subramanian V, Mahajan H, McLeod D, Byth K and Bourke MJ. Histopathological effects of electrosurgical interventions in an in vivo porcine model of colonic endoscopic mucosal resection. *Gut*. 2022;71:864–70. doi:10.1136/gutjnl-2021-324140
27. Copland AP, Kahi CJ, Ko CW and Ginsberg GG. AGA Clinical Practice Update on Appropriate and Tailored Polypectomy: Expert Review. *Clin Gastroenterol Hepatol.* 2024;22:470-479.e5. doi:10.1016/j.cgh.2023.10.012
28. Pohl H, Rex DK, Barber J, Moyer MT, Elmunzer BJ, Rastogi A, Gordon SR, Zolotarevsky E, Levenick JM, Aslanian HR, Elatrache M, von Renteln D, Wallace MB, Brahmbhatt B, Keswani RN, Kumta NA, Pleskow DK, Smith ZL, Abu Ghanimeh MK, Simmer S, Sanaei O, Mackenzie TA and Piraka C. Cold snare endoscopic resection for large colon polyps: a randomised trial. *Gut* 2025; 74(11):1804-1813. doi:10.1136/gutjnl-2025-335075
29. Chen Q. Effects of hysteroscopic cold knife technique on the treatment of endometrial polyps and its protective effect on the endometrium. *Am J Transl Res* 2025; 17(12):10084-10092. doi:10.62347/PZJV3082
30. Gullo G, Billone V, Catania E, Russo G, Petousis S, De Paola L, Chitoran E, Cucinella G and Ferrero S. Cold Knife Hysteroscopic Myomectomy: A Literature Review on Its Role as a Fertility Sparing Tool. *Healthcare (Basel)* 2025; 13(14):1651. doi:10.3390/healthcare13141651
31. Isokääntä S, Ruohoaho UM, Anttila M, Kokki H, Sintonen H, Toroi P and Kokki M. Resilience, pain, and health-related quality of life in gynecological patients undergoing surgery for benign and malignant conditions: a 12-month follow-up study. *BMC Womens Health* 2022; 22(1):345. doi:10.1186/s12905-022-01923-7
32. Ravichandren N, Faris NANBM, Ping TE and Ayakannu T. The effect of robot-assisted surgery on the gynecology patients' experience and quality of life after surgery. *J Robot Surg* 2025; 20(1):59. doi:10.1007/s11701-025-03006-9.