



Article

Optimization of Hysteroscopic Diagnosis of Chronic Endometritis in Women With Reproductive Loss

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Abstract: Chronic endometritis (CE) is a significant factor in reproductive loss, including recurrent pregnancy loss and repeated implantation failure in assisted reproductive technology programs. Despite its high prevalence, diagnosing CE remains challenging due to its often asymptomatic course and the lack of strictly pathognomonic clinical signs. Hysteroscopy, combined with morphological and immunohistochemical examination of the endometrium, is considered a key tool for detecting the disease.

Keywords: Chronic endometritis, hysteroscopy, reproductive loss, recurrent pregnancy loss, CD138, endometrial biopsy.

Introduction

Reproductive loss remains one of the most pressing problems in modern gynecology and reproductive medicine. According to the literature, up to 15–20% of clinically confirmed pregnancies end in spontaneous miscarriage, and 1–3% of women experience recurrent pregnancy loss. One of the potentially reversible causes of this pathology is chronic endometritis—a persistent inflammatory lesion of the uterine lining associated with impaired endometrial receptivity[1,2,3].

Chronic endometritis is characterized by a subtle clinical course and is often detected only upon in-depth examination. Routine diagnostic methods (ultrasound, bacteriological analysis) have limited sensitivity. Therefore, hysteroscopy with subsequent morphological and immunohistochemical assessment of the endometrium is considered the "gold standard" for diagnostic verification[4].

In a specialized tertiary care hospital setting, developing a standardized diagnostic protocol makes it possible to improve the detection rate of CE and reduce the number of false-negative results[5,6].

The objective of this study is to develop and substantiate an optimized algorithm for the hysteroscopic diagnosis of chronic endometritis in women with a history of reproductive loss. The article presents clinical criteria for patient selection, a standardized protocol for hysteroscopic examination, the principles of targeted biopsy, and morphological verification of the diagnosis.

Research materials and methods: The study was conducted at the National Medical Center. Patients of reproductive age (18-42 years) with reproductive losses in the anamnesis were examined:

- two or more spontaneous miscarriages before 22 weeks;

Citation: N. G. Shokirova, N. D. Muratova. Optimization of Hysteroscopic Diagnosis of Chronic Endometritis in Women With Reproductive Loss. Central Asian Journal of Medical and Natural Science 2026, 7(3), 111-115.

Received: 10thFeb 2026

Revised: 21th Mar 2026

Accepted: 20th Apr 2026

Published: 13th May 2026



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- undeveloped pregnancy;
- repeated failure of implantation in IVF programs;
- an unclear factor of infertility, excluding male and genetic factors.

Inclusion criteria: presence of clinical or anamnesic data that allows for suspicion of intrauterine pathology; informed consent for invasive diagnostics. Hysteroscopy was performed during the early proliferative phase of the menstrual cycle (5-10 days). Office or surgical hysteroscopy was performed using a physiological solution of sodium chloride as a medium for expanding the uterine cavity.

- bleeding;
- uneven vascularization.

The most informative sign was the combination of micropolyps and hyperemia. However, isolated hysteroscopic assessment without morphological verification did not allow for the establishment of a definitive diagnosis. Immunohistochemical examination using CD138 allowed for the identification of plasma cells in the endometrial stroma in a significant portion of patients suspected of having CE, including cases with minimal visual changes.

It has been established that performing a targeted biopsy from areas with visual markers increases the diagnostic value of the study compared to "blind" aspiration biopsy.

RESULTS. The clinical characteristic of patients is a set of anamnesic and clinical-diagnostic indicators reflecting reproductive health, the presence of risk factors, and previous pathological conditions capable of influencing the course and outcome of pregnancy. Data analysis allows for the identification of the most significant predictors of implantation and gestational disorders.

Depending on the nature of the identified disorders in the anamnesis, the patients were divided into the following clinical categories: habitual miscarriage, non-developing pregnancy, repeated implantation failures, the presence of intrauterine interventions in the anamnesis, and postpartum endometritis[7,8,9].

Among the examined patients, intrauterine interventions were most frequently encountered in the anamnesis - 139 cases (55.6%), which indicates the high prevalence of invasive procedures in the uterine cavity and their possible role in disrupting endometrial receptivity. Habitual miscarriage was noted in 118 patients (47.2%), indicating a significant proportion of women with recurrent reproductive losses and the possible presence of chronic pathophysiological mechanisms.

Repeated implantation failures were recorded in 68 patients (27.2%), reflecting problems in the early stages of gestation related to the disruption of embryo-endometrial interaction[10]. Non-developing pregnancy was identified in 64 patients (25.6%), which also confirms the presence of pronounced gestational disorders.

The lowest frequency was noted for postpartum endometritis—42 cases (16.8%), but this condition is of significant clinical importance, as it can lead to structural and functional changes in the endometrium.

Table 1. Clinical characteristics of patients (n = 250).

Indicator	n	%
Habitual miscarriage	118	47,2
Non-developing pregnancy	64	25,6
Recurrent implantation failures	68	27,2
History of intrauterine interventions	139	55,6

Postpartum endometritis	42	16,8
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Thus, the obtained data indicate a high prevalence of adverse reproductive factors, among which intrauterine interventions and habitual miscarriage play a leading role. The identified features must be taken into account when planning diagnostic and therapeutic measures aimed at restoring reproductive function and increasing the effectiveness of pregnancy onset and delivery[11,12].

Hysteroscopic signs of chronic endometritis represent a set of visual changes in the uterine mucosa identified during endoscopic examination, reflecting the presence of an inflammatory process, its prevalence, and activity. Assessing these signs allows for judging the state of the endometrium and serves as an important stage in the diagnosis of chronic endometritis.

Depending on the nature of the hysteroscopic picture, the following main signs are distinguished: micropolyps, diffuse hyperemia, focal hyperemia, endometrial edema, contact bleeding, and the absence of pathological changes.

Diffuse endometrial hyperemia was most frequently identified in 134 patients (53.6%), indicating a widespread inflammatory process in the uterine mucosa. Micropolyps were found in 122 patients (48.8%), which is a characteristic morphological marker of chronic inflammation and indicates a prolonged course of the pathological process[13].

Endometrial edema was recorded in 101 patients (40.4%), reflecting impaired microcirculation and increased vascular wall permeability. Focal hyperemia was noted in 88 patients (35.2%), which may indicate localized areas of inflammation.

Contact bleeding was detected in 76 patients (30.4%) and indicates increased endometrial vulnerability and inflammatory process activity. At the same time, 82 patients (32.8%) showed no hysteroscopic signs of pathology, which emphasizes the limited sensitivity of the method and the need for comprehensive diagnostics.

Table 2. Hysteroscopic signs of chronic endometritis (n=250).

Sign	n	%
Micropolyps	122	48,8
Diffuse hyperemia	134	53,6
Focal hyperemia	88	35,2
Endometrial edema	101	40,4
Contact bleeding	76	30,4
Absence of pathological signs	82	32,8

Table 3. Morphological verification (CD138+) (n=250).

Result	n	%
Verified XE	142	56,8
Negative result	108	43,2

Thus, the hysteroscopic appearance of chronic endometritis is characterized by the predominance of diffuse inflammatory changes and the presence of specific signs such as micropolyps and hyperemia. However, the absence of visual changes in a portion of the patients indicates the need to confirm the diagnosis using additional research methods.

Morphological verification of chronic endometritis (CD138+) represents the "gold standard" of diagnosis, based on identifying plasma cells in the endometrial stroma using immunohistochemical methods. This approach allows for objective confirmation of the presence of a chronic inflammatory process[14,15].

According to the results of the morphological study, chronic endometritis was confirmed in 142 patients (56.8%), indicating a high prevalence of this pathology in the study group. A negative result was obtained in 108 patients (43.2%), indicating the absence of morphological signs of inflammation despite possible clinical or hysteroscopic changes.

Thus, morphological verification allows for the reliable diagnosis of chronic endometritis and the clarification of the nature of the pathological process. Comparing hysteroscopic and morphological data is of great practical importance, as it ensures increased diagnostic accuracy and the validity of treatment tactics.

Discussion. Optimizing hysteroscopic diagnosis of CE requires a comprehensive approach. First, strict selection of patients is necessary. Performing hysteroscopy on all women with infertility is economically impractical and clinically unjustified. The method should be used in cases of reproductive loss or suspicion of intrauterine pathology.

Secondly, the correct timing of the procedure is important. The early proliferative phase ensures the best visualization of the endometrium and reduces the risk of diagnostic errors.

Third, standardizing the inspection protocol reduces the subjectivity of interpretation. The fixation of objective parameters (localization, severity of hyperemia, presence of micropolyps) increases the reproducibility of results.

Morphological verification remains the key stage. The presence of plasma cells in the endometrial stroma is a morphological criterion for chronic endometritis. The use of CD138 significantly increases diagnostic sensitivity and minimizes the risk of hyperdiagnosis[16].

The diagnosis of SE is of particular importance in ERT programs. The restoration of endometrial receptivity after adequate antibacterial therapy and control of recovery is associated with an increased frequency of pregnancy.

Conclusion. Chronic endometritis is a clinically significant and potentially reversible factor in reproductive losses. Hysteroscopy combined with targeted biopsy and immunohistochemical examination of the endometrium significantly increases diagnostic accuracy.

Standardization of the examination protocol, correct selection of patients, and mandatory morphological verification of the diagnosis are the main directions for optimizing the diagnostic process.

In the conditions of the specialized center, the implementation of a unified diagnostic algorithm contributes to improving reproductive outcomes and increasing the effectiveness of treatment for women with habitual miscarriage and failed implantation.

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