Improving Outcomes After Severe TBI – A Conversation with Wendy Chang and the BOOST-3 Clinical Team

By Arin Jayes

This week I had the pleasure of conducting a Facebook Live interview with Wendy Chang, Principal Investigator of the BOOST-3 Study at University of Maryland's Shock Trauma Center. The goal of this randomized clinical trial is to determine the comparative effectiveness of two strategies for monitoring and treating patients with traumatic brain injury (TBI) in the intensive care unit (ICU), with the hopes of improving patient's long-term outcomes and quality of life.

Of the approximately 3.5 million Americans that sustain a TBI each year, 50,000 die and another 300,000 survive the injury. The increase in survival rates is due to advancements in emergency medicine and intensified focus on the "golden hours" of treatment, or the initial hours after a severe brain injury. "The golden hours are critical," says Robert Neumar, M.D., Ph.D., professor and chair of emergency medicine at the University of Michigan Medical School. "They can determine whether a patient survives their injury and, if so, what type of long-term function and disability issues they may have."

When an individual enters the ICU after a severe brain injury, physicians monitor intracranial pressure and treat the elevated pressure to prevent a secondary injury. However, low brain tissue oxygen (cerebral hypoxia) also causes brain cell loss and prevents recovery. Recent clinical trials have shown that monitoring the partial pressure of brain tissue oxygen allows for faster interventions, which has prompted physicians to measure brain tissue oxygen as part of standard practice. Monitoring both intracranial pressure and brain tissue oxygen helps physicians precisely adjust treatment in the crucial time after injury – including medication dosages, IV fluids, ventilator settings, blood transfusions, and other medical care. BOOST-3 is designed to compare both strategies and identify if one is more effective than the other.

BOOST-2 (published in 2017) found that brain hypoxia burden was reduced by 74% in the patients monitored and treated based on partial pressure of oxygen in brain tissue and intracranial pressure monitoring compared to intracranial pressure monitoring alone. BOOST-3 expands upon BOOST-2's hypothesis: that treating TBI based on partial pressure of oxygen in the brain tissue and intracranial pressure monitoring will improve neurological outcomes six months after the injury compared with treatment based on intracranial pressure monitoring alone.

BOOST-3 is being conducted in the National Institutes of Health-funded Strategies to Innovate Emergency Care Clinical Trials Network (SIREN). The University of Michigan Medical School is the clinical coordinating center for the network. BOOST-3 began in 2018 at 45 SIREN clinical sites across the United States. University of Maryland's Shock Trauma Center is one of these clinical sites, led by principal investigators Gary Schwartzbauer M.D., Ph.D. and Wendy Chang M.D. Dr. Chang is an assistant professor in the Department of Emergency Medicine and Program in Trauma at the University of Maryland School of Medicine.

Dr. Chang explained to Facebook Live viewers that enrollment in BOOST-3 is different from other medical research studies. Normally, researchers get permission (consent) before a person can be included in a study. A person with a severe TBI will not be able to give consent at the time of injury. Since the "golden hours" after a severe brain injury are so crucial, there might not be enough time to locate and talk to the person's family or legal representative about

the study. When consent is not possible, a person might be enrolled in this study without consent. This is called "Exception from Informed Consent" (EFIC). EFIC can only be used when all of the following conditions are met: the person's life is at risk, the best treatment is not known, the study might help the person, it is not possible to get permission from the person because of his or her medical condition nor from the person's representative because there is a very short amount of time required to treat the medical problem, or the representative is not available. Once the family or legal representative is located, they will be asked whether they want the participant to continue in the study.

BOOST-3 plans to enroll 1,094 participants with severe TBI. Participants in this study must be 14 years or older with: a blunt closed head injury, a severe brain injury, and can start the study immediately following brain monitor placement. Subjects will be randomized within six hours of arriving at the ICU. Patients will have brain tissue oxygen monitors and intracranial pressure monitors placed within six hours of arrival. Patients will then be randomized to treatment based on intracranial pressure and brain tissue oxygen levels for the first five days after admission, with all other care being standard. Subjects will be followed for six months and investigators will compare the functional outcomes and neurological function of the groups.

"The brain is a mysterious yet quite magnificent organ. It can recover in miraculous ways," Dr. Chang tells us over Facebook Live, "and we are proud to participate in this study."

To learn more about BOOST-3, visit BOOST3trial.org or call 800-555-1122. You can also click on the links below to learn more about BOOST-3 and Emergency Research**.** If you have questions about this trial, email Leslie Sult at lsult@som.umaryland.edu or visit their BOOST-3 Facebook Page at UMD BOOST3 Trial Community Feedback.

Fast Facts on BOOST-3

BOOST-3 Participating Sites

About Emergency Research

Opt-Out Form

En Espanol

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