МЕДИЦИНСКИ УНИВЕРСИТЕТ
ПЛОВДИВ
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# STATEMENT

**By Prof. Dora Konstantinova Zlatareva, MD, PhD**

**Head of Department of Diagnostic Imaging, Medical Faculty,**

**Medical University Sofia**

**Member of Jury designated by a written order № P-422/25.03.2021**

**of the Rector of the Medical University Plovdiv**

On dissertation for awarding the educational and scientific degree of **Doctor**

**Professional field:** 7.1. Medicine

**Doctorate program:** Medical radiology and Rentgenology

**Author:** Katya Angelova Doykova, MD

**PhD student**

**Department:** Diagnostic Imaging

**Topic:** pSW-ELASTOGRAPHY OF THE LIVER AND SPLEEN IN THE ASSESSMENT OF LIVER STIFFNESS IN CHRONIC VIRAL HEPATITIS AND LIVER CIRRHOSIS WITH VIRAL ETIOLOGY

**Scientific Supervisor:** Assoc. Prof. Dr. Silvia Tsvetkova-Trichkova, MD

## 1. General description of the procedure and the doctoral candidate

The set of materials presented to me electronically complies with Art. 115(1) of the procedure for awarding the educational and scientific degree of PhD at Medical University Plovdiv, the Regulations of MU- Plovdiv as of 06.11.2014 and includes the required documents.

The PhD student has presented 3 scientific articles in Bulgarian scientific journals, including one in Journal with Impact rank. In addition one poster on National conference and two on International Congresses: Balkan Congress of Radiology and European Congress of Radiology have been also presented.

**Biography and career**

Doctor Katya Angelova Doykova was born on 03.01.1987 in Plovdiv. She went to Mathematical school "Acad. Kiril Popov", Plovdiv, class of 2006. She went to Medical University of Plovdiv, graduated in 2013. As a student, during the period January 2009 - May 2013 she worked as a statistic –registrar in the Gastroenterology Department, UMHAT Caspela. During the period October 2013- May 2015 she worked as a doctor in The Endocrinology Department , UMHAT Caspela, Plovdiv. She is currently a Phd student in the Department of Diagnostic Imaging, Medical University Plovdiv since April 2020. She is an assistant in the Department of Imaging Diagnostics, Medical University Plovdiv since January 2017. She is a certified radiologist since January 2020. She currently works in the Department of Imaging Diagnostics, UMHAT Caspela, Plovdiv.

The PhD student has passed courses in Medical University Plovdiv in ultrasound diagnostics, emergency diagnostics and teaching medicine. She has participated in international courses in CT colonography, liver imaging and contrast-enhanced Ultrasound. She has won a Grant in the Young ESGAR Mentorship program 2021.

Dr Doykova speaks fluent English.

**2. Relevance of the subject**

Chronic liver damage is of great clinical and social importance, and many scientific studies are dedicated to it. A common consequence of chronic viral hepatitis and liver cirrhosis of viral etiology is liver fibrosis, which is a reversible process. Timely diagnosis of the condition is prevention of cirrhotic transformation and serious complications. Laboratory, ultrasound, computed tomography and magnetic resonance imaging methods are used independently or in various combinations for diagnosis and follow-up of patients with chronic liver damage. In recent years, the "gold standard" in the diagnosis of liver fibrosis has been liver biopsy, but it is associated with a risk of rare but serious complications. In 2017, the European Federation of Ultrasound Societies in Medicine and Biology approved ultrasound elastography of the liver as an alternative method of liver biopsy for the diagnosis of liver fibrosis. Current trends are aimed at replacing invasive methods with non-invasive methods that are easily reproducible, well tolerated by patients and have great potential for development.

The presence of physiological and pathophysiological links between the liver and spleen is the reason for many studies aimed at changes in the spleen in patients with chronic viral hepatitis B and C and their complications - liver fibrosis, portal hypertension, esophageal varices. Preliminary data indicate that the assessment of spleen stiffness as an indirect marker of liver fibrosis is less affected by liver inflammation than the assessment of liver stiffness. Conducting additional research in this area would significantly complement the current knowledge on the problem. This is a prerequisite for timely diagnosis, prevention, therapy and prognosis of patients with regard to chronic liver damage.

## 3. Knowledge of the problem

The doctoral student has a deep knowledge of the state of the problem and the change in the level of knowledge in recent years. The literature review is written in a very good scientific style and the information is presented at the same time accessible. Modern understandings of the change in the stiffness of the spleen in chronic liver damage, especially in chronic viral hepatitis B and C and their complications - liver fibrosis, portal hypertension, esophageal varices. The unresolved problems in elastography for the assessment of liver fibrosis are presented. Attention is also paid to the most modern scientific research on magnetic resonance elastography, MR perfusion and liver diffusion.

Dr. Doykova demonstrates excellent analytical skills, as a result of which, logically and concisely, after the literature review, conclusions are drawn, determining the need for further research in this area.

## 4. Methods of the study

For the period 2018-2019 in the Department of Diagnostic Imaging UMHAT "Kaspela" were studied 90 patients with positive markers for chronic viral hepatitis. These were inpatients in the Clinic of Gastroenterology of UMHAT "Kaspela". Of these, 30 had chronic viral hepatitis B, 30 with chronic viral hepatitis C and 30 patients with cirrhosis of viral etiology. The inclusion and exclusion criteria for the three groups of subjects are indicated. The control group consisted of 35 healthy adult volunteers. Standard abdominal ultrasound and point transverse elastography were performed. They were compared with liver biopsy and histological examination. Modern methods for data processing and subsequent statistical processing and analysis are used.

The research methodology chosen by the doctoral student is modern and allows achieving the set goal and obtaining an adequate answer to the tasks of the dissertation.

## 5. Characterization and assessment of the dissertation

The presented material is written on 141 pages, contains 61 figures, 26 tables and 2 high quality diagrams. The dissertation is in accordance with the requirements of MU-Plovdiv for structuring and volume content. The bibliography covers 129 literature sources, mostly (125) in Latin. It is up-to-date and comprehensive, covering modern sources.

The paper is written in very good Bulgarian and is structured in the following sections Introduction, Literary Review, Purpose and Tasks, Material and Methods, Results and Discussion, Conclusions, Contributions, Bibliography. The technical layout of the dissertation meets the requirements.

As a result of the review, a clear **goal** is logically derived. The **set 6 tasks** correspond to it and are scientifically substantiated. They were completed in stages during the study.

The results of the study are presented divided according to the main tasks, after each of which the main trends are logically summarized and the results are compared with the data from the research of other scientists. Comparison with healthy controls allows clinical use. Dr. Doykova logically presents the results in detailed tables and illustrates the distribution of patients by groups according to the observed changes in the spleen, liver, age of the patient, BMI, viral hepatitis B and C and liver cirrhosis with viral etiology and other indicators. Statistically significant correlations were found.

In the discussion after the results of each task, Dr. Doykova compares her data with the known literature, which shows in-depth knowledge of the problem and critical analysis.

The 8 conclusions are based on the literature review, analysis of own results and discussion. They are precisely formulated and reflect the set tasks and the obtained results.

**I fully accept the contributions indicated by the doctoral student. The original contributions to Bulgaria are:**

The first comprehensive study to assess spleen stiffness in chronic viral hepatitis and liver cirrhosis of viral etiology

Comparison between spleen stiffness and liver stiffness with histological evaluation in patients with chronic viral hepatitis and liver cirrhosis of viral etiology.

Establishing a limit value for the density of the spleen at which we might expect decompensation of liver cirrhosis with the appearance of ascites and varicose veins of the esophagus.

**Affirmative contributions** to the enrichment of knowledge about:

The usefulness and reliability of pSW-elastography in the diagnostic follow-up of patients with chronic viral hepatitis with their complications.

Spleen stiffness measured by pSW-elastography, which can be used as an additional indicator in assessing the degree of liver parenchymal damage in chronic viral hepatitis and as an additional indicator in monitoring complications of liver fibrosis such as esophageal varices and ascites.

**6. Evaluation of the publications and personal contribution of PhD student**

On the topic of the dissertation, Dr. Doykova has submitted 3 scientific articles in Bulgarian journals, one of which in a journal with an impact rank. Three scientific papers were presented respectively: one participation in a poster session of a Bulgarian conference and two participations in poster sessions of international congresses: Balkan Congress of Radiology and European Congress of Radiology.

The personal participation of Dr. Doykova is evident from the text of the dissertation, the abstract and the presented publications.

**I have no critical remarks or recommendations** for the conducted research and the presented materials.

**7. The author's abstract**

The abstract reflects the essence of the dissertation and meets the requirements. It is presented on 68 pages and consists of parts that present the structure and content, main results and contributions of the dissertation.

**CONCLUSION**

In my opinion the presented dissertation of Dr. Katya Angelova Doykova is relevant, conducted with modern imaging methods and has a theoretical and scientifically applied contribution to modern diagnostic imaging.

The dissertation contains ***scientific, scientific-applied and applied results, which represent an original contribution to science.***

The structure, content and volume meet all regulatory requirements of the Academic Staff Development Act(ASDA) in the Republic of Bulgaria, Regulations for implementation of ASDA and Regulations of Medical University – Plovdiv.

The dissertation shows that the doctoral student Dr. Katya Angelova Doykova has in-depth theoretical knowledge and professional skills in the scientific specialty of imaging diagnostics, **demonstrating** qualities and skills for independent research.

Due to the above, I confidently give my **positive assessment** of the research presented by the above-reviewed dissertation, abstract, results and contributions, **and I propose to the esteemed scientific jury to award the educational and scientific degree 'Doctor'** to Dr. Katya Angelova Doykova in the doctoral program "Medical Radiology and Rentgenology"

13.04.2021 **Prof. Dora Konstantinova Zlatareva, MD, PhD**

Sofia