

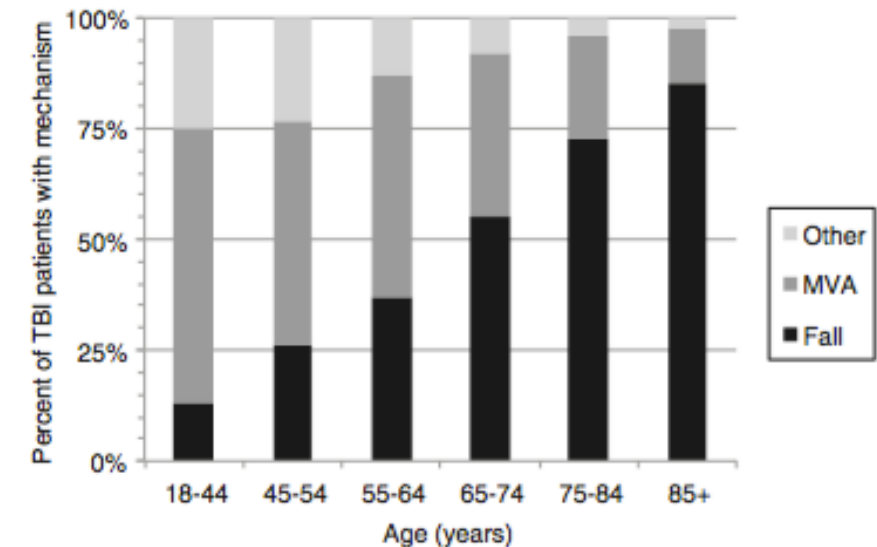
# ***CONCUSSIONS in the Elderly & those with Neurodegenerative Diseases***

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# CAUSES OF TBI IN ELDERLY

- Falls: 8% of 65+ visit ER b/c of falls; ¼ get hospitalized; falls in hospital
  - 10% of fall = TBI
  - History of a single fall is a major risk factor for a subsequent fall = increasing the risk of repetitive TBI
- MVC: 70+ have higher accident rate/km driven than any other age group, except young male drivers
  - Age-related changes in cognitive functioning (reduced visual, cognitive and psychomotor skills)
- Suicide: highest  $\geq 65$ ;
  - 3<sup>rd</sup> leading cause of injury in  $\geq 65$
  - Gunshot or jumping
  - RF: white, male, PAST depression.
    - Chronic pain, illness, social isolation
- Elder abuse



J Neurotrauma 2018 35:889–906; Can J Neurol Sci. 2018; 45: 636-642;  
Accid Anal Prev. 2003;35(2):227-35. ; Nat Rev Neurosci. 2006;7(1):30-40.;  
Accid Anal Prev. 1998;30 (3):337-46.

# MECHANISMS & DEMOGRAPHICS

- Mechanisms of TBI are important considerations:
  - Fall-related TBIs more commonly = mass lesions, i.e. Subdural hemorrhage (BLEEDS)
  - MVC-related TBIs more commonly result in diffuse axonal injury
- Distribution of mild, moderate, severe unknown but study suggests similar across ages

# ELDERLY & mTBI

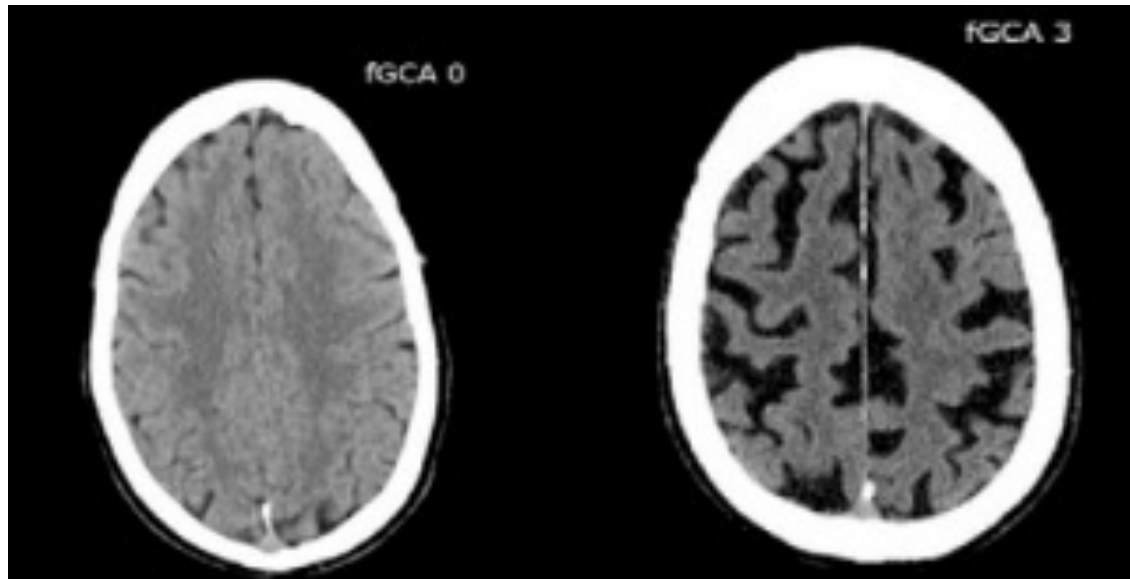
- Assessment in acute phase difficult:
  - age-related issues such as variable baseline cognitive function and impaired memory
  - comorbid diseases and medications that can affect their mental status
- Interaction of complex comorbid medical conditions, medications, premorbid cognitive difficulties, and aging brain makes diagnosis more difficult and prognostication challenging
- With repetitive falls, older individuals are also at risk for repetitive head injury
- Risk of delayed intracranial bleeding from anticoagulant use (blood thinner)
- Risk of delayed effect of bleed because of atrophy (brain shrinkage)

# ASSESSING TBI IN THE ELDERLY

- Lack of guidelines
  - Older adults with pre-existing dementia - abnormal baseline cognitive function
  - Comorbid medical conditions/ medication side effects that may complicate accurate diagnosis i.e. hearing
  - Burden/evolution of TBI may not be captured by initial Glasgow coma scale in acute phase– inaccurately assign TBI severity in older adults, i.e. Age-related brain shrinkage may provide space for intracranial bleed to expand substantially before clinically apparent signs or symptoms that would be detected

# WHY ARE ELDERLY AT HIGHER RISK OF MORE SEVERE TBI?

Younger



Older



679 x 750

# MISSING THE TBI DIAGNOSIS IN OLDER ADULTS

- Many TBIs missed

300 REFERRALS <1% IN >65

>1000 <1% IN >65

- G
  - M
- \*BUT NUMBERS INCREASING
- parkinsonism etc

# Quality Improvement Study

## • Methods

- We sent 1400 surveys to physicians that see older adults or those with ND, most of whom practice in North America, through email using the REDCap platform.
- A total of 141 physicians replied.
- Neurologists made up the largest group of respondents at 44% with 13% being movement disorder specialists. Geriatrics comprised 37.1% of respondents followed by primary care (8.3%).
- The rest of the group was made up of psychiatry, palliative medicine, neurosurgery, emergency medicine/neurocritical care, and pain doctors.

## Concussion Survey For Physicians

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Dear Colleague,

Falls and other low-energy accidents are common in older adults and those with neurodegenerative diseases. We are conducting a very short quality improvement survey to assess knowledge of mild traumatic brain injury/concussions in physicians treating patients with neurodegenerative disease or older adults. The hope is to better understand your practice when you suspect mild traumatic brain injury/concussion.

Thank you for your time!

Kind regards,  
Goldin Joghataie (MSc candidate) and Carmela Tartaglia, MD

**Please indicate approximately how many patients with each condition you see per week.**

	None	less than 5	5-10	10-20	>20
1) Parkinson's Disease	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2) Alzheimer's Disease	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3) Huntington's Disease	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4) Dementia patients in general	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5) Atypical Parkinsonian syndrome	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6) Elderly patients (>60) without neurodegenerative disease(ND)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7) Elderly patients with mTBI(concussion)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8) If other, please choose number here, and state patient disease type below:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9) If applicable, please specify the "other" patient population. \_\_\_\_\_

10) What is(are) your specialty(ies)?

- Geriatrics
- Movement disorders
- Primary care
- Other

11) If "other", please specify your specialty. \_\_\_\_\_



## Summary of Main Results

- 71.4% of all responding physicians either never inquired or inquired in less than 5% of their ND or older adult patients, about history of falls.
- 51.8% either never ask or do not consider it necessary to ask about concussion symptoms post-fall.
- <4% inquire about post-concussion symptoms for patients who themselves or their caregivers mention a fall.
- 92% of physicians recognized that concussions can have lasting effects on patients, particularly on mood and demonstrated good knowledge of post-concussion symptoms.
- > 70% of responding physicians believed that patients with neurodegenerative disease or older adults can fully recover from a concussion with the same probability as any other age group if treated.
- 50% of physicians reported feeling confident in managing post-concussion symptoms themselves.

# COGNITIVE CONSEQUENCES OF TBI IN OLDER ADULTS

- Cognitive symptoms and impairment common after TBI in older adults
- Increasing impairment with increasing severity
- Slower cognitive recovery c/w younger
- Worse cognitive outcomes c/w younger (inconsistent)
- Premorbid conditions affect outcome
- Need to know baseline

# TBI IN OLDER ADULTS

- Pre-existing medical conditions = worse outcomes after TBI - common in older adults
  - Past history of TBI = Risk factor for TBI
  - Cerebrovascular disease, depression, impaired activities of daily living - late-life TBI risk
- Older adults with TBI experience higher morbidity & mortality, slower recovery trajectories, worse functional, cognitive & psychosocial outcomes
- If hospitalized following TBI, older adults usually require extended hospitalizations and more severely disabled & functionally dependent after discharge

# ELDERLY & mTBI & OUTCOME

- Trauma registry data in 3244 elderly patients (age > 64 years) with mTBI
  - higher percentage of nonsurvivors in  $\geq 65$ - risk ratio of 7.8; (95% CI, 6.1–9.9) for elderly vs. nonelderly patients (ages 16–64 years)
  - sharp increase in mortality from age 65 -75 years (mortality leveled off at 75 and not significantly different from 75 to 84 years or over 84 year)s
  - >64 years who survived worse functional outcome at discharge than those who were younger

# RATES OF NEUROPSYCHIATRIC SYMPTOMS POST CONCUSSION

- Prevalence of psychiatric disorder in PCS extremely high: depression 14-61% & anxiety 18-60%
- More concussions = higher risk
- Can have >1 psychiatric disorder
- Post-traumatic stress disorder symptoms overlap
- Comorbid conditions ie substance abuse
- Worsening of pre-morbid psychiatric condition

# NEUROPSYCHIATRIC SYMPTOMS OF PCS IN OLDER ADULTS

- **Common**
- Most common include: depression, anxiety, irritability
- Post-TBI depression
  - Prevalence of depression:
    - In older community-dwelling is 1.8–8.9%
    - In skilled nursing facilities is 25%
    - Older adults with TBI 21-37%
- TBI in older adults - associated with 11% increased risk of new-onset depression and 50% increased risk of new-onset PTSD
- **SCREEN FOR DEPRESSION after TBI**

# TREATMENT OF PCS IN OLDER ADULTS

- Just like with younger people
- Target all the symptoms
- Headache/vertigo/sleep issues/pain COMMON IN OLDER ADULTS
  - OSA common in PCS, in older adults
  - Neuropsychiatric symptoms affected by physical symptoms - address both
- Prevention – assess causes ie falls, MVC
  - Fall prevention/driving

# PAST HISTORY CONCUSSION & NEURODEGENERATION

- Increasing evidence that remote head trauma is a risk factor for delayed neurodegeneration i.e. chronic traumatic encephalopathy, Alzheimer's disease, Parkinson's disease, ALS, and other neurodegenerative diseases
  - Study of > 350 000 veterans +/- TBI, mTBI w/o LOC associated with > 2-fold increase in risk of dementia
- Concern in aging population because of media attention ie people reporting concussion in childhood

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## Dementia prevention, intervention, and care: 2020 report of the *Lancet* Commission

*Gill Livingston, Jonathan Huntley, Andrew Sommerlad, David Ames, Clive Ballard, Sube Banerjee, Carol Brayne, Alistair Burns, Jiska Cohen-Mansfield, Claudia Cooper, Sergi G Costafreda, Amit Dias, Nick Fox, Laura N Gitlin, Robert Howard, Helen C Kales, Mika Kivimäki, Eric B Larson, Adesola Ogunniyi, Vasiliki Orgeta, Karen Ritchie, Kenneth Rockwood, Elizabeth L Sampson, Quincy Samus, Lon S Schneider, Geir Selbæk, Linda Teri, Naaheed Mukadam*

Barnes et al, JAMA Neurology, 2018;  
Tartaglia et al, Front in Neuroscience, 2013;  
Livingston et al, Lancet, 2020





Source: Livingston et al. A, et al. Dementia prevention, intervention, and care: 2020 report of the Lancet Commission

# CONCUSSION IN DEMENTIA

- Often **UNDIAGNOSED**
- Could be associated with sudden deterioration
- Untreated concussion symptoms (i.e. headache, dizziness, etc) could be associated with behavioral issues, i.e. agitation, aggression
- Multiple concussions

# SUMMARY

- Personalized medicine: consider the person, their circumstances and mechanism of injury
- Special populations: elderly/pre-existing cognitive impairment
  - FEAR/EMBARRASSED OF REPORTING; FORGET TO REPORT
- Global vulnerability factors for PERSISTENT SYMPTOMS
  - Previous concussions
    - Elderly – baseline functions (neurodegeneration), comorbid conditions/meds, “forgetting” falls

THANK YOU FOR LISTENING