OPINION

By

Assoc. Prof. Dr. Gancho Georgiev Kostov, MD, Medical Simulation and Training Center, Medical University of Plovdiv, Department of Surgery, University Hospital "Kaspela".

On the dissertation of Dr. Lyuboslav Rosenov Dimov

Doctoral student at the Department of Endocrinology and Metabolic Diseases at the Medical University of Plovdiv

on the topic:

"CHARACTERISTICS OF METABOLIC SYNDROME AND QUALITY OF LIFE OF PATIENTS FOLLOWING THYROIDECTOMY"

For the award of the educational and scientific degree "DOCTOR"

The dissertation of Dr. Lyuboslav Rosenov Dimov is written on 175 pages and is illustrated with 41 tables and 31 figures. The bibliography contains 250 literary sources, of which 5 are by Bulgarian authors and 3 are in Cyrillic. The structure of the dissertation is as follows: Introduction 2 pages, Literature review 36 pages, Aim and objectives 1 page, Patients and methods 15 pages, Results 60 pages, Discussion 12 pages, Summary of results 2 pages, Conclusions 2 pages, Contributions 1 page, Publications on the topic 2 pages, Bibliography 16 pages, Appendices 20 pages.

The dissertation work has been approved and directed for official defense by the extended departmental council of the Department of Endocrinology and Metabolic Diseases at the Medical University of Plovdiv.

Prevention of metabolic complications after thyroidectomy is important given the complications associated with the surgical intervention. This necessitates the use of prognostic indicators for postoperative metabolic control in these patients. The constantly increasing incidence of metabolic syndrome worldwide makes it one of the main health problems of this century. What is it - a set of interconnected metabolic disorders, including central obesity, arterial hypertension, dysglycemia and dyslipidemia. It has been established that thyroid hormones and more precisely impaired thyroid hormone production play a significant role in the pathogenesis of metabolic syndrome, directly affecting the cardiovascular, hematopoietic, pulmonary and neuromuscular systems. A number of clinical studies have proven their influence on cardiac contractility,

heart rate and systemic vascular resistance. On the other hand, the effect of uncompensated hypothyroidism has been insufficiently studied.

The discovery of adipokines secreted by white adipose tissue and the theory of its role as an energy-storing organ involved in thermoregulation have completely changed. It is currently considered an active metabolic tissue secreting a number of hormones and proteins that modulate various aspects of inflammation and may even initiate an immune response. Whether their function is influenced by thyroid status or only by body mass index remains unclear. This question directs the focus to the investigation of adipocytokines as potential new biomarkers to be used as prognostic factors for worsening metabolic performance in patients after thyroidectomy.

Due to the above, I believe that the dissertation presented by Dr. Lyuboslav Dimov is extremely relevant and contemporary with important scientific, practical and clinical significance. The dissertation is properly structured, in accordance with generally accepted scientific requirements.

The presented detailed literature review in a volume of 36 pages shows that the author knows in detail the current state of the subject under consideration. It is well-organized, consistent and multifaceted. The anatomical and physiological features of the thyroid gland, as well as the laboratory tests used to assess its function, the indications for surgical intervention, as well as the accompanying potential risks and complications, have been exhaustively traced and analyzed. The dissertation does not fail to examine in detail the metabolic syndrome with detailed classification criteria, as well as the correlation between quality of life, thyroidectomy and metabolic syndrome, focusing on searching for a correlation between FT4 and abdominal obesity, BP values, fasting plasma glucose, triglycerides and HDL-cholesterol. The relationship between T3 levels and abdominal and visceral obesity, which has been proven in recent years, has not been overlooked, as well as research in recent years on the process of "meta-inflammation", which is particularly important in the context of diseases associated with thyroid dysfunction. It has been proven that changes in hormonal balance, including hypothyroidism or hyperthyroidism, can enhance inflammatory reactions in the body, which in combination with metabolic diseases such as obesity, increases the risk of developing serious complications. It identifies and examines quality of life, which is not only a valuable subjective marker for assessing patient satisfaction with their health, but also a powerful objective predictor of mortality.

In the dissertation work, Dr. Lyuboslav Dimov has a clearly defined goal –

***To study the effect of thyroid hormone treatment on the metabolic characteristics of patients after total thyroidectomy and to analyze its relationship with the quality of life in the context of the features of the postoperative period.***

To fulfill the defined goal, the dissertationist sets himself five tasks that are clearly and precisely formulated, which allows accumulating sufficient data to form conclusions.

A monocentric study was conducted, in which the subjects of the study were 62 patients with ultrasound-detected nodular goiter or cytologically verified thyroid carcinoma, followed up preoperatively and 6 months after thyroidectomy. The target group of patients includes those who have undergone the "Clinic of Surgery", the Clinic of "Endocrinology and Metabolic Diseases", of the University Hospital Kaspela. The available socio-demographic, clinical and laboratory data for the studied individuals were obtained using an interview and physical examination. Each participant in the study completed a quality of life assessment questionnaire preoperatively and 6 months after the intervention.

When analyzing **the results** obtained, Dr. L. Dimov used a very rich set of statistical tools determined according to the tasks of the dissertation work and the type of values (metric, categorical, rank). The metric values were checked for normality of distribution using the Shapiro-Wilks test. In the presence of a normal distribution ($p > 0.05$ from the Shapiro-Wilks test), the values are presented with the arithmetic mean (Mean) and standard deviation (SD). In the case of asymmetric values ($p < 0.05$ from the Shapiro-Wilks test), the average trend is expressed by the median and the interquartile range (IQR). Categorical and binary values are summarized in number and percentage (%).

Dr. Dimov uses the optimal capabilities of graphical analysis to assess the reliability of prognostic models, etc. This extremely diverse statistical set allows the dissertationist to obtain optimal information from the presented data, which guarantees the reliability of the results and the conclusions drawn.

In the chapter "**Results and then in Discussion**" Dr. Dimov makes an extremely detailed analysis, presented also figuratively, of the clinical characteristics of metabolic indicators in patients depending on the nature of the underlying disease (benign/malignant process of the thyroid gland).

He tracks the metabolic characteristics of the operated patients after compensation of postoperative hypothyroidism and analyzes the role of thyroid hormone treatment on the metabolic status in the postoperative period.

To track the change in the metabolic characteristics of the operated patients, he compares the data before and after surgery. The dynamics in the parameters is tracked separately for patients with malignant and benign processes.

It compares the values of adipocytokines: adiponectin, leptin and resistin before and after surgery and analyzes the metabolic changes that occurred, by studying the importance of the studied adipocytokines as a prognostic factor for changing the metabolic characteristics of patients in the postoperative period. It does not miss an important task from a surgical point of view, considering the frequency and characteristics of the most frequently registered surgical complications in patients after total thyroidectomy, namely postoperative hypoparathyroidism, damage to the recurrent laryngeal nerves /RLN/ and adjacent structures, by analyzing the predisposing factors in detail.

It does not miss to consider one of the current components of any study affecting clinical work, namely assessing the quality of life of patients with thyroid disease and total thyroidectomy, using a survey method and the QOL-CS Thyroid version questionnaire, which has a high level of validation and reliability. The questionnaire includes, in addition to the demographic sector, the four main aspects of the patients' lives, namely physical, mental state, social and spiritual sphere.

The chapter **"Contributions"** of the dissertation emphasizes the significance of this study, for the first time in Bulgaria the relationship between thyroid markers and metabolic status before and after surgery is investigated, as well as the change in thyroid status and metabolic indicators after thyroidectomy for benign and malignant diseases, as well as the factors determining them.

For the first time, the levels of leptin, adiponectin and resistin are examined before and after total thyroidectomy and the factors that determine their dynamics, as well as the frequency of postoperative complications, and the factors that significantly increase the risk of their occurrence are actively sought. As I have already noted, the dissertation does not miss one of the important aspects in modern clinical studies, namely the assessment of the quality of life of patients after total thyroidectomy.

In conclusion, the dissertation submitted for review on the topic "Characteristics of metabolic syndrome and quality of life of patients after thyroidectomy" has significant scientific and practical potential. It fully corresponds to current medical needs, with the author demonstrating a good approach and significant contributions. The scientific work meets all the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADSRB), the Regulations for the Implementation of the ADSRB and the Regulations of the Medical University - Plovdiv. Based on the above, I vote positively and recommend that the esteemed members of the scientific jury also vote for awarding Dr. Lyuboslav Rosenov Dimov the educational and scientific degree "Doctor".

10.02.2026
Kostov, M.D., Ph.D.

Plovdiv

Ass. Prof. Gancho Georgiev