

To
The chairman of the scientific jury,
determined by protocol № 1 / 09.03.2023

Attached I present:

REVIEW

CONCERNING: the dissertation for awarding the educational and scientific title of "Doctor of Philosophy" to

Dr. Svetomir Sevdalinov Chakarov with a title:
**"ROLE OF CT AND MR ENTEROCOLONOGRAPHY FOR
DIAGNOSIS AND FOLLOW-UP IN CROHN'S DISEASE"**

Clinic of Diagnostic Imaging, UMHAT "Sveta Marina" Varna
Study Sector "Radiological Technologist" Medical College Varna, part of Medical
University "Prof. Dr. Paraskev Stoyanov" Varna

Scientific Specialty "Medical Radiology and Roentgenology (Including Use of
Radioactive Isotopes)",

Professional Heading "Medicine" (7.1)

FORM OF DOCTORAL STUDY: independent candidate

Research supervisor: **Radoslav Georgiev, MD**

Reviewer: Prof. Dr. Nachko Iliev Totsev, MD. - Head of the department

"Imaging diagnostics and radiation therapy" - MU-Pleven

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I received all the necessary hardcopy and electronic documents on time. I have no conflict of interest and did not find any evidence of plagiarism.

The review was compiled in accordance with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria.

1. Brief professional and biographical data for the doctoral student

Dr. Svetomir Sevdalinov Chakarov graduated in Medicine from the Faculty of Medicine of the Medical University of Varna in 2011. From 10.2011 Until 09.2012, he worked in the Department of Imaging Diagnostics at the "Dr. Atanas Dafovski" Medical Center, Kardzhali, and from 10.2012 to the present time, he worked in the Imaging Clinic at the "Sveta Marina" Medical Center, Varna. Obtained specialty Imaging Diagnostics 01.2018. Since 01.2020, he has been enrolled as a full-time doctoral student at the Department of "Imaging Diagnostics, Interventional Radiology and Radiation Therapy" at Varna University Medical University, and since September 2021, an assistant in a graduate school in the "Teaching Sector X-Ray Laboratory Assistant", Medical College department of the Medical University "Prof. Dr. Paraskev Stoyanov" Varna.

Member of:

- Bulgarian Association of Radiology (BAR)
- European Society of Radiology (ESR)
- Bulgarian Medical Union (BLS)

After successful implementation of the planned individual study plan and research work, the doctoral student was dismissed with the right of defense by order of the Rector No. R – 109-169/28.02.2023.

2. General description of the dissertation and the presented materials

The dissertation work of Dr. Svetomir Chakarov is written in a clear, concise style. The individual parts are well sequenced and interconnected. It contains 141 pages divided into the following sections: Introduction, Literature Review, Aims and Objectives of the Dissertation, Research Methodology and Organization, Results and Discussion, Conclusion, Conclusions, Contributions and Bibliography. The work includes 9 tables and 49 figures. The tables and graphs are well illustrated. 190 literary sources were discussed, of which 4 in Cyrillic and 186 in Latin.

The literature review is covered in 47 pages.

Duration of the study – 5 years (2017 - 2022). The total number of patients is 194. Only patients hospitalized in "St. Marina" with histologically proven Crohn's disease. Only CT and MR images performed according to CT enterocolonography and MR enterocolonography protocol are considered. During this period, patients have a different number of hospitalizations and, accordingly, examinations, which are distributed by visits. The number of visits is six. The total number of imaging tests performed is 446 - 386 CTE and 60 MPE. In addition to imaging studies, laboratory and clinical indicators that are available for the relevant hospitalization are considered, namely - C-reactive protein, fecal calprotectin (FCP), Crohn's Disease Activity Index (CDAI), quality of life (calculated using the IBDQ questionnaire) and histological results with activity data.

Data processing was performed using the SPSS v 20 mathematical-statistical program and Jamovi 2.3.24.

3. Objective of the dissertation and relevance of the subject

The topic of the dissertation work is current and reflects trends in the development of global medical practice and, in particular, imaging diagnostics in the direction of personalized medicine and an individual approach in the selection of imaging modalities in Crohn's disease. The imaging methods used are computed tomography and magnetic resonance imaging.

Objective of the dissertation: To investigate CT and MR enterocolonography changes in Crohn's disease and to determine their role in the diagnosis and follow-up of the disease.

The purpose of the study is clearly defined. The main tasks in the dissertation work are well formulated and meet the set goal. The own results of the study are described comprehensively and correctly, so they are sufficient for the

implementation of the set tasks. The statistical methods used are adequate enough and with good reliability analysis. The dissertation student shows a very skillful capacity for comparative analysis and evaluation.

In the discussion, the author defines his own conclusions from the results and outlines the contribution of the dissertation to the research area, which reflects the thorough preparation achieved in the development process.

The conclusions of the own results drawn from extensive material are carefully and precisely defined.

The **results and discussion** are presented in 40 pages, tables, figures and statistical analysis are used for their presentation.

4. Structuring the dissertation work

The dissertation is divided logically into several parts, the first of which is a literature review. It includes information on the epidemiology, etiology, histology and anatomy of this chronic, socially significant disease, with a chronic-relapsing and destructive course in its development. Particular attention is paid to the many risk factors, namely: smoking, genetic, environmental factors, the use of non-steroidal anti-inflammatory drugs and others. Modern options for the therapy of the disease are discussed - conservative and surgical methods.

Finally, the imaging methods - computerized enterocolography (CTE) and magnetic resonance enterocolography (MPE) are described in making the diagnosis, emphasizing their extremely important role in monitoring the effect of the treatment.

The abstract is structured according to the requirements, well-illustrated and fully reflects the main results achieved in the dissertation. It gives a very good, accurate and clear idea of the scientific development, conclusions and contributions of the author.

The methods used to identify the imaging defined markers in the study sample and their relationships with the defined markers and patient survival are well described and illustrated with sufficient figures.

The statistical analysis is well described and logically structured.

Dr. Svetomir Chakarov has precisely and clearly drawn 9 conclusions from his own research. Responsibly and critically he analyzes the methods used to identify the image-defined markers in the studied sample and their relationships with the definitively defined markers and patient survival. The results of the study correspond to the data published in the literature.

5. Dissertation Contributions

Contributions are divided into three groups: scientific contributions of an original nature - 4, scientific contributions of a confirmatory nature - 5, scientific contributions of practical value - 3.

12 contributions are presented, reflecting the final results of the dissertation.

For the first time in Bulgaria, a large-scale study is being conducted based on the imaging characteristics aimed at the local manifestations of Crohn's disease. Important correlation dependences between the individual factors - Lemann index and IBDQ are proven.

An example protocol was developed for the preparation and examination of patients with Crohn's disease with CTE and MPE according to global

recommendations. Future directions are to investigate the role of imaging markers as prognostic factors.

I accept the stated 12 contributions of the dissertation as undisputed.

6. Scientific publications on the topic of the dissertation

Dr. Chakarov's scientific output related to the present work includes - 3 full-text publications.

The results of the scientific research have been published in three **full-text publications**. One in a refereed journal: Chakarov Sv., Georgiev R., Valchev G, Balev B, Banova S., **Crohn's disease -bowel changes on CT enterography and MR enterography**. (Roentgenologia and Radiologia 2022, issue 3) and two in not referenced:

1. Chakarov St. Abscesses in patients with Crohn's disease - the opinion of the radiologist. (Varna medical forum, item 11, 2022, issue 1)
2. Chakarov St., Georgiev R., Valchev G., Atanasova An., Yordanova M., Mavrodinova St., Kostova E. **Crohn's disease: contemporary diagnostic techniques**. (Varna medical forum, item 11, 2022, appendix 2).

7. Conclusion:

Dr. Svetomir **CHAKAROV** knows the state of the problem very well, not only theoretically, but also as an established specialist in Imaging Diagnostics, which gives him the opportunity for targeted practical application of the obtained results. There is the analytical approach in evaluating literary information. He has mastered and can successfully and independently apply the methods of scientific research. He skillfully uses a wide range of statistical methods. The candidate shows very good professional training and mastery of the material, which enables him to draw significant conclusions for scientific

and clinical practice. There are sufficient publications and scientific activity related to the dissertation.

The dissertation fully meets the requirements of the Law and the Regulations for awarding the educational and scientific degree "doctor".

This gives me the reason, with full conviction, to vote positively and to propose to the respected members of the Scientific Jury, appointed by order of the Rector of the MU - Varna, to vote with a positive vote for awarding the scientific and educational degree "doctor" to Dr. Svetomir Sevdalinov Chakarov for the presented dissertation on the topic: "ROLE OF CT AND MR ENTEROCOLOGY FOR DIAGNOSIS AND FOLLOW-UP IN CROHN'S DISEASE"

05/09/2023

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MD)

Prepared the review:


(Prof. Dr. Nachko Totsev,