Stroke

INHIBITION OF NEURONAL AUTOPHAGY CONTRIBUTES TO REDUCED ISCHEMIC BRAIN DAMAGE IN DIABETIC ANIMALS

Dinesh Tripathi[1],S Tiwari[1], C Mishra[1]

Physiology, King George's Medical University, India

Introduction: Emerging evidence suggests a strong correlation between apoptosis, autophagy and their pathological processes in cerebral ischemic injury particularly in diabetes. Oxidative stress and blood brain barrier dysfunction are one of the important factors causing disability and mortality in stroke patients, which have a significant impact on diabetic induced stroke progression. Amla, an Indian gooseberry, have been reported to antioxidant and anti-inflammatory activity. The aim of this study was to investigated the therapeutic effects of amla fruit extract against ischemic stroke in hyperglycemic rats and its role in modulating autophagy.

Methods: Hyperglycemia was induced by intraperitoneal injection of streptozotocin (35mg/kg) in male Sprague Dawley (SD) rats and rats were subjected to middle cerebral artery occlusion (MCAO) for 1 hour. Amla fruit extract was administered at 3 hours after the induction of MCAO. Lipid profile, blood glucose, Neurological deficit, oxidative stress makers (MDA & GSH), blood brain barrier (BBB) permeability and brain edema, were measured. Additionally, RT-PCR and western blot analysis of Bcl-2, Beclin-1 and LC3 were examined.

Result: Amla fruit extract significantly reduced brain edema, BBB integrity, oxidative damage and ameliorated neurologic outcome in rats. Amla fruit extract treatment significantly decreased serum glucose level, serum TG, TC and serum LDL. Amla decreased apoptosis and autophagy via down-regulation of the LC3 and Beclin-1 expression.

Conclusion: Our finding suggests that amla fruit extract attenuates cerebral ischemic injury in hyperglycaemic rats and promotes functional recovery via its antioxidant, anti-apoptosis, and anti-autophagy properties, may have a therapeutic potential for stroke prevention in diabetic settings.