

Modulation Of Neuropeptide Response In Traumatic Brain Injury

José Luís Alves¹

¹*Neurosurgery/ Centro Hospitalar E Universitário De Coimbra/ Portugal*

Purpose

Traumatic brain injury (TBI) is a major public health issue, with an obvious impact on its victims and a significant economic/social burden. Besides major neurological sequelae, a growing body of evidence shows that, even at mild levels, TBI can induce long-term deficits (concerning cognitive function and motor coordination) as a consequence of glutamatergic excitotoxicity, blood-brain barrier breakdown and neuroinflammation with an end-stage status of neurodegeneration and loss/impairment of higher functions. We hypothesized that TBI leads to a multi-staged neuropeptide response, with significant impact in different aspects of TBI's pathophysiology.

Materials and Methods

A blood-sampling protocol on TBI victims (with and without brain contusions) was undertaken, with several analytical/ionic/proteic components assessed. For a better understanding of underlying cellular alterations, an animal model of neurotrauma was used (weight drop injury protocol in rats) and distinct experimental protocols were undertaken - immunofluorescence, western blotting and cell death experiments – following TBI and intranasal administration of NPY and its NPY13-36 agonist.

Result

Experimental protocols allowed us to conclude about the fluctuation of neuropeptide concentrations (namely early substance P increment and late Neuropeptide Y response) and its relation to ionic disturbances and S-100B levels. A staged neuropeptide response was shown, along with a strong correlation to glutamate levels, blood-brain barrier status and neuronal/astrocyte cell death. A neuroprotective effect of NPY concerning cortical and hippocampal apoptosis and BBB breakdown was demonstrated.

Conclusion

Modulation of neuropeptide response shows an obvious potential to prevent TBI deleterious effects as well as improve the functional outcome, presenting itself as a new and promising therapeutic target.