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CHANGES IN HEMORHEOLOGICAL PARAMETERS AND THEIR IMPACT ON THE COURSE OF HEART FAILURE

Eka Arziani, Tamar Kandashvili, Maia Gotsadze

Department of Internal Medicine No. 3, Tbilisi State Medical University, Tbilisi, Georgia

Background: Heart failure is accompanied by hemodynamic disturbances and alterations in the microcirculatory system, including changes in hemorheological properties such as erythrocyte aggregation, erythrocyte deformability, and plasma viscosity, which influence the efficiency of blood flow. Significant hemorheological abnormalities also occur in patients with atrial fibrillation (AF), potentially contributing to impaired intracardiac hemodynamics and local tissue perfusion. This study assessed the relationship between hemorheological parameters and intracardiac hemodynamics in patients with heart failure and paroxysmal or persistent AF.

Objective: To evaluate changes in hemorheological parameters and their relationship with intracardiac hemodynamics and left ventricular functional parameters in patients with heart failure (CHF), functional class I–II, and paroxysmal or persistent AF.

Materials and Methods: The study included 32 patients with CHF and paroxysmal or persistent AF and 10 healthy controls aged 20–65 years. Patients with valvular heart disease, malignancy, or diabetes mellitus were excluded. Erythrocyte aggregation index (EAI), erythrocyte deformability index (EDI), plasma viscosity, fibrinogen level, and left ventricular functional parameters, including ejection fraction (EF), were assessed according to the study protocol.

Results: Hemorheological abnormalities became more pronounced with progression of AF. EAI was 33.9±9.4 in the study group. Mean fibrinogen levels were 332±29.7 in patients with paroxysmal AF and 398.4±10.9 in those with persistent AF, compared with 301±21.1 in controls. Left ventricular EF was 59.1±2.5% in controls, 52.4±6.7% in patients with paroxysmal AF, and 37.4±6.7% in patients with persistent AF and CHF. EAI increased significantly in an inverse relationship with left ventricular EF ($P<0.05$).

Conclusion: The findings indicate that hemorheological abnormalities, particularly increased erythrocyte aggregation, are associated with more prolonged and progressive forms of AF, reduced left ventricular systolic function, and the presence of CHF. The inverse relationship between EAI and EF suggests a potential contribution of hemorheological disturbances to the

complex hemodynamic and microcirculatory alterations accompanying heart failure. Assessment of hemorheological parameters during AF episodes may provide additional information for evaluating the clinical status and disease course in patients with heart failure.

Keywords: hemorheology; erythrocyte aggregation; atrial fibrillation; heart failure