

## **Review**

on the scientific papers

of **Dr. Emilyan Bojidarov Kalchev MD, PhD**, senior assistant-professor,  
applying in a concourse for the academic position of "Associate Professor"  
In the field of higher education 7. Health care and sports, Professional direction  
Medicine, Scientific specialty "Diagnostic Imaging"  
as announced in the State Gazette no. 15/21.02-2025

**By Prof. Dr. Georgi V. Hadjdekov, PhD**

Medical Faculty of Sofia University "St. Kliment Ohridski

According MU –Varna's Rector Order № P-109-200/16.04-2025

Dr. Emilyan Bojidarov Kalchev MD, PhD, senior assistant-professor, is a candidate in the competition for the academic position "Associate professor" in the field of higher education 7. Health and sports, professional direction Medicine, scientific specialty "Diagnostic Imaging", as announced in the State Gazette no. 15/21.02-2025, for the needs of the activities of the Department of Diagnostic Imaging and Interventional radiology of the Faculty "Medicine" of the Medical University – Varna and the Clinic of Diagnostic Imaging of the University Hospital "Sv. Marina". The materials and documents submitted by the candidate meet the requirements and the order of Section III, Article 126 (1) of the Regulations for the Development of the Academic staff of the Medical University – Varna from 14.04.2025.

### **1. General applicant's data**

Dr. Kalchev was born in 1986. In 2005, he graduated from the Mathematics High School in Varna, and in 2001 - for higher education: Master's degree, specialty "Medicine", Medical University of Varna. Since January 2018, he has a recognized specialty in Imaging Diagnostics.

In September 2019, he successfully defended his dissertation thesis on the topic of: "Arterial spin labeling for assessment of cerebral perfusion in patients with microangiopathy" for the acquisition of the educational and scientific degree "PhD".

Since 2012, he has been an assistant professor, and since 2021, a senior assistant professor, at the Department of Diagnostic Imaging and Interventional Radiology of the Medical University - Varna.

Married.

Fluent in English and German.

## **2. Scientific research**

To participate in the concourse, Dr. Kalchev presents fifteen full-text publications, all in English, ten of which are grouped as habilitation papers and are in publications referenced by international databases (WoS/Scopus). These publications find their place on the pages of editions such as Cureus, Cerebral Circulation - Cognition and Behavior, Journal of Medical Imaging and Radiation Sciences, Рентгенология и Радиология. There is no data presented for papers in journals with an impact factor IF according to Thomson Reuters. The Google Scholar site indicates 24 (twenty-four) citations of Dr. Kalchev's papers.

Some of the candidate's publications are dedicated to the application of arterial spin-labeling in magnetic resonance imaging - a topic that is a continuation of his dissertation thesis work. It has been demonstrated that the inclusion of a global assessment of cerebral perfusion offers a more holistic approach to understanding of the neurodegenerative diseases, guiding the assessment not only of where changes occur in the brain, but also how these changes fit into the broader vascular context. A retrospective analysis of 40 patients with meningiomas, examined with 3T magnetic resonance imaging

using the 3D pulsed Arterial Spin Labeling technique, showed the greater importance of tumor localization over size. A five-point visual scale for assessing global changes in cerebral perfusion during arterial spin labeling is proposed. The study has a very good approach and methodology, which allow this visual assessment scale to be effectively applied in daily practice for assessing global perfusion changes. Very interesting is the study on the relationship between the presence of a “fetal type” of the posterior cerebral artery and hyperperfusion patterns in the medial occipital cortex and thalamus, established by arterial spin labeling. Magnetic resonance imaging studies in eighty-four individuals without imaging signs of brain pathology were retrospectively analyzed, and the posterior cerebral artery type and perfusion pattern were compared. It is known that the “fetal type” of the posterior cerebral artery is associated with an increased risk of neurological disorders. Statistical processing of the results with the Fisher test indicates that there is a relationship between the type of the posterior cerebral artery and the perfusion patterns in the medial occipital cortex and thalamus observed by the magnetic resonance imaging technique of arterial spin labeling. This technique was applied to assess cerebral blood flow (CBF) in a study on its global relationship with increased venous prominence assessed by Susceptibility Weighted Imaging sequence. With adequate statistical processing, it has been shown that there is a systematic interaction between reduced cerebral blood flow and venous changes. The magnetic resonance technique of arterial spin labeling has been applied in interesting and difficult diagnostic cases, such as the one with the simultaneous presence of arteriovenous malformation and glioma in a 38-year-old man.

The potential of prostate-specific antigen density (PSAD) as an additional tool for stratifying high-risk lesions with PI-RADS 3 in the peripheral zone of the gland on non-contrast magnetic resonance imaging has been investigated. The study, announced as a pilot, includes 30 patients with lesions assessed as PI-RADS 3,

who underwent magnetic resonance/ultrasound fusion biopsy and indicates the utility of prostate-specific antigen in the evaluation of high-risk PI-RADS 3 lesions in the peripheral zone on magnetic resonance imaging without the use of contrast-enhanced imaging.

Some Dr. Kalchev's publications are impressive and demonstrate his broad worldview as a specialist. I would like to mention three publications here:

- One reflects the author's opinion on the need to develop diagnostic imaging training in the context of personalized medicine and the need to include artificial intelligence, interdisciplinary learning modules, and global distance learning platforms in future programs.

- Another examines the role of education during the COVID-19 pandemic and the importance of education with reduced clinical contact, practical skills and patient interaction. The role of continuing education with the integration of telemedicine and digital medicine is examined. The article calls for a balanced assessment of both the challenges and the capabilities of medical professionals formed in the context of the pandemic.

- The third presents an opinion on the importance of technological improvements in audio systems for a number of physiological, psychological and social factors that could influence auditory perceptions. The article emphasizes the importance of distinguishing between actual physical changes in audio technology and the complex human factors that can modulate sound perception.

Interesting clinical cases and their imaging findings complete the palette of the presented publications. Such are the demonstrated cases:

- of intussusception caused by intestinal Burkitt lymphoma in a seven-year-old girl,

- of an 82-year-old patient with mitral annulus calcifications – a finding relevant for a subsequent endovascular procedure

- of the solid pseudopapillary tumor of the pancreas in a 60-year-old female patient, presented on positron emission tomography/computed tomography (PET/CT) and magnetic resonance imaging

### **3. Scientific papers contributions**

The author's assessment of the contributions of his publications is exhaustive. I accept it, highlighting the original 5-point visual scale for global assessment of cerebral perfusion by arterial spin labeling, the established reduction of arterial spin labeling signal in the medial occipital lobes and thalamus in individuals with fetal-type posterior cerebral artery, as well as the conceptual model for interpreting arterial spin labeling in regional hypoperfusion foci against the background of global perfusion status.

It should emphasize the excellent presentation of the publications submitted for participation in the competition by Dr. Kalchev, both in terms of language and terminology. The original articles used a wide and adequate range of statistical methods.

### **4. Teaching activity**

Dr. Kalchev participates in teaching imaging diagnostics to medical, dental and medical college students. Certificate 099-1147/14-04.2025 of the Human Resources Department of the Medical University - Varna proves a total teaching experience of Dr. Kalchev in the Department of Imaging Diagnostics and Interventional Radiology of 12 years, one month and 16 days (at the time of issuance). A report from the Vice-Rector for Academic Affairs No. 112-83 of the same date indicates that over the past five years, the annual academic workload has been significantly over 100 hours per year.

### **5. Critical notes and recommendations**

I have no significant critical remarks. The candidate may be recommended to continue, develop and expand his publication activity as a leading author of original research.

## **6. Conclusion**

**Dr. Emilian Bozhidarov Kalchev MD, Senior Assistant Professor, is a well-established specialist in diagnostic imaging, lecturer and researcher. The scientific papers presented demonstrate professionalism and culture. The latter, together with the candidate's materials and documents, meet the requirements of the Regulations for the Development of Academic Staff at the Medical University - Varna.**

**I give my positive assessment that Dr. Emilian Bozhidarov Kalchev, MD, Senior Assistant Professor, be elected and occupy the academic position of "Associate Professor" for the needs of the Department of Imaging and Interventional Radiology of the Faculty of Medicine of the Medical University of Varna and the Clinic of Imaging of the University Hospital "St. Marina".**

**Reviewer:**

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**Prof. Dr. George V. Hadjdekov, PhD**

**Sofia, June 2025**