'Quantum Leap' in Severe Head Injury Survival With EMS Protocol

Megan Brooks

May 13, 2019

Training paramed spital guidelines for traumatic brain injury (TBI) has dramatically improved survival in patients with severe head trauma, new data show.

Results from the Excellence in Prehospital Injury Care (EPIC) study, which included more than 21,000 TBI patients, showed a doubling of the survival rate in severe TBI victims and a tripling of the survival rate in those who were intubated with prehospital guideline implementation by paramedics.

"In medicine, improved outcomes are almost always incremental, and very few things that we do in medicine improve the ultimate outcome, which is surviving versus dying. This is a quantum leap. This is not incremental," Daniel Spaite, MD, professor of emergency medicine at the University of Arizona in Tucson, who led the study, told *Medscape Medical News*.

Findings from the study were published online May 8 in *JAMA Surgery*.

"Astounding" Results

In the study, more than 11,000 paramedics from 130 EMS agencies across Arizona took a 2-hour training session on prehospital TBI treatment guidelines, which emphasize avoidance/treatment of hypoxia,

prevention/correction of hyperventilation, and avoidance/treatment of hypotension.

The before-and-after analysis included 21,852 patients with moderate, severe, or critical TBI — 15,228 in the preimplementation period and 6624 in the postimplementation period.

Implementing the prehospital TBI guidelines did not affect overall survival, but did significantly improve survival in the severe TBI subgroup (adjusted odds ratio [aOR], 2.03; 95% confidence interval [CI], 1.52 - 2.72; $P < .001$) and the severe intubated TBI subgroup (aOR 3.14; 95% CI, 1.65 - 5.98; $P < .001$).

"The results are astounding and show that the first 20 minutes of care dramatically impacted the final outcome," Spaite said. "The last 40 years of attempts to find ways to improve brain injury outcomes in the prehospital setting is literally a graveyard full of failed drugs and procedures," he added.

An important point, emphasized Spaite, is that "medics already know how to do this and it doesn't require EMS systems to buy expensive equipment. This can basically be applied anywhere in the world."

Major Clinical Implications

In a statement, Patrick Bellgowan, PhD, program director at the National Institute of Neurological Disorders and Stroke, said the results demonstrate "the significance of conducting studies in real-world settings and brings a strong evidence base to the guidelines. It suggests we can systematically increase the chances of saving lives of thousands of people who suffer severe traumatic brain injuries."

Reached for comment, Robert Glatter, MD, an emergency physician at Lenox Hill Hospital in New York City, noted that this is the first "major prehospital study to evaluate the impact of national prehospital TBI treatment guidelines, which were developed after years of research superseding decades of management based on outdated protocols."

Glatter said the findings have important implications for the prehospital management of patients with severe TBI, "which will lead to increased survival and improve neurological outcomes."

"Implementing simple interventions by EMS providers — addressing hypoxia, hypotension, and avoiding hyperventilation — can make a clear difference in outcome in those with severe neurological impairment after TBI," said Glatter, who was not involved with the current study.

"Simply put," he added, "what we do in the early stages after acute injury is an extension of principles of critical care that continue in the hospital. By focusing and adhering to principles that maximize oxygenation, reduce hypotension, and avoid hyperventilation, we can make a difference in who survives."

The study was supported by the National Institute of Neurological Disorders and Stroke (NINDS). The authors and Glatter have disclosed no relevant financial relationships.

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