OPINION

By Assoc. Prof. Plamen Todorov, MD, PhD,

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on a dissertation thesis for the acquisition of an educational and scientific degree **"DOCTOR"**

Higher education section: **7. Health and Sports.**

Vocational field: **7.1. Medicine.**

Medical specialty: **"Internal Diseases"**

on the topic:

"Biochemical and ultrasound signs of early cardiovascular injury in patients with spondyloarthritis"

written by Dr. Miroslav Penev Mark-grade PhD student at the Department of Propaedeutics of Internal Diseases, Faculty of Medicine at the Medical University – Varnas. Scientific supervisors: **Assoc. Prof. Dr. Maria Dimova-Mileva, MD** and **Assoc. Prof. Dr. Tsvetoslav Georgiev, MD.**

By Order No. **R-109-426/06.10.2025** of the Rector of MU – Varna I have been appointed as a member of the scientific jury and on the basis of Protocol No. **1/ 09.10.2025,** I am in charge of preparing an opinion on the procedure for acquiring the educational and scientific degree **"Doctor"**.

Brief data on the professional development and qualification of the PhD student

The PhD student graduated in medicine from the Medical University - Varna in 2020 and has been working at the Clinic of Internal Medicine at the University Hospital "St. Kliment Ohridski". Marina" – Varna, where he developed clinical and scientific activities in the field of rheumatology and cardiovascular diseases. He has acquired a specialty in Internal Medicine and is an assistant at the Department of Propaedeutics of Internal Diseases, where he participates in the training of medical students. Since 2021, she has been a full-time PhD student in the same department.

Significance of the topic

The topic of the dissertation is relevant and reflects the current trends in the interdisciplinary study of rheumatological and cardiovascular diseases. There is a growing interest in the mechanisms by which chronic inflammation accelerates atherogenesis and leads to earlier vascular involvement in patients with inflammatory joint diseases. For me, the study is particularly significant because it evaluates cardiovascular risk by combining **biochemical and ultrasound markers**, focusing on the role of adhesion molecules (ICAM-1, VCAM-1), lipid profile and arterial rigidity parameters.

Such an approach is in line with the trends in modern medicine and contributes to the earlier diagnosis of subclinical atherosclerosis – a problem with a direct impact on morbidity and mortality.

Structure and content of the dissertation

The dissertation is formatted according to the requirements of the Medical University - Varna, contains **141 pages**, **30 tables** and **33 figures**.

The author has clearly formulated the main goal – assessment of ultrasound vascular parameters and levels of adhesion molecules as potential markers of subclinical atherosclerosis in patients with ankylosing spondylitis and psoriatic arthritis. **The tasks** are sequential and logically structured.

The literature review is analytical and shows a good understanding of modern ideas about the relationship between inflammation, endothelial dysfunction and arterial rigidity. The purpose and tasks are clearly formulated, and the methods used are adequate to the scientific questions posed.

Materials and methods. 154 participants **were studied**, divided into three groups: patients with ankylosing spondylitis, patients with psoriatic arthritis and a control group without inflammatory diseases. The methodology includes clinical assessment of disease activity (ASDAS, BASDAI, DAS28), measurement of lipid profile, calculation of atherogenic indices and risk scores (Framingham, SCORE2), as well as ultrasound assessment of vascular parameters (CIMT, β-stiffness, PWV, AI, EP, AC) via echo-tracking system.

Statistical processing was carried out using **SPSS v.27** using an adequate set of benchmarks and correlation analysis. The approach is rigorously scientific and meets the requirements for reliability and reproducibility of results.

Results and discussion. The author found statistically significant differences in ultrasound parameters between patients and the control group, with the most significant changes observed in the values of **CIMT, β-stiffness, PWV and EP.** A positive association between **VCAM-1** and a

number of indicators of atherogenicity and vascular rigidity was reported, confirming its role as a biomarker of endothelial dysfunction.

The discussion is analytical and compares the results with established and published ones. The depth of the discussion is impressive, which shows a very good orientation on the topic of the dissertation in contemporary scientific literature. The author compares in detail his own results with those of other authors and manages to interpret and compare them logically and reasonably. **The conclusions** are clearly formulated and logically follow from the presented results.

References. The literature used includes **363 sources**, of which 362 are in Latin, which testifies to the author's deep awareness of current scientific achievements in the topic of the dissertation.

Contributions

1. Scientific and theoretical contributions

1. For the first time in Bulgaria, a comprehensive study of ultrasound indicators of arterial stiffness and serum levels of ICAM-1 and VCAM-1 was carried out in patients with ankylosing spondylitis and psoriatic arthritis.
2. Correlations have been identified between markers of endothelial dysfunction and indicators of lipid metabolism, inflammation and arterial elasticity.
3. It has been proven that classical cardiovascular scores have a limited prognostic value in chronic inflammatory diseases.
4.

2. Scientific and applied contributions

1. The potential of VCAM-1 as a biochemical marker for early vascular involvement has been established.
2. The diagnostic advantages of the ultrasound indices β-stiffness and PWV for early detection of subclinical atherosclerosis are derived.
3. The results are of practical importance for improving prevention and individualization of therapy in patients with inflammatory joint diseases.

Contributions are clearly formulated, substantiated and meet the criteria of originality.

Critical remarks and recommendations

The notes are rather formal and do not affect scientific value. They are in the nature of proposals, not critical remarks:

1. In some parts of the text there are very detailed descriptions of statistical procedures that can be summarized more compactly, i.e. The text could be slightly synthesized for better readability
2. It would be useful in future publications to present the results both by disease and by therapeutic subgroups, in order to distinguish the effects more clearly.
3. It would be useful in future developments to trace the dynamics in the mansion of biomarkers in response to the therapy being carried out.

Conclusion

The presented dissertation is methodologically precise, of high scientific and practical value. The author demonstrates in-depth knowledge of internal medicine, rheumatology, and cardiology, as well as interdisciplinary data analysis skills.

The results of the study expand the understanding of the mechanisms of early vascular involvement in inflammatory diseases and create prerequisites for future studies on biomarkers of endothelial dysfunction.

The dissertation fully meets the requirements of the Law on the Development of the Academic Staff and the Regulations of the Medical University – Varna for awarding the educational and scientific degree **"Doctor"**.

I propose to the esteemed scientific jury to vote positively for the awarding of the educational and scientific degree "Doctor".

Date: 12.11.2025 Reviewer:

Plovdiv / Assoc. Prof. Plamen Todorov, MD, PhD/