

# OPINION

by **Prof. Dr. Nikolay Margaritov Runev, M.D.**,

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**Subject:** Dissertation on:

## "ENDOVASCULAR TREATMENT OF TYPE A AND TYPE B DISSECTION OF THE AORTA"

for awarding an educational and scientific degree "**Doctor**" in the Doctoral Program "Cardiology" to Dr. Zoran Stankov, assistant at the Medical Faculty of Sofia university "Kliment Ohridski" with training site of Clinic of Cardiology and Angiology of Acibadem City Clinic Sofia.

### **Short autobiographical data**

Dr. Stankov graduated Medicine at MU-Sofia in 2007. During the period 2009-2012 years he worked as a doctor at the Cardiology Clinic of Tokuda Hospital – Sofia, and since 2012 in the Clinic of Cardiology and Angiology of "Acibadem City Clinic - Sofia" University Hospital. Medical Faculty of Sofia University "Kliment Ohridski".

He has acquired specialties in: cardiology (2015), angiology (2019) and health management (2021). Holds an invasive cardiology certificate (as of 2016).

Fluent in English, Serbian and French - written and spoken.

He is a member of: The Society of Cardiologists in Bulgaria, the European Cardiology Society, the International Society of Endovascular Specialists, as well as the associations in Bulgaria in: invasive cardiology, endovascular therapy and angiology.

Dr. Stankov has over 35 publications in foreign journals, he is a co-author of 3 international and 2 Bulgarian textbooks.

The dissertation is written in 179 pages, of which 53 - literary review; 19 - objective, tasks, material and methods; 38 - results, 37 - discussion; 3 - conclusions and contributions; 6 - clinical cases, 23pages - bibliography.

The dissertation work is structured in the classical way according to **the generally accepted requirements in Bulgaria.**

### **Actuality of the topic**

The topic of the dissertation work is current, both in theoretical, scientific and practical aspects. For this statement, I have the following grounds:

**1. Aortic dissection (AD) is the most common manifestation of acute aortic syndrome** and is associated with dramatic clinical presentation, manifestations of malperfusion syndrome and very high mortality (up to 50% at the 48th h.).

**2. In Stanford type A AD, the gold standard is surgical treatment.** However, 20% of patients were assessed as too high risk for surgery. Although no specific stent-grafts have been approved so far for the ascending aorta, significant advances in **endovascular technologies**

since the year 2000 have made it possible in patients with AD type A, appropriate anatomy and "prohibitive" high operational risk to conduct full **endovascular treatment - TEVAR**.

3. **In Bulgaria there is no register with data on the effectiveness, complications, frequency of reinterventions and mortality in endovascular treatment of type A and type B dissection of the aorta.**

### **Knowledge of the problem**

It is clear from the review that the author has thoroughly become acquainted with the available literature on the subject.

1. There is insufficient conclusive data concerning the indications, early and distant results of **endovascular treatment** of dissecting aneurysm of the type A aorta **in comparative terms with surgical treatment**.

2. **The behavior algorithms in patients** with acute aortic syndrome and the presence of organ ischemia have not been clarified.

3. **There are no clear recommendations for the treatment of patients with persistent AD** and an increase in false lumen after surgical or endovascular intervention in the proximal segment of dissection.

4. **The role of uncovered stents implanted** in the aorta and its branches has not been studied to improve blood current in the real lumen and spade, reduction of blood flow and thrombosis of the false lumen.

Thus, the author fully justifies the meaning of his study.

**The shaping of the objective and tasks** arise from the conclusions of the review.

**The material and methods** give full reason to believe the results obtained.

A total of 70 patients, 61 men and 9 women, at an average age of 54.5 years, were examined, with endovascular treatment of acute, subacute or chronic aortic dissection conducted in the period 2014-2018. They are divided into **two groups: group I – 14 patients with Stanford type A AD and group II – 56 patients with complicated AD type B**. The intervention was successfully performed in 68 of the patients (97.1%), with 2 cases of intra-procedural mortality described (1 in each of the groups). In group I 11 patients, primary surgical treatment of the ascending aorta was conducted, and the endovascular procedure was performed due to persistent compression of the real lumen with the manifestation of malperfusion syndrome or progression of the diameter of the false lumen.

**Acute aortic dissection is defined as a dissection from the beginning of the complaints to the 14th day, and subacute – until the 90th day.** The decision about the endovascular treatment was taken in emergency by HeartTeam, including interventional cardiologist, cardiologist, vascular surgeon, cardiac surgeon, anesthesiologist and radiologist

A **detailed** analysis of the risk profile of patients, the anatomical characteristics of aortic dissection and numerous procedural and periprocedural features are described.

**Procedural success is defined as successful** implantation of stent-graft (or uncovered stent), leading to the preservation of the patient's life and the presence of the following procedural results: relief of the patient's complains, closure of the main "endri" of AD, signature decrease in pressure in the false lumen, lack of data on malperfusion syndrome or threatening rupture, decompression of the real lumen and reduction or elimination of the filling of the false lumen with contrast matter.

All patients were clinically followed and with CT scans up to 1 year after endovascular intervention.

Modern **statistical processing** of the results was carried out by statistical package SPSS version 20.0. Data on quantitative variables are presented as an average of  $\pm$  standard deviation (or median if the distribution is not normal), and for categorous variables – as absolute number and relative share (%).

To assess the distribution of quantitative variables, the Kolmogorov-Smirnov method is applied. A Chi-square test and a Fisher's exact test were used to compare averages from two independent groups in Gaussian data distribution, and in the absence of proper distribution, a Mann-Whitney test.

The accepted threshold level of significance is  $\alpha=0.05$ . Statistical significance shall be taken where the value of p is less than  $\alpha$ .

### **Characteristics of the results and discussion:**

The most important results, in my opinion, are as follows:

- 1. It is established that the endovascular treatment of AD Stanford type A and type B is a safe and effective interventional method with a low incidence of early and late complications**, which leads to improved prognosis and survival of patients.
- 2. In patients after surgery for AD type A**, a high percentage of residual vascular **stenosis** is established: truncus brachiocephalicus, left common carotid artery, a. Subclavia, visceral and renal arteries, which necessitates secondary endovascular **revascularization**.
- 3. Treatment of aortic dissection is most often complex**, involving both endovascular methods and surgery (primary or secondary hybrid treatment).
- 4. Endovascular treatment in AD type B is a real alternative to surgical and medical treatment and is established as a method of choice.**
- 5. It is proven that the presence of "endoleak" and persistent communication between the false and the real lumen are the most common causes of reintervention.**
- 6. Endovascular treatment for decompression of the segment with maximum dissection using uncovered stents significantly reduces the frequency of repeated interventions.**
- 7. Treatment of AD type A and type B is not a one-time act**, but requires periodic diagnostic control and, if necessary, operational and/or endovascular corrections of the complications that have arisen.

The results are appropriately illustrated with 41 tables and 58 figures.

I agree with the report on the conclusions and contributions of the dissertation work.

**Conclusion:**

**Especially valuable in my opinion are the results of the study conducted for the first time in Bulgaria with a large group of patients (total 70):**

**(1) endovascular therapeutic possibilities in aortic dissection type A and type B with clinical and CT monitoring of 1st, 3rd, 6th, and 12th month for evolution of the true and false lumen, frequency of reinterventions and mortality.**

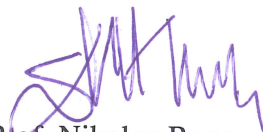
**(2) methods of endovascular intervention in the manifestation of malperfusion syndrome caused by stenosis/thrombosis in different vascular territories (carotid, subclavian, visceral and peripheral arteries) and requiring secondary endovascular or hybrid revascularization.**

**(3) with the development of a diagnostic and therapeutic protocol of behavior in patients with aortic dissection, which shows that in general endovascular approach in AD type A is an alternative to surgical or hybrid treatment in patients with very high perioperative risk.**

This gives me reason to vote with a positive vote for the award of an educational and scientific degree "Doctor" in the Doctoral Program "Cardiology" to Dr. Zoran Stankov, assistant at the Medical Faculty of Sofia university "Kliment Ohridski" with training site of Clinic of Cardiology and Angiology of Acibadem City Clinic – Sofia.

10.05.2022

Signature:

  
Prof. Nikolay Runev, M.D.