OP-ED

Dopamine Treatment in Acute Ischemic Stroke

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Stroke is the second most common cause of mortality worldwide. The current management of acute stroke revolves around neuroprotection and supportive management. Most of the stroke patients who survive the attack live with a permanent disability. The medicines that are used specifically for the neuronal damage are yet to be proven as 'the treatment of stroke'. Citicholine may not benefit acute stroke and neuroprotectants such as piracetam exhibit marginal benefits from its use. Similarly agents such as neuroaid, cerebrolysin and others are yet to be proven useful in altering the stroke outcome.

Dopamine is a well-known pharmaceutical molecule and has been employed for treatment of shock and movement disorders. Dopamine is an important neurotransmitter of the central nervous system. It is an organic chemical in the catecholamine family, a monoamine neurotransmitter, which has a number of important physiological roles in the bodies of animals. Dopamine may be classified as a substituted phenethylamine. The name derives from it's chemical structure, which consists of an amine group (NH2) linked to a catechol structure, called dihydroxyphenethylamine, the decarboxylated form of dihydroxyphenylalanine (acronym DOPA). In the brain, dopamine functions as a neurotransmitter, released by nerve cells to send signals to other nerve cells. The human brain uses five known types of dopamine receptors, labelled D1, D2, D3, D4, and D5. Dopamine is produced in several areas of the brain, including the substantianigra and the ventral tegmental area. The effects of dopamine are meditated through dopamine receptors which are also present on the glial cells and immune cells which are probably involved in synthesis and modulation of neurotrophic factors and inflamatory response. Animal studies show that subpopulations of reactive GFAP (glial fibrillary acidic protein; probably involved in controlling the shape, movement, and function of astroglial cells)astrocytes in the ischemic hemisphere express D1R and D2R (dopamine receptors) and might be modulated by levodopa treatment. Reactive Astrocytes express dopamine receptors in the peri-infarct area. The expression of DRs is accompanied with an increase of DARPP-32(Dopamine- and cAMP-regulated phosphoprotein,) in reactive astrocytes. DARPP-32 phosphorylation provides a mechanism for integrating information arriving at dopaminoceptive neurons, in multiple brain regions, via a variety of neurotransmitters,

astrocytes in the peri-infarct area may contribute to the dopamine enhanced recovery mechanisms.[1] Dopamine has been used in treatment of spasticity and in chronic stroke.[2,3] Similarly effects of dopamine have also been established by its uses in studies which advocate use of dopamine augmented rehabilitation therapy (DARS, a multicentre , NHS approved on-going study).[4] We suggest treatment of acute stroke patients with dopamine(Levodopa) and measure the outcomes. It is strongly recommended that there should be more research on dopamine treatment in acute as well as chronic stroke.

References

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