To the Chairman of the Scientific Jury

appointed by Order of the Rector of MU-Varna No. P-109/471/6.12.2025

REVIEW

By Prof. Pencho Tonchev Tonchev, MD

MU-Pleven

of the dissertation work of Dr. Vyara Dimitrova Grigorova

on the topic: "Conventional Approach to Postoperative Hernias - Possibilities and Challenges",

for the award of the educational and scientific degree "Doctor"

in the scientific specialty "Surgery"

scientific field 7. Healthcare and Sports

professional field 7.1. Medicine

Scientific Supervisor: Prof. Dr. Plamen Milchev Chernopolski, DSc

INFORMATION ABOUT THE PROCEDURE AND THE DOCTORAL CANDIDATE

Dr. Vyara Grigorova was born in 1988. She graduated from MU-Varna in 2013 with a degree in "Medicine" and in 2016 with a degree in "Health Management". Since 2013, she has been working at the Second Surgery Department of the University Hospital "St. Marina" - Varna, specializing in surgery from 2014-2019, and since 2019, she has held the specialty "Surgery". She has been a lecturer and assistant in the "Department of Surgical Diseases - US in Abdominal Surgery" at MU-Varna since 2017 and a doctoral student since 2019. She was withdrawn with the right to defense in 2025.

By Order of the Rector of MU-Varna No. P-109/471/6.12.2025, I was appointed as a member of the scientific jury. I received all the necessary documents in accordance with the regulations for the application of DASRB (Development of the Academic Staff in the Republic of Bulgaria Act) at MU-Varna. In connection with the dissertation work, one article on the topic was presented, which earned the doctoral candidate 30 points. Dr. Grigorova meets the minimum national requirements, but according to the regulations for the application of DASRB at MU-Varna for "professional field 7.1. Medicine" dated 27.05.2025, the doctoral candidate must provide 2 articles, one of which must be published in a journal indexed in international databases. I consider the discrepancy mentioned to be insignificant, given the qualities of the dissertation, as well as the valid decision for internal defense by the

Department Council of the "Surgical Diseases" Department, Medical University "Prof. Dr. Paraskev Stoyanov" - Varna dated 05.11.2025.

I. RELEVANCE OF THE PROBLEM

The dissertation work presented addresses a highly relevant and important problem in contemporary surgical practice: postoperative (incisional) hernias following abdominal surgical interventions. The relevance of the topic is indisputable and is justified by several key aspects:

First, postoperative hernias represent the most common late complication of abdominal surgery, with a frequency of 2% to 20% according to contemporary publications, and in the presented dissertation, a frequency of 12.8-30% is reported. Given the increasing number of abdominal interventions worldwide, this condition has become a serious health problem with global dimensions.

Second, the socioeconomic burden of postoperative hernias is significant. The doctoral candidate presents convincing data that in the USA, 150,000-200,000 reconstructive operations for incisional hernias are performed annually, and hospitalizations alone related to their treatment cost over 6 billion dollars per year. Patients with postoperative hernias are hospitalized 2.5 times more often and have a threefold increased medical morbidity.

Third, despite the progress in surgical techniques and the development of the synthetic industry for prosthetic materials, the percentage of recurrences remains unacceptably high - up to 32% according to the cited literature. This emphasizes the need for in-depth study of risk factors and optimization of therapeutic approaches.

Fourth, the choice of the conventional approach as the object of study is justified, as it remains the "cornerstone" in the treatment of postoperative hernias, especially in conditions of limited resources and in centers outside highly specialized herniology clinics.

The dissertation topic is original in Bulgarian medical literature and has a pronounced practical orientation. The study fills a gap in the national scientific literature regarding the conventional treatment of postoperative hernias, providing local data and developing a practically applicable algorithm for management.

II. STRUCTURE OF THE DISSERTATION

The dissertation work is logically and consistently structured, complying with all requirements for this type of scientific work. The total volume is 203 standard pages, which include:

- Introduction
- Literature review
- Aim and objectives
- Material and methods
- Results
- Discussion
- Conclusion
- Conclusions
- Contributions
- References (418 sources - 9 in Cyrillic and 411 in Latin on 38 pages)

The material is illustrated with 45 tables and 78 figures, which significantly facilitate the perception of the presented information and increase the clarity of the presentation.

The automatic abstract is professionally prepared and adequately reflects the dissertation's content, preserving its main accents and conclusions.

The structure is balanced, with the literature review being in-depth and covering historical development, modern classifications, and operative techniques. The own research is presented clearly and systematically, and the discussion successfully links the obtained results to the literature.

III. LITERATURE REVIEW

The literature review is comprehensive and in-depth, demonstrating excellent knowledge of the problem. The doctoral candidate demonstrates impressive erudition by tracing the development of the doctrine of hernias from antiquity to the present day.

The historical part is particularly valuable, as it systematizes the evolution of surgical techniques through different epochs:

- Antiquity and the Greco-Roman period (with the contributions of Hippocrates, Celsus, Galen)
- Middle Ages
- The period of surgeon-anatomists (1700-1900)
- The dawn of modern surgery (1900 - Second World War)
- Modern era (from the Second World War to the present day)

Special attention is paid to the development of the doctrine of postoperative hernias in Bulgaria, which is a valuable contribution to the medical-historical literature.

The contemporary part of the literature review covers:

- Detailed analysis of classification systems for postoperative hernias (European Hernia Society, Ventral Hernia Working Group, etc.)
- Exhaustive presentation of conventional operative methods
- Detailed overview of prosthetic materials and their characteristics
- Critical analysis of risk factors for occurrence and recurrence

The used literature is current, extensive, and relevant. Impressive is the balance between classical foundational publications and the latest studies (including from 2024-2025). This demonstrates that the doctoral candidate actively follows the scientific literature and is familiar with the latest trends in the field.

Critical observation: Despite the high quality of the literature review, more attention could be paid to economic aspects and cost-effectiveness analyses from different countries, since economic analysis is part of the research objectives.

IV. AIM AND OBJECTIVES

The main aim of the dissertation work is clearly formulated and reads as follows:

"To analyze the results of conventional surgical treatment of postoperative hernias, to define the risk factors for their occurrence and recurrence, as well as to standardize the preoperative and postoperative approach with a view to achieving optimal results."

To achieve this aim, five objectives have been set:

- Retrospective analysis of patients operated on for postoperative hernias with a conventional approach for the period 2017-2021
- Definition of risk factors for the development of postoperative hernias

- Analysis of postoperative complications and the possibility of recurrence
- Preparation of an economic analysis
- Standardization of the preoperative and postoperative approach

The aim is ambitious but realistic and achievable with the chosen research methods. The objectives are specific, measurable, and directly related to the main aim. They cover different aspects of the problem - from clinical to economic and organizational.

It is positive that the doctoral candidate sets not only analytical but also applied goals (standardizing the approach and developing an algorithm), thereby increasing the practical value of the research.

V. MATERIAL AND METHODS

The research methodology is correct and well thought out. The dissertation presents a retrospective cohort study of 273 patients who underwent surgery for postoperative hernias at the Second Clinic of Surgery of the University Hospital "St. Marina" - Varna over five years (2017-2021).

Characteristics of the studied cohort:

- Total number of patients: 273
- Gender distribution: 59.3% women, 40.7% men
- Mean age: 60.3 ± 12.8 years
- Age range: 23-88 years
- Mean BMI: 29.57 ± 6.017

The choice of the conventional approach is justified, as it is the most commonly used method in Bulgarian surgical practice and allows the assessment of real clinical results in typical conditions.

Research methods include:

- Collection of demographic and clinical data
- Analysis of perioperative characteristics
- Tracking postoperative complications and recurrences
- Statistical analysis using appropriate tests (Student's t-test, Chi-square, correlation analysis, regression)
- Economic analysis of costs

The follow-up period ranges from 1 to 5 years, which is sufficient to assess long-term results.

The statistical methods are correctly chosen and appropriately applied. The use of descriptive statistics, correlation analysis, and multivariate regression enables a comprehensive assessment of the data.

VI. RESULTS

The results are presented clearly, systematically, and with sufficient detail. The doctoral candidate demonstrates excellent analytical skills and the ability to interpret complex data. The main findings can be systematized as follows:

A. Primary hernias vs. recurrent hernias:

- Primary hernias: 69.2% (189 patients)
- Recurrent hernias: 30.8% (84 patients)

This distribution aligns with the literature and confirms that recurrent hernias represent a significant portion of the surgical volume.

B. Risk factors for the occurrence of postoperative hernias:

A statistically significant relationship was established between the occurrence of hernias and:

- Female gender (59.3% vs. 40.7%, p=0.000)
- Emergency character of the primary operation (r=0.532, p=0.000)
- Obesity (BMI >30)
- Intraoperative bleeding during the initial intervention

Important finding: Contrary to expectations and literature data, factors such as smoking, COPD, and diabetes were not established as independent risk factors in this study. The doctoral candidate offers reasonable explanations for these results related to the multifactorial genesis of hernias and the influence of other dominant factors.

C. Risk factors for recurrence:

A statistically significant relationship was established between recurrence and:

- Number of previous interventions (r=0.697, p=0.000)
- Type of previous repair
- Increased bleeding during the initial operation

Original contribution: For the first time in the literature, non-compliance with the motor regimen and lifting of weights is established as an independent risk factor for recurrence.

D. Recurrence rate:

The overall recurrence rate is 27.1% (74 out of 273 patients), with:

- Highest rate after previous mesh repair: 16.1%
- 60.7% of recurrences appear in the first two years

These results are higher than expected and raise important questions regarding the factors influencing the outcomes.

E. Complications:

The following complications were registered:

- Serous collections: 29.7%
- Surgical site infection: 9.9%
- Evisceration: 1.8%
- Other complications occur in a lower percentage

F. Economic analysis:

The doctoral candidate presents a detailed economic analysis, establishing:

- Average direct costs: BGN 2,978.22 ± 1,485.51
- Average total costs: BGN 5,227.46
- Average duration of hospitalization: 10.8 days

The regression analysis proves that:

- Each additional day of hospitalization increases direct costs by BGN 268.34
- Each square centimeter increase in defect adds BGN 0.578
- Each day of antibiotic therapy adds BGN 97.74

VII. DISCUSSION

The discussion is in-depth, critical, and well-structured. The doctoral candidate demonstrates excellent ability to analyze and synthesize results, systematically comparing them with data from the world literature.

Strengths of the discussion:

1. Critical approach to own results: The author is not afraid to admit discrepancies between expected and obtained results (for example, the high percentage of recurrences after prosthetic reconstruction).

2. Multifactorial analysis: When discussing the high percentage of recurrences after mesh repairs (16.1%), the doctoral candidate offers several explanations:

- Predominant use of the onlay position of the mesh
- Learning curve with new techniques
- Tendency towards preventive prosthesis placement in high-risk patients

3. Comparison with literature data: For each significant result, data from multiple studies are presented, which allows for an objective assessment.

4. Explanation of contradictions: When results differ from the literature, the author offers possible explanations (for example, regarding the lack of statistical significance of obesity as a risk factor).

5. Practical recommendations: Based on the results, specific recommendations for clinical practice are made.

VIII. CONCLUSIONS

The dissertation presents five specific conclusions that are logically justified by the results:

- The role of some traditional risk factors (obesity, diabetes, smoking, COPD) as independent predictors is questioned, emphasizing the multifactorial genesis.
- New risk factors are established: number of previous interventions, increased bleeding, and type of previous repair.
- Original contribution: non-compliance with the motor regimen with lifting of weights as an independent risk factor.
- Factors affecting costs are identified.
- A regression model for forecasting direct costs is created.

The conclusions are clearly formulated, specific, and supported by the data. They have both theoretical and practical value.

IX. CONTRIBUTIONS

The dissertation has pronounced scientific and applied contributions:

Scientific contributions:

- Establishing, for the first time, non-compliance with the motor regimen as an independent risk factor for recurrence.
- Critical reassessment of traditional risk factors in the context of conventional treatment.
- Detailed analysis of different conventional techniques and their results in Bulgarian practice.

- Economic analysis of the health burden of postoperative hernias with the development of a regression model.

Scientific-applied contributions:

- Development of a standardized algorithm for management in conventional surgical treatment of postoperative hernias, including six steps from prevention to follow-up.
- Specific recommendations for preoperative rehabilitation of patients to reduce recurrences.
- Systematization of indications for different types of conventional reconstructive operations.
- Practical guidelines for the choice of prosthetic material.

The contributions are real, proven by the research results, and have practical applicability. Particularly valuable is the developed algorithm, which can be implemented in clinical practice.

X. CRITICAL REMARKS AND WEAKNESSES

With the high overall quality of the dissertation work, the following critical remarks can be noted:

1. Methodological limitations:

- The retrospective design limits the possibilities for establishing causal relationships
- There is no information about patients lost to follow-up

2. Analysis of results:

- The influence of surgical experience and volume of the operating team on results was not analyzed.

3. Statistical analysis:

- Analysis of recurrence-free survival (Kaplan-Meier) is lacking
- It would be useful to present ROC curves for the prognostic models

4. Economic analysis:

- Cost-effectiveness analysis of different techniques is lacking
- No comparison with international cost data was made

5. Literature review:

- Although thorough, it could include more information about laparoscopic and hybrid techniques as alternatives to the conventional approach

6. Presentation of material:

- In some tables and figures, the graphical visualization could be improved

7. Abstract: In the provided electronic version of the abstract, the conclusions and contributions are missing. In the printed version, they are present.

These critical remarks do not diminish the value of the dissertation but rather outline opportunities for future research and improvements.

XI. CONCLUSION

The dissertation by Dr. Vyara Dimitrova Grigorova, titled "Conventional Approach to Postoperative Hernias - Possibilities and Challenges," is an in-depth, methodologically sound, and practically applicable scientific study.

The dissertation addresses a highly relevant problem in surgical practice and presents original results from the analysis of 273 patients over five years. The scientific contributions are real and proven, with the establishment of new risk factors and the development of a practically applicable management algorithm standing out in particular.

The literature review is thorough and demonstrates excellent knowledge of the problem. The methods used are adequate to the objectives, and the statistical analysis is correctly applied. The results are presented clearly and systematically, and the discussion is in-depth and critical.

The economic analysis adds an important dimension to the study, highlighting the real burden the problem places on the healthcare system.

Despite the mentioned critical remarks and limitations, the overall assessment of the dissertation is extremely positive. The work meets all requirements for the award of the educational and scientific degree "Doctor" and represents a valuable contribution to Bulgarian medical science and practice.

XII. RECOMMENDATION

Based on the above, I confidently **RECOMMEND** to the esteemed Scientific Jury to award Dr. Vyara Dimitrova Grigorova the educational and scientific degree "DOCTOR" in the scientific specialty "Surgery", field 7.1. Medicine.

Date: 27.12.2025

Reviewer: .....

Prof. Pencho Tonchev, MD