



Levothyroxine: Therapeutic Use and Potential Adverse Effects

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DESCRIPTION

Levothyroxine is a synthetic form of the thyroid hormone thyroxine (T4) and is widely prescribed for the management of hypothyroidism and related thyroid disorders. Its effectiveness in normalizing thyroid hormone levels and restoring metabolic balance has made it a mainstay in endocrine therapy. Despite its generally favorable safety profile, levothyroxine carries potential adverse effects that require careful monitoring to ensure therapeutic success and minimize complications. Awareness of these effects is essential for both healthcare providers and patients.

Cardiovascular effects are among the most significant concerns with levothyroxine therapy. Excessive dosing can lead to symptoms of hyperthyroidism, including palpitations, tachycardia, elevated blood pressure, and arrhythmias. Patients with pre-existing heart disease are particularly vulnerable, and careful dose titration along with periodic monitoring of heart rate, blood pressure, and electrocardiogram changes is recommended to prevent cardiovascular complications.

Gastrointestinal disturbances may also occur. While generally mild, symptoms such as nausea, diarrhea, or abdominal discomfort have been reported. These effects are more common during dose adjustments or in sensitive individuals and usually resolve once the body acclimates to the therapy. Taking levothyroxine on an empty stomach and spacing it appropriately from other medications can improve absorption and reduce gastrointestinal complaints.

Skeletal health is another important consideration. Chronic overtreatment with levothyroxine can accelerate bone turnover, increasing the risk of osteoporosis, particularly in postmenopausal women. Regular bone density monitoring and ensuring appropriate calcium and vitamin D intake are recommended for patients at risk of reduced bone mass.

Neuropsychiatric effects may arise if levothyroxine levels become excessive. Patients can experience anxiety, irritability, insomnia, or tremors. While rare, severe cases may present with confusion

or agitation. Monitoring thyroid function tests regularly and adjusting doses gradually helps minimize these effects and maintain mental well-being.

Metabolic and endocrine considerations are central to levothyroxine therapy. Over replacement can lead to symptoms such as weight loss, heat intolerance, and increased basal metabolic rate, while under replacement results in persistent hypothyroid symptoms like fatigue, weight gain, and cold intolerance. Regular assessment of serum Thyroid Stimulating Hormone (TSH) and free T4 levels is essential to maintain a therapeutic balance and prevent systemic complications.

Pregnancy introduces unique considerations for levothyroxine therapy. Adequate thyroid hormone levels are essential for fetal development, particularly neurocognitive growth. Close monitoring and dose adjustments during pregnancy are necessary to meet increased metabolic demands and prevent complications for both mother and child. Despite these potential adverse effects, levothyroxine remains an essential treatment for thyroid hormone deficiency. By educating patients about proper administration, monitoring laboratory values, and titrating doses carefully, clinicians can maintain safe and effective therapy.

CONCLUSION

Levothyroxine therapy is highly effective for managing hypothyroidism, but its use requires careful attention to cardiovascular, gastrointestinal, skeletal, neuropsychiatric, and metabolic effects. Through regular monitoring, patient education, and individualized dosing strategies, healthcare providers can optimize therapeutic outcomes and minimize the risk of adverse reactions. With proper management, levothyroxine provides life-long benefits, improving quality of life and preventing complications associated with thyroid hormone imbalance. Early recognition of signs of over- or under replacement allows timely interventions and ensures that the benefits of hormone normalization are achieved without compromising patient safety.

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