IJIMM, Volume 3, Issue 12, 2025 ISSN: 2995-5319
http://medicaljournals.eu/index.php/IJIMM/issue/view/3
INTERNATIONAL JOURNAL OF INTEGRATIVE AND MODERN MEDICINE

# Thyreoidectomy and Postoperative Hypothyroidism

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**Abstract:** The thyroid gland is an endocrine organ composed of highly specialized epithelial cells arranged to synthesize, store, and secrete thyroid hormones. Classical histological structure includes follicles, parafollicular cells, and a rich vascular network. Recent research has expanded our understanding of follicular biology, stem cell populations, microanatomy, and molecular regulation within the gland.

**Keywords:** Endocrine organ, thyroid gland, Grave's disease, surgical treatment, malignant thyroid tumors.

## Introduction

The thyroid gland, despite its relatively simple anatomical and morphological structure, is characterized by a wide variety of pathogenetically distinct diseases, such as colloid and proliferating goiters, adenomas, chronic autoimmune thyroiditis, Graves' disease (diffuse toxic goiter), and malignant thyroid tumors. These tumors require various treatment approaches, and in some cases, surgical intervention.

The history of modern thyroid surgery spans no more than 130-140 years. The dangers and difficulties of thyroid surgery have been discussed by surgeons of all generations. As early as 1928, surgeon De Quervain wrote: "Anyone who, without good surgical training, succumbs to the temptation to operate on a 'mild' goiter should not forget the cases that, in inexperienced hands, have resulted in death from blood loss on the operating table."

Surgical treatment of thyroid diseases rapidly developed in the second half of the 19th century, driven by the introduction of general anesthesia. The founders of modern thyroid surgery, who made significant contributions to its development, were the Austrian surgeon Albert Theodor Billroth and the Swiss surgeon Emil Theodor Kocher.

The expansion of thyroid surgery options has required endocrine surgeons to develop strict indications for surgical treatment of thyroid diseases to avoid unnecessary surgical interventions.

All forms of malignant thyroid tumors are absolute indications for thyroidectomy. Given the post-Chernobyl situation and the post-accident consequences, total thyroidectomy is recognized as the treatment of choice even for minimally invasive, well-differentiated thyroid carcinomas. Mandatory preoperative cytological verification of the diagnosis allows for the determination of the planned surgical intervention. Total thyroidectomy for well-differentiated thyroid carcinomas has opened up opportunities for the effective treatment of metastases with 131I isotopes and has resulted in favorable treatment outcomes.

Thyroid surgery is most often performed for nodular goiters. It should be noted that modern thyroidology offers a wide range of diagnostic methods (ultrasound, cytology, hormonal, and radiological) that allow for the identification of the pathogenetic and morphological basis of the disease before treatment and, in most cases, avoidance of surgery, recognizing the minimal oncological risk of the identified focal thyroid changes. In most cases, nodular goiter is colloid, proliferating to varying degrees (up to 90%), which requires observation and conservative treatment. Organ-preserving

surgical interventions for multinodular colloid proliferating goiter typically result in disease recurrence, and thyroidectomy must be performed for compelling objective reasons.

Over the past decade, a large number of studies have appeared on the problem of hypothyroidism, transforming our understanding of thyroid disease. This is primarily due to the introduction of modern thyroid hormone preparations into clinical practice. Indeed, with the relatively low-burden nature of these medications, hypothyroidism becomes less of a disease and more of a way of life for the patient, requiring virtually no restrictions.

Modern, precisely dosed synthetic levothyroxine (L-T4) preparations are structurally identical to human thyroxine (T4) and allow for the simple and effective maintenance of stable euthyroidism with just one daily dose.

The following factors underlie this:

- the thyroid gland's only vital function is the production of thyroid hormones;
- There is virtually no circadian rhythm to thyroid hormone secretion (less than 15% variation from day to day), so daily administration of levothyroxine (L-T4) at the same dose easily simulates their endogenous production;
- The body's need for thyroid hormones is stable (rare situations requiring a change in the selected L-T4 dose include significant weight changes, pregnancy, and the concomitant administration of certain medications);
- High bioavailability of L-T4 when taken orally;
- Long half-life of L-T4 in plasma (approximately 7 days);
- The presence of an accurate criterion (TSH level), which fully reflects the quality of hypothyroidism compensation over a long period (approximately 2-3 months);
- The relative affordability of L-T4 preparations;
- The quality of life of patients with hypothyroidism who receive continuous L-T4 replacement therapy differs virtually insignificantly from that of individuals without hypothyroidism.

The goal of replacement therapy for hypothyroidism is to maintain thyroid hormone levels in the body that meet physiological needs. The primary indicator for assessing the adequacy of replacement therapy for hypothyroidism is the TSH level, determined by methods with high functional sensitivity.

The principles of replacement therapy for hypothyroidism are well known, discussed in detail in many guidelines, and should be familiar not only to endocrinologists but also to thyroid surgeons.

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