

Analysis of Clinical Characteristics and Risk Factors for Recurrence after Hysteroscopic Resection in Endometrial Cancer Patients

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Abstract: Objective To investigate changes in clinical characteristics and risk factors for recurrence after hysteroscopic resection in endometrial cancer patients. Methods This study enrolled 108 endometrial cancer patients who underwent hysteroscopic resection at our hospital from January 2022 to June 2023. All participants received two-year postoperative follow-up through outpatient visits and telephone interviews, with subsequent stratification into recurrence and non-recurrence groups based on documented recurrence status. The postoperative recurrence was recorded, and the patients were divided into the recurrence group and the non-recurrence group based on whether they had a recurrence. General information, laboratory tumor marker indicators, pathological features and other relevant data were collected through the hospital's electronic medical record system. The related risk factors affecting the recurrence of endometrial cancer patients after hysteroscopic electroresection were further analyzed. Results Among the 108 patients with endometrial cancer included in this study, adenocarcinoma was the most common pathological type, accounting for 69.44%, and most of them were at stage I-II (78.65%) with early-stage lesions. After a 2-year follow-up after hysteroscopic electroresection, 24 cases (22.22%) recurred and 84 cases (77.78%) did not. There were statistically significant differences in serum CA125 levels, histopathological grades, lymph node metastasis, depth of myometrial invasion, tumor diameter, para-aortic lymph node dissection, and postoperative hormone therapy between the recurrence group and the non-recurrence group ($P < 0.05$). The results of multiple logistic regression analysis showed that serum CA125, histopathological grade G3, lymph node metastasis, myometrial invasion depth $\geq 1/2$, tumor diameter > 2 cm, no para-aortic lymph node dissection, and no postoperative hormone therapy were risk factors for recurrence after hysteroscopic electroresection in patients with endometrial cancer ($OR > 1$, $P < 0.05$). Conclusion: The recurrence rate after hysteroscopic electroresection for endometrial cancer is relatively high and is related to factors such as serum CA125 levels, histopathological grades, lymph node metastasis, depth of myometrial invasion, and tumor diameter.

Keywords: Endometrial cancer; Clinical characteristics; Hysteroscopic electroresection; Recurrence; Risk factors

Endometrial cancer is a kind of gynecological tumor disease, and the sus-

ceptible population is postmenopausal and perimenopausal women. Recent epidemiological surveillance data show that the incidence of endometrial cancer in China has been increasing year by year and the patients are getting younger. The main reasons are related to changes in people's dietary structure and the continuous rise in the prevalence of endocrine disorders and metabolic syndrome in women^[1-2]. Hysteroscopic electroresection has gradually become one of the important surgical methods for treating this disease due to its characteristics of minimally invasive, less bleeding, quick postoperative recovery and preservation of uterine function, and has achieved good results in clinical treatment^[3]. However, clinical follow-up has found that some patients still experience recurrence after surgical treatment for endometrial cancer, which is one of the main reasons for postoperative death of patients^[4]. Therefore, how to effectively prevent postoperative recurrence in the early stage has become an urgent clinical problem to be solved. Identifying the high-risk groups for recurrence after hysteroscopic electroresection in patients with endometrial cancer is the key to guiding the formulation of recurrence prevention plans and improving prognosis. At present, there are many clinical studies on postoperative recurrence and influencing factors in patients with gynecological malignant tumors^[5], but there are few reports on the risk factors for recurrence in patients with endometrial cancer after hysteroscopic electroresection. Based on this, this study statistically analyzed the recurrence situation of 108 patients with endometrial cancer who underwent hysteroscopic electroresection within 2 years after surgery, and further analyzed the risk factors influencing postoperative recurrence. It is as follows.

1. Materials and methods

1.1 General

Information A total of 108 patients with endometrial cancer who underwent hysteroscopic electroresection in the hospital from January 2022 to June 2023 were selected. The inclusion criteria were as follows: ① They met the diagnostic criteria of endometrial cancer^[6] and were confirmed by surgical pathological examination; ② The first hysteroscopic electroresection was performed; ③ Pathological stage I - III; ④ Age ≥ 18 years old; ⑤ All patients completed a 12-month follow-up after the operation. ⑥ The case data is complete. Exclusion criteria: ① Patients with recurrent endometrial cancer who have undergone surgical treatment; ② Combined with coagulation dysfunction or hematological diseases; ③ Accompanied by other tumor diseases; ④ There is a history of radiotherapy and chemotherapy before the operation; ⑤ Accompanied by severe organic lesions; ⑥ Postoperative loss to follow-up and missing case data.

1.2 Methods

1.2.1 Baseline data collection Through the hospital's electronic medical record system, general information of patients is collected, including age, body

mass index (BMI), age of first menstruation, whether menopause has passed, whether they have given birth, and comorbidities (hypertension, diabetes, hyperlipidemia). Laboratory indicators: After the patient's admission, fasting venous blood was drawn in the early morning and centrifuged (at a speed of 300r/min; Time: 10 minutes Serum samples were collected with a radius of 10cm and the levels of carbohydrate antigen 125 (CA125), human epididymal protein 4 (HE4), and carcinoembryonic antigen (CA19-9) were detected by enzyme-linked immunosorbent assay (kit purchased from Guangdong Gucang Biotechnology Co., LTD., IME00040). Pathological feature data include pathological classification (adenocarcinoma, others), tumor stage (stage I, II, III), histopathological grade (G1, G2, G3), lymph node metastasis, depth of myometrial invasion, and tumor diameter. Whether para-aortic lymph node dissection was performed during the operation, postoperative treatment including whether radiotherapy and chemotherapy were received after the operation, and whether hormone drug treatment was combined after the operation.

1.2.2 Postoperative follow-up All patients after the operation were followed up for a period of 2 years through hospital outpatient visits and telephone follow-ups (once every 3 months) until June 30, 2025. Record the recurrence of patients during the follow-up period. Patients with recurrence were included in the recurrence group, and the remaining patients were included in the non-recurrence group.

1.4 Statistical

Methods Data were processed using SPSS25.0 statistical software. Measurement data were expressed $\bar{x} \pm s$, and the t-test was used for comparison between groups. n (%) represents the count data, and the χ^2 test was used; logistic regression was used to analyze the risk factors for recurrence after hysteroscopic electroresection in patients with endometrial cancer. A P value < 0.05 indicates a statistically significant difference.

2 Results

2.1 Clinicopathological characteristics of patients with endometrial cancer

In this study, 108 patients with endometrial cancer were included. The pathological type of adenocarcinoma accounted for the highest proportion (69.44%), and most of them were early-stage I-II lesions (78.65%). Other pathological features are detailed in **Table 1**.

Table 1. Clinicopathological Characteristics of 108 Endometrial Cancer Patients

Pathological features	n	P
Histological Type	Adenocarcinoma	75
	Others	33
		69.44%
FIGO Stage	Stage I	47
	Stage II	36
	Stage III	25
		30.56%
		43.52%
		33.33%
		23.15%

Histopathological Grade	G1	30	27.78%
	G2	37	34.26%
	G3	41	37.96%
Lymph Node Metastasis	Yes	45	41.67%
	No	63	58.33%
Depth of Myometrial Invasion	< 1/2	62	57.71%
	≥1/2	46	42.59%
Tumor Diameter	≤2cm	65	60.19%
	< 2cm	43	39.81%

2.2 Recurrence in Patients with endometrial cancer after hysteroscopic electroresection

Among the 108 patients with endometrial cancer in this study, 24 cases (22.22%) relapsed and 84 cases (77.78%) did not relapse during the 2-year follow-up after hysteroscopic electroresection.

2.3 Univariate analysis of Recurrence after hysteroscopic electroresection in Patients with endometrial Cancer

There were statistically significant differences in the levels of serum CA125, histopathological grades, lymph node metastasis, depth of myometrial invasion, tumor diameter, para-aortic lymph node dissection, and postoperative hormone drug treatment between the two groups ($P < 0.05$). There was no statistically significant difference in age, BMI, age of first menstruation, menopause, reproductive history, comorbidities, HE4, CA19-9, tumor stage, and postoperative radiotherapy and chemotherapy between the two groups ($P > 0.05$). See **Table 2**.

Table 2. Univariate analysis of postoperative recurrence in endometrial cancer patients

Index		Non-recurrence group(n=84)	Recurrence group(n=24)	t/χ2	P
Age ($\bar{X} \pm s$, years)		54.76±6.15	55.48±6.52	t=0.499	0.619
BMI ($\bar{X} \pm s$, kg/m ²)		23.75±1.13	23.84±1.18	t=0.341	0.734
Menarche Age ($\bar{X} \pm s$, years)		12.85±2.31	12.73±2.27	t=0.225	0.822
Menopausal Status	Yes	57(67.86)	16(66.67)	χ2=0.012	0.912
	No	27(32.14)	8(33.33)		
Obstetric History	Yes	78(92.86)	19(79.17)	χ2=2.474	0.116
	No	6(7.14)	5(20.83)		
Comorbidities	Hypertension	23(27.38)	7(29.17)	χ2=0.030	0.863
	Diabetes Mellitus	20(23.81)	6(25.00)	χ2=0.015	0.904
	Hyperlipidemia	27(32.14)	7(29.17)	χ2=0.077	0.782
CA125 ($\bar{X} \pm s$, U/ml)		23.62±4.58	30.24±5.72	t=5.897	< 0.001
HE4 ($\bar{X} \pm s$, pmol/L)		75.65±12.43	80.34±13.42	t=1.602	0.112
CA19-9 ($\bar{X} \pm s$, U/ml)		13.52±3.24	14.75±3.86	t=1.570	0.119
Histological Type	Adenocarcinoma	58(69.05)	17(70.83)	χ2=0.028	0.867
	Others	26(30.95)	7(29.17)		
FIGO Stage	Stage I	40(47.62)	7(29.17)	Z=4.668	0.097
	Stage II	28(33.33)	8(33.33)		
	Stage III	15(17.86)	9(37.50)		
Histopathological Grade	G1	25(29.76)	5(20.83)	χ2=11.497	0.003
	G2	34(40.48)	3(12.50)		
	G3	25(29.76)	16(66.67)		
Lymph Node Metastasis	Yes	28(33.33)	17(70.83)	χ2=10.800	0.001
	No	56(66.67)	7(29.17)		
Depth of Myometrial Invasion	<1/2	53(63.10)	9(37.50)	χ2=5.001	0.025
	≥1/2	31(36.90)	15(62.50)		
Tumor Diameter	≤2cm	57(67.86)	8(33.33)	χ2=9.285	0.002
	<2cm	27(32.14)	16(66.67)		

Para-aortic Lymphadenectomy	Yes	43(51.19)	6(25.00)	$\chi^2=5.166$	0.023
	No	41(48.81)	18(75.00)		
Adjuvant Radio/Chemotherapy	Yes	67(79.76)	16(66.67)	$\chi^2=1.799$	0.180
	No	17(20.24)	8(33.33)		
Adjuvant Hormonal Therapy	Yes	60(71.43)	7(29.17)	$\chi^2=14.156$	<0.001
	No	24(28.57)	17(70.83)		

2.4 Analysis of Influencing Factors of Recurrence in Patients with Endometrial Cancer after Hysteroscopic Electroresection

The dependent variable was the recurrence of endometrial cancer patients after hysteroscopic electroresection (1= recurrence, 0= no recurrence), and the independent variables were the indicators with statistical differences such as serum CA125 level, histopathological grade, lymph node metastasis status, depth of myometrial invasion, and tumor diameter (assigned values are shown in Table 3). The results of multiple logistic regression analysis showed that Serum CA125, histopathological grade G3, lymph node metastasis, myometrial invasion depth $\geq 1/2$, tumor diameter $> 2\text{cm}$, no para-aortic lymph node dissection, and no postoperative hormone drug treatment are risk factors for recurrence after hysteroscopic electroresection in patients with endometrial cancer ($\text{OR} > 1$, $P < 0.05$). See Table 4.

Table 3. Assignment of Major Independent Variables

Independent Variable	Variable Specification	Assignment notes
Serum CA125	Continuous variable	-
Histopathological Grade	Categorical variable	1=G3,0=G1-G2
Lymph Node Metastasis	Categorical variable	1=Yes,0=No
Myometrial Invasion Depth	Categorical variable	1= $\geq 1/2$,0= $< 1/2$
Tumor Diameter	Categorical variable	1= $< 2\text{cm}$,0= $\leq 2\text{cm}$
Para-aortic Lymphadenectomy	Categorical variable	1=No,0=Yes
Postoperative Hormonal Therapy	Categorical variable	1=No,0=Yes

Table 4. Multivariate Logistic Regression Analysis of Recurrence after Hysteroscopic Resection in Endometrial Cancer Patients

Related Factors	β	SE	Wald	P	OR	95%CI
Serum CA125	0.344	0.075	20.902	<0.001	1.411	1.217-1.635
Histopathological Grade	1.552	0.494	9.851	0.002	4.720	1.791-12.439
Lymph Node Metastasis	1.580	0.505	9.786	0.002	4.857	1.804-13.074
Myometrial Invasion Depth	1.047	0.478	4.790	0.029	2.849	1.116-7.278
Tumor Diameter	1.440	0.492	8.570	0.003	4.222	1.610-11.076
Para-aortic Lymphadenectomy	1.146	0.519	4.869	0.027	3.146	1.137-8.710
Postoperative Hormonal Therapy	1.804	0.510	12.511	<0.001	6.071	2.235-16.494
Constant	-10.677	2.170	24.212	<0.001	-	-

3 Discussion

Hysteroscopic electroresection is a common surgical procedure for the clinical treatment of endometrial cancer at present. During the operation, the lesion can be precisely removed with the assistance of hysteroscopy, which can minimize the stress damage caused by the surgery to the endometrium and preserve uterine function [7]. However, the recurrence in the short term after this operation has become the main problem that troubles both doctors and patients in current clinical practice. According to literature reports [8], the recurrence of gynecolog-

ical malignant tumors in the short term after surgical treatment is one of the important reasons for the persistently high mortality rate of patients. The research results of Yuan Chaoqun ^[9] et al. found that among 96 patients with endometrial cancer, 23 (23.96%) experienced recurrence after surgery. Among the 108 patients with endometrial cancer in this study, 24 cases relapsed during the 2-year follow-up after hysteroscopic electroresection, with a recurrence rate of 22.22%, which is consistent with the above study. This suggests that the postoperative recurrence rate of endometrial cancer patients is relatively high and the prognosis is poor. It is necessary to draw the attention of both clinical doctors and patients. If the risk factors that induce postoperative recurrence can be identified as early as possible, it will be of great significance for improving the prognosis of patients and preventing postoperative recurrence.

The results of further multiple logistic regression analyses in this study showed that Serum CA125, histopathological grade G3, lymph node metastasis, myometrial invasion depth $\geq 1/2$, tumor diameter $> 2\text{cm}$, no para-aortic lymph node dissection, and no postoperative hormone drug treatment are risk factors affecting the recurrence of endometrial cancer patients after hysteroscopic electroresection ($\text{OR} > 1$, $P < 0.05$). The reasons for this are analyzed as follows: (1) Serum CA125 is a high-molecular glycoprotein that is widely present in mesothelial cell tissues and is an important tumor marker for endometrial cancer and ovarian cancer, participating in the occurrence and progression of malignant tumors^[10]. According to the research report by Nakamura K et al. ^[11], the serum CA125 level is closely related to the depth of myometrial invasion, stage and lymph node metastasis of endometrial cancer, supporting the conclusion of this study. The mechanism may be that the higher the preoperative serum CA125 level of the patient, the higher the tumor stage, the higher the malignancy degree, or the presence of metastasis, the higher the risk of residual lesion tissue even after surgical treatment, leading to an increased risk of postoperative recurrence^[12]. Therefore, in clinical practice, the preoperative serum CA125 level should be incorporated into the comprehensive assessment of the patient's condition, and targeted treatment and prevention plans should be formulated to reduce the risk of postoperative recurrence. (2) Pathological grade G3, lymph node metastasis, myometrial invasion depth $\geq 1/2$, and tumor diameter $> 2\text{cm}$ are all pathological features of endometrial cancer. In the recurrence group, the presence of the above pathological features indicates a high degree of tumor malignancy, rapid lesion proliferation, and severe invasion of surrounding normal tissues. Even after hysteroscopic electroresection, the risk of residual tumor cells is much higher than that of patients with low differentiation and no lymph node metastasis, and recurrence is more likely to occur after the operation [13-15]. In this regard, in clinical practice, the pathological characteristics after surgery should be clearly defined, and postoperative adjuvant treatment plans, such as chemotherapy, radiotherapy, and hormone therapy, should be formulated based on the histopathological features to eliminate residual tumor cells and reduce the postoperative

recurrence rate. (3) Endometrial cancer is mostly confined to the uterus, but some patients may still have lymph node metastasis beside the abdominal aorta ^[16]. In this study, the proportion of undissected para-aortic lymph nodes in the recurrence group was significantly higher than that in the non-recurrence group, suggesting that para-aortic lymph node dissection has a certain correlation with recurrence, which is similar to the research report by Li Rong ^[17]. The patient did not perform para-aortic lymph node dissection during the operation, which may result in residual lesions at the invaded lymph nodes and lead to postoperative recurrence. In this regard, in clinical practice, adjuvant treatment methods such as radiotherapy and chemotherapy should be implemented for patients who have not undergone para-aortic lymph node dissection after surgery, in order to minimize recurrence to the greatest extent. (4) Endometrial cancer is a kind of estrogen-dependent malignant tumor. When the hormones in the body are disordered and the estrogen level rises, it will promote the growth, proliferation and differentiation of tumor cell tissues [18-19]. If hormone-assisted therapy is not given after the operation, estrogen may promote tumor growth, increasing the risk of postoperative recurrence. Therefore, after hysteroscopic electroresection, it is necessary to provide the patient with progesterone preparations for adjuvant treatment based on their condition and physical function, in order to antagonize estrogen activity, prevent endometrial hyperplasia and tumor cell growth, and thereby reduce the risk of postoperative recurrence ^[20].

In conclusion, the recurrence rate of endometrial cancer after hysteroscopic electroresection is relatively high and is related to factors such as serum CA125 levels, histopathological grades, lymph node metastasis status, depth of myometrial invasion, and tumor diameter. In clinical practice, targeted countermeasures should be actively taken to address the above risk factors in order to reduce the postoperative recurrence rate.

References

- [1]Chen Xiaojun. Interpretation of Clinical Guidelines for the Diagnosis, Treatment and Follow-up of Endometrial Cancer by ESMO [J]. Journal of Practical Obstetrics and Gynecology, 2023, 39(3):182-187.
- [2]Ribeiro-Santos P, Martins Vieira C, Viana Veloso GG, et al. Tailoring Endometrial Cancer Treatment Based on Molecular Pathology: Current Status and Possible Impacts on Systemic and Local Treatment[J]. Int J Mol Sci. 2024, 25(14):7742.
- [3]Li Jian, Mu Huaibo, Fu Jiuyuan. Analysis of the efficacy and safety of gonadotropin-releasing hormone agonists combined with levonorgestrel intrauterine sustained-release contraceptive system in the treatment of endometrial cancer after hysteroscopic electroresection [J]. Chinese Medical Journal, 2023, 58(11):1245-1248.
- [4]Zhang Meng, Zhang Shan, Wang Yunyun, et al. Establishment of a nomogram prediction model for postoperative recurrence in patients with endometrial cancer and its clinical application value [J] Advances in Modern Obstetrics and Gynecology, 2023,32 (5):349-354.
- [5] Lu Junjie, Hu Chunxiu, Chen Jingting, et al. Analysis of Postoperative Recurrence of Gynecological Malignant Tumors and its Influencing factors [J]. South China Preventive Medicine, 2020,46 (4):441-443,453.
- [6] Gynecological Oncology Committee of the China Anti-Cancer Association Diagnosis and Treatment Guide-

lines for endometrial Cancer (2021 Edition)[J]. Chinese Journal of Cancer, 2021, 31(6):501-512.

[7] Zhao Yanru, Xu Yuexun, Zhou Yan. The influence of Goserelin combined with hysteroscopic electroresection on postoperative disease remission and recurrence in patients with early endometrial cancer [J]. Chinese Journal of Pharmacy and Clinical Medicine, 2022,22 (4):358-360.

[8] Jiang Shenyi, Wu Bin, Yu Xiaosong. Analysis of the Order of Causes of death and Mortality Rate of Malignant Tumors among Urban and Rural Women in China from 2004 to 2015 [J] Chinese Public Health, 2019,35 (12):1706-1709.

[9] Yuan Chaoqun, Feng Yanxiao, Wu Lecce. Analysis of Risk Factors for Recurrence in Patients with endometrial Cancer after hysteroscopic electroresection [J]. Journal of Practical Cancer, 2023,38 (6):1003-1005.

[10]Prueksaritanond N, Angsathapon S, Insin P.The Utility of Preoperative Serum CA125 Combined with HE4 to Predict Lymph Node Metastasis in Endometrial Cancer[J]. Gynecol Obstet Invest, 2023, 88(1):53-60.

[11]Nakamura K,Imafuku N,Nishida T,et al. Measurementof the minimum apparent diffusion coefficient(ADCmin) of the primary tumor and CA125 are predictive of diseaserecurrence for patients with endometrial cancer[J].Gyne-col Oncol, 2012, 124(34):335-339.

[12]Liao Xuhui, Zhang Xiaoyan, Lu Hongsheng. Expression and Correlation analysis of cancer antigen 125 CD68 and carcinoembryonic antigen in patients with endometrial cancer [J]. Chinese Journal of Maternal and Child Health, 2023,38 (16):3108-3112.

[13] Zhai Mengjiao, Sun Lisha, Zhang Juan. Analysis of clinicopathological characteristics and prognostic factors of advanced endometrial cancer [J]. Journal of Practical Cancer, 2023,38 (8):1361-1364.

[14]RAINBO Research Consortium. Refining adjuvant treatment in endometrial cancer based on molecular features: the RAINBO clinical trial program. Int J Gynecol Cancer[J]. 2023,33 (1):109-117.

[15] Liu Tingting, Kong Weimin, Han Chao, et al. Construction and verification of clinicopathological characteristics and prognosis nomogram of endometrial cancer in the elderly based on SEER Database [J]. Journal of Clinical Oncology, 2024, 29(2):142-147.

[16] Wang Huan, MAO Xiguang, Mu Shan, et al. The application effect of para-aortic lymph node dissection in total hysterectomy of both adnexa in patients with type I endometrial cancer [J]. Journal of Clinical Military Medicine, 24, 52(4):365-368.

[17] Li Rong, Lu Yuli, Li Yongli. The influence of para-aortic lymph node dissection at the renal vein level on postoperative recurrence in patients undergoing surgery for non-stage I endometrial cancer [1]. South China Journal of Defense Medicine, 2020,34 (1):67-69.

[18] Zhang Yi, Liu Lu. The influence of high-dose progesterone combined with hysteroscopic resection on the pregnancy rate of young patients with early endometrial cancer [J]. Journal of Practical Cancer, 2024,39 (6):1012-1015.

[19] An Qi, Wang Yiyang. Research Progress on non-progesterone Receptor Mechanisms of progesterone Resistance in endometrial cancer [J]. Medical Review, 2023,29 (12):2306-2311.

[20] Gynecological Oncology Group, Obstetrician and Gynecologist Branch, Chinese Medical Doctor Association, Ma Xiaoxin, Xiang Yang, et al. Chinese Expert Consensus on Endocrine Therapy for Recurrent Endometrial Cancer (2024 Edition)[J] Chinese Journal of Practical Gynecology and Obstetrics, 24, 40(1):68-73.