

# MEDICAL MISSION SUPPORT

## TRAUMATIC BRAIN INJURY

The Medical Mission Support newsletter provides the latest advances in facilitating early detection, intervention, and treatment of medical conditions by military personnel. This issue discusses the latest advances in preventing secondary brain injury in patients who have suffered traumatic brain injury.

## PREVALENCE OF TRAUMATIC BRAIN INJURY

Traumatic brain injury (TBI), a condition that can be traced back to Greek literature from the 8th century B.C., continues to be a challenge during modern warfare. Reports of TBI injuries of all levels—from mild to moderate to severe—among servicemen and women peaked in 2011 but have not returned to levels seen before the conflicts in Iran and Afghanistan.<sup>1</sup> It is estimated by the U.S. Department of Defense that as many as 360,000 servicemen and women from the Iran and Afghanistan conflicts may have experienced TBI, often referred to as the “signature wound” of these conflicts.<sup>2</sup> TBI injuries and their resulting symptoms and impairments carry significant implications for victims’ mental and physical health as well as warfighter performance and lethality.<sup>1</sup>



### IN THIS ISSUE:

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- TBI on-demand webinar
- Improving outcomes for severe TBI patients
- Doing business with ZOLL®

## An on-demand webinar: “TBI in the military”

Listen as our expert panel of speakers discuss various aspects of treating mild to severe TBI in military personnel, from point of injury to advanced surgical care. Topics and speakers include:



### **Effects of non-neuropermissive environments on brain health in military service members**

- Ricky Ditzel Jr, CCP-C, FP-C, SO-ATP  
Director, Research and Education  
SOM+C



### **Optimizing the prehospital management of TBI patients**

- Annemarie Silver, PhD  
Vice President, Clinical and Scientific Affairs  
ZOLL Medical Corporation



### **Severe traumatic brain injury: Current recommendations and latest research for TBI in a military setting**

- Ron Jithoo, MBChB, FRACS, Neurosurgeon  
The Alfred Hospital (Australia),  
Commander, No 1 Expeditionary Health Squadron  
Royal Australian Air Force

**Watch our webinar on your schedule: [zoll.com/en/medical-markets/military/tbi](https://zoll.com/en/medical-markets/military/tbi)**

## Improving outcomes for severe TBI patients

Traumatic brain injury occurs when the brain withstands an injury from an external force that is considered to be more or less complete at the time of impact, leading to a decrease in or loss of consciousness, memory loss, or an altered mental state.<sup>1</sup> TBI may include neurological deficits and intracranial lesions and can lead to secondary brain injury.<sup>1</sup> As the primary injury can't be undone, management strategies must focus on preventing secondary injury<sup>3</sup> to improve patient outcomes.

The continued evolution of military munitions and insurgent use of improvised explosive devices (IEDs) in recent conflicts means that TBI continues to pose a significant challenge to military forces. It is frequently diagnosed in both combat and training environments.<sup>1</sup> Thankfully, advances in technology mean clinicians have more tools to care for patients with these types of injuries. **(read more)**



## Improving outcomes for severe TBI patients (cont.)

Following the mechanical force of the initial injury in some TBI patients, it's possible for biochemical events to occur in the brain that could lead to the destruction of brain tissue.<sup>2</sup> This cascade of events may include cellular, chemical, tissue, and blood vessel changes in the brain during the hours and days following the primary injury,<sup>4</sup> with the potential for hypoxia, cerebral edema, increased intracranial pressure, and infection.<sup>5</sup> TBI fatalities can result from secondary brain injuries arising from the primary injury or from suboptimal clinical management of these patients. The brain needs a constant supply of oxygenated blood and secondary injury can occur when that supply is compromised.<sup>3</sup>

A state-wide study by the Arizona Emergency Medicine Research Center evaluated patient outcomes before and after the implementation of evidence-based, prehospital TBI treatment guidelines. The study involved more than 130 EMS agencies and 21,852 enrolled patients and showed increased survival rates among patients with severe TBI.<sup>6</sup> The Excellence in Prehospital Injury Care Traumatic Brain Injury Project (EPIC-TBI) study examined patient outcomes before and after training EMS paramedics to implement guidelines focusing on three interventions: hypoxia prevention and treatment, hyperventilation prevention and avoidance, and hypotension treatment and prevention. Implementing guidelines for these three interventions resulted in significant improvement in the rates of survival to hospital admission.<sup>5</sup>



In cohorts of patients who suffered severe TBI, adjusted survival rates doubled after implementation of the TBI guidelines. In cohorts of intubated TBI patients, survival rates tripled.



**The beauty of EPIC was that the “Three H-Bombs” (hypoxia, hypotension, and hyperventilation) were managed by simple interventions—this wasn’t a million-dollar ‘un-obtainium’ drug being tested.<sup>7</sup>**

— Daniel Spaite, MD, FACEP  
Associate Director, Arizona  
Emergency Research Center,  
University of Arizona.



The EPIC team found that by treating or preventing these three H-bombs—hypoxia, hyperventilation, and hypotension—pre-hospital clinicians have the potential to measurably improve survival and outcome for patients who have suffered severe TBI. For more detailed information, **download the EPIC study.**

In light of these significant findings, ZOLL now features its TBI Dashboard™ on the Propaq® M monitor and the Propaq MD and X Series® Advanced monitor/defibrillators. TBI Dashboard provides military medical personnel the vital information they need to effectively treat TBI patients. With real-time vital sign and ventilation feedback, clinicians can manage hyperventilation, hypoxia, and hypotension in this patient population. TBI Dashboard is provided as a field (USB) upgrade at no additional cost to existing Propaq customers.

**Read more about the TBI Dashboard at [zoll.com/medical-markets/military/tbi](http://zoll.com/medical-markets/military/tbi).**

**Learn how to upgrade your device to include TBI Dashboard or schedule training by contacting one of ZOLL’s military team members at [zoll.com/medical-markets/military/government-sales-team](http://zoll.com/medical-markets/military/government-sales-team).**



## Doing Business with ZOLL

We make it easy for you to do business with us by offering several ways for military and federal agencies to purchase ZOLL products.

### ZOLL WebStore

Purchases that use a Government Purchase Card and fall under the micro-purchase threshold can be made directly from **ZOLL's WebStore**. Don't have a ZOLL WebStore account? **Simply request an account here: [zollwebstore.com/request-login/index/index/](http://zollwebstore.com/request-login/index/index/)**

### Military contracts

ZOLL products are available through GSA Advantage, GSA e-Buy, DIBBS, DLA ECAT, BPAs, and Authorized Government Resellers. Many of our products also have National Stock Numbers (NSNs).

Contract Vehicle	Contract Number	Effective Date	Expiration Date	Link
Vital Signs Monitor	SPE2D1-18-D-0005	12/8/2017	12/7/2023	<a href="#">DLA ECAT Login</a>
Vital Signs Monitor ECAT	SPE2D1-18-D-7003	12/8/2017	12/7/2023	<a href="#">DLA ECAT Login</a>
PMCE	SPE2D1-19-D-0011	1/14/2019	1/13/2024	<a href="#">DLA ECAT Login</a>
PMCE ECAT	SPE2D1-19-D-7003	1/14/2019	1/13/2024	<a href="#">DLA ECAT Login</a>
FSS	V797D-40135	5/1/2014	4/30/2024	<a href="#">GSA Advantage</a>
Propaq MD Contingency	SPE2D1-19-D-0035	9/20/2019	9/19/2024	<a href="#">DLA ECAT Login</a>
Ventilator Contingency	SPE2D1-17-D-0043	9/29/2017	9/28/2022	<a href="#">DLA ECAT Login</a>
Aspirator Contingency	SPE2D1-19-D-0034	9/25/2019	9/24/2024	<a href="#">DLA ECAT Login</a>

### Have questions or need assistance?

Whether you have product, contract, or purchasing questions, we're here to help.

Our customer service or ZOLL Military team members are available to assist you and are easy to reach.

Customer service can answer non-technical questions regarding product features and benefits, individual purchases, pricing, refunds, rebates, shipping status, or other service-related information. Contact our customer service representatives by phone or email:

#### ZOLL Resuscitation Products (Chelmsford, Mass)

Monday through Friday

8:30 a.m. to 6:00 p.m. EST/EDT

(978) 421-9440 Direct

(800) 348-9011 Toll-free (US)

(866) 442-1011 Toll-free (Canada)

Email: [GSales@zoll.com](mailto:GSales@zoll.com)

**For more detailed information on products, services, or training, don't hesitate to contact a member of our ZOLL Military team: [zoll.com/medical-markets/military/government-sales-team](http://zoll.com/medical-markets/military/government-sales-team)**

## Military Customer Resources

We offer educational, service, and maintenance support for your ZOLL devices. We want to ensure that your team and your equipment are ready when needed.

### User training and in-depth knowledge base

To help ensure that you're familiar with the advanced features and operation of your ZOLL devices, we offer multiple online training options. Available 24 hours a day, 7 days a week, these resources are tailored to fit your needs. From in-depth and trackable training courses to video product overviews, ZOLL's online training resources help providers prepare to respond with confidence.

[zoll.com/contact/onlinetraining](https://zoll.com/contact/onlinetraining)

We understand that more customized, interactive, or live hands-on training is often required to ensure you and your operators are confident and fully prepared to use your equipment. ZOLL Military's team of experienced clinical and technical experts are ready to provide training remotely or in-person at your facility. For questions, or to arrange remote or on-site training, simply contact one of our Military team members:

[zoll.com/medical-markets/military/government-sales-team](https://zoll.com/medical-markets/military/government-sales-team)

### Technical support

Do you have questions about your ZOLL device or need service and repair?

We're pleased to provide military-specific technical assistance through our Technical Support Department.

Monday through Friday

8:30 a.m. to 6:00 p.m. EST/EDT

(800) 348-9011 | Email: [milsupport@zoll.com](mailto:milsupport@zoll.com)

### Documentation and manuals

Product manuals for all of your ZOLL products can be found on our website.

[zoll.com/medical-products/product-manuals](https://zoll.com/medical-products/product-manuals)

**Product literature, brochures, spec sheets, and quick reference materials can be found by visiting [zoll.com/markets/military](https://zoll.com/markets/military) or by reaching out to a ZOLL Military team member.**

<sup>1</sup> Pazdan R, et al. Traumatic Brain Injury in the Military. *Fundamentals of Military Medicine*. Borden Institute-Office of the Surgeon General U.S. Army MedCoE. 2019, Chapter 38

<sup>2</sup> Gordon ML. *Traumatic Brain Injury: A Clinical Approach to Diagnosis and Treatment*. Millennium Publishing, 2015

<sup>3</sup> Vella, M. et al. Acute Management of Traumatic Brain Injury. *Surgical Clinics of North America*, 2017 Oct; 97(5):1015-1030

<sup>4</sup> *Columbia University Irving Medical Center website*, [www.cuimc.columbia.edu/rehab/staywell/traumatic-brain-injury#:~:text=Secondary%20brain%20injury%20refers%20to,further%20destruction%20of%20brain%20tissue](http://www.cuimc.columbia.edu/rehab/staywell/traumatic-brain-injury#:~:text=Secondary%20brain%20injury%20refers%20to,further%20destruction%20of%20brain%20tissue). Accessed Feb. 2022

<sup>5</sup> McKee AC and Daneshvar DH. The neuropathology of traumatic brain injury. *Handb Clin Neurol*. Author manuscript. PMC 2015 December 29.

<sup>6</sup> Spaitte DW et al., Association of Statewide Implementation of the Prehospital Traumatic Brain Injury Treatment Guidelines With Patient Survival Following Traumatic Brain Injury: The Excellence in Prehospital Injury Care (EPIC) Study. *JAMA Surgery*. 2019 July; 154(7)

<sup>7</sup> Glatter R. "Three Simple Interventions Increase Survival after a Severe Head Injury," *Forbes website*, May 20, 2019, [forbes.com/sites/robertglatter/2019/05/20/three-simple-interventions-increase-survival-after-a-severe-head-injury-study-finds/?sh=10328f0a2e3b](https://forbes.com/sites/robertglatter/2019/05/20/three-simple-interventions-increase-survival-after-a-severe-head-injury-study-finds/?sh=10328f0a2e3b). Accessed Feb 4, 2022. May 20, 2019