TBI in Returning Veterans: DoD/VHA System of Care for Comprehensive Treatment

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WRAMC
Key Iraq wound: Brain trauma
By Gregg Zoroya, USA TODAY

A growing number of U.S. troops whose body armor helped them survive bomb and rocket attacks are suffering brain damage as a result of the blasts. It's a type of injury some military doctors say has become the signature wound of the Iraq war.

Shaun Radhay, a Marine, suffered brain damage and other injuries in a mortar blast.

By H. Darr Beiser, USA TODAY
American Congress of Rehabilitation Medicine Criteria for Mild TBI

- Traumatically induce physiologic disruption of brain function, indicated by at least one of the following:
  - Any period of loss of consciousness
  - Any loss of memory for events immediately before or after the accident
  - Any alteration in mental state at the time of the accident
  - Focal neurologic deficits that may or may not be transient

- Severity of the injury does not exceed:
  - Loss of consciousness of 30 min
  - GCS score of 13-15 after 30 min
  - Posttraumatic amnesia of 24 hr
# Criteria for Severity of TBI

<table>
<thead>
<tr>
<th></th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
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<tbody>
<tr>
<td>LOC</td>
<td>LOC ≤ 30 min with with</td>
<td>LOC ≤ 6 hours with with</td>
<td>LOC &gt; 6 hours with with</td>
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<tr>
<td></td>
<td>normal CT &amp;/or MRI</td>
<td>abnormal CT &amp;/or MRI</td>
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<tr>
<td>GCS</td>
<td>13-15</td>
<td>9-12</td>
<td>3-8</td>
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<tr>
<td>PTA</td>
<td>≤ 24hr</td>
<td>≤ 7days</td>
<td>&gt; 7days</td>
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</table>

- **Mild**: LOC ≤ 30 min with normal CT &/or MRI, GCS 13-15, PTA ≤ 24hr
- **Moderate**: LOC ≤ 6 hours with abnormal CT &/or MRI, GCS 9-12, PTA ≤ 7days
- **Severe**: LOC > 6 hours with abnormal CT &/or MRI, GCS 3-8, PTA > 7days
Severe Brain Injury
Consequences of TBI

Cognitive

- Attention
- Information processing (speed & efficiency)
- Memory and Learning
- Executive Functions
  - Problem solving, planning, insight/awareness, set shifting, sequencing
Consequences of TBI

- Behavioral-emotional
  - Affect Regulation: apathy, agitation, aggression
  - Irritability
  - Impulsivity
  - Depression, Anxiety
  - Social Pragmatics

Cognitive and behavioral impairments are the most disabling long-term, more so than physical injuries.
Treatment Considerations

- Treatment varies based upon:
  - Severity of injury
  - Time since injury
  - Constellation of impairments
IED’s are the Weapon of Choice: One Explosion/Blast has Multiple Mechanisms of Injury
TBI in Combat Settings

- New mechanism of injury
- New constellation of injuries
- New challenges for TBI rehabilitation
- Requires new expertise and new model of care
WRAMC Patients

Patients with severe enough injuries to be evacuated from the military theater

- Blast-Related injury most common = 68%
- Of all blast patients screened, 59% had head injury
- 89% had closed head injury
- Severity: 56.3% mod-severe; 43.7% mild
War Injured Patients: Multiple Impairments (Tampa VAMC data)

- Pain: 95%
- Brain: 77%
- Wounds: 65%
- Ortho: 46%
- Nerve: 38%
- Psychiatric: 35%
- Visual: 31%
- Lung: 31%
- Infections: 27%
- Hearing: 15%
- Amputee: 12%

Average of Six Impairments
Military Evacuation
International Tracking

Level V MTF
WRAMC
NMMCNMMC
BAMC

Level I – First Aid
Level II Forward Surgical team
Level III CSH

Level IV Landstuhl
DoD Levels of Care

- **Level I** – Basic Level of Care (First Aid; medic)
- **Level II** – At least one Emergency Medicine-trained physician and the basic equipment that allows the patients to be treated according to standards of practice found in most CONUS Emergency Departments
- **Level III** – That plus neuroimaging and specialty evaluation (neurosurgery and neurology)
- **Level IV** – Major Medical Center with all trauma and specialty care LRMC (in this conflict)
VHA - Polytrauma System of Rehabilitation Care

A New Kind of Care in a New Era of Causalities
VHA Polytrauma: Definition

- Trauma to several body areas or organ systems
- Occur at the same time
- One or more is life threatening
Polytrauma Rehabilitation System of Care (National Tracking)

Polytrauma Centers (4)

Polytrauma Networks (22)

Polytrauma Support Clinics (76)

Polytrauma Case Management

Goal: Get Home
Four Polytrauma Rehabilitation Centers

Minneapolis

Eastern
Southern
Midwest
Western
Lead Center

Network of Care

Palo Alto
Tampa
Richmond

VISN Boundary

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VHA Polytrauma Rehabilitation Centers (PRCs) Level I

- “Brain Injury Plus”
- Brain injury drives the care process
- Integrate care for complex polytrauma in single location -- simultaneous tx of multiple injuries
- Higher level of medical acuity
- Sequence and integrate treatment to meet patient need
- Coordinated team effort with expanded team of consultants
Interdisciplinary Team and Interdisciplinary Rehab Approach

- Rehab Medicine physician
- Rehab nurses (primary nurse model)
- Rehabilitation Psychologists
- Neuropsychologists
- Physical, Occupational, Recreational, and Vocational Therapists
- Speech Therapists
- Social Workers
- Case Managers (including long-term)
Extensive Team of Consultants

- Anesthesiology
- Audiology
- Chaplin Services
- Dentistry
- Driver Rehabilitation
- Gastroenterology
- General Surgery
- Infectious Disease
- Medicine
- Neurology
- Neuro-ophthalmology
- Neurosurgery
- Nutritionist
- Optometry
- Oral and Maxillofacial Surgery
- Orthopedics
- Orthotics
- Otolaryngology
- Pharmacy
- Plastic Surgery
- Prosthetics
- Psychiatry
- Pulmonology
- Radiology
- Urology
- Vocational Specialist
Inpatient Acute Rehabilitation

- 3-5 hours of therapies per day (OT, PT, SP, Recreational, Psychology)
- Average length of stay 1-3 months
- Therapies include community outings planned and organized by the TBI patients together with the therapists
- Case management begins before patients arrive and includes contacting families
- Case management continues following discharge, may last for years
Other Lead TBI Center Programs

- **Emerging Consciousness Program:**
  For those with acute coma, NOT long-term coma or vegetative state care

- **Short-stay admissions for:**
  - Evaluation and treatment planning
  - Treatment trials
  - Vocational evaluations

- **Respite Care** upon occasion
Other Lead TBI Center Programs (cont.)

**New Program** beginning July/August 2007

➢ **Transitional Residential Programs**
  - 6 – 12 month program
  - Residential
  - Community re-entry program / services
  - Compensated Work Therapy
  - Work trials
Polytrauma Network Sites: Level II (Outpatient)

- Screen every returning Iraq or Afghanistan veteran who seeks care in the VA for TBI
- Evaluate and treat on an outpatient basis mild TBI (or post-acute moderate/severe TBI)
- Refer any appropriate patient to the nearest PRC for specialized care, if needed
- Develop innovative outpatient programs (e.g., Day Treatment programs, Community Re-entry programs)
- Work with PRCs to provide Community Re-entry services to veterans discharged from PRCs to their catchment area
- Assist with ongoing Case Management
Polytrauma Support Clinical Teams: Level III (Outpatient)

- Screen every returning Iraq or Afghanistan veteran who seeks care in the VA for TBI
- Evaluate and triage (treat) TBI patients to appropriate local programs
- Refer any appropriate patient to the nearest PNS or PRC for specialized care, if needed
- Work with PRCs and PNSs to facilitate Community Re-entry to veterans in their catchment area
- Serve as a local resource for ongoing TBI case management
Polytrauma Rehabilitation
Lifetime Continuum of Care

DoD
Acute Trauma care
  Surgical
  Medical

VHA
Acute Rehabilitation
  -- Inpatient Acute
  -- Inpatient Subacute
  -- Inpatient emerging consciousness

VHA
Post Acute Rehabilitation
  Transitional/Community Re-entry - Residential
  Transitional/Community Re-entry - Day Program
  Outpatient

VHA
Lifetime Community Care
  -- Supported Living
  -- Vocational
  -- Educational
  -- Day Activities
  -- Support Groups
  -- Outpatient follow-up

Family Support
Case Management
Benefits Management