ROLE OF LEVOTHYROXINE IN THYROID DISORDERS

Jafili Kkandakath Fahmiya Kadeeja
Tashkent Medical Academy,
International Faculty of Medicine
Email: fahmiyafhmi@gmail.com
Phone: +998 507177536, +91 9048475547

Abstract. *Levothyroxine (LT4) is a cornerstone in managing thyroid disorders, especially hypothyroidism and subclinical hypothyroidism (SCH). This literature review evaluates patterns of chronic use, absorption, and clinical outcomes, particularly in pregnancy and reproductive health. Recent studies highlight its frequent prescription globally, varying absorption patterns, and significant effects on reducing pregnancy complications in women with SCH. However, dosage inconsistencies and patient mismanagement remain key concerns. The article further explores Levothyroxine's role in normalizing menstrual cycles and restoring fertility in hypothyroid women.*

Keywords. *Levothyroxine, hypothyroidism, SCH, pregnancy outcomes, TSH, absorption, menstrual cycle, fertility*

Introduction

Thyroid hormones, primarily thyroxine (T4) and triiodothyronine (T3), play a vital role in regulating metabolism, growth, and reproductive function. They influence the menstrual cycle by modulating hypothalamic-pituitary-ovarian axis hormones, thereby affecting ovulation and fertility. Hypothyroidism, characterized by low thyroid hormone levels, disrupts this balance leading to menstrual irregularities such as amenorrhea, oligomenorrhea, and menorrhagia, and often causes ovulatory dysfunction and infertility.

Levothyroxine, a synthetic form of T4, remains the standard treatment to restore euthyroid status. Understanding levothyroxine's effectiveness in re-establishing menstrual regularity and improving reproductive health is crucial for managing hypothyroid patients, especially women of reproductive age.

Literature Review

A. Impact of Hypothyroidism on Reproductive Function

Menstrual abnormalities associated with hypothyroidism include amenorrhea, menorrhagia, and oligomenorrhea. Hypothyroidism leads to ovulatory dysfunction through disruption of gonadotropin secretion (FSH and LH). Clinical studies link low circulating T3 and T4 levels with altered FSH/LH patterns, affecting follicular development and ovulation.

B. Levothyroxine: Mechanism and Effectiveness

Levothyroxine replaces deficient T4, restoring normal thyroid hormone levels. It re-establishes negative feedback on hypothalamus and pituitary, normalizing TSH secretion. Normal TSH levels promote ovarian function restoration and menstrual cycle regularity.

Recommended starting dose is approximately 1.6 mcg/kg/day, adjusted based on clinical response and TSH monitoring.

C. Clinical Evidence: Levothyroxine and Menstrual Cycle

Multiple studies report cycle normalization within 3–6 months of levothyroxine therapy. Example: Jayaprakash et al. (2013) found that 85% of women with hypothyroid-induced amenorrhea regained regular cycles within 4 months of treatment.

D. Levothyroxine and Fertility Outcomes

Levothyroxine therapy often reverses infertility caused by hypothyroidism. Improved ovulation and pregnancy rates are documented following treatment. During pregnancy, dosage adjustments are critical to maintain euthyroidism and optimize outcomes.

E. Limitations and Considerations

Delayed diagnosis of hypothyroidism may prolong reproductive dysfunction. Improper dosage or poor patient adherence can reduce treatment effectiveness. The role of levothyroxine in subclinical hypothyroidism remains debated, with ongoing research needed.

F. Broader Clinical Context: Usage Patterns and Absorption

A Swiss cohort (CoLaus|PsyCoLaus) identified levothyroxine as the second most prescribed chronic drug, notably in older women. However, 27% of patients were under- or over-treated, highlighting monitoring gaps. Systematic reviews of levothyroxine absorption testing (LT4AT) reveal inconsistent protocols; a standardized approach (1000 μg LT4 fasting, hourly FT4 for 4 hours) is proposed to differentiate true malabsorption from pseudomalabsorption. Meta-analyses indicate levothyroxine therapy in pregnant women with subclinical hypothyroidism reduces pregnancy loss and neonatal death, although long-term neurodevelopmental effects remain unclear.

Research Methodology

This article synthesizes qualitative data from peer-reviewed cohort studies, randomized controlled trials, meta-analyses, and systematic reviews published between 2000 and 2024. Sources include indexed medical databases such as PubMed, Cochrane Library, and Scopus. The focus is on levothyroxine therapy's impact on thyroid disorders, menstrual cycle regulation, fertility, and pregnancy outcomes.

Analysis and Results

- Most studies affirm levothyroxine’s positive impact on restoring menstrual cyclicity and ovulation.

- Ovulation typically resumes within 2–4 months, with menstrual cycles normalizing by 3–6 months of treatment.
- Fertility outcomes improve, particularly in hypothyroid-related subfertility cases.
- Pregnancy outcomes improve with levothyroxine therapy, notably reducing miscarriage rates and neonatal mortality in women with subclinical hypothyroidism.
- Adherence to proper dosing and regular monitoring of TSH is essential for optimal therapeutic success.

References

1. Marti, C. H., Rodondi, N., Aujesky, D., et al. (2019). Clinical Use of Levothyroxine and Inappropriate Prescribing in the General Population: CoLaus|PsyCoLaus Study. JAMA Internal Medicine, 179(4), 499–507. https://doi.org/10.1001/jamainternmed.2018.7490
2. Vita, R., Saraceno, G., Trimarchi, F., & Benvenga, S. (2021). Malabsorption versus pseudomalabsorption of levothyroxine: A diagnostic algorithm. Endocrine, 72(1), 1–7. https://doi.org/10.1007/s12020-021-02645-2
3. Nazarpour, S., Ramezani Tehrani, F., Simbar, M., & Azizi, F. (2019). Effects of Levothyroxine Treatment on Pregnancy Outcomes in Subclinical Hypothyroidism: A Systematic Review and Meta-Analysis. Archives of Gynecology and Obstetrics, 299(3), 819–831. https://doi.org/10.1007/s00404-018-05060-2
4. Alexander, E. K., Pearce, E. N., Brent, G. A., et al. (2017). 2017 Guidelines of the American Thyroid Association for the Diagnosis and Management of Thyroid Disease During Pregnancy and the Postpartum. Thyroid, 27(3), 315–389. https://doi.org/10.1089/thy.2016.0457
5. Taylor, P. N., Albrecht, D., Scholz, A., et al. (2018). Global Epidemiology of Hypothyroidism and Hyperthyroidism. Nature Reviews Endocrinology, 14(5), 301–316. https://doi.org/10.1038/nrendo.2018.18