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PREMATURE OVARIAN INSUFFICIENCY: MODERN DIAGNOSTIC AND FERTILITY MANAGEMENT APPROACHES

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Premature ovarian insufficiency (POI) is a clinical condition characterized by the loss of normal ovarian function before the age of 40 years, leading to menstrual irregularities, infertility, and hypoestrogenism. Unlike natural menopause, POI may present with intermittent ovarian activity and occasional spontaneous ovulation. It is associated with significant reproductive, psychological, and long-term health consequences, including osteoporosis and cardiovascular disease. Epidemiologically, POI affects approximately 1% of women under 40 years and 0.1% under 30 years, making it an important but often underdiagnosed condition.

Objective of the study was to analyze modern diagnostic approaches and fertility management strategies in patients with premature ovarian insufficiency.

We conducted a systematic review of articles published between 2000 and 2025 focusing on the etiology, diagnosis, and management of premature ovarian insufficiency. Relevant studies were identified through searches in PubMed, Scopus, and Web of Science. The findings were synthesized qualitatively to identify key diagnostic methods and effective fertility management strategies.

This study highlighted that POI results from multifactorial causes including genetic abnormalities, autoimmune mechanisms, and iatrogenic factors such as chemotherapy and radiotherapy. The pathophysiology is characterized by follicular depletion or dysfunction leading to decreased estrogen levels and compensatory elevation of follicle-stimulating hormone (FSH). Diagnosis of POI is based on clinical presentation (amenorrhea or oligomenorrhea for at least 4 months), elevated gonadotropin levels (FSH >25 IU/L on two occasions), and decreased estradiol levels. Anti-Müllerian hormone (AMH) has emerged as a valuable marker of ovarian reserve, while genetic testing (e.g., FMR1 premutation) and autoimmune screening are recommended in selected cases.

Advances in imaging techniques, particularly transvaginal ultrasound, allow assessment of antral follicle count and ovarian volume. Ultrasound evaluation of antral follicle count, along with genetic testing such as FMR1 premutation analysis and karyotyping, further improves diagnostic accuracy. Emerging biomarkers and molecular techniques show potential for earlier detection of ovarian dysfunction.

This study demonstrates that fertility management in POI remains challenging. Although spontaneous pregnancy may occur in a small proportion of patients, oocyte donation remains the most effective treatment, with high success rates. Assisted reproductive technologies may be considered in selected cases, while fertility preservation techniques such as oocyte and ovarian tissue cryopreservation are important for patients at risk of POI. Emerging therapies, including platelet-rich plasma (PRP), stem cell therapy, and in vitro activation of follicles, offer promising future directions but require further clinical validation.

Conclusion. Increased awareness, early diagnosis, and individualized management strategies are crucial in improving reproductive outcomes and quality of life in women with POI. Future research should focus on regenerative therapies and personalized medicine approaches.