**OPINION STATEMENT**

By Prof. Dr Irena Kostadinova, MD, Head of Nuclear Medicine Clinic at University Hospital Acibadem City Clinic, Sofia,

on a dissertation titled: **Nuclear Medicine Methods for Evaluation of Abnormal Parathyroid Glands in Patients with Primary and Secondary Hyperparathyroidism**, submitted by Dr Albena Dimitrova Botushanova, a medical doctor at the Department of Nuclear Medicine of St George University Hospital, Plovdiv, an SDL doctoral student in field of higher education: Health and Sport, professional field: Medicine, Doctoral Program “Medical Radiology and Roentgenology”, Department of Imaging Diagnostics and Radiotherapy- Prof. Dr Paraskev Stoyanov Medical University- Varna.

Parathyroid scintigraphy is a well established and reliable method in the diagnostic algorithm of patients with primary and secondary hyperparathyroidism for localization of parathyroid adenoma and hyperplasia. This imaging allows an accurate planning of surgical approach and obtaining an optimal outcome. Scintigraphy provides a unique opportunity to visualize ectopic parathyroid glands which can often be missed by other imaging methods resulting in an additional surgical procedure. In the literature there are numerous proposed scintigraphic protocols and various radiopharmaceuticals, however, there is no single opinion on their optimal use in patients with primary and secondary hyperparathyroidism.

In this aspect, the proposed topic of dissertation: *Nuclear Medicine Methods for Evaluation of Abnormal Parathyroid Glands in Patients with Primary and Secondary Hyperparathyroidism,* is very topical, and the set aim and objectives enable a detail clarification of their role in the overall diagnostic algorithm of these disorders. The dissertation is properly structured as follows: 35 pages of literature review, 3 pages of aim and related 8 objectives, 7 pages of material and methods, 49 pages of results and discussion, 3 pages of conclusion and 1 page of references. The literature review covers 104 sources, including 4 of Bulgarian authors. The dissertation is illustrated with highly indicative 33 figures and 4 tables.

The study covers a sufficient number of patients -94, and considers the use of the world-recognized radiopharmaceuticals 99mTc-sestamibi,99mTc–tetrofosmin and 99mTc-pertechnetate in the scintigraphic visualization of parathyroid gland pathogens, and their advantages and disadvantages. Different protocols - dual-phase, single-phase subtraction, application of 1 or 2 radiopharmaceuticals with either planar or tomographic techniques, are used to determine the optimal mode of operation to achieve maximum diagnostic accuracy. The sensitivity and specificity of scintigraphy is determined depending on the proposed protocols and radiopharmaceuticals. All results are compared to those from imaging techniques, to parathyroid hormone levels and calcium-phosphorus exchange, and in case of positive scintigraphic findings, the results are compared to the operative findings.

The contribution of the dissertation, which is significantly relevant, is the proposed diagnostic algorithm for preoperative detection and localization of hyperfunctioning parathyroid glands. For the first time, an in-depth study has been carried out on the correlation between scintigraphic findings and calcium-phosphate exchange, as well as to ultrasound results in patients with primary and secondary hyperparathyroidism. A comparative assessment of different examination protocols, including both single and dual isotope examinations, and the application of various techniques, was performed to achieve high diagnostic accuracy to minimize volume and side effects of subsequent surgical procedure.

The dissertation presents a total of 4 actual publications, of which 1 in Folia Medica, which is equivalent to an international publication according to the attestation system of Medical University- Plovdiv. The author has additional contributions to three other scientific forums, one of which at the European Congress of Nuclear Medicine in 2015, whose abstracts were published in Eur.JNMMI. with Impact factor. I would recommend that the dissertation abstract be shortened in order to be used as a reference guide for medical doctors who specialize in the field of nuclear medicine, endocrinology, internal diseases, imaging diagnostics and endocrine surgery.

In conclusion, I believe that the submitted dissertation presents for the first time in Bulgaria a study on the contemporary use of scintigraphic methods for localization of hyperfunctioning parathyroid glands with a view to the application of an optimal surgical approach. The findings are accurately correlated with imaging results and various laboratory data related to hyperparathyroidism. The dissertation contributes to the field of nuclear medicine and endocrinology, and more specifically to the field of endocrine surgery.

**With view to the above, I recommend to the honorable members of the Scientific Jury to give a positive evaluation to award Dr Albena Dimitrova Botushanova with the academic and scientific degree"Doctor".**

**2.1.2019 Prof. Dr Irena Kostadinova, MD**