

# REVIEW

by Prof. Nikola Yordanov Kolev, MD, DSc

Head of the Department of General and Operative Surgery – Medical University of Varna

**Regarding:** Dissertation for the award of the educational and scientific degree *Doctor*

**Title:** *“Early Postoperative Complications after Open-Heart Surgery – a Contemporary Approach to Prediction and Risk Stratification”*

**Author:** Dr. Georgi Stefanov Bachvarov

By Order No. R-109-273/20.06.2025 of the Rector of the Medical University of Varna, Prof. Dimitar Raykov, MD, DSc, I was appointed as a member of the scientific jury for the defense of the above-mentioned dissertation.

The doctoral candidate has submitted all documents required by the Act for the Development of the Academic Staff in the Republic of Bulgaria (ADASRB) and the Regulations for its application at the Medical University of Varna.

## Biographical Data

Dr. Georgi Stefanov Bachvarov graduated from the Medical University of Varna in 2006. In 2006–2007, he worked as a resident physician in the Department of Surgery at the General Hospital in Omurtag. In 2007–2008, he was a physician at the Department of Cardiac Surgery, University Hospital “St. Marina” – Varna. In 2008, he was enrolled in a specialization in cardiac surgery, which he successfully completed in 2016. Since 2018, he has been an assistant professor at the Department of Cardiovascular Surgery and Angiology, Medical University of Varna. Since September 2024, he has been Head of the Department of Cardiac Surgery at University Hospital “St. Marina” – Varna. His doctoral training commenced on 18.05.2022.

## Dissertation

The topic is both researchable and relevant, as complications following open-heart surgery worsen clinical outcomes, reduce patients’ quality of life, burden the healthcare system, and increase costs. Knowledge of the etiology, risk factors, and preventive and therapeutic approaches may help reduce the frequency of these complications and improve both early and late postoperative results.

The literature review (49 pages) is up-to-date, well-structured, and comprehensive. It discusses the nature of open-heart surgery, epidemiological data, definitions of postoperative complications, their main types, and existing risk stratification models. Three classifications of complications, according to severity and timing, are presented. A thorough analysis of the international literature has been performed, with clear identification of unresolved questions.

The dissertation’s aim is clearly defined: to develop optimal methods for predicting and stratifying the risk of early complications such as atrial fibrillation, significant bleeding, delirium, acute kidney injury, and death.

Six main research tasks have been formulated. The applied statistical methods are contemporary and correctly used. The analysis encompasses 504 patients operated on in the Department of Cardiac Surgery, University Hospital “St. Marina” – Varna (March 2017 – March 2020). Despite



the retrospective design, all patients were treated according to European guidelines. The data are well-structured and clearly visualized, and the analysis is in-depth.

The dissertation comprises 159 pages, organized into 7 chapters, and includes 55 tables and 39 figures. The bibliography contains 320 references, 52 of which are from the past five years. The results (51 pages) are presented clearly and are statistically substantiated. The conclusions (seven in total) are logical and consistent with the findings.

### Contributions

The following contributions are acknowledged:

- The first retrospective study of its kind, involving simultaneous analysis of 120 perioperative indicators.
- Development of predictive models for the probability of major postoperative complications.
- Introduction of an evaluation model for postoperative atrial fibrillation and a predictive model for delirium.
- Demonstration of the potential for enhancing the predictive value of established risk calculators.

Two full-text articles related to the dissertation have been published in non-indexed but peer-reviewed journals, one of them with Dr. Bachvarov as the lead author. In terms of both quantity and quality, the scientific output is sufficient. His personal contribution is unquestionable, as evidenced by his diligent work, obtained results, and presented contributions.

### Conclusion

The dissertation of Dr. Georgi Stefanov Bachvarov is of significant scientific and practical value and fully complies with the requirements of the ADASRB and its Regulations.

I hereby give a **positive evaluation** of the dissertation and propose to the esteemed scientific jury that Dr. Georgi Stefanov Bachvarov be awarded the educational and scientific degree *Doctor*.

**Date:** 05.09.2025

**Place:** Varna

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