

To the Chairman of the Scientific Jury,
determined by Order No. P-109-160/ 24.02.2023
of the Rector of the Medical University - Varna
On your Protocol No. 1/ dated 07.03.2023

REVIEW

from

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On the dissertation work of Dr. Pavel Ivelinov Abushev, on the topic:

**"Role of Multiparametric Magnetic Resonance/Ultrasound-Guided Transrectal
Fusion Biopsy for the Diagnosis of Prostate Carcinoma"**

for the awarding of a scientific educational degree "Doctor"

The dissertation work for obtaining the scientific educational degree "Doctor" on the topic "Role of multiparametric nuclear magnetic resonance/ultrasound directed transrectal fusion biopsy for the diagnosis of prostate carcinoma"

developed by Dr. Pavel Abushev is the result of the introduction to the Clinic of Urology at the MU Varna of a new, innovative technique for the diagnosis of prostate carcinoma.

The presented scientific work contains 142 pages and is illustrated with 25 graphs and 14 tables. The bibliography includes 194 titles, of which 19 are in Cyrillic and 175 are in Latin.

The structure of the dissertation corresponds to modern requirements and contains all the necessary sections.

The literature review is detailed in content and, in a volume of 30 pages, informs us about the nature and specificity of the prostate cancer disease and the main principles and problems in its diagnosis. In more than 50% of cases, prostate cancer is diagnosed late, due to a latent course. Missing symptoms, as well as non-specific ones, lead to late diagnosis of prostate carcinoma.

Dr. Abushev examines in detail the data published in the modern medical literature concerning the occurrence, genetic factors, frequency of the disease in Bulgaria and worldwide, the possibilities for screening research, the main diagnostic methods, including new ones such as biomarkers, MRI and PET scanning. The types of biopsy methods for the diagnosis of prostate carcinoma are reviewed. Particular attention is paid to the fusion biopsy is the known advantages of the method over the standard prostate biopsy. The technology used to perform a fusion biopsy combines the technologies of transrectal ultrasound and nuclear magnetic resonance. The possibility of using fusion biopsy to take histological material based on an individual scheme for each patient from suspicious areas provides a greater possibility of detecting prostate carcinoma. This detailed study of the problem creates a basis for the development of the thesis of the scholar's research.

These discussion questions direct the PhD student towards an attempt to create a more complete picture of the significance of the biopsy examination and specifically of the fusion biopsy for the detection of prostate carcinoma.

The goal set by Dr. Pavel Abushev in the development of his dissertation is to

investigate the application of Fusion biopsy in the diagnosis of prostate carcinoma. The purpose of the dissertation is clear and well-articulated.

For the realization of this goal, Dr. Abushev sets himself five tasks with which to prove his thesis.

Task I. To analyze patients with a histological result of adenocarcinoma, including in relation to anesthesia used, measured PSA, undergone previous prostate biopsy and digital rectal examination (DRE) results, PI-RADS category.

Task II. To investigate the correlation between patients with a normal DRE, without symptoms, and prostate cancer detected by transrectal Fusion biopsy.

Task III. To analyze the volume of the biopsied prostate, the material taken from the patients (including the ratio between target and systemic materials), the ratio between positive and negative samples, and the comparison of ISUP grade and PIRADS score, in the patients with the histological result of adenocarcinoma.

Task IV. To analyze the stage of prostate carcinoma in patients with histological result adenocarcinoma, Gleason score and location of the tumor.

Task V. To analyze the length of hospital stay and the presence of fever in patients, after the application of Fusion biopsy.

The number of tasks set is quite sufficient to substantiate the main thesis of the dissertation work. They are formulated correctly, clearly and precisely.

In the next section, Dr. Abushev presents the results of the fusion biopsy studies used in the study on 167 patients over a three-year period. All biopsy procedures were performed in the Urology Clinic at the "St. Marina" - Varna from 2019 to 2022.

The PhD student makes a comparative analysis between Fusion biopsy and classical transrectal ultrasound biopsy and the opinion of different authors. The place of the presented discussion, which should be in the literature review chapter, is striking. Disadvantages of ultrasound-guided biopsy are presented,

such as missing small lesions, ambiguity in the image or interpretation, past inflammatory diseases, difficult-to-biopsy localizations. The author presents in detail the views of various authors on the advantages of using MRI and fusion biopsy examination, possible anesthetics and advantages of the method.

In the next chapter, the transrectal and transperineal approaches to MRI fusion biopsy are discussed. The historical development of both approaches, their advantages and disadvantages such as complications and diagnostics are presented. From the analyzed data, it is concluded that transperineal access allows successful prostate biopsies to be performed, without the need for antibiotic coverage, with similar cancer detection rates to the transrectal approach and minimal complications, while transrectal biopsy is less painful, smaller risk of urinary retention, a more familiar method among doctors. For these reasons, transrectal biopsies are currently the more common method of choice.

Dr. Abushev presents in detail the technique of transrectal fusion biopsy of the prostate used in the study with the fusion of real-time ultrasound images with MRI data before the study.

The third chapter presents the obtained **results**. At the beginning, the preoperative data, age, type of anesthesia, correlation between the histological result prostate carcinoma and PSA, previous biopsies, prostate volume, prostate size, PI-RADS score, number of biopsy cylinders, distribution of cancer patients by stage, Gleason score, tumor distribution in the prostate. It looks at the patients' daily stay, side effects such as fever.

The number of patients is completely sufficient for statistical processing and obtaining reliable results.

The following section includes a **summary** and formulation of **conclusions**, which, after the analysis of the obtained results, give in a synthesized form the conclusions regarding the significance and advantages of Fusion biopsy for the diagnosis of prostate carcinoma, the most important of which are:

- Precise marking of the suspect area.

- Ability to direct the needle to the suspicious area with maximum accuracy.
- Reaching hard-to-reach areas located ventrally and apically.
- Reduced false-negative results reduce the need for repeat biopsy.
- The correlation between a high PI-RADS class of the detected lesions and histologically verified clinically significant prostate carcinoma proves a high diagnostic value.
- It takes a little time to carry out the manipulation - on average 10 minutes.


In the **scientific contributions** chapter, Dr. Abushev formulated four scientific contributions of a practical and applied nature. The most valuable part of the thesis is the demonstration of the advantages in a number of aspects of the presented specificity of transrectal approach in the Fusion biopsy for the diagnosis of prostate carcinoma.

In **conclusion**, I can say that the dissertation work of Dr. Pavel Ivelinov Abushev on the topic "**Role of multiparametric nuclear magnetic resonance/ultrasound-guided transrectal fusion biopsy for the diagnosis of prostate carcinoma**" is properly structured and written in an academically sound style with an emphasis on scientific applied contribution. The dissertation student has fulfilled the scientific objective through the formulated tasks and made correct and logical conclusions.

The scientific value of the dissertation gives me reason to recommend to the respected scientific jury to award Dr. Pavel Abushev the educational and scientific degree "Doctor".

16.04. 2023

Yours sincerely:

A handwritten signature in blue ink, appearing to read 'N. Kolev', with a long, sweeping flourish extending to the right.

Prof. Dr. Nikolay Kolev, MD