Please estimate the number of persons

- Who sustain a TBI each year
  A. In USA
  B. In Wisconsin
- The number of persons in your practice who have a TBI
Traumatic Brain Injury & Primary Care Clinicians: A Critical Connection

WREN Conference
Wisconsin Research and Education Network Conference
September 17, 2010
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Overview

• TBI statistics
• Personal story
• TBI common residual symptoms
• Unique role of primary care clinicians
• Follow-up: some ideas and suggestions
• Questions & discussion
A Traumatic Brain Injury is

• caused by an external force
  • a blow or jolt to the head
  • penetrating head injury
  • a “blast” injury
• that disrupts the normal function of the brain.
The “Silent Epidemic”

Each year 1.7 million sustain a TBI:

- Severe: 10% 170,000
- Moderate: 10% 170,000
- Mild: 80% 1,360,000

~ 75% to 85% of Mild TBI spontaneously improve, usually within 3 weeks

~ 15% to 25% of Mild TBI patients may have life-long symptoms or limitations.

CDC, 2010
Comparison of Annual Incidence

Data compiled and arranged by the Brain Injury Association of America based on data from the Centers for Disease Control and Prevention, American Cancer Society and National Multiple Sclerosis Society
TBI in Wisconsin, 2007

- ~ 5,857 persons sustained a TBI
  - that is ~ 16 persons each day
- > 4,600 TBI related hospital discharges
- > 1,100 WI residents died from TBI
- How many go undiagnosed?

WI Bureau of Health Information
Brain Injury Consequences

A brain injury can affect who we are and the way we think, act and feel.

It can change everything about us in a matter of seconds.
Personal TBI Time Line 1999-2009

• May 19, 1999        “The Fall”
• June 14, 1999       Return to work
• January 20, 2000   “Retired”
                      … “Wandering in the Wilderness”…
• July 12, 2000       Start treatment
• 2005 - 2007        Back to school
My Journey

• May 19, 1999, fall from ladder with overnight hospitalization
• Subdural, subarachnoid hemorrhages “resolved” by early June…but pain did not
• “You’ll be back to your normal self in a month.”
• The “lost month” at home
• Return to work June 14, 1999
Wandering in the Wilderness

- **July 1999, Neurologist**, “Will improve over the next six months, no further treatment recommended”
- **January 20, 2000**, last day of my career
- **February 5, 2000**, fall with broken leg
- **April 2000, Physiatrist**, “I have no specific interventions other than the passage of time”
- **May 2000, Psychologist**, “His ideas and my anger”
Finally Finding Help

- BIA-WI State Conference, May 17-18, 2000
- Mayo Clinic, July 12, 2000 - 1st visit
- Relief in finding competent, caring providers with knowledge and experience
- Magical hopes of returning to “old” self
- Desperate desire for them to know who I had been vs. who I was post-TBI
The Beginning Stages of Treatment

- Assessment and evaluation
- Problem identification
- Education
Early Struggles in Treatment

• Depression and anxiety, different opinions
• Impossible assignments
  – Stop when you hurt
  – Stop when you feel tired
  – Stop thinking, put your mind at rest
Major Problems for Me

- Ignorance
- Pain
- Automatic behaviors
- Fatigue
- Sensitivity to external stimuli
- “Brain Brown-out”
- “Emotional Isometrics”
- Loss of sense of self
Fatigue

0%....20%....40%....60%....80%....100%

(window of awareness)

Least severe » Most severe
Components of Fatigue

- Physical
- Emotional
  (Emotional Isometrics)
- Psychological
- Intellectual
  (Brain Brownout)
Things That Help

• Having a loving and supportive wife, Andrea
• Having the support of my family physician
• Learning and following “the treatment program”
• Getting back on track, multiple times
• Learning to live within my limits, with less apologizing and feeling guilty and/or ashamed
• Having a sense of humor
Overall Strategies for Success

• Education about my injury for me and my family
• Building the alliance
• Team of experts working together
• Coaching and encouraging
Specific Coping Strategies

- Increase self awareness
- Create structure and organization
- Move from “failures” to “problems” to “solutions”
- Find new definitions of success and self
An Essential Tool

QuickTime™ and a decompressor are needed to see this picture.
Activities That Helped

• Cooking
• Volunteering
• Lying in a hammock
• Exercising
• Going back to school
• Getting together with friends
Allure of Alcohol

- Relieves pain from physical symptoms
- Helps to fill the time when I can’t really function
- Blocks out emptiness and meaninglessness
Severity of TBI

Within the 1.7 million persons with TBI annually

- Severe: 10% 170,000
- Moderate: 10% 170,000
- Mild: 80% 1,360,000

“Miserable Minority” 204,000 to 340,000

( that ~ 15% to 25% of the “Mild” 80% who have significant persistent symptoms)

CDC, 2010
Types of TBI

• **Penetrating Head Injury**
  – Gun Shot Wound
  – Stabbing
  – Blast (fragments)

• **Closed Head Injury**
  – Blast
  – Fall
  – MVA
  – Blunt trauma
  – Sports
Closed Head Injury
Acceleration/Deceleration

**Mechanism of Closed Head Injury**

- Head thrown backward while brain hits front of skull
- Head thrown forward while brain hits back of skull

**Whiplash**

**MVA**
Mechanism of Damage

- Brain is like consistency of formed “Jell-O”
- Bruising of the brain is due to forward/backward movement against skull
- Twisting of nerve fibers is due to twisting of brain within skull
- Nerve fibers are broken or stretched = temporary or permanent brain damage
- Leads to cognitive and behavioral changes
Areas of the Brain

Lobes of the Brain: Frontal, Temporal, Parietal, Occipital
The base of the skull is rough, with many bony protuberances. These ridges can result in injury to the temporal lobe of the brain during rapid acceleration.
Diffuse Axonal Injury (DAI)

- Healthy Axon
- Stretched Axon
- Twisted Axon
- Sheared Axon
Axonal Injuries

• Nerve fibers within specific areas of the brain are severed … never to be regained

• Nerve fibers are stretched … resulting in inefficient and slowed functioning

• Onset of physical, cognitive and behavioral changes after the TBI reflect impaired functioning due to these broken or stretched nerve fibers

• These injuries are not visible on CT scan or MRI
In TBI, there is preferentially greater damage to the \textit{frontal} and \textit{temporal} lobes of the brain.
Frontal Lobe Functions

- Planning/anticipation/initiation
- Problem solving/judgement
- Awareness
- Mental flexibility
- Ability to inhibit responses
- Personality/ emotions
Temporal Lobe Functions

- Memory and learning
- Organizing and sequencing
- Hearing
- Understanding language
Thinking Changes in “Executive Functioning”

- Difficulty planning and setting goals
- Difficulty problem solving
- Difficulty organizing
- Difficulty prioritizing
- Difficulty being flexible
- Difficulty being aware of thinking changes in self
Thinking Changes

Attention

• Reduced concentration
• Reduced visual attention
• Inability to divide attention between competing tasks

Processing speed

• Slow thinking
• Slow reading
• Slow verbal and written responses
Thinking Changes (2)

Communication
• Difficulty finding the right words, naming objects
• Disorganized in communication

Learning and Memory
• Information before TBI intact
• Reduced ability to remember new information
• Problems with learning new skills
Physical Problems

- Fatigue
- Headaches
- Increased sensitivity to noise/bright lights
- Overall slowing
- Clumsiness
- Decreased vision/hearing/smell
- Dizziness
Typical Descriptions...

- “Unmotivated”
- “Unfocused”
- “Poorly organized”
- “Unable to plan ahead”
- “Unable to follow a train of thought”
- “Forgetful”

TBI: Cost to Society

• $ 60 Billion per year
• High risk populations
  - Veterans
  - Homeless persons
  - Prison population
• 3.17 million persons on long-term disability from TBI

CDC
Higher Risk for TBI

• Special Populations:
  – Veterans ~ 20%
  – Homeless ~ 50%
  – Prisoners ~ 27% to 85%

• Males: 1.5 to 2 times risk

• Age: 15-45; < 5 years; > 75 years

• TBI: leading cause of death ages 15-45

CDC
TBI: Children Statistics

• CDC reports 300,000 sports-related “mild” TBI per year (a “concussion”) – with LOC

• 165,000 children will be hospitalized each year with a BI

• After hospital stay fewer than 2% are recommended for special education (though 19% have cognitive limitations) [from National Pediatric Registry]
TBI: Academic Stress Points

![Graph showing the relationship between Context/Support and Content over different school years (1st, 4th, 7th, and High School). The graph indicates that as Context/Support increases, Content decreases, and vice versa.]
How to Recognize TBI

• High index of suspicion
• History
• Observation of behavior and cognitive functions
• More formal testing
• CT scan and MRI may be negative
• Neuropsychological testing
Missing ... TBI

• **Mild to moderate TBI** often goes undiagnosed

• The effects of brain injury can be very subtle

• Lingering effects of TBI may not emerge in earnest until after 12 months

• Families and school personnel have limited knowledge about brain injury

• “Growing into your deficits”
Perspective on Brain Injury

The most important things to remember include:

• No two brain injuries are exactly the same
• The effects of a brain injury depend on such factors as cause, location and severity
• Adjustment is dependent on “before-after” changes in the person
• When the symptoms persist, TBI is not an event but a lifelong process.
Conceptual Models

- TBI as a family illness
- Improvement can continue
- “Erosion by chronic condition”
- Difficulties at transition points
- Interdisciplinary team
- Need to create resources
- Referral and consultation issues
Unique Role of the Primary Care Providers

- Has an ongoing relationship
- Knows the person both pre-TBI and post-TBI
- Knows the family
- Knows the community
- Remains a constant when transitions occur
Primary Care Clinicians have Unique Opportunities to

- Partner with TBI treatment experts
- Educate others
- Create systems for identification
  - Sports injuries
  - Higher risk populations
- Create treatment systems at local level
- Develop long-term care protocols
Develop your TBI Network

- TBI model systems in your area
- Rehabilitation hospitals
- VA hospitals and clinics
- University medical centers
- Brain Injury Association of WI
- Training of local TBI providers
Long-Term Follow-Up Goals

- Best quality of life
- Life style changes
- Prevention of problems
- Continuity of care
- Life cycle challenges
- Early intervention for problems
- Emerging treatment options
TBI: A Chronic Condition

*When the symptoms persist, TBI is not an event but a life long process.*

Symptomatic TBI affects the

- Individual
- Family
- School / Work
- Community
Ideas for Discussion

- Frequency of follow-up
- TBI, adaptations in office visit
  - Time
  - Structure and focus
- Goals of active follow-up
- When/how to involve the family
“Say you get hit in the leg,” Kampman said. "You can analyze with your brain to say, 'OK, my knee is sore, my leg is sore.'

Well, if your head is sore, it's kind of hard to analyze your own thing you're trying to analyze, if that makes sense."

Kampman said he could tell watching film of himself against Tampa Bay that he was not playing the way he normally does.

Tom Silverstein of the Milwaukee Journal Sentinel
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Thank You

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