Identification and Management of Posttraumatic Stress Disorder after Traumatic Brain Injury

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So many templates to choose from
Subspecialty Certification in Brain Injury Medicine
Millennial generation (1980s – early 2000)

- Poor Work Ethic
- Afraid of Face-to-Face Communication
- Career Impatience
- Frequently Job Hop
- Dependent on Feedback
- Fixated on Flexibility
- Act Entitled
- Love brunch, avocados and memes
Objectives

• Understand risk factors and protective factors related to posttraumatic stress disorder after a traumatic brain injury

• Appreciate differences in symptoms of PTSD for people with TBI compared to people without TBI

• Will highlight pharmacology in some areas but bedrock foundation of treatment is multidisciplinary team assessment and treatment
Traumatic Brain Injury (TBI)

• 51,000 Americans die each year after TBI

• 1.2 million are evaluated in the ED after a TBI
  • Mostly mild TBI

• Disproportionately occurs in males ages under 25 and over 65
Definitions

• TBI
  – Traumatically induced physiological disruption of brain function and/or structure resulting from the application of a biomechanical force to the head, rapid acceleration or blast forces

• Mild TBI = Concussion
  – By definition no abnormality is seen on standard neuroimaging studies
  – Must include 1 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 neurological deficit that may or may not be transient
What causes the damage after a TBI

- Macroscopic or gross evidence of pathology
- Fractured skull
- Intracranial Hemorrhage
  - Epidural
  - Subdural
  - Subarachnoid
  - Cerebral (Intra-parenchymal)
What causes the damage after a TBI

• Microscopic injury
• Rapid depolarization
• Different densities of brain tissue

• Neural damage releases glutamate (and other neurotransmitters), cascade of events

• Leads to further neuron death

• Loss of neuronal circuitry
  – Can be anywhere or any neural circuits
Mechanisms of brain injury

**PRIMARY INJURY**

**FOCAL**
- Contusion &/or hematoma

**DIFFUSE**
- Axonal strain and compromised axolemma

**SECONDARY SYSTEMIC COMPLICATIONS**
- Edema, ↑ICP, Hemorrhage
- ↓CBF leading to ischemia

**SECONDARY CELLULAR INJURY MECHANISMS**
- Excitotoxicity, Calcium Overload, Oxidative Stress, Mitochondrial Dysfunction, Inflammation.

**SYNAPTIC DYSFUNCTION**
- Activation of protein kinase signaling pathways e.g. CaMKII, MAPK
- Impaired Neurotransmission
  - ↓LTP ↑LTD

**CELL DEATH**
- Necrosis or programmed cell death

**AXONAL DEGENERATION**
- Damage to white matter tracts

**COGNITIVE DYSFUNCTION**
Long term outcomes after TBI

• About 40% of hospitalized TBI survivors developed long term disability
  — Higher rates for more severe TBI

• Estimated 3.2 million Americans currently living with TBI related disability

• High variability, difficult to predict
David Steele
@David_C_Steele

“We just left a rest stop! Why didn’t you go then?”
Posttraumatic Stress Disorder

The Deer Hunter
Meryl Streep, Robert De Niro, Christopher Walken

American Sniper
Bradley Cooper, Sienna Miller, Jonathan Groff

Born on the Fourth of July
Tom Cruise, Willem Dafoe, Tom Berenger
Posttraumatic Stress disorder

• As old as war

• Most literature and study relates to war

• Nostalgia, Soldier's Heart, Railway Spine, Shell Shock

• Battle Fatigue, Combat Stress Reaction (CSR), war neurosis

• PTSD first appeared in the DSM III in 1980
Posttraumatic Stress Disorder

• Lifetime prevalence of PTSD is 5% in males and 10% in females
  – Up to 25% or higher after trauma

• Diagnosis
  – Assessment, observation and interview
PTSD Risk Factors

- Greater trauma severity
- Lack of social support
- Elevated life stress

- female gender, lower SES, less education, lower intelligence, previous psychiatric disease, history of abuse, other trauma (not causing PTSD), childhood adversity, family psychiatric history
PTSD Protective factors

• Psychological resilience: adaptive response to high-intensity stressors
• The ability to maintain relatively stable, healthy levels of psychological and physical functioning as well as the capacity for generative experiences and positive emotions even when exposed to trauma
• Positive attitude, optimistic, realistic, emotional self-regulation, confidence, communication and problem solving skills
• Criticisms
  – Victim blaming
Alyssa Limperis
@alyssalimp

me making sure the barista sees me put money in the tip jar

153K  6:51 AM - Jul 31, 2018
Posttraumatic Stress Disorder
(diagnosis)

• Acute emotional responses following trauma are common, expected and temporary

• Exposure to actual or threatened trauma plus all of the following for > 1 month
  – Directly experiencing trauma
  – Witnessing someone else
  – Learning about traumatic events of a loved one
  – Experiencing repeated exposure to aversive details of the traumatic events
Posttraumatic Stress Disorder

• Intrusion symptoms
  – Recurrent intrusive memories
  – Recurrent distressing dreams
  – Dissociative reactions “Flashbacks”
    • Acting out the trauma again
  – Psychological and physiological reactions to triggers
Posttraumatic Stress disorder

• Avoidance of stimuli associated with the trauma
  – Memories, thoughts, feelings
  – People, places, things
Posttraumatic Stress disorder

• Negative cognitions and mood
  – Amnesia for elements of trauma (not from TBI)
  – Exaggerated negative beliefs about oneself
    • I’m a bad person, no one can be trusted, the world is dangerous
  – Distorted cognitions about cause/consequences
    • Self blame, survivors guilt
  – Negative emotional state
  – Disinterest in activities, anhedonia
  – Feeling detached from others
Posttraumatic Stress disorder

• Altered arousal and hyper reactive (flight of flight)
  – Irritable behavior, angry outbursts, aggression
  – Reckless and self-destructive
  – Hypervigilance
  – Exaggerated startle response
  – Can’t concentrate
  – Insomnia
My mom checking my homework

Young Thug
Lil Durk
Trauma and Stress Related disorders

• PTSD related disorders

• Acute Stress Disorder
  – PTSD symptoms < 1 month duration
  – 50% chance to continue beyond 1 month into PTSD
  – Research into how to prevent Acute stress disorder from progressing to PTSD is mixed
Trauma and Stress Related disorders

• Adjustment disorder
  – Emotional or behavioral symptoms that develop in response to an identifiable stressor occurring within 3 months of the stressor
  – Distress is out of proportion to the severity of the stressor
  – Life is disrupted

• Persistent complex bereavement disorder
  – Severe and persistent grief

• Complex PTSD
  – Controversial topic. Childhood abuse leads to affective dysregulation as an adult without altered arousal or intrusion symptoms
Disruptions in normal functioning

- Severe
- Moderate
- Mild

potentially traumatic events

Time since event

- PTE
- 1 year
- 2 years

CHRONIC
DELAYED
RECOVERY
RESILIENCE
me after I put the fitted sheet on my bed by myself
Prevention of Posttraumatic Stress Disorder (PTSD)

• After TBI and before development of PTSD there is a window to for prevention

• Psychological interventions
  – In the immediate aftermath focus typically needed on safe environment
  – Most common intervention is Psychological Debriefing
  – Other approaches are coping skills therapy, stress inoculation therapy, psychoeducation, normalization, reassurance
Prevention of Posttraumatic Stress Disorder (PTSD)

- Alcohol
  - Interferes with memory and pain
- Morphine
  - If given right after injury decreases rate of PTSD
- Propranolol
  - Reduce the ‘fight or flight’ response
- Gabapentin
  - No better than placebo
- Hydrocortisone
DUDE, WHAT IF...WHAT IF WE LAUNCHED MY CAR INTO SPACE?
PTSD and TBI

• The origin of PTSD and TBI may overlap
  – So can their symptoms

• TBI consequences generally separated into:
  – Cognitive
    • Amnesia
  – Emotional
    • Irritability, dysphoria, anxiety
  – Somatic
    • Spasticity, dysautonomia
PTSD and TBI

• Since core symptom of PTSD is re-experiencing and a common feature of TBI is amnesia, in some cases they ‘cancel out’

• Rates of PTSD after MVC studied were similar for those with and without a TBI

• In cases of PTSD and TBI the two generally worsen each other

• They can also both happen at two different points in time
PTSD and TBI

• TBI may alter the response to standard pharmacological treatments for PTSD
  – TBI may alter neurotransmitter levels
  – Loss of neurons in important pathways

• Primary feature of psychotherapy for PTSD is exposure and desensitization
PTSD and TBI

• Pharmacologic treatment

• Similar to those without TBI

• Antidepressants
• Adrenergics
  – Beta blocker (propranolol) and alpha antagonists (prazosin)
• Antipsychotics
• Benzodiazepines again recommended short term only
PTSD Pharmacological Treatment - Antidepressants

- SSRI’s
- Sertraline (Zoloft)
- Paroxetine (Paxil)
  - Fluoxetine (Prozac)
  - Escitalopram (Lexapro)
  - Fluvoxamine (Luvox)
  - Citalopram (Celexa)
PTSD Pharmacological Treatment – Adrenergics

• Propranolol
  – β-blocker
  – blocks the beta receptor site for catecholamines epinephrine (adrenaline) and norepinephrine

• Prazosin
  – α-1 antagonist
  – Blocks the alpha-1-adrenergic receptor in vascular smooth muscle, the central nervous system, and other tissues

• Clonidine, Guanfacine
  – α-2 agonist
  – stimulating α2 receptors in the brain causes reflex inhibition of downstream neurons
PTSD Pharmacological Treatment - Antipsychotics

• Quetiapine
• olanzapine
• Risperidone
• aripiprazole
• Ziprasidone
• Lurasidone
  – Others
PTSD Pharmacological Treatment – Benzodiazepines

• Often used but the research suggests they shouldn’t be
• Side effects are considered benign
• They can work short term (reinforces prescribing practices)
  – lorazepam (Ativan)
  – alprazolam (Xanax)
  – clonazepam (Klonopin)
  – chlordiazepoxide (Librium)
  – diazepam (Valium)
AMERICA

BABY BOOMERS

[gunshots]

WHY WOULD MILLENNIALS DO THIS?
YOU HAVE QUESTIONS

I HAVE ANSWERS