

**To the Chairman of a Scientific Jury  
appointed by order of  
the Executive Director of "Acibadem  
City Clinic UMHAT Tokuda" EAD  
No 243/01.06.2021**

### **OPINION**

From Prof .Borislav Georgiev Georgiev, MD PhD,  
Head of the Cardiology Clinics, MHAT "National Heart Hospital" Sofia,  
Member of the scientific jury for the competition for the acquisition of the academic position  
"Associate Professor" in the field of higher education 7. "Health and Sport", professional field  
7.1." Medicine" and scientific specialty "Cardiology" for the needs of the Clinic of Cardiology,  
Department of Invasive Electrophysiology of "Acibadem City Clinic University Hospital Tokuda"  
announced in SG issue 27/02.04.2021

For the above competition, documents were submitted by one candidate – Dr. Vassil Traykov, PhD, Department of Invasive Electrophysiology at the Cardiology Clinic of "Acibadem City Clinic UMHAT Tokuda". The documents submitted by the applicant are in accordance with the requirements of the regulation for the academic position "Associate Professor" and the rules of "Acibadem City Clinic UMHAT Tokuda" EAD. I do not find any gaps in the submitted documentation and declare that I do not have scientific works with the candidate.

#### **1. Research**

##### *1.1. Publications.*

Dr. Vassil Traykov has presented 90 scientific works, of which one dissertation work for the acquisition of educational and scientific degree "PhD", 72 scientific publications and 17 scientific reports.

Of the 38 articles presented in peer-reviewed journals, 36 were published in international scientific journals indexed in Scopus and Web of Science databases. Two of the publications in Bulgarian journals are also indexed in the Web of Science.

In journals not in the specified databases, 16 publications are presented, of which 15 are in a Bulgarian journals and 1 are abroad.

There are 14 participations as a stand-alone author or co-author in collective monographs. 8 of these are in books published in Bulgaria and 6 in publications abroad. One of the books is under the editing of Dr. Traykov.

##### *1.2 Scientific forums*

Dr. Vassil Traykov has actively participated in 17 national or international forums with lectures and reports. In 13 of them (76,4%) as a single or first author.

##### *1.3 Authorship and citations*

The official citation from the Central Medical Library mentions 20 citations in Bulgarian scientific journals.

315 citations are found in the Scopus database and 690 citations are found in the Web of Knowledge.

The total number of citations is 710, of which in Bulgarian scientific journals - 20, in foreign scientific journals - 690.

The total impact factor calculated on the basis of the official report submitted by the Central Medical Library amounted to 84.55. The estimated h-index is 10 and the average number of citations per publication is 14.14.

#### ***1.4 Participation in working and expert groups***

- Member of the EHRA Scientific Documents Committee - 2017-2020
- Member of the EHRA National Societies Committee 2020-2022
- Chairman of the Association of Cardiac Stimulation and Electrophysiology in Bulgaria mandates 2016-2019 and 2019-2022
- President-elect of the Bulgarian Society of Cardiology - Mandate 2022-2024
- Member of the Expert Council on Cardiology at the Ministry of Health

## **2. Most significant scientific contributions**

Research and clinical activity are in areas which can be grouped into several fields: mechanisms of atrial fibrillation and catheter ablation as a therapeutic approach, electrophysiological findings in supraventricular tachycardias, electrophysiological findings and results of catheter ablation in atrial flutter, infections in implantable electronic devices, treatment of ventricular tachyarrhythmias and prevention of sudden cardiac death. He also participated in the Development of consensus documents and position papers of leading organizations.

### ***2.1 Study of the mechanisms of atrial fibrillation and catheter ablation as a therapeutic approach.***

#### **Contributions of a theoretical nature**

The role of triggering structures in maintaining the fibrillation process has been clarified. Good temporal stability of the frequency distribution in the atria has been demonstrated and the role of pulmonary veins in maintaining the AFib (1, 4, 5, 36, 74, 85, 87) has been shown.

#### **Contributions of a scientifically applied and confirmatory nature**

For the first time in Bulgaria, a case of catheter ablation in AFib has been reported (56).

Results were found in terms of procedural characteristics, procedural success and incidence of complications in groups of patients with AFib who underwent catheter ablation. Among them is the largest group of patients reported in Bulgaria, as well as a large group of patients from real clinical practice, included in a large European registry (1, 2, 3, 12, 15, 82). Factors were identified determining the procedural success of patient follow-up by identifying a new, unreported predictive factor - the HAS-BLED score (1, 2, 33, 86). Evidence of benefit of general anesthesia in terms of procedural time reduction, radiation dose, fluoroscopic time, number of radiofrequency applications and cumulative radiofrequency time (1, 76) have been identified.

## ***2.2 Study of electrophysiological findings in supraventricular tachycardias***

### ***Contributions of an original nature***

It is demonstrated that the analysis of the electrograms of the coronary sinus and the His bundle area in patients with focal atrial tachycardia can help determine the origin of the focus without the need of transeptal access and mapping of the left atrial and right-atrial septum. In cases where the left-atrial component of the signal from His bundle area or coronary sinus precedes the right-atrial component, the need for access to the left atrium to achieve successful ablation with high sensitivity and specificity (38, 39, 46, 80, 89) has been demonstrated.

A method has been created to determine the mechanism of tachycardia as focal or macroreentry tachycardia originating from the right atrium. A threshold value of the ratio of biatrial activation to the duration of the tachycardia cycle length of 40% is determined, which has been shown to help determine the arrhythmia mechanism with a high diagnostic accuracy. An algorithm has also been created to determine the mechanism and chamber of origin of focal atrial tachycardias with high diagnostic accuracy. There are also limited possibilities of the algorithm in cases of focal atrial tachycardia from the coronary sinus ostium (46, 55).

A method has been introduced to determine the need for access to the left atrium in catheter ablation of posteroseptal and left posterior accessory pathways. The method is based on the analysis of the earliest atrial electrogram by electrode pairs of the coronary sinus in retrograde conduction conditions exclusively on the retrograde conduction. It is established that in 95% of accessory pathways successfully interrupted by ablation after access from the left atria, the low-frequency component of the electrogram originating from the left atrium precedes the high-frequency component generated by the muscle sleeve of the coronary sinus. Some of the patients for this study were also examined prospectively, which further increased its scientific value (53).

Predictive factors for the success of catheter ablation in typical AV nodal reentry tachycardia have been identified. In a large group of patients, it was found that the rapid acceleration of nodal rhythm and the presence of more than 25 junctional beats is a combination of factors with a high predictive value for success in radiofrequency catheter ablation in AV nodal reentry tachycardia. It is also established that after ablation, a shortening of the effective refractory period of the fast pathway is observed in patients who experience shortening of the sinus cycle length, possibly as a result of changes in autonomic tone.

Shortening of the sinus cycle length and the effective refractory period of the fast pathway in the AV node is not a prerequisite for achieving immediate and long-term procedural success (69, 80).

### ***Contributions of an applied and confirmatory nature***

For the first time in Bulgaria, cases of successful catheter ablation in focal atrial tachycardia from a right lower pulmonary vein with the use of a three-dimensional mapping system and cases of catheter ablation of continuous ectopic atrial tachycardia in a child using transeptal access (57, 65) have been described.

A case of transeptal access through the left femoral vein is also described in a patient with focal atrial tachycardia (52), which is a contribution of practical application.

For the first time in Bulgaria, in a retrospective study, the procedural parameters of ablation were compared in patients with left-sided accessory pathways, in which various

ablation accesses were used – retrograde transaortic, transseptal or access through the coronary sinus. Significantly shorter fluoroscopic time is demonstrated when using transseptal access and insignificant differences in terms of procedural time, radiofrequency application time and procedural success. Thus, the location of transseptal access in catheter ablation of additional water connections with left-sided localization is confirmed, which has great practical application for the daily practice of the electrophysiologist (72).

Two cases of special scenarios in electrophysiological examination and catheter ablation that have a significant didactic value (45, 54) have been described.

### ***2.3 Study of electrophysiological findings and results of catheter ablation at atrial flutter.***

#### ***Contributions of an original nature***

Various mechanisms and circles of atrial flutter are described in patients after open heart surgery. The most common substrate has been established in this patient population, which is the atrial flutter dependent on the cavotricuspid isthmus. The increasing incidence of atypical atrial flutter after performing a more extensive atriotomy with the possibility of the appearance of right atrial incisions reentry circles in right atriotomy and dependent on the roof of the left atrium or perimitral left atrial flutter after left side atriotomy has been demonstrated. This is a contribution of scientific and practical value that adds further evidence on the mechanisms of atrial flutter in these patients (41).

In a prospective study, the procedural parameters and success of ablation of the cavotricuspid isthmus are compared with and without the use of intracardiac echocardiography to visualize the anatomy of the cavotricuspid isthmus. A shorter procedural time, a lower X-ray dose and less cumulative radiofrequency energy are found when using intracardiac echocardiography (42). This is an original contribution of a significant scientifically applied nature that confirms the place of intracardiac echocardiography in invasive electrophysiology, which has been demonstrated by the author in other works (84).

#### ***Confirmatory contributions***

The results of catheter ablation in the treatment of typical atrial flutter in terms of procedural success, manifestation of atrial fibrillation before and after ablation and the presence of intra-procedural complications in one of the first groups of patients described in Bulgaria (68, 90) are considered. The factors for the occurrence of atrial fibrillation after ablation of the cavotricuspid isthmus in patients with documented typical atrial flutter (78)-contributions of a scientifically applied nature were also considered.

Two cases of interesting scenarios of catheter ablation of typical atrial flutter are described – with access to the right heart cavities through the *v. cava sup.* and an approach for ablation of the cavotricuspid isthmus in a patient after correction of an anomaly of Ebstein, in which part of the isthmus was located on the ventricular side of a tricuspid-implanted biological valve prosthesis (50).

### ***2.4 Study of infections in implantable electronic heart rhythm control devices.***

#### ***Contributions of an original nature***

A consensus document has been created for the prevention and treatment of infections associated with implantable electronic devices for heart rhythm control. This

document introduces basic principles in the prevention, diagnosis and treatment of these conditions by setting new diagnostic criteria (27-29).

With great scientific and practical value is participation in a survey among centers around the world regarding clinical practices for the prevention, diagnosis and treatment of infections of implantable electronic devices for heart rhythm control and adherence to modern guidelines. The results demonstrate significant differences in clinical practices globally and regionally (32).

## ***2.5 Treatment of ventricular tachyarrhythmia and prevention of sudden cardiac death.***

### ***Contributions of an original nature***

For the first time in Bulgaria, a methodology for intrapericardial insufflation of carbon dioxide was introduced after perforation of a branch of the coronary sinus with subsequent access to the pericardium in patients with ventricular tachyarrhythmia in structural heart disease. Patients treated with this methodology were included in an international multicentre register demonstrating the reproducibility and good safety profile of this approach (21, 60).

The author participated in a large multicenter prospective study on the clinical effectiveness of implantable cardioverter-defibrillators in the primary prevention of sudden cardiac death (23-26, 30, 34). The contributions from the study are of high scientific value.

### ***Confirmatory contributions***

For the first time in Bulgaria, catheter ablation results in idiopathic left ventricular septal tachycardia are reported, demonstrating excellent long-term procedural success. Single-centre catheter ablation experience has also been reported in patients with ventricular tachyarrhythmia in a structurally normal heart (61, 73, 77).

Cases of special clinical scenarios in ventricular tachyarrhythmia have been described in patients with and without significant structural heart disease – bidirectional ventricular tachycardia in a patient with pheochromocytoma, two cases of arrhythmogenic right ventricular cardiomyopathy, one of which is the first case for Bulgaria of substrate-based catheter ablation using a three-dimensional mapping system. Two cases of bundle-branch reentry tachycardia in patients with previously implanted ICDs have also been described (40, 44, 47, 51, 64).

## ***2.6 Development of consensus documents expressing the position of leading organisations***

The applicant is involved in the publication of a consensus of the European Heart Rhythm Association document on behavior in arrhythmias in emergency conditions associated with acute coronary syndrome and after revascularization. The consensus document provides guidance and algorithms for these conditions, indicating treatment recommendations for different types of clinical scenarios.

The applicant is also involved in the development of a document expressing the position of the Heart Failure Association, the European Heart Rhythm Association and the European Association of Cardiovascular Imaging, which are subsidiaries of the European Society of Cardiology regarding the use of cardiac resynchronization therapy.

## ***2.7 Miscellaneous***

The results of catheter ablation in the treatment of a wide spectrum of arrhythmias in a single center are described. The site of catheter ablation is established as a method of treatment associated with high immediate and long-term procedural success. It is demonstrated that the results obtained in a single Bulgarian centre are comparable to those published in the world literature (81).

Two overview articles demonstrate the principles of catheter ablation for the treatment of rhythm disturbances and the location of three-dimensional cartography systems of the heart in the practice of the electrophysiologist (67, 71).

The applicant participates in the author's team of a guide in cardiology with a chapter dedicated to the basic principles of electrophysiological examination and catheter ablation (6).

The role of dyssynchrony induced by right ventricular apical pacing on left ventricular remodeling in patients with prolonged right ventricular stimulation in the conditions of the AV block. It has been established that in some patients with AV block left ventricular dyssynchrony increases, which is a predictive factor of left ventricular remodeling (43).

For the first time in Bulgaria a single-center experience with VDD stimulation in patients with AV block is confirmed.

The equivalence of the application of Valsalva maneuver and rapid ventricular stimulation with 5 to 8 stimuli during an electrophysiological procedure as adrenergic stimuli, affecting the turbulence of arterial pressure which is a marker of baroreflex sensitivity. A method of non-invasive baroreflex sensitivity testing is proposed in patients with cardiac implantable electronic devices by applying short-term burst ventricular stimulation (48).

The mechanisms underlying the occurrence of heart rate variability, as well as the parameters for its evaluation based on continuous ECG recordings are also reviewed demonstrating the role and clinical significance of the heart rate variability parameters for cardiovascular risk assessment (8).

An overview of the expression of arrhythmias in patients with COVID-19 was carried out, in pointing out the mechanisms of arrhythmogenesis and looking at the different types of arrhythmias in terms of therapeutic behavior in pandemic conditions. The role of antiviral drugs as proarrhythmogenic factors has been examined in detail, with practical guidelines for the prevention of proarrhythmias (59).

### **3. Teaching and scientific and organizational activities**

From 2004 to 2008 Dr. Vassil Traykov was a research associate at the National Heart Hospital, and from 2019 he is a full-time assist. Prof. at Sofia University "Kliment Ohridski".

According to a report from "Acibadem City Clinic UMBAL Tokuda" EAD Dr. Vassil Traykov has for the last 5 years 4515 equivalent hours of training of graduates and continuing training courses.

The teaching workload of Dr. Vassil Traykov corresponds to the requirements for the teaching workload for the academic position "Associate Professor".

### **4. Diagnostic work**

*Professional skills-* Dr. Vassil Traykov has 19 years of practice as a doctor, of which he works almost all the time in the field of rhythmology and invasive therapy.

For its diverse scientific and professional realization, the proficiency in English, German and Hungarian is also of great importance.

### **5. Membership of scientific organizations**

Dr. Vassil Traykov is a member of the following national and international scientific organizations:

- Bulgarian Society of Cardiology
- Association of Cardiac Stimulation and Electrophysiology in Bulgaria
- Hungarian Society of Cardiology
- European Society of Cardiology - FESC
- European Heart and Rhythm Association - EHRA

According to the requirements of THE National Centre for Information and Documentation for the academic position "Associate Professor" Dr. Vassil Traykov meets more than the minimum requirements.

Based on the above data about Dr. Vassil Traykov, it can be characterized as:

- ✓ a  
built rhythmologist and electrophysiologist who makes recognised contributions nationally and internationally,
- ✓ a  
researcher capable of independent creative scientific work in the field of rhythm pathology,
- ✓ erudite physician with a wide medical perimeter.

In conclusion, I believe that Dr. Vassil Traykov meets the requirements of the Law for the Development of the Academic Staff in the Republic of Bulgaria for acquiring the Academic positions and the Rules for the Development of the Academic Staff in "Acibadem City Clinic UMHAT Tokuda" EAD for acquiring scientific degrees and holding the academic position "Associate Professor". I propose that the esteemed scientific jury to award him with the academic position "Associate Professor" in the field of higher education 7. "Health and Sport", professional department 7.1. "Medicine" and scientific specialty "Cardiology".

26.07.2021



(Prof. Borislav Georgiev, MD PhD)