**OPINION**

**By Prof. Ivan Tomov Gruev, PhD.**

**Deputy Director of Medical Activities, NMTB "Tsar Boris III**

**on a dissertation for the acquisition of the educational and scientific degree "PhD"**

**in the field of higher education 7. Health care and sports, professional direction 7.1. Medicine, PhD program "Angiology".**

**Author: Dr. Polya Todorova Antova**

**Form of doctoral studies: Independent preparation**

**Scientific unit: Clinic of angiology**

**Topic: "Peripheral arterial disease of the lower extremities in women - risk profile, clinical picture, outcome of the disease"**

**Research supervisor: Prof. Dr. Milena Staneva Staneva, d.m.**

**1. General presentation of the procedure and the doctoral student**

In connection with the work submitted to me for opinion, I declare that I have no conflict of interest and no evidence of plagiarism.

The dissertation work was discussed and proposed for defense by the extended Scientific Board of the Angiology Clinic at Acibadem City Clinic UMBAL Tokuda. At a meeting of the Scientific Council of "Ajibadem City Clinic UMBAL Tokuda" EAD (Minutes 47/01.06.2023) No. 15-05-99/09.10.2023 of the Executive Director and the Procurator of the hospital, I am appointed as an external member of The scientific jury in connection with the dissertation work of Dr. Polya Antova. I am determined to submit an Opinion.

Dr. Polya Todorova Antova was born in 1986 in Vratsa. In 2005 graduated from the Academy of Science and Mathematics High School Ivan Tsenov, Vratsa. She graduated from the Medical University of Sofia in 2011. Since 2012 until 2016 is a specialist in angiology at the Clinic of Cardiology and Angiology, then at the Clinic of Vascular Surgery and Angiology of MBAL Tokuda Hospital Sofia.

Dr. Antova acquired a specialty in "Angiology" in June 2016. in Sofia University, and in the same year he also acquired a certificate in "Ultrasound Vascular Diagnostics" from Sofia University.

Since 2017 works in Angiology Clinic at "Ajibadem City Clinic UMBAL Tokuda" EAD.

Author and co-author of numerous scientific publications. He is a member of the Bulgarian Society of Angiology, the Bulgarian Association of Neurosonology and Cerebral Hemodynamics, the Bulgarian Association of Ultrasound in Medicine, the Scientific Council of "Ajibadem City Clinic UMBAL Tokuda" EAD from September 2021 to June 2023

**2. Relevance of the topic**

The topic of the dissertation is extremely relevant. In the world literature, gender differences in the manifestation of cardiovascular diseases have become an acute problem in recent years. It is likely that the complexity of gender-specific interactions are important both for pathophysiology, risk factors, treatment, and for the outcome of the disease. Additional efforts to raise awareness and to better understand gender-based differences in the development, diagnosis, and treatment of PAD will lead to improved treatment outcomes and improved quality of life in women with peripheral arterial disease of the extremities. In this regard, the dissertation work, with the presented recommendations, is relevant from a practical point of view.

**3. Knowing the problem**

The doctoral student thoroughly knows and analyzes the problem and thoroughly analyzes the published data in the world and national scientific literature.

**4. Research methodology**

The chosen research methodology allows achieving the set goal and obtaining an adequate answer to the tasks set in the dissertation work.

**5. Characterization and evaluation of the dissertation work**

Dr. Antova's dissertation is written in a volume of 146 pages, well illustrated with 22 figures and 48 tables. It is properly structured and includes the following sections: Abbreviations and symbols used - 2 pages; Introduction – 2 pages; Literature review – 26 pages; Purpose and tasks – 1 page; Material and methods – 7 pages; Own results – 62 pages; Discussion and Conclusion – 23 pages; Conclusions and recommendations – 3; Bibliography – 18 pages; The bibliographic reference contains 218 literary sources, of which 5 are in Cyrillic and 213 are in Latin.

***The review*** is comprehensive and thorough. In published PAB studies, the percentage of women included is significantly lower than the percentage of men included. Peripheral artery disease of the extremities is an extremely common disease, with the condition affecting women as much or even more often than men. Gender differences in pathophysiology and risk factors may contribute to the later onset and often atypical presentation of PAB in women. The lack of purposeful thinking about PAB in women prevents timely diagnosis and treatment.

***The aim of the dissertation*** work is to determine the risk profile, the peculiarities of the course and the outcome of the disease in women with peripheral arterial disease of the limbs. The objective is well formulated in accordance with the topic of the dissertation and the presented literature review. The set tasks, 7 in total, are completely sufficient and are fully implemented in the dissertation work.

In the "***Materials and methods"*** section, 200 patients with PAB - 100 women and 100 men over the age of 18, who were examined by an angiologist for the period 2017 - 2022, are described in detail. The subjects were aged from 38 to 92 years, average age 68 years ±10. For the period 2018 - 2020, the study is retrospective, based on an electronic database, then in the period - 2020-2022, the collection of patient follow-up data continues prospectively. The methodology describes in detail the risk factors, methods of research, therapy and follow-up in patients with PAB, comparing the features of the course in men and women. For the statistical processing of the data used appropriate methods and specialized statistical package SPSS (Statistical Package for the Social Sciences) version 16.0, which guarantees the reliability of the obtained results.

***Results and discussion:*** The obtained results have been analyzed in detail and meet the set goals and objectives of the study. It should be noted that they are very well visualized and analyzed adequately with appropriate statistical methods.

***Conclusions and contributions***: Based on the obtained results, Dr. Antova makes 8 groups of conclusions that correspond to the tasks set. The more important ones are:

-Women with PAB are older than men with PAB.

-Women are less likely to have a history of the disease when it is registered.

-Women with PAB more often have accompanying arthropathy, neuropathy and carotid pathology.

-Women more often take analgesics and less often anticoagulants compared to men.

-Women with PAB are more often in a more advanced stage of the disease at its initial diagnosis and have not experienced previous vascular interventions.

-Women with PAB more often have an ABI < 0.3

-Women with PAB more often have multiple arterial lesions

-Women with PAB more often have vessel thrombosis

- In women, revascularization treatment was performed less frequently.

-Women appear less frequently for follow-up examinations than men. Based on the findings, recommendations were developed for women with PAB.

The contributions are well-formed - 6 in number - 1 theoretical and 5 practical-applied.

6. **The abstract** is written on 69 pages, meets the requirements and fully reflects the results presented in the dissertation

7**.Evaluation of the PhD student's publications and personal contribution**

The PhD student has submitted 2 publications in national journals and 2 scientific communications at national scientific forums, one of which has been published in a journal with IF. In 1 publication, Dr. Antova is first author and independent author in 1 publication and 2 communications. This scientific production fully meets the minimum requirements for the educational and scientific degree "PhD".

**CONCLUSION**

Dr. Antova's dissertation work shows in-depth knowledge of the problem and excellent opportunities to analyze, interpret and compare the obtained results with world data. It meets all the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for the Implementation of Law and the Regulations of "Acibadem City Clinic UMBAL Tokuda" EAD.

Given everything that has been said so far, I give my positive assessment and strongly recommend that the members of the Scientific Jury positively evaluate the dissertation "Peripheral arterial disease of the lower extremities in women - risk profile, clinical picture, outcome of the disease" and award Dr. Polya Todorova Antova the scientific and educational degree "PhD" in the field of Higher Education 7. Health care and sports, professional direction 7.1. Medicine, Doctoral Program "Angiology".

24.10.2023 Prepared the opinion:

City of Sofia Prof. Dr. Ivan Gruev, PhD