

## Vascular Biology in Hypertension: Impact on Hemorheology

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Hypertension is a one of the disease which causing significant impact to mortality and morbidity. Hypertension has been one of the common problem anywhere in the world struggling to lower the cardiovascular disease, the number one cause of mortality in the world. The number of population is clearly increasing even in the developing countries as well as Asian countries. Although hypertension not consider stand alone in increasing cardiovascular event, by improving understanding, pathophysiology of hypertension it is with big hopes that the impact to mortality will be lessened.

The understanding of hypertension process has been quite changed in the recent years. It is now believed that hypertension is part of heterogenous condition that is best described as atherosclerotic syndrome or hypertension syndrome with genetic and acquired structural and metabolic syndrome. It is estimated that around 70% of patients with genetic hypertension have one or more of the coexisting metabolic or functional disorders increasing the risk of vascular damage, atherosclerosis and target organ damage.

The deterioration of endothelial function has been discovered as the culprit of the disease. As this process will impact to the balance of vasoconstriction-vasorelaxation function as well as hemorheology role of endothelial. Endothel dysfunction has been related to increase vascular tone, increase thrombogenicity, and acceleration of atherosclerosis process in the vascular. Increase wall stress to the vascular causing remodeling process in the vascular, heightening endothelial constriction signal and worsened the disease process.

The abnormalities in coagulation and fibrinolytic pathways associated with hypertension may lead to an increased risk of thrombotic events due to enhanced coagulability and impaired fibrinolysis. The association between rising blood pressure and impaired fibrinolysis in hypertensive patients is obvious. The increase level of D-dimer was found in such patients. Another prove showed by higher level of plasma fibrinogen (prothrombotic factors) in patient with left ventricle hypertrophy.

Platelets in hypertensive patients differ in terms of size, shape, volume and life span, they also demonstrate an increased tendency to aggregate. Biochemical indices released from platelets such as beta-thromboglobulin and soluble P-selectin, where these agents will increase platelet activation. Many commonly associated conditions with hypertension such as diabetes, atrial fibrillation and congestive heart failure are recognized to activate platelet aggregation.

Key words: hypertension, endothelial dysfunction, platelet aggregation, thrombogenicity