

To Chairperson of the Scientific Jury,  
appointed by Order  
No. P-109-348/18.07.2023  
of the Rector at the Medical University  
“Prof. Dr. Paraskev Stoyanov” - Varna

## **PhD DISSERTATION REVIEW**

Author of the Review: Assoc. Prof. Daniel Georgiev Valchev, MD, PhD, habilitation in professional field 7.1. Medicine, Faculty of Medicine, Trakia University, Chief of the Thoracic Surgery Clinic at the University Multi-Profile Hospital for Active Treatment “Prof. Dr. Stoyan Kirkovich” AD, Stara Zagora

**Author of the PhD Dissertation:** Katerina Marinova Marinova, MD

**PhD Dissertation Title:** “Advantages and Disadvantages of the Different Thoracoscopic Approaches Used in the Diagnosis and Treatment of Pleural Effusions”,

For conferring the educational and scientific degree “DOCTOR” in the PhD programme in Thoracic Surgery in professional field 7.1. „Medicine“, higher education area of study 7. „Healthcare and Sports”, the training taking place at the Thoracic Surgery Clinic at the University Multi- Profile Hospital for Active Treatment “Sveta Marina” – Varna, and the Department of Surgical Diseases, Thoracic Surgery Unit, at the Medical University – Varna.

Scientific Supervisor: Prof. Rumens Nikolov Nenkov, MD, PhD.

Procedure Details: I have been appointed as an external member of the Scientific Jury by Order No. P-109-348/18.07.2023 of the Rector at the Medical University – Varna. In a session of the Scientific Jury and

after a decision taken by its Chairperson, I have been assigned to draw up a Review of the PhD Dissertation discussed herein.

My Review is in compliance with the provisions of the Act on Development of the Academic Staff in the Republic of Bulgaria, the Regulations on its enforcement and the House Regulations at the Medical University – Varna. I have been provided with all the materials needed for the elaboration of this Review. The set of documents submitted to me in soft and hard copy, is in compliance with the Procedure for Conferring the Educational and Scientific Degree “DOCTOR” at the Medical University – Varna, the House Regulations at the Medical University – Varna, and includes the following:

- European format CV;
- Orders, Enrollment Record and Programme Completion Record entitling the PhD student to PhD dissertation defense;
- PhD Dissertation;
- Summary;
- List of the scientific publications on the dissertation topic and participation in science forums;
- Other documents related to the procedure.

The Review has been elaborated on the basis of the submitted PhD Dissertation and Summary. They are properly structured and comply with the requirements on structuring a scientific paper as set out in the Act on Development of the Academic Staff in the Republic of Bulgaria and the Regulations on the Requirements and Procedure for Conferring Science Degrees and Occupying Academic Positions at the Medical University – Varna.

**PhD Student Details:** Katerina Marinova Marinova, MD, was born on 04.08.1986 in Haskovo. In 2012 she graduated her higher education in Medicine at the Medical University “Prof. Dr. Paraskev Stoyanov” – Varna. She works as a Thoracic Surgeon at the University Multi-Profile Hospital for Active Treatment “Sveta Marina” EAD – Varna. Until 2015 she was also a part-time Assistant Professor at the Medical University “Prof. Dr. Paraskev Stoyanov” – Varna, Department of Surgical

Diseases, Thoracic Surgery Unit. Since 2015, she has also been working as an Administrative Assistant.

In 2020, the PhD student acquired a specialty in Thoracic Surgery and in 2023 - in Surgery. In 2016, the student earned a Master's degree in Health Management.

Katerina Marinova, MD has specialized in various fields such as minimally invasive thoracoscopic surgery, mammary gland surgery and thyroid gland surgery in Berlin, Strasbourg, Ljubljana, London, Cambridge, Athens, Hamburg, Prague, etc. Since November 2020, after successfully performing in a competition, she has been a full-time PhD student at the Department of Surgical Diseases.

Dr. Marinova is a member of the Bulgarian Association for Thoracic, Cardiac and Vascular Surgery, as well as the European Society of Thoracic Surgeons /ESTS/, Bulgarian Association of Pulmonary Diseases and the Heart-Lung Association. She is a long – term member of the Bulgarian Surgical Society and the Union of Scientists in Bulgaria.

Dr. Marinova is a regular and an active participant in the science congresses organized by the Bulgarian Association for Thoracic, Cardiac and Vascular Surgery.

She has a command of both written and spoken English and German and the required computer literacy.

**Dissertation Topic Relevance:** Pleural effusions are one of the most common disorders affecting the pleura. According to a systematic review and meta-analysis of 34 studies published in the Journal of Thoracic Disease in 2017, the incidence of patients with pleural effusion was estimated at 320 cases per 100,000 people per year.

The causes for pleural effusion are various and often occur in combination with each other. On the other hand, the minimally invasive surgery has proven itself over the years as the technique of choice in the diagnosis and treatment of pleural effusions. There are different thoracoscopic technique types. Each of them features its own advantages and disadvantages. Improvement of the techniques with minimization of the surgical and anaesthetic trauma is of significant importance especially when it comes to the impaired and elderly patients with

multiple concomitant diseases and associated concomitant complications.

As the greatest success so far of this endeavour, is introducing the articulated surgical instruments and the single-port video-assisted surgery technique, as well as the non-tracheal intubation (tubeless) anesthetic technique with spontaneous respiration. With all these facts in mind, the research study conducted on the advantages and disadvantages of the different thoracoscopic approaches used in the diagnosis and treatment of pleural effusions, is especially relevant and of interest, from a scientific but also from a practical point of view.

**Dissertation Structure:** The Dissertation submitted for a review is written in Bulgarian formal language style, on 125 standard pages, the data visualization presented in 10 diagrams, 18 tables and 20 pictures. The Bibliographical Reference includes 228 authors, where 10 of the sources are in the Cyrillic script languages and 218 – in the Latin script languages.

The Dissertation comprises of the following:

Introduction - 2 pages; Literature Review - 38 pages; Aims and Objectives - 1 page; Materials and Methods - 10 pages; Results - 18 pages; Discussion - 34 pages; Final Chapter - 2 pages, Conclusions - 1 page; Contributions – 1 page; Bibliographic Reference – 10 pages.

**The Introduction** presents comprehensively enough the relevance and importance of the dissertation topic.

**The Literature Review** is presented on 38 pages and discusses in a profound and comprehensive manner the problems and concepts in the existing literature. The etiology, pathophysiology, classification and the different types of pleural effusions are presented at the beginning of the Literature Review. Treated also are the clinical picture and the different types of invasive and non-invasive diagnostic methods. Examined and described in details are the different types of VATS as well as the

preferences of some authors with regards to using particular methods for a particular pleural effusion type. Examined is also the development of the different thoracoscopic minimally invasive techniques in historical and evolutionary terms, as well as their advantages and disadvantages in comparison with each other.

**The aim** is to clarify and discuss the advantages and disadvantages of the different thoracoscopic approaches in the diagnosis and treatment of pleural effusions by personalizing the choice of a particular approach and technique depending on the pleural effusion type.

**The tasks** have been accurately formulated and are sufficient for achieving the set aim. Four tasks have been set:

1. Investigating the world experience and trends in the diagnostic and treatment approach and the modern methods for treatment of pleural effusions;
2. Based on the author's own experience, analyzing and refining the indications and contraindications for the use of thoracoscopic techniques in the diagnosis and treatment of pleural effusions;
3. Determining the advantages and disadvantages of each thoracoscopic approach depending on the location, type and nature of the pleural effusion;
4. Developing an algorithm for diagnosis and treatment to use in patients with pleural effusion, consistent with the most recent trends and the practical reality in Bulgaria.

**Materials:** The study is retrospective and it covers a period of 10 years (from 2012 to 2022). A retrospective analysis of 325 patients with pleural effusion of different origin, treated during the reference period at the Clinic for Thoracic Surgery at the University Multi-Profile Hospital for Active Treatment "Sveta Marina" was conducted. This significant number convincingly suggests statistical reliability of the results and the

conclusions drawn. The material includes 207 men and 118 women aged between 15 and 88 years, with the average age of the patients being 64.5 years.

### **Methods: Included in this Chapter are:**

- Clinical, paraclinical and instrumental tests;
- Surgical methods – multi-port (M-VATS), bi-port (B-VATS) and uni-port (U-VATS);
- Clinical observation, post discharge behavior and follow-up.
- Statistical methods

The methodology of the scientific research is applied in a sufficient degree as to produce a high-quality scientific product.

### **Results and Discussion:**

The obtained results have been presented clearly, accurately and correctly with a detailed visualization. They have been structured properly and it has been found out that the thoracoscopic techniques are applicable and safe in terms of the diagnostic and treatment activities. Determined are the advantages and disadvantages of each of the VATS techniques used in the diagnosis and treatment of pleural effusions. Clarified are the reasons for the differences in the results obtained when using the different VATS approaches. Determined are indications and contraindications for performing video-assisted minimally invasive surgery in connection with different types of pleural effusions. Compared are the results obtained from the conventional thoracotomy techniques with those obtained from the minimally invasive techniques, where the advantages of the latter are clearly emphasized in terms of the diagnosis and treatment of pleural effusions. In her dissertation paper, the PhD student has also discussed the experience of the Thoracic Surgery Clinic at the University Multi-Profile Hospital for Active Treatment “Sveta Marina” with the diagnosis and treatment of pleural

effusions. The comparison of the results such as intraoperative time, postoperative period, hospital stay, duration of the pleural catheter stay, complications, and cosmetic outcome, provides a comprehensive overview of the characteristics of the individual surgical methods used for diagnosis and treatment of pleural effusions. In the closing part of the Discussion, the PhD student has brought out and presented an algorithm for diagnosis and treatment of pleural effusions.

**Conclusions:** the 7 conclusions drawn up in the Dissertation comply with the set aim and tasks. They are clearly and accurately formulated. The conclusions are based on the author's own results presented in the body of the Dissertation and their correct interpretation and summarization.

**Contributions:** the contributions are correctly and accurately formulated:

1. In scientific and theoretical aspect:

- Analyzed are the advantages and disadvantages of the different thoracoscopic approaches.

2. In applied scientific aspect:

- Introduced in the clinical practice are the three main types of thoracoscopic approaches;

- Proposed and introduced in the clinical practice is an algorithm for diagnosis and treatment of pleural effusions with various etiology, which could also be useful for doctors of various specialties.

**Summary:** The summary presented consists of 75 pages. The summary has been prepared in accordance with the relevant regulations and requirements and accurately reflects the parts of the dissertation paper.

**PhD student research involvement:** The dissertation research has been conducted personally by the PhD student who has participated in every stage of the research. The results, conclusions and contributions

presented in the Dissertation are the results of the student's personal involvement.

**Evaluation of the publications** submitted in support of this dissertation: the PhD student Dr. Marinova has submitted 3 scientific publications on the topic discussed. In two of them she is the lead author. The third one is in English. Submitted is evidence for her participation in 5 science congresses and conferences.

**Conclusion:** The submitted PhD Dissertation complies with all the requirements of the Act on Development of the Academic Staff in the Republic of Bulgaria, the Regulations on its enforcement and the Regulations on Conferring Scientific Degrees at the Medical University – Varna. The Dissertation paper shows that the PhD student Katerina Marinova Marinova possesses a profound theoretical knowledge and professional skills in the scientific specialty of Thoracic Surgery. The PhD student has the qualities and skills needed to independently conduct a scientific research. The Dissertation is of high value and on a relevant topic.

All of the above gives me grounds to express my positive opinion and suggest to the Honorary Scientific Jury to confer the educational and scientific degree “DOCTOR” to Katerina Marinova Marinova, MD, in the PhD programme in Thoracic Surgery.

23.08.2023

Signature:

Assoc. Prof. Daniel Valchev. MD, PhD

