Review

by Prof. Dr. Boyan Balev, Ph.D.

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determined by Order № P-109-180 from 03.06.2020 of the Rector of the Medical University - Varna, for a member of the jury of a competition for the academic position "Associate Professor" in the field of higher education 7. "Health and Sports", in professional field 7.1. "Medicine" and scientific specialty "Medical Radiology and Radiology (including the use of radioactive isotopes)" for the needs of the Department of Imaging, Interventional Radiology and Radiation Therapy of the Ministry of Health of Varna, announced in SG no. 8 / 28.01.2020

Within the legally established term, documents were submitted by one candidate: Dr. Marin Boykov Penkov, who was admitted to the competition in accordance with the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria, the Regulations for Implementation of the Law at the Medical University "Prof. Dr. P. Stoyanov "- Varna.

1. Biographical data and career development.

Dr. Marin Penkov was born on December 3, 1977. In 2003 he graduated with a degree in medicine from the Medical Faculty of the Medical University of Sofia. During the period 2004-2009 he worked consecutively as a resident radiologist at the University Hospital "Lozenets" and Tokuda Hospital Sofia. Since July 1, 2009 he has been a resident radiologist at the MHAT “St. Ivan Rilski ”Sofia, and since April 1, 2012 he

has been the head of the same department. Dr. Penkov was elected an assistant at the Department of Imaging Diagnostics at MU Sofia in 2016. In 2011 he acquired a professional qualification and legal capacity "Health Manager" from the Faculty of Public Health of MU Sofia with a diploma of educational qualification degree.

In 2018 he was awarded the educational and scientific degree "Doctor" in the scientific specialty "Social Medicine and Health Management" after defending his dissertation "Conceptual framework and model for organization and quality management in the medical institution" University Hospital St. Iv. Rilski ”EAD Sofia according to ISO 9001: 2008”

The academic development of the candidate is characterized by an active desire to improve his medical skills through a number of courses and specializations conducted in the country and abroad.

Dr. Penkov speaks German, English and Russian.

2. General characteristics of the research and applied research activity.

Dr. Penkov participated in the competition with 93 scientific papers, divided thematically in different areas of imaging. In them, he consistently poses and analyzes various problems that are fundamental to the stage at which they are considered.

What unites all these works is their depth, scientific and practical relevance and recognized contributions they bring.

Papers	**All**
1. Full text printed issues	**43**
1.1. Bulgarian journals	32
1.2. International journals (English linguae)	6
1.3 Thesis	1
1.4. Books	4
2. Scientific meetings with printed abstracts	**50**
2.1. National meetings	40

2.2. International meetings	10
All papers	**93**

The analysis of the 32 full-text publications published in Bulgarian editions shows 9 original articles and 22 reports based on clinical cases. Of the 6 publications published in foreign publications, 1 is an original article and 5 are reports based on clinical cases.

Citations*	29 (18 of which in Bulgarian)
*remark	7 are self-citations

IF*	**9**	

A special place is occupied by the full-text publications, printed in reviewed and indexed in world databases journals, covering the requirements for habilitation work, 11 in number. Most of them are devoted to individual clinical cases, but this does not diminish their scientific value, because in syndromology, as is known, due to the rarity of nosological units, each published case contributes to the enrichment and formation of the symptom complex of the disease. Only with the accumulation of a sufficient number of observations in the world periodicals is it possible to perform a systematic analysis.

He is the beneficent of a European project BG16RFOP002-1.002-0044 for development for scientific activity in the field of neurocognitive science and theoretical and practical bases of Neuroeconomics and Neuromarketing.

3. Teaching activity

Dr. Penkov's teaching activities are diverse. Although he has been a full-time assistant for four years, his extensive clinical practice allows him to lead a full-fledged learning process and to gain valuable teaching experience at a satisfactory intensity. Dr. Penkov provides a detailed report, certified by the University Hospital "St. Iv. Rilski ”Sofia, where his classroom and extracurricular workload is applied. From the

attached reference can be accepted for participation in the competition only part of the included classes, which according to the requirements of MU Varna belong to the classroom employment, namely those that are set aside for lectures and exercises with students. Therefor a cost of 110 hours per year is formed, which, according to the requirements for appearing in the announced competition for 0.25 associate professors in image diagnostics, represent sufficient academic employment.

Dr. Penkov is active in conducting examines and teaching in various forms of graduates and medical students (both in the compulsory program and additional extracurricular activities for students of different courses). His participation in the lectures of the main courses for the specialists in the specialty of Imaging Diagnostics has a special weight. His inclusion in the course program is a recognition of his high teaching qualification. Dr. Penkov also participates in the editing of materials in the scientific journal of the guild, as well as in other publications. Dr. Penkov regularly participates in the training panels of the congresses of BAR and congresses and courses of other professional organizations.

Participates in the writing of separate chapters dedicated to image diagnostics in 2 textbooks and 2 monographs for various medical specialties, demonstrating teaching skills and didactics in the presentation of the material. The creation of a textbook should be a priority for the evaluation of the candidate.

Dr. Penkov has an active profile in ResearchGate and GoogleScholar.

4. Main scientific contributions

The scientific and practical contributions from the activity of Dr. Penkov are significant, not only in the field of neuroradiology, where he is a recognized capacity, but shows a variety of scientific interests in a number of areas of imaging. They unite several areas, in each of which there are scientific and applied contributions.

In practical terms, Dr. Penkov introduces a number of highly specialized research methods and specialized protocols for specific pathology: virtual colonoscopy, CT / MR enterography, MR spectroscopy, MR perfusion, MR tractography, functional MR, MR cartilage mapping, MR quantitative assessment of jelly liver parenchyma, fetal MR.

The introduced protocols for: Development (as a team) of a protocol and safety rules for MRI examination, Introduction of the Humpert method in the diagnosis of patients with epilepsy in Bulgaria, Preparation and introduction in Bulgaria of a diagnostic algorithm and monitoring of patients with deep brain stimulation in Parkinson's disease, Development (collectively) of the principles and foundations of Neuroeconomics and Behavioral Economics, Development (collectively) of an algorithm for diagnosis and follow-up of patients with CNS tumors, Development (collectively) of algorithm for diagnosis and follow-up of children with craniosynostosis, Introduction in practice of a protocol for preoperative preparation of patients for liver transplantation with a living donor, development (in a team) of rules for good medical practice in imaging.

4.1. Endovascular approaches in neuroradiology.

This relatively new and current field, not only in our country, is enriched by several developments and clinical observations of teams in which Dr. Penkov actively participates. Several publications have been devoted to transcatheter embolizations of cerebral aneurysms, carotid-cavernous and dural arterio-venous fistulas.

A group of 251 patients with cerebral aneurysms treated with various endovascular techniques was published, in which a very good result was achieved. Postoperative mortality was found in 3.6% and postoperative morbidity in 3.2%.

An extremely rare spinal artery aneurysm has been described, the treatment of which is a major challenge for traditional neurosurgery. The experience of the author's team with the endovascular approach in this pathology has been published. The described case from the practice of successful embolization of a post-traumatic carotid-

cavernous fistula of a 27-year-old man, as well as transvenous embolization of a carotid-cavernous fistula through an superior ophthalmic vein in a 52-year-old woman, is also contributing. Transcatheter embolization procedures are effective and safe in the treatment of carotid-cavernous fistulas. The application of ONYX embolizing agent for the treatment of vascular malformations with double-lumen catheters, is a contribution to the Bulgarian practice.

Coil placement in wide-necked aneurysms is a recognized challenge for interventionists. Balloon-assisted coiling is a contribution to the success of this procedure. This technique is also used in patients with ruptured aneurysms and those with inappropriate aneurysm anatomy.

Successful embolization of a blister aneurysm of the internal carotid artery has been published - a rare and clinically dangerous manifestation of vascular pathology. Due to the pronounced instability of the aneurysm, the published procedure is remarkable as a professional success, as well as a contribution to the application of the methodology.

The original article presented the results of 21 patients with drug-resistant epilepsy who underwent preoperative 18FDG PET / CT and MRI using a special epilepsy protocol. The post-procedure fusion of the images from both methods demonstrates localization of the epileptogenic zone and increases the chances for successful resective surgery.

4.2. Brain mapping

The research in this field in our country, the subject of several articles, is undoubtedly of a contributing nature. The studies analyzed the most common brain mapping methods: Wada test, functional magnetic resonance imaging (fMRI) and intraoperative direct electrical stimulation (DES). A specific study included 4 patients with preoperative brain mapping using the Wada test and fMRI. Intraoperative mapping with DES during awake craniotomy was performed in one case. The histopathological

diagnosis was low-grade glioma in 2 cases, cortical dysplasia (1 patient) and arteriovenous malformation (1 patient). Brain mapping allows complete resection of the lesion in three of four patients. There is no new postoperative deficit, despite surgery near or within functional brain areas. Brain plasticity, provoking the displacement of eloquent areas from their usual places, is observed in two cases. Brain mapping methods allow surgery in eloquent areas of the brain that have been recognized as "forbidden areas" in the past. This mapping technique is a prerequisite for achieving radical resection of epileptogenic lesions.

4.3. Imaging studies in pediatric neuroradiology

Dr. Penkov is undoubtedly a leading specialist in pediatric neuroradiology and a sought-after consultant in difficult cases by fellow radiologists from all over the country. Recognition for this is the acquired European diploma, the only one in Bulgaria, in pediatric neuroradiology. Preoperative anatomical localization of pathological processes and important brain functions is essential for successful neurosurgery. Dr. Penkov participates in the application of intraoperative brain mapping through direct electrical stimulation in children.

Several descriptions of rare cases in childhood contribute to the enrichment of symptom complexes in pediatric neuroradiology - reversible posterior encephalopathy syndrome (PRES), giant intracranial sacral aneurysm in a 6-year-old child, Rubinstein-Taby syndrome.

5 cases of isolated extramedullary localization in children with acute myeloid leukemia (AML) and acute lymphoid leukemia (ALL) are presented. This rare manifestation of the disease creates diagnostic difficulties, especially in children without manifestations of the typical deviations in the clinical and laboratory picture. The authors emphasize the image morphology of pathological findings and discuss possible errors in recognizing the condition.

Clinical observations of successfully diagnosed complications of the rare multisystem neurocutaneous disease neurofibromatosis type 1 have been published. The authors document cases of malignant tumors of the peripheral nerve sheath occurring in association with NF type 1. of the disease and its possible complications.

A case of a 5 years boy with achondroplasia has been described, showing one of the common and very important complications of the disease - high spinal stenosis due to disturbed ossification of the foramen megnum. Achondroplasia is the most common dwarfism with normal intelligence and acquaintance of fellow imaging diagnosticians through the publication of such observations contributes to optimizing practical behavior with these patients.

4.4. Introduction of a new magnetic resonance technique in our country - MR urography.

The method was developed in an author's team and is extremely useful for assessing the morphological and functional features of the urinary system. It is especially valuable for pediatric patients in whom urological pathology is very common due to the lack of ionizing radiation and avoidance of the shortcomings of ultrasound. The method is also very suitable for pregnant women, who also often need to assess impaired renal drainage. The method is applied in two variants - MR static urography and MR excretory urography. In most cases, using static T2 images, high signal intensity is achieved without the need for contrast.

5. Public activity, scientific organizations and organizational skills

Dr. Penkov is an active member of 4 scientific medical societies - the Bulgarian Association of Radiology (BAR), the European Society of Radiology (ESR), the European Society of Neuroradiology (ESNR) and the European Society of Gastrointestinal and Abdominal Radiology (ESGAR).

Dr. Penkov obtained the European Diploma in Neuroradiology - 2015 and the only specialist in Bulgaria with the European Diploma in Pediatric Neuroradiology - 2019.

Founder and chairman of the Bulgarian Association of Neuroradiology. He is a co-founder, member of the board and scientific secretary of the Bulgarian Association of Cardiothoracic Radiology.

Founder of the Bulgarian Society of Neurooncology, the Bulgarian Society of Neurooncology and the Bulgarian Society of Endovascular Therapy.

He is a member of the National Expert Board for Imaging Diagnostics.

Dr. Penkov has repeatedly been a guest on television and radio programs dedicated to current issues of imaging and healthcare. Actively works with patient organizations.

He is the winner of the awards "Best Doctors" on Darik Radio (2011 and 2015) and "Doctor Who Bulgarians Trust" (2019).

6. Critical notes

The predominant part of Dr. Penkov's publications are based on the descriptions of individual clinical cases, the so-called case report. Most of them present a detailed and up-to-date literature reference, which undoubtedly has an educational effect and is essentially an overview of the published topics. My recommendation is that Dr. Penkov in his future works to focus on the original developments and reviews, for which he undoubtedly has both rich clinical material and a competent team. Full-text articles in foreign editions in which original works are published are also recommended for future work.

Another critical note is the lack of full-text articles, of which Dr. Penkov is the first author.

7. Conclusion

Dr. Marin Penkov is an established Bulgarian specialist with great scientific potential and clinical experience. The scientific production presented by him covers modern imaging methods, and the new techniques introduced in medical practice prove his contribution to the development of the specialty and to raising the prestige of Bulgarian medicine. He enjoys undeniable authority not only among the guild of Bulgarian imaging specialists, but also among other clinical specialties. Demonstrates a desire and ability to share the accumulated theoretical knowledge and practical skills with his younger colleagues, which makes him an excellent teacher and sought-after lecturer.

Based on the presentation, including a comprehensive assessment and analysis of the candidate's activities and according to the requirements and accepted evaluation criteria of the Medical University - Varna, I find it reasonable and convinced to propose to the esteemed scientific jury of Dr. Marin Penkov, MD. to award the academic position of "Associate Professor"

12 May 2020 Professor Boyan Balev: