Phase characteristics of rheograms. Original classification of phase-related changes of Rheos

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Abstract
The phase characteristics of a rheogram are described in literature in general only. The existing theory of impedance rheography is based on an analysis of the form of rheogram envelopes, but not on the phase-related processes and their interpretation according to the applicable laws of physics. The aim of the present paper is to describe the phase-related characteristics of a rheogram of the ascending aorta. The method of the heart cycle phase analysis has been used for this purpose. By synchronizing an ECG of the aorta and a rheogram, an analysis of specific changes in the aorta blood filling in each phase is provided. As a result, the phase changes of a rheogram associated with the ECG phase structure are described and tabulated for first time. The author hereof offers his own original classification of the phase-related changes of rheograms.

Keywords
Impedance cardiography • Rheogram • Classification • Phase-related changes • Heart cycle phase analysis • ECG • Ascending aorta

Introduction

Despite the fact that diagnostic capabilities of rheograms have been investigating for a long time, nowadays the heart cycle phase analysis is ignored by every method of the Rheo interpretation in general [1-4]. In its turn, the phase analysis is the basis for understanding the biophysical processes occurring in the cardiovascular system. Therefore, all the existing methods of the Rheo interpretation, including the pulse contour analysis, have not found their wide application. CARDIOMETRY considers a rheogram from the point of view of hemodynamic phase-related processes and offers a new approach to the cardiovascular system diagnostics [6-9].
Materials and methods

The experience accumulated when using the Cardiocode device allows describing the phase structure of a rheogram and creating a fundamentally new classification of the Rheo phase-related changes [6-8]. This original classification of the phase-related changes in rheograms is presented in Fig.1 below. The rheogram curve changes are classified by considering 6 phases in total. These changes characterize the energetic capabilities of the heart and the influence of the systemic and pulmonary circulation vessel resistance on hemodynamics.

Conclusions

The above classification is successfully used in practice. In combination with the heart cycle phase analysis and the synchronously recorded ECG of the aorta it is possible to make diagnostics in the most accurate way and identify primary causes of the changes [6-10].
Statement on ethical issues
Research involving people and/or animals is in full compliance with current national and international ethical standards.

Conflict of interest
None declared.

Author contributions
The author read the ICMJE criteria for authorship and approved the final manuscript.

References


