

REVIEW

From Assoc. Prof. Vladimir Borisov Kornovski, MD, PhD.

Head of the Department of Cardiac Surgery at MBAL "Heart and Brain", Burgas

On a dissertation thesis for awarding educational and scientific degree "Doctor"

Field of Higher Education: 7. Healthcare and Sports, Professional Field 7.1. Medicine

Scientific Specialty: "Surgery"

Author: Dr. Georgi Stefanov Bachvarov

Form of Doctoral Studies: Individual (self-directed) study

Department: General and Operative Surgery, Medical University "Prof. Dr. Paraskev Stoyanov", Varna

Title of the Dissertation: "Early Postoperative Complications In Open Cardiac Surgery.
A Current Strategy For Prediction And Risk Stratification "

Scientific Supervisor: Prof. Dr. Krasimir Ivanov, MD, PhD, DSc, Department of
General and Operative Surgery, Medical University "Prof. Dr. Paraskev Stoyanov",
Varna

By order No. R-109-273/20.06.2025 of the Rector of the Medical University "Prof. Dr. Paraskev Stoyanov", Varna, Prof. Dimitar Raykov, D.Sc., I was appointed as a member of the scientific jury for the defense of the above-mentioned dissertation.

1. General presentation of the procedure and the doctoral candidate

The following documents were provided to me in both paper and electronic format: the dissertation, its abstract, an application to the Rector for initiation of the defense procedure, curriculum vitae, copy of the diploma for higher education (Master's degree), order of enrollment, protocols of doctoral minimum exams, protocol of the Faculty Council with a positive decision on readiness for defense, order of discharge with the right to defense; declaration of originality, list of publications related to the dissertation, declaration of authenticity of the submitted documents, declaration of registration in scientific databases, similarity report from the Publishing Department, report of a current profile with a full list of scientific publications in Google Scholar and ORCID issued by the university library, list of participations related to the dissertation signed by the doctoral candidate. The presented set of documents meets the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB) and the Regulations for Academic Staff Development at MU 'Prof. Dr. Paraskev Stoyanov', Varna.

2. Brief biographical data on the doctoral candidate

Dr. Georgi Stefanov Bachvarov graduated from MU - Varna in 2006. From 2006 to 2007, he worked as a physician at the Department of Surgery at MBAL Omurtag. From 2007 to 2008, he worked as a physician at the Department of Cardiac Surgery at University Hospital 'St. Marina', Varna. In 2008, he was enrolled in a specialization in Cardiac Surgery and defended his specialty in 2016. Since 2018, he has been an assistant at the Department of Cardiovascular Surgery and Angiology, MU 'Prof. Dr. Paraskev Stoyanov', Varna. As of September 2024, he is the Head of the Department of Cardiac Surgery at University Hospital 'St. Marina', Varna. He was enrolled as a doctoral student on 18.05.2022.

3. Relevance of the topic

I consider the topic of the dissertation thesis highly relevant, especially given that complications after open heart surgery compromise clinical outcomes, reduce patients' quality of life, burden the healthcare system, and increase costs. Understanding the causes of postoperative complications, risk factors for their occurrence, and modern

methods of prevention and treatment could contribute to reducing the frequency of such complications and improving both early and long-term postoperative results.

4. Knowledge of the problem

The literature review is modern, detailed, logically structured, and presented across 49 pages. It covers essential aspects such as the nature of open-heart surgery, epidemiological data, definitions of postoperative complications, the most frequent early complications after open-heart surgery, and various models for risk stratification. Three classifications of postoperative complications are cited, based on severity and timing. It is evident that Dr. Bachvarov is thoroughly acquainted with the complex and multifaceted aspects of postoperative complications in cardiac surgery. A comprehensive review of international literature was conducted, with clearly defined unresolved research questions.

5. Objectives, tasks, and methodology of the research

The objective of the dissertation is clearly formulated: to propose optimal methods for defining the risk of early postoperative complications, namely atrial fibrillation, significant bleeding, delirium, acute kidney injury, and death after open-heart surgery.

Six main tasks have been defined to achieve this objective. The statistical methods applied are modern and appropriately employed. A large set of parameters was analyzed, enabling clear and precise conclusions. Data from 504 patients indicated for cardiac surgery due to isolated coronary disease, isolated valvular disease, or combined coronary and valvular pathology, operated at the Department of Cardiac Surgery, University Hospital 'St. Marina', Varna, in the period March 2017 – March 2020, were analyzed. The material is well-structured and illustrated. Despite the retrospective nature of the study, all patients were treated in accordance with contemporary European guidelines for the relevant cardiac pathology. The demographic characteristics, risk factors, and clinical, ultrasonographic, and laboratory features of the patients were thoroughly analyzed.

6. Characteristics and evaluation of the dissertation thesis and contributions

The dissertation thesis consists of 159 pages structured into seven main sections. It includes 55 tables and 39 figures supporting the scientific thesis. The bibliography

comprises 320 references, 52 of which are from the last five years. The literature review is extensive and comprehensive. The objectives and tasks are precisely and clearly formulated. Results are presented over 51 pages, offering statistical information on the significance of potential risk factors in the context of the cardiac surgery clinic. The discussion critically compares the obtained results with international data. Seven well-formulated conclusions follow logically from the results and analyses. The contributions include original elements and practical applicability: the first retrospective study analyzing 120 perioperative indicators for predicting and risk stratification of most common early postoperative complications; development of predictive models for estimating the probability of specific complications; and the first predictive models for postoperative atrial fibrillation and delirium, as well as enhanced applicability of established postoperative risk calculators.

7. Assessment of publications related to the dissertation and the doctoral candidate's contribution

In connection with the dissertation thesis, the candidate has presented two full-text publications in non-indexed but peer-reviewed journals, being the lead author of one. Both in terms of quantity and quality, the publications meet the requirements for the award of the educational and scientific degree 'Doctor.' The doctoral candidate's personal contributions are evident from the in-depth work on the dissertation, the results obtained, and the conclusions drawn.

8. Abstract

The abstract consists of 80 pages, properly structured, presenting the main research results and the list of scientific publications related to the dissertation. It adequately reflects the findings and conclusions.

9. Critical remarks and recommendations

As critical remarks, I would note: the omission in the dissertation of early complications such as impaired ventricular function after cardiac surgery, postoperative myocardial infarction, and graft failure—complications that significantly affect postoperative prognosis. Furthermore, the otherwise extensive bibliography lacks references by Bulgarian authors.

10. Conclusion

Based on the presented facts, I am convinced that the dissertation thesis of Dr. Georgi Stefanov Bachvarov, entitled 'Early Postoperative Complications In Open Cardiac Surgery. A Current Strategy For Prediction And Risk Stratification' possesses high scientific and practical value and meets all the requirements for such a scientific work. I believe that the dissertation complies with the provisions of the Law on the Development of Academic Staff in the Republic of Bulgaria and its implementing regulations. Therefore, I give my positive assessment and propose to the esteemed Scientific Jury to award the educational and scientific degree 'Doctor' to Dr. Georgi Stefanov Bachvarov.

Date:

05.09.2025

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Assoc. Prof. V

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