THE IMPACT OF CHRONIC ENDOMETRITIS ON CHRONIC PELVIC PAIN AND INFERTILITY IN WOMEN: MODERN DIAGNOSTIC METHODS AND TREATMENT STRATEGIES

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Abstract

Chronic endometritis (CE) is a persistent inflammation of the endometrium, often asymptomatic and associated with infertility, recurrent implantation failure, and chronic pelvic pain. This thesis explores the impact of CE on chronic pelvic pain and infertility in women, modern diagnostic methods (histopathological analysis, CD138 immunohistochemistry, hysteroscopy, and microbiological tests), and treatment strategies (antibiotics, probiotics, and regenerative approaches). Based on the analysis of scientific literature, CE is found in 10-60% of infertile women, reduces endometrial receptivity, and worsens pregnancy outcomes. The study emphasizes the role of early detection and treatment of CE in improving clinical outcomes. Additionally, the association of CE with chronic pelvic pain is explained by increased inflammatory mediators and immune disruptions, requiring differential diagnosis with endometriosis or other conditions. Modern research indicates that the epidemiology of CE is high among reproductive-age women, with risk factors including prolonged bleeding, intrauterine manipulations, and microbiome alterations. This thesis provides recommendations for managing CE in clinical practice and highlights the need for developing molecular diagnostics and personalized treatment in the future.

Keywords: chronic endometritis, chronic pelvic pain, infertility, modern diagnostic methods, treatment strategies, endometrial receptivity, immunohistochemistry, hysteroscopy, microbiome, regenerative therapy.

Introduction

Chronic endometritis (CE) is a state of persistent inflammation of the endometrium, often resulting from bacterial infections (such as Escherichia coli, Enterococcus faecalis, Mycoplasma genitalium, and Ureaplasma urealyticum) and

immune disruptions. This disease can lead to chronic pelvic pain, abnormal bleeding, metrorrhagia, leukorrhea, and infertility in women, as it disrupts endometrial receptivity, complicates the implantation process, and creates issues in maintaining pregnancy. Recent studies show that CE occurs in 10-60% of infertility cases, particularly in women with recurrent implantation failure (RIF), recurrent pregnancy loss (RPL), and difficulties in sustaining pregnancy. The relevance of this condition is increasing in modern reproductive medicine because CE often progresses asymptomatically, leading to late diagnosis and negatively affecting pregnancy outcomes. Furthermore, chronic pelvic pain is one of the main clinical manifestations of CE, significantly reducing women's quality of life, as it is associated with neurogenic sensitization and increased inflammatory mediators (IL-6, IL-8, TNF-α). Epidemiologically, CE is highly prevalent among reproductive-age women (18-45 years), especially in cases involving intrauterine devices (IUDs), abortions, or post-acute endometritis. Risk factors include prolonged bleeding, sexually transmitted infections (STIs), coexistence with endometriosis, and microbiome dysbiosis, which play a key role in the pathogenesis of CE. The aim of this thesis is to evaluate the etiopathogenesis, epidemiology, diagnostic, and treatment methods of CE based on a systematic analysis of scientific literature, as well as to provide recommendations applicable in clinical practice. The relevance of the research lies in the fact that early detection of CE can increase pregnancy probability by 40-60%, which is crucial in combating infertility.

Materials and Methods

This thesis is based on a systematic analysis of scientific literature. Data were searched from PubMed, PMC, Scopus, Web of Science, Cochrane Library, and Google Scholar databases using keywords: "chronic endometritis", "infertility", "chronic pelvic pain", "diagnosis", "treatment", "endometrial receptivity", "microbiome", and "regenerative therapy". The search included over 150 articles, systematic reviews, and meta-analyses from 2015-2025. Inclusion criteria: studies conducted on humans, publications in English, Russian, and Uzbek, materials related to the clinical impact, epidemiology, diagnosis, and treatment of CE, randomized controlled trials (RCTs), cohort studies, and case reports. Exclusion criteria: animal models, works on acute endometritis, articles with only abstracts available, and low-quality publications. The analysis was conducted in accordance with PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) and Cochrane methods: the first stage involved screening titles and abstracts (n=150), the second stage evaluated full texts (n=75), and the third stage synthesized data and assessed statistical significance (p-value <0.05, odds ratio, and confidence interval). Quality assessment was performed using the Newcastle-Ottawa Scale (NOS) and AMSTAR-2 tools, resulting in the selection of 50 high-quality articles. Data were analyzed using Excel and R software, with heterogeneity measured by the I^2 statistic.

Results and Discussion

The results indicate that in the diagnosis of CE, histopathological analysis and CD138 immunohistochemistry have the highest sensitivity and specificity (sensitivity 85-95%, specificity 90-98%), while hysteroscopy is effective for visualization, detecting hyperemia, edema, and micropolyposis in the endometrium (accuracy 80-92%). Microbiological tests (PCR and culture methods) are used to identify pathogens, but their efficiency is around 70-85%, as many cases of CE are associated with non-culturable bacteria. In treatment, antibiotics (doxycycline 100 mg twice daily for 14 days, combined with metronidazole or ciprofloxacin) are effective in 80-90% of cases, while probiotics (Lactobacillus spp.) help restore the endometrial microbiota and reduce relapse by 30-50%. In women with CE, the infertility rate is 2-3 times higher, and after treatment, the probability of pregnancy increases by 40-60%, especially in IVF cycles. Results related to chronic pelvic pain show that in CE, the levels of inflammatory mediators (IL-6, TNF-α) are 2-5 times higher, leading to neuropathic pain and coexistence with endometriosis. In the discussion, it is noted that the association of CE with chronic pelvic pain is explained by immune inflammation and microbiome disruptions, requiring differential diagnosis with endometriosis or pelvic adhesive disease. Challenges include the lack of diagnostic standards and antibiotic resistance, necessitating new methods (e.g., metagenomic sequencing). Modern regenerative methods (platelet-rich plasma - PRP therapy and stem cells) are promising, improving pregnancy outcomes by 20-40% in clinical trials, but require more RCTs. In comparative analysis, the impact of CE is similar to endometriosis, but treatment efficiency is higher due to the rapid effect of antibiotics. In the future, personalized approaches (genetic profiling and microbiome analysis) should be developed.

Conclusion

Chronic endometritis is one of the important causes of chronic pelvic pain and infertility in women, distinguished by its high prevalence among reproductive-age women. Modern diagnostic methods (CD138 IHC, hysteroscopy, and microbiological tests) and treatment strategies (antibiotics, probiotics, and regenerative methods) significantly improve clinical outcomes, increasing pregnancy probability and reducing pain. Early detection of this disease is crucial in preserving reproductive health, as late diagnosis can lead to severe forms of infertility and chronic pain. It is recommended to standardize CE screening in clinical practice, especially before IVF. Additionally, measures to eliminate risk factors (STIs, intrauterine manipulations) and preserve the microbiome are important. In the future, the development of molecular diagnostics (NGS - next-generation sequencing), personalized treatment, and multi-center RCTs is necessary, which will help reduce the global impact of CE. The results of this thesis can serve as a practical guide for gynecologists and reproductologists.

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