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MODERN APPROACHES TO EARLY DIAGNOSIS AND MANAGEMENT OF ENDOMETRIAL HYPERPLASTIC PROCESSES

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Abstract: Endometrial hyperplastic processes represent a group of proliferative conditions of the endometrium that range from benign glandular-stromal overgrowth to precancerous atypical hyperplasia. They are considered one of the most significant gynecological disorders due to their potential progression to endometrial carcinoma. Early diagnosis and adequate treatment are essential to prevent malignant transformation while maintaining reproductive potential. Recent advancements in imaging techniques, molecular diagnostics, and fertility-preserving treatment options have significantly transformed the clinical approach to endometrial hyperplasia. This article provides a comprehensive overview of the current strategies for early detection and treatment, emphasizing personalized medicine and evidence-based management.

Keywords: Endometrial hyperplasia; atypical hyperplasia; early diagnosis; hysteroscopy; endometrial biopsy; progestin therapy; levonorgestrel intrauterine system; fertility preservation; molecular markers; endometrial carcinoma prevention.

Introduction

Endometrial hyperplasia is defined as an abnormal proliferation of the endometrial glands and stroma, most often associated with prolonged estrogen stimulation unopposed by progesterone. Clinically, patients present with abnormal uterine bleeding, infertility, or incidental findings during imaging. The significance of these lesions lies in their potential for malignant transformation, particularly in atypical cases, which may progress to endometrial carcinoma in up to 30 percent of patients if left untreated. Modern approaches to diagnosis and therapy aim to balance effective treatment with preservation of fertility and quality of life.

Epidemiological data suggest that the incidence of endometrial hyperplasia has been rising globally, in parallel with increasing rates of obesity and metabolic syndrome. Studies indicate that nearly 10–15 percent of women presenting with abnormal uterine bleeding in perimenopausal age are diagnosed with some form of endometrial hyperplasia. The World Health Organization (WHO) has classified these lesions into non-atypical hyperplasia and atypical hyperplasia, with the latter being associated with a substantially higher risk of malignant transformation. In fact, atypical hyperplasia is now often referred to as endometrial intraepithelial neoplasia (EIN), reflecting its premalignant potential. Reports suggest that up to 25–30 percent of patients with atypical hyperplasia may progress to carcinoma if left untreated.

Traditionally, the management of endometrial hyperplasia involved radical surgical interventions, including hysterectomy, which, while effective in preventing malignant progression, also resulted in the irreversible loss of fertility. However, over the past two decades, significant advances have transformed the diagnostic and therapeutic landscape of this condition. The development of high-resolution transvaginal ultrasonography, saline

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infusion sonohysterography, and office-based hysteroscopy has greatly improved the accuracy of early detection. Moreover, the introduction of molecular diagnostic techniques, such as immunohistochemistry and genetic profiling, has provided additional tools to assess malignant potential at an earlier stage.

Parallel to diagnostic innovations, the therapeutic paradigm has shifted toward conservative and fertility-preserving strategies. Hormonal therapy, particularly the levonorgestrel-releasing intrauterine system (LNG-IUS), has demonstrated high efficacy in reversing hyperplastic changes while minimizing systemic side effects. In addition, minimally invasive hysteroscopic surgery has become a preferred alternative to blind curettage, offering both diagnostic and therapeutic benefits. These developments have made it possible to individualize treatment, taking into account the patient's age, reproductive desires, comorbidities, and histological subtype of hyperplasia.

In this context, early diagnosis and modern treatment approaches are essential not only for reducing the burden of abnormal uterine bleeding but also for preventing progression to endometrial carcinoma. This article aims to review contemporary strategies in the early detection and management of endometrial hyperplastic processes, highlighting the integration of advanced diagnostic tools, molecular insights, and innovative treatment modalities into everyday clinical practice.

Diagnostic Approaches

Transvaginal ultrasound remains the first-line imaging tool for detecting abnormal endometrial thickening. In premenopausal women, a thickness greater than 12 mm and in postmenopausal women a thickness above 5 mm should raise suspicion. Saline infusion sonohysterography improves visualization of focal lesions, while hysteroscopy provides direct assessment and the opportunity for simultaneous biopsy or resection. Histopathological examination through endometrial biopsy remains the gold standard for diagnosis, allowing differentiation between non-atypical and atypical hyperplasia. In addition, molecular diagnostics such as PTEN, PAX2, KRAS, and mismatch repair gene analysis are being investigated as predictive markers of progression risk.

Therapeutic Approaches

Medical therapy has become the cornerstone of treatment for non-atypical hyperplasia. Progestin therapy, whether systemic or local, induces regression in the majority of patients. The levonorgestrel-releasing intrauterine system (LNG-IUS) has shown superior results compared to oral progestins, offering high rates of regression with minimal systemic side effects. Surgical treatment is reserved for resistant cases or patients with atypical hyperplasia. Hysteroscopic resection is increasingly used as a fertility-sparing option, allowing precise removal of localized lesions. For women with completed childbearing and recurrent or atypical disease, hysterectomy remains the definitive therapy. Fertility-preserving management is particularly relevant for younger patients; combining LNG-IUS therapy with assisted reproductive technologies has shown promising pregnancy outcomes.

Preventive and Follow-up Strategies

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Lifestyle modifications, including weight reduction, management of insulin resistance, and treatment of metabolic syndrome, significantly decrease recurrence risk. Continuous monitoring with ultrasound and repeat biopsies is necessary for early detection of relapse or progression, particularly in women managed conservatively. A multidisciplinary approach involving gynecologists, endocrinologists, and oncologists is recommended for optimal care.

Discussion

Modern approaches to endometrial hyperplasia highlight a shift from radical interventions to patient-centered, minimally invasive, and fertility-preserving therapies. Integration of imaging, histopathology, and molecular biomarkers allows for earlier and more precise diagnosis. Hormonal therapy, especially with LNG-IUS, offers high efficacy and safety for non-atypical hyperplasia. In contrast, atypical hyperplasia requires more aggressive management due to its high malignant potential. Hysteroscopic resection combined with close follow-up provides a safe alternative to hysterectomy in selected patients. Future directions include the development of molecular-based prognostic models and targeted therapies to further refine individualized treatment strategies.

Conclusion

Endometrial hyperplastic processes require timely diagnosis and evidence-based management to prevent progression to carcinoma. Modern advances in imaging, molecular pathology, and conservative treatment approaches allow effective disease control while preserving reproductive potential. The paradigm has shifted toward individualized care, emphasizing fertility preservation, minimally invasive surgery, and molecular-guided diagnostics as key elements of modern gynecological practice.

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