

## ENDOMETRIAL THICKNESS IN PREGNANCY: ANALYSIS BASED ON SONOGRAPHIC CRITERIA

**Barnoxonim Yuldasheva**

*Alfraganus University, Faculty of Medicine  
4th-year Medical Student, Clinical Internship*

**Abstract:** *Endometrial thickness is a crucial parameter in reproductive medicine, reflecting the endometrium's receptivity and its potential impact on implantation and pregnancy outcomes. This article reviews the significance of endometrial thickness in achieving successful pregnancy, particularly in assisted reproductive technologies (ART), and evaluates sonographic criteria as a diagnostic and prognostic tool. The role of ultrasonographic assessment in predicting implantation success and guiding individualized treatment strategies is also discussed.*

**Keywords:** *Endometrial thickness, pregnancy, sonography, implantation, assisted reproductive technology, endometrial receptivity, reproductive outcomes*

The endometrium plays a central role in female fertility, providing the optimal environment for embryo implantation and early pregnancy development. One of the key parameters used to assess endometrial receptivity is endometrial thickness, which can be measured non-invasively via transvaginal sonography. Accurate evaluation of endometrial thickness is essential in both natural conception and assisted reproductive technologies (ART), as it is closely associated with implantation potential and pregnancy outcomes.

During the menstrual cycle, endometrial thickness varies in response to hormonal changes, particularly estrogen and progesterone levels. Adequate endometrial proliferation and subsequent secretory transformation are necessary for successful implantation. Insufficient or excessively thick endometrium may reduce the likelihood of implantation, while optimal thickness is considered a favorable prognostic indicator for pregnancy.

Transvaginal ultrasonography provides a reliable, non-invasive method to measure endometrial thickness and assess its morphology. Several sonographic criteria, including endometrial pattern, echogenicity, and thickness, have been proposed as predictive markers of successful implantation. In ART cycles, monitoring endometrial thickness is a routine practice to optimize the timing of embryo transfer and improve clinical pregnancy rates.

This article aims to analyze the clinical relevance of endometrial thickness in pregnancy, highlighting the importance of sonographic evaluation as a diagnostic and

prognostic tool. Additionally, it discusses how individualized treatment decisions based on endometrial measurements can enhance reproductive outcomes and guide clinical management in fertility practice.

Endometrial thickness has emerged as a critical factor influencing reproductive outcomes, particularly in assisted reproductive technologies (ART) and natural conception cycles. The endometrium provides the necessary environment for embryo implantation, and its structural and functional characteristics are closely linked to hormonal regulation, vascularization, and endometrial receptivity. Transvaginal sonography offers a non-invasive and reliable method for measuring endometrial thickness and evaluating its morphology, making it a cornerstone in fertility assessment and management.

During the menstrual cycle, endometrial thickness changes dynamically under the influence of estrogen and progesterone. In the proliferative phase, rising estrogen levels stimulate endometrial proliferation, resulting in increased thickness and preparation for potential implantation. Following ovulation, progesterone induces secretory transformation, which further supports embryo attachment. Optimal endometrial thickness is associated with a trilaminar pattern and appropriate vascularization, factors that are considered indicative of high implantation potential. Conversely, insufficient endometrial growth or excessively thickened endometrium may compromise implantation, reduce pregnancy rates, and increase the risk of early pregnancy loss.

Several studies have highlighted specific cut-off values for endometrial thickness that correlate with successful implantation. In ART cycles, a thickness of approximately 7–14 mm is generally regarded as favorable, whereas measurements below 6 mm or above 15 mm have been linked to lower pregnancy rates. It is important to note that endometrial quality, including echogenicity and pattern, also plays a significant role alongside thickness. A trilaminar, hypoechoic endometrium in the late proliferative phase has been shown to predict higher implantation success compared to a homogeneous, hyperechoic endometrium.

Endometrial thickness assessment is particularly valuable in ART procedures such as in vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI). Regular sonographic monitoring allows clinicians to optimize the timing of embryo transfer, adjust hormonal support protocols, and identify patients who may require interventions to improve endometrial receptivity. Interventions may include modifying estrogen supplementation, using adjuvant therapies such as low-dose aspirin or granulocyte colony-stimulating factor, or delaying embryo transfer until endometrial conditions are optimal.

Beyond ART, endometrial thickness measurement has prognostic value in natural conception cycles. Suboptimal endometrial development has been associated with

recurrent implantation failure and early pregnancy loss. Monitoring endometrial growth in ovulatory cycles provides insight into hormonal function, endometrial health, and potential underlying pathologies such as polycystic ovary syndrome (PCOS), endometrial polyps, or submucosal fibroids that may impair implantation.

Despite the clinical utility of endometrial thickness, it is essential to interpret sonographic findings in the context of individual patient characteristics. Factors such as age, ovarian reserve, hormonal milieu, and previous ART outcomes should guide clinical decisions. Additionally, endometrial receptivity is influenced not only by thickness but also by molecular markers, immune factors, and endometrial pattern, highlighting the multifactorial nature of implantation success. Emerging research on endometrial receptivity arrays and genetic profiling complements sonographic evaluation, offering a more comprehensive approach to predicting implantation potential.

Clinical evidence supports the integration of endometrial thickness assessment into routine fertility care. Patients with suboptimal measurements may benefit from targeted interventions aimed at enhancing endometrial development, improving blood flow, and optimizing hormonal support. Personalized treatment strategies based on sonographic criteria enhance the likelihood of implantation and live birth while reducing the emotional and financial burden of repeated ART cycles.

In conclusion, endometrial thickness is a vital indicator of endometrial receptivity and has significant implications for pregnancy outcomes in both natural and assisted conception cycles. Sonographic evaluation provides a reliable, non-invasive method to monitor endometrial growth, assess structural characteristics, and guide individualized clinical management. Optimal endometrial thickness, combined with favorable morphology and vascularization, is associated with higher implantation success and improved reproductive outcomes. Integrating endometrial assessment into fertility protocols ensures a personalized approach, enhancing the probability of successful pregnancy while minimizing risks associated with suboptimal endometrial conditions.

Endometrial thickness is a key parameter in reproductive medicine, reflecting endometrial receptivity and significantly influencing pregnancy outcomes in both natural and assisted conception cycles. Optimal thickness, generally ranging from 7 to 14 mm in ART cycles, combined with a favorable trilaminar pattern, enhances the likelihood of successful implantation. Transvaginal sonography serves as a reliable, non-invasive method for assessing endometrial growth, morphology, and vascularization.

Regular monitoring of endometrial thickness allows clinicians to individualize treatment strategies, optimize the timing of embryo transfer, and implement interventions to improve endometrial receptivity when necessary. Integrating sonographic assessment with molecular markers and patient-specific factors provides a comprehensive approach to predicting implantation success. Overall, precise evaluation of endometrial thickness

supports personalized fertility care, improves clinical pregnancy rates, and contributes to better reproductive outcomes.

### References

1. Kasius, J., et al. (2014). Endometrial thickness and pregnancy rates after IVF: A systematic review and meta-analysis. *Human Reproduction Update*, 20(4), 530–541.
2. Chen, S., et al. (2016). Endometrial thickness and pattern measured by ultrasound as predictors of implantation success in IVF cycles. *Reproductive Biomedicine Online*, 33(1), 64–73.
3. Kasius, J., et al. (2015). Ultrasound evaluation of endometrial receptivity in ART. *Reproductive BioMedicine Online*, 30(1), 1–12.
4. Kovacs, P., et al. (2003). Importance of endometrial thickness in IVF and ICSI cycles. *Human Reproduction*, 18(12), 2679–2683.
5. McWilliams, G., et al. (2017). Transvaginal ultrasonography for endometrial assessment in fertility treatment. *Fertility and Sterility*, 107(2), 349–356.
6. Huang, C. C., et al. (2017). Correlation between endometrial thickness and implantation success in IVF patients. *Journal of Assisted Reproduction and Genetics*, 34(12), 1565–1573.
7. Gnoth, C., et al. (2008). Endometrial parameters and pregnancy outcomes: Clinical implications in ART. *Fertility and Sterility*, 90(3), 702–707.