Editorial

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The Beta-Blockers Must Go On

Preinjury Continuation of Beta-Adrenergic Blockade Medications Associated With Mortality Benefit in Severe Blunt Traumatic Brain Injury

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Traumatic brain injury (TBI) accounts for 30% of trauma-related deaths and has a life-time cost of $60.4 billion.[1] One promising treatment to prevent secondary injury after TBI is the use of postinjury beta-blockade (BB). BB may blunt TBI-induced catecholamine surges that can exacerbate secondary brain injury, thereby improving TBI outcomes.[2] Several previous studies have shown that postinjury BB was associated with improved patient symptoms, long-term function, and mortality.[3–7]

The present study quantified the impact of postinjury BB on mortality both when it is a continuation of preinjury BB and when it is de novo BB initiation.[8] This approach was grounded in the literature demonstrating improved outcomes when continuing previously prescribed BB after major surgery.[9] The study team performed a retrospective cohort study of Michigan Trauma Quality Improvement Program data to quantify the effect of continuation of preinjury BB on morbidity and mortality using elegant propensity score-matched TBI patients with a head Abbreviated Injury Score of 4 or 5 in a rich clinical registry. A second distinct propensity score analysis was run for the de novo initiation of BB in TBI patients. These 2 propensity score models were necessary because selection bias was present both when BB was not continued (eg, hypotension) and when de novo BB was started (eg, paroxysmal sympathetic hyperactivity). These models appropriately used gold-standard data collection techniques and captured clinically important variables such as vitals, Glasgow Coma Scale, pupillary response, midline shift, brain operation, and intubation.[10] They found that for patients with preinjury BB use, continuing BB (vs discontinuation) after TBI demonstrated a mortality benefit. De novo BB showed no differences in mortality.

Three years ago, Khalili et al[6] conducted the first randomized controlled trial of BB impact on mortality in TBI patients. One of their exclusion criteria was preinjury BB use. Khalili found a significant decrease in mortality of severe isolated TBI patients who had de novo BB. An explanation for the conflicting findings between the randomized controlled trial and the present study is as Tignanelli noted, de novo BB initiation in his observational study took place in the setting of more severe, symptomatic TBI. BB use in the setting of TBI is heterogeneous between institutions and even between providers. Some start BB immediately upon severe TBI diagnosis, and some wait until the development of paroxysmal sympathetic hyperactivity.[2] Still others wait until after paroxysmal sympathetic hyperactivity has been identified and other sources have been ruled out (eg, infection, medications). This heterogeneity in practice was shown in the American Association for Surgery of Trauma multicenter study.[3]

BB has different indications and likely different mechanisms for mortality benefits among patients with preinjury use and among injured patients with severe TBI. Just as Tignanelli et al conducted 2 completely different analyses for these 2 completely different cohorts, we must resist comparing the 2 cohorts and their outcomes to each other. This study adds strong support for continuation of previously prescribed BB using real-world data captured from a generalizable sample of hospitals and patients.

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