

## Sanal Flow Choking Leads to Aneurysm, Haemorrhagic Stroke and other Neurological Disorders in Earth and Human Spaceflight: New Perspective

**V.R. Sanal Kumar**

Department of Stress Management, Med Center Air Trauma Flight Team in Charlotte, United States of America.

Evidences are escalating on the diverse neurological disorders associated with COVID-19 pandemic. The theoretical discovery of Sanal flow choking is a paradigm shift in the diagnostic science of asymptomatic stroke causing neurological disorders in earth and at the microgravity condition (human spaceflight). A critical review has been carried out herein for correlating the phenomenon of Sanal flow choking (PMCID: PMC7267099) and haemorrhagic stroke. Herein, we show that when systolic to diastolic blood pressure ratio (BPR) reaches the lower critical haemorrhage index (LCHI) the internal flow choking and shock wave generation occurs in the downstream region of the vessels, with sudden expansion, divergence, bifurcation, stenosis and/or occlusion, leading to pressure overshoot causing brain haemorrhage and/or neurological disorders. The critical BPR for internal flow choking is uniquely regulating by the bio fluid/blood heat capacity ratio (BHCR). The BHCR is well correlated with BPR and blood viscosity. The closed form analytical model reveals that the relatively high and the low blood viscosity are risk factors of internal flow choking causing aneurysm and haemorrhagic stroke. In vitro data shows that fresh blood samples of healthy subjects evaporate at a temperature range of 37°C-40°C (98.6°F-104°F) and generate carbon dioxide, nitrogen, and oxygen gases in the vessel. The single phase in silico results demonstrated the occurrence of Sanal flow choking and pressure overshoot causing memory effect (stroke history) leading to progressive neurological disorders. We concluded that disproportionate blood thinning medication increases the risk of flow choking causing haemorrhagic stroke. The risk of brain haemorrhage and various types of neurological disorders in COVID-19 patients and others in earth and microgravity environment could be diminished by concurrently lessening the viscosity of bio fluid/blood and flow turbulence by increasing the thermal tolerance level in terms of BHCR and/or by decreasing the BPR. The effect of Sanal flow choking is more severe in blood vessels with divergent/bifurcation regions because it leads to the shock wave generation and the transient pressure overshoot causing irreversible neuronal damage forming the core of infarction. We concluded that, for a healthy life all subjects with high BPR inevitably has high BHCR for reducing the risk of the internal flow choking (bio fluid/Sanal flow choking) triggering neurological disorders as results of infraction.

### Biography

VR Sanal Kumar is a Scientist at the Department of Science and Technology, Kumaraguru College of Technology, Coimbatore, Tamil Nadu, India.

vr\_sanalkumar@yahoo.co.in