A Message to Our Veterans

VA Research and Development Program: Unraveling the Complexities of Traumatic Brain Injury

With improvements in body armor and battlefield medicine, many military men and women are surviving modern warfare in Afghanistan and Iraq with multiple, complex injuries that would have proved fatal in previous wars. One such injury is traumatic brain injury (TBI), which can be caused without any visible wounds when an explosion jars the brain. Estimated to affect at least 20 percent of our troops wounded in the current conflicts, TBI can involve symptoms ranging from headaches, irritability, and sleep disorders to memory problems, slower thinking, and depression. TBI is also a significant cause of disability outside of military settings—most often as the result of assaults, falls, automobile accidents, or sports injuries. In the civilian sector alone, TBI has been estimated to cost more than $56 billion annually.

Because TBI can affect how a person thinks and acts, even mild brain injuries can significantly disrupt the lives of Veterans and their families. Current therapeutic strategies can help patients with TBI regain some degree of function, but there remains a compelling need for improved methods of care.

VA Research is leading the way in TBI investigation, conducting studies that cover the spectrum of screening, diagnosis, rehabilitation, and treatment.

This brochure highlights some of the groundbreaking research projects being undertaken by VA’s dedicated investigators—studies that we hope will make an important difference in understanding TBI and ultimately improve the care available to our courageous Veterans coping with this condition.

For questions or additional copies contact:
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103 South Gay Street, Ste. 517
Baltimore, MD 21202
(410) 962-1800 x223
research.publications@va.gov
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Joel Kupersmith, M.D.
Chief Research and Development Officer
Department of Veterans Affairs

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Spotlight on VA Research

VA’s research related to traumatic brain injury (TBI) is wide-ranging. Among its goals: shedding light on the brain changes in TBI; improving screening methods and refining tools for diagnosing the condition; developing drugs to treat brain injury or limit its severity when it first occurs; designing improved methods for assessing treatment effectiveness; helping Veterans with TBI to reinsert themselves into their communities; and learning the best ways to help family members cope and provide support.

Recent Milestones in Traumatic Brain Injury Research and Care

2005
- VA establishes the Polytrauma and Blast-Related Injury Quality Enhancement Research Initiative (QUERI) to promote the successful rehabilitation of Veterans with TBI and other blast-related injuries.

2006
- VA, DoD, and other partners inaugurate the Center to the Imaging of Neurodegenerative Diseases at San Francisco VAMC, where researchers study TBI as well as conditions such as Alzheimer’s disease and Gulf War Veterans’ Illnesses.

2007
- VA establishes the Center of Excellence for Research on Returning Veterans, based at the Central Texas Veterans Healthcare System, to study TBI, PTSD, and related conditions.

2008
- DoD establishes the Defense Center of Excellence for Psychological Health and TBI, which will incorporate the Defense and Veteran’s Brain Injury Center—a program begun by DoD and VA in 1995—and be fully operational by late 2009.

- VA holds a state-of-the-art conference on TBI to further advance research and care.

“As the stepping stone to advancements in care, research into the causes and treatment of TBI is crucial to so many Veterans. Even mild to moderate TBI can have far-reaching effects on quality of life, though the outside world may not see the signs of the injury.”

Michael Selzer, M.D., Ph.D., Neurotologist and VA’s Director of Rehabilitation Research and Development

Team Approach to TBI Care

Because TBI often occurs along with other severe injuries, some patients with TBI receive care in the regional VA polytrauma teams. Polytrauma refers to multiple, complex injuries, often including limb loss, spinal cord injury, vision or hearing loss, burns, and related medical complications. Those needing the most intensive care are treated at one of VA’s four main polytrauma centers, in Minneapolis, Tampa, Richmond, and Palo Alto.

Initially established as TBI clinics in the early 1990s, these sites now provide comprehensive care for polytrauma. VA is building a fifth polytrauma center in San Antonio.

More Information

A recent issue of VA’s Journal of Rehabilitation Research and Development (Volume 44, Number 7, 2007) is devoted entirely to scientific research on TBI and polytrauma. Among the articles is a discussion of recent studies linking posttraumatic stress disorder (PTSD) and TBI. Other articles cover topics such as everyday and VA telemedicine systems for patients with TBI; a neuropsychiatric perspective on TBI; hearing, vision, awareness, and balance problems following TBI; and community-integrated rehabilitation for TBI.

The articles are available online at www.authenticresearch.va.gov.

Important areas of VA research in TBI include:

- Characterizing Brain Changes
  - TBI can result in sometimes-subtle brain damage with changes in memory, attention, thinking, personality, and behavior that are currently difficult to diagnose and treat.
  - VA researchers are refining ways to reliably diagnose TBI and predict patients’ outcomes and care needs.

- Regenerating Nerve Cells
  - VA investigators are working to identify ways to repair the nervous system by supporting regrowth of nerve cells.

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Important areas of VA research in TBI include:

- **Characterizing Brain Changes**
  VA investigators are working to identify ways to repair the nervous system by supporting regrowth of nerve cells. Strategies being explored include gene therapy, tissue engineering, and adult stem cell transplantation. Advances in this area hold promise not only for TBI, but also for conditions such as spinal cord injury, multiple sclerosis, and Alzheimer’s disease.

- **Regenerating Nerve Cells**
  VA investigators are using a device, which simulates the effects of explosions, to help them understand how cells in the brain respond. The study could support the development of therapies that troops would receive while in a combat zone—either before they go out on patrol, as a preventive measure, or after a blast has occurred, to limit damage to the brain.

- **Using Medications for TBI Symptoms**
  The Defense and Veterans Brain Injury Center, a collaboration between VA and the Department of Defense (DoD), is studying the effectiveness of various drugs for treating TBI symptoms such as headaches, anxiety, and mood swings.

- **Advanced Personalized Medicine**
  Because genetic factors may play a role in how TBI develops after an injury and how patients respond to treatment, a new VA registry will allow for anonymous analysis of DNA samples from Veterans who served in Afghanistan and Iraq. The goal is to learn how to use individuals’ genetic information to optimize care and treatment for TBI.

- **Treating Blast-Related Sensory Loss**
  VA Research is increasing its focus on the hearing and vision loss that often occurs as part of TBI. For example, investigators at VA’s National Center for Rehabilitative Auditory Research are partnering with audiologists at Walter Reed Army Medical Center to study central auditory processing—how the brain interprets incoming sounds—in service members who have been exposed to blasts.

- **Supporting Reintegration**
  VA investigators are studying the prevalence and nature of vision problems among Veterans with TBI. Their findings will point to the need for more comprehensive evaluations that include, for example, binocular function tests, which may detect subtle but distressing vision problems that may be missed in standard eye exams.

Plans for Further Research

In an effort to maximize the benefits from traumatic brain injury research, VA’s Office of Research and Development recently held a conference titled “Research to Improve the Lives of Veterans: Approaches to Traumatic Brain Injury Screening, Treatment, Management, and Rehabilitation.” Recommendations from the conference included calls for enhanced access to TBI data through a central database, increased recruitment of TBI researchers into the VA system, and additional support for TBI clinical trials. VA has already acted on recommendations from the TBI conference and issued a request for new study proposals reflecting priorities discussed.

Recent Milestones in Traumatic Brain Injury Research and Care

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As the stepping stone to advancements in care, research in the causes and treatment of TBI is crucial to so many Veterans. Even mild to moderate TBI can have far-reaching effects on quality of life, though the outward signs may be lost or the signs of the condition subtle.

Michael Selzer, M.D., Ph.D., Neuroscientist and VA’s Director of Rehabilitation Research and Development

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(http://www.polytrauma.va.gov)

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