May 8th, 10:30 AM - 12:00 PM

Traumatic Brain Injury: Translation from Animal Models and Genetics to Improving Outcomes

Susanne Muehlschlegel
University of Massachusetts Medical School

Et al.

Let us know how access to this document benefits you.
Follow this and additional works at: https://escholarship.umassmed.edu/cts_retreat

Part of the Nervous System Diseases Commons, Neurology Commons, Translational Medical Research Commons, and the Trauma Commons

Repository Citation

Creative Commons License
This work is licensed under a Creative Commons Attribution-Noncommercial-Share Alike 3.0 License. This material is brought to you by eScholarship@UMassChan. It has been accepted for inclusion in UMass Center for Clinical and Translational Science Research Retreat by an authorized administrator of eScholarship@UMassChan. For more information, please contact Lisa.Palmer@umassmed.edu.
Traumatic Brain Injury
Translation from Animal Models and Genetics to Improving Outcomes

Susanne Muehlschlegel, MD, MPH
Assistant Professor of Neurocritical Care
UMASS Depts. Of Neurology, Anesthesia/Critical Care and Surgery

Nils Henninger, MD
Assistant Professor of Neurology
UMASS Dept. Of Neurology

Raphael Carandang, MD
Assistant Professor of Neurocritical Care
UMASS Depts. Of Neurology and Surgery

Constance Moore, PhD
Associate Professor of Psychiatry
UMASS Center for Comparative Neuroimaging
Traumatic Brain Injury (TBI) is due to a sudden forceful, mechanical injury to the brain.

TBI Type

- Blunt/Closed
- Penetrating
  - Gun Shot Wounds
  - Shrapnel
The severity of TBI is determined by the Glasgow Coma Scale on presentation.

### The Glasgow Coma Scale (GCS)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Scale Responses</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye opening</td>
<td>Spontaneous</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>To voice</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>To pain</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>1</td>
</tr>
<tr>
<td>Verbal response</td>
<td>Oriented</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Confused conversation</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Words (inappropriate)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Sounds (incomprehensible)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>1</td>
</tr>
<tr>
<td>Best motor response</td>
<td>Obeys commands</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Localizes</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Withdraws</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Flexion Posture</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Extension Posture</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>1</td>
</tr>
</tbody>
</table>

**Total** 3 - 15

Jennett and Bond Lancet 1975
Traumatic Brain Injury is a real public health problem in the U.S. (and worldwide).

Appr. 1.7 million Americans sustain a TBI annually

- 52,000 Deaths
- 275,000 Hospitalizations
- 1,365,000 Emergency Department Visits
- ??? Receiving Other Medical Care or No Care*

From: http://www.cdc.gov/traumaticbraininjury/statistics.html

• 25% of these are moderate-severe TBI.
Falls and motor vehicle accidents are the most common causes of adult TBI.

- Falls are the leading cause of TBI
- Fall-related TBIs older adults aged ≥75 years is increasing

Among all age groups, motor vehicle crashes and traffic-related incidents result in the largest % TBI-related deaths (31.8%).
Long-term effects and poor outcomes require research to improve outcomes and develop new therapies.

- Cognition: Memory, Reasoning
- Language: Communication, Understanding, Expression
- Emotion: Depression, Anxiety, Personality changes, Aggression, Social inappropriateness

Direct medical costs and indirect costs (lost productivity) of TBI:

~ $76.5 billion in the U.S. in 2010

From: http://www.cdc.gov/traumaticbraininjury/statistics.html