Hope or Hype: Beta-Blockers in Traumatic Brain Injury

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Traumatic brain injury (TBI) has significant consequences for patients, families, and healthcare systems worldwide.[1] The mortality remains considerably high despite modern advances in critical management. After the primary event of TBI, the structural lesion in the brain parenchyma triggers complex pathophysiological processes. One of the identified mechanisms is associated with the release of systemic catecholamines, producing a hyperadrenergic state with high-utility of glucose and oxygen.[2] This hyperadrenergic state has been linked to increased mortality, with the possibility that if we modulate catecholamine levels, we can positively impact the outcome.

Modulation of the hyperadrenergic state, based on physiological and pharmacological concepts, can be done using pharmacological interventions in the form of β-blockers.[3] Beta-blockers belong to a family of drugs with the ability to bind to β-adrenergic receptors, using a competitive antagonism mechanism. The use of these drugs has been extensive in cardiac pathologies such as ischemic heart disease where they reduce cardiac oxygen consumption, heart rate, and contractility.

Alali et al, in a systematic review with a low-quality of evidence, demonstrated a favorable effect of β-blockers on mortality in patients with TBI.[4] In a prospective, observational cohort study by the American Association for the Surgery of Trauma Clinical Trial Group in patients with TBI who received β-blockers, there was improvement in patient survival.[5] Arbabi et al reported that the administration of any β-blocker is associated with a better prognosis in trauma patients.[6]

Which β blocker to administer in TBI? Nonselective or selective β-1 receptor antagonist? Although it seems that any agent with a β-blocker effect could be administered, its different pharmacological profiles will require a rational study to determine effectiveness in the context of TBI, including route of administration.

Finally, we consider that the potential effects on outcome in patients with TBI should be confirmed in well-designed and robust studies. The implementation of a pharmacological and economic strategy such as β-blockers can be a hope for the management of this catastrophic disease.

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Conflict of Interest
None declared.

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