

REVIEW

by Assoc. Prof. Georgi Angelov Pavlov, MD, PhD

Department of Anesthesiology, Emergency and Intensive Care Medicine, Faculty of Medicine,
Medical University of Plovdiv,

in accordance with a written order No. R-3012/18.10.2023

Regarding the thesis for awarding the educational and scientific degree “Doctor of Philosophy” in the field of higher education 7. Health and sports; professional field 7.1. Medicine; Doctoral Program „Anesthesiology and Intensive Care“.

Author: Dr. Angel Petrov Prodanov, PhD student on independent preparation at the Department of Anesthesiology, Emergency and Intensive Care Medicine, Faculty of Medicine, Medical University of Plovdiv.

Topic: „LIFE-THREATENING HYPERGLYCEMIC DISORDERS IN PATIENTS WITH DIABETES MELLITUS IN INTENSIVE CARE UNIT”

Scientific Supervisor: Prof. Chavdar Stefanov Stefanov, MD, PhD, DMSc, Head of the Department of Anesthesiology, Emergency and Intensive Care Medicine, Faculty of Medicine, Medical University of Plovdiv.

1. General Presentation of the Procedure and the PhD Student

The PhD student was enrolled by a written order of the Rector of the Medical University of Plovdiv No. R-867/08.06.2021 and dismissed with the right to defense by a decision of the Faculty Council, Faculty of Medicine, Medical University of Plovdiv (Protocol No. 1/15.02.2023 and a written order of the Rector of the Medical University of Plovdiv No. R-404/23.02.2023).

The submitted set of materials on paper and electronic media is in accordance with the requirements specified in Article 70 (1) of Section I. Acquisition of the educational and scientific degree “Doctor of Philosophy” and the scientific degree “Doctor of Science” in the Medical University of Plovdiv; Regulations for academic staff development in the Medical University of Plovdiv from 28.01.2021.

The PhD student has supplied 3 scientific publications in reference to the PhD thesis. The articles have been published in a peer-reviewed scientific journal refereed and indexed in the world – renowned scientific information databasis Scopus.

2. Short Biography of the PhD Student

Dr. Angel Petrov Prodanov was born in 1985 in Pazardjik. He graduated his Master’s degree in Medicine from the Medical University of Plovdiv in 2011. In the same year he started his medical

practice as an anesthesiologist intensivist in the Department of Anesthesiology and Intensive Care at the University Hospital "St. George" in Plovdiv where he has still been working so far. In 2016 after successfully passing the state exam Dr. Angel Prodanov was recognized as a specialist in Anesthesiology and Intensive Care. From 2014 until now he has been working as an assistant professor in the Department of Anesthesiology, Emergency and Intensive Care Medicine at the Medical Faculty of the Medical University of Plovdiv. From 2018 until now he has been working as a procurator at the Hospital "Uni Hospital", Panagyurishte. In 2020 he obtained a Master's degree in Public Health and Health management. As a member of the Department of Anesthesiology, Emergency and Intensive Care Medicine at the Medical University of Plovdiv, he has participated in a national project with European funding. The candidate is fluent in English.

3. Relevance of the Topic

Life-threatening hyperglycemic conditions are the most severe acute complications among patients with diabetes mellitus and the most common critical endocrine conditions in intensive care units. Without adequate control they ultimately lead to severe electrolyte and acid-base disturbances, severe hypovolemia and tissue hypoperfusion, as well as a number of related vital organ and system dysfunctions. That is why life-threatening hyperglycemic conditions seem to be an independent risk factor associated with significantly longer hospital stay, higher mortality and higher cost of treatment among these patients in intensive care units.

Despite the significant progress in our understanding of the intimate mechanisms of these critical conditions and the availability of international algorithms and guidelines, currently there has been a lack of recommendations with a high level of evidence for the monitoring and treatment of hyperglycemic conditions among critically ill patients with diabetes mellitus. This explains why the diagnosis and treatment of these patients has often been planned, conducted and monitored arbitrarily and inadequately. In this sense the development and implementation of standardized protocols for the diagnosis, assessment, monitoring and treatment of acute life-threatening hyperglycemic disorders is a significant challenge for the intensivists as an effective contemporary strategy for managing the final outcome in this patient population in intensive care units. **Based on the abovementioned facts I strongly believe that the topic of Dr. Angel Prodanov's PhD thesis is an exceptionally relevant and promising problem of great practical importance which has not been the subject of scientific research in Bulgaria so far.**

4. Understanding of the Problem

The construction of the dissertation is dedicated to the solution of a significant interdisciplinary problem, which undoubtedly enhances the importance of the scientific research. In the "Literature

review" chapter the doctoral student shows that he is well acquainted with the nature and social impact of diabetes mellitus and related life-threatening hyperglycemic complications, their pathophysiological features, clinical characteristics, diagnostic criteria, organ damages as well as with the unresolved and controversial problems of their management in the intensive care settings. It can be seen that Dr. Prodanov has a thorough knowledge of the problems and the published results on the topic of the PhD thesis. The cited sources are up-to-date, appropriately selected and sufficiently informative. The literature review represents the PhD student as a researcher with the ability to interpret and evaluate critically the scientific achievements. From the presented literature review and the detailed bibliography it can be concluded that the doctoral student has the ability for a thorough and critical analysis of scientific information.

5. Methodology of the Study

The scientific research is planned and conducted correctly. The obtained results are reliably reported and subjected to detailed statistical analysis. It is noteworthy that Dr. Prodanov has mastered and used appropriately specialized software products for analysis and statistical processing of primary data.

6. Characteristics and Assessment of the PhD Thesis

The thesis represents a completed scientific work. It is properly constructed and includes all the relevant sections following the established specific form. It is written in an understandable grammatically correct Bulgarian in accordance with the scientific nature of the paper. The following sections are included in the thesis: Contents – 4 pages; Index of Figures – 2 pages; Index of Tables – 2 pages; Abbreviations- 2 pages; Literature Review - 42 pages; Aim and Tasks - 1 page; Materials and Methods - 12 pages; Results - 58 pages; Complex Therapeutic Approach to patients with Life-threatening Hyperglycemic conditions. Discussion - 16 pages; Protocol for the Treatment of Life-threatening Hyperglycemic Disorders – 3 pages; Conclusions - 1 page; Contributions - 1 page; and Bibliography - 23 pages. The doctoral thesis is written on a total of 170 pages. It is well illustrated with 31 figures and 25 tables. The bibliographic reference includes 246 titles all of which are in Latin, and in accordance with the citations in the doctoral work. There is a lack of citations of scientific works by Bulgarian authors who have worked on the problems of hyperglycemia and glycemic control in critically ill patients over the years. I find it absolutely necessary the results of their work should have been shared in the current dissertation.

The title is clearly formulated and sufficiently informative. It reflects adequately the content of the research and corresponds to the presented data and conclusions.

The literature review shows excellent knowledge of the issue and creative analysis of the literature. It highlights the controversial and unsolved issues in worldwide and national clinical practice. It is written in short and comprehensible sentences which makes it easy and pleasant to read. The review gives enough information about life-threatening hyperglycemic complications in diabetes mellitus and shows controversial aspects of their diagnosis, evaluation and treatment. The presented literature review allows the author to analyze various aspects of the problem as well as to determine the main goal and the priorities of the scientific research.

The main goal of the doctoral thesis is correctly defined and clearly and precisely formulated. It is in unison with the title of the thesis and corresponds to the further development of the scientific research.

The tasks are formulated specifically and precisely. The doctoral candidate deserves credit for the exceptionally concise and concrete statement of the objectives, which demonstrates a mature and well-developed scientific approach. Many young doctoral candidates often get involved in numerous minor tasks and subtasks, losing focus. Four tasks have been defined. They are formulated precisely and academically describing the necessary actions to be taken: to determine the main factors associated with the development of life-threatening hyperglycemic conditions requiring treatment in ICU, to evaluate the main factors for severe course of these conditions, to compare the two basic strategies for glycemic control and based on this to develop a complex therapeutic approach to critically ill patients with diabetes mellitus and life-threatening hyperglycemic conditions.

The section "Materials and Methods" represents the subject, the object and the design of the study accurately. It is very well structured and properly presented. The overall methodology of the research is very well described. It is a retrospective observational study which design and stages are very well illustrated graphically. The research materials and methods are correctly and precisely selected to fulfill the main goal and tasks. The inclusion and exclusion criteria are carefully formulated making it possible to minimize all the factors that could affect the accuracy and reliability of the results. The large number of patients included in the study is impressive which is a guarantee of good representativeness of the sample and high reliability of the results and the conclusions. The methods of clinical observation, laboratory examinations and therapeutic approach are presented systematically in great detail. The main indicators for evaluation of clinical course and their definitions are specified and characterized in great detail and precisely. A wide range of modern and accurate statistical tests has been used for statistical processing which guarantees the reliability of the obtained results and the conclusions made.

The obtained results correspond to the set tasks. Their description is supported by detailed graphic and tabular material with comprehensive text descriptions. When discussing his own results, the doctoral student offers generalisations, systematization and comparison with the results of other authors and teams postulating his own hypotheses. However, a general appeal can be made to the PhD student to seek a deeper and more thorough discussion of the presented results.

Based on the analysis of the obtained results the doctoral student develops and offers a protocolized complex therapeutic approach to critically ill patients with diabetes mellitus and life-threatening hyperglycemic conditions. The proposed protocol is actually the most significant achievement of Dr. Prodanov's PhD thesis as it offers an opportunity for optimized care and effective correction of disorders in this patients population with the aim of preventing the resulting complications, improving the final outcome and increasing the quality of medical care.

The conclusions are clear and informative and reflect the essence of the research. I accept them as content and personal achievement of the doctoral student. I appreciate the fact that they follow the specific tasks and present the results of the study convincingly and systematically.

7. Contributions and Significance of the Dissertation for Science and Practice

Four contributions have been formulated and divided into two groups - scientific and applied. They are quite sufficient for such a thesis. I accept contributions without objection. Three of the contributions are of an original nature. The most important contribution for clinical practice is the development of a standardized protocol for the complex management of patients with acute life-threatening hyperglycemic conditions.

8. Publications Related to the Doctoral Thesis

Three scientific articles related to the proposed dissertation in the journal "Anesthesiology and Intensive Care" have been presented. The journal is refereed and indexed in the world – renowned scientific information databasis Scopus. Dr. Prodanov is the first author in all the publications. The scientific works meet the minimum requirements for acquisition of the educational and scientific degree "Doctor of Philosophy" according to the Regulations for the academic staff development in the Medical University of Plovdiv.

9. Personal contribution of the doctoral student

Taking into account the professional competences of Dr. Angel Prodanov as a specialist in anesthesiology and intensive care medicine and the upgraded scientific capacity I am entirely convinced that the doctoral thesis is his personal achievement under the skillful guidance of his scientific supervisor.

10. Abstract

The abstract is prepared following standard guidelines and accurately reflects the content of the dissertation. It is prepared in accordance with the requirements of the Regulations of the Medical University of Plovdiv. It has a total volume of 55 pages and is very well structured and illustrated. The abstract reflects the aim, tasks, materials, methods and logically presents the results related to the conclusions and contributions of the dissertation work. I have no further critical remarks on its content.

11. Critical remarks and recommendations

I have no critical remarks. My recommendation to Dr. Prodanov is to continue his scientific research by investigating the effectiveness of the implementation of the proposed protocol for the management of patients with acute life-threatening hyperglycemic disorders in a prospective study as well as to promote the results of his work in full-text articles in scientific journals refereed and indexed in the world – renowned scientific information databases Scopus and Web of Science.

12. Personal impressions

I have known Dr. Angel Prodanov personally since the beginning of his work at the Department of Anesthesiology and Intensive Care. In his work he is distinguished by his honesty, precision, purposefulness and responsibility. He comes across as a colleague who can be relied on and who is dedicated to his work. The PhD thesis presents Dr. Prodanov as an accomplished and thorough researcher.

CONCLUSION

The doctoral work "Life-threatening hyperglycemic disorders in patients with diabetes mellitus in the intensive care unit" by Dr. Angel Petrov Prodanov contains scientific and applied results that constitute an original contribution to the field of science and meet all the requirements of the Law on Academic Staff Development in Republic of Bulgaria, the Regulations for its implementation and the Regulations of the Medical University of Plovdiv. The presented materials and the dissertation results are fully completed according to the specific requirements of the Medical University of Plovdiv.


The doctoral thesis shows that the PhD student - Dr. Angel Petrov Prodanov, possesses in-depth theoretical knowledge and professional skills in the scientific specialty "Anesthesiology and

Intensive Care" by demonstrating qualities and skills for independent conduction of scientific research.

Taking into account all the abovemention facts, I grant my positive assessment of the study presented by the reviewed doctoral thesis, abstract, results and contributions by proposing to the members of the honorable Scientific Jury to give their positive vote for awarding the educational and scientific degree "Doctor of Philosophy" to Dr. Angel Petrov Prodanov in doctoral program "Anesthesiology and Intensive Care".

01.11.2023

Reviewer:



Заличено на основание
Чл.5 §1, б."В" Регламент (ЕС)2016/679

Assoc. Prof. Georgi Angelov Pavlov, MD, PhD