PRESENCE OF A DEDICATED TRAUMA CENTER PHYSIATRIST IMPROVES FUNCTIONAL OUTCOMES FOLLOWING TRAUMATIC BRAIN INJURY

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TRAUMATIC BRAIN INJURY

- Estimated 2 million people sustain TBI annually ➔ 200,000 will experience long-term disability.
- 5 million people with TBI
- Economic burden of direct medical care, rehabilitation, and indirect socioeconomic cost may reach upwards of 48 billion dollars.
GOALS OF ACUTE CARE

- Neurointensive care focuses primarily on physiology
  - ICP
  - BP
  - Hypoxia
- Rehab and other factors often take a back seat in the ICU
OVERALL GOALS OF CARE

Promote neuro-protection + Improve Neuro-recovery = Better Functional outcomes
WHAT ARE THE CURRENT RECOMMENDATIONS?

- ACS statement --> Rigorous disease management and Rehabilitation in Level I and II Trauma Centers
HYPOTHESIS

The presence of a physician trained in brain injury medicine who manages medications of TBI patients in the acute care setting, will impact functional outcomes.
STUDY DESIGN

- Prospective, longitudinal, multicenter cohort of TBI patients
- 2005-2013
- Treated at 4 trauma centers
  - One with a full time TBI physiatrist (PHYS)
  - Three without (No-PHYS)
- Transferred to a single TBI model systems rehabilitation center
INCLUSION CRITERIA

- First-time injury
- LOC > 30min
- Moderate-Severe TBI (GCS < 13)
- At least 16 years of age
DATA COLLECTED

- Measures:
  - FIM
- Brain Injury Severity:
  - GCS
  - PTA
- Medication prescription patterns

![Figure 1: Functional Independence Measure](image)
RESULTS

318 TBI survivors

Length of stay (LOS) was significantly greater in PHYS group (almost double) and the distribution was highly skewed.

Sample sectioned into quartiles (25th/50th/75th)

N = 148 participants

PHYS Group
44

Non-PHYS Group
104
DEMOGRAPHICS

Age 63
Gender 86/62
PTA 14
LOS 24
GCS 11
Mechanism

Level of Education

10 YEARS PHYS GROUP
14 YEARS NON-PHYS GROUP
TOTAL FIM

Significant improvement over time in both groups (repeated Measures ANCOVA)
FIM COMPONENTS

- PHYS group starts lower but gets better
WAIT A SECOND…

What makes them different?

Medications?

Check prescription habits
PRESCRIBING PATTERNS FOR BOTH GROUPS

Neurodepressants
- No (70%)
- Yes (29%)

Neurostimulants
- No (80%)
- Yes (18%)

Sleep
- No (77%)
- Yes (22%)
EXAMINING CHANGES IN FUNCTION

- **Sleep**
  - Improved motor function
  - No improvement in cognition

- **Stimulant**
  - Slight improvement motor function
  - No improvement in cognition

- **Neurodepressants**
  - No effect in motor function
  - No effect on cognition

WHAT IF WE COMBINED THEM?
Functional Change in Rehabilitation and Admission Medications

Controlling for Injury Severity

- FIM Motor
- FIM Cognitive

Change in FIM from Admission to Discharge

- No Neurostimulants or Sleep Meds (n=99)
- Either Neurostimulants or Sleep Meds (n=34)
- Both Neurostimulants and Sleep Meds (n=12)

Combination of Neurostimulants and Sleep Medications

- p = 0.017
- p = 0.047
- Neither neurostimulants or Sleep
- Neurostimulants without Sleep
- Both Neurostimulants and Sleep
- Sleep without Neurostimulants
SUMMARY

TBI patients → 4 Trauma Centers → One Rehabilitation Center

Lower Starting Cognition → Less Educated
Lower Starting Motor

Presence of a Physiatrist

MEDICATIONS

Better Outcomes

Higher Starting Motor

High starting Cognition → Better Educated

No Physiatrist → Average Outcomes
LIMITATIONS

- The TBIMS has a selective population.
- Trauma level status
- Qualitative, not quantitative, medication information.
CONCLUSION

- A trauma center physiatrist providing and directing early specialized care to TBI patients can result in improved outcomes upon discharge from rehabilitation.
- Improvement in outcome was associated in a marked difference of prescription of neuroprotective medications.
- Medications are also likely a surrogate marker for other non-measurable factors.
THANK YOU

- David H. Livingston, M.D.
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- Anthony Lequerica, Ph.D.
- Irene Ward, PT, DPT, NCS
- Nancy Chiaravolloti, Ph.D.
- Laurie Dabaghian, M.D.
- Gabriel Felix
- Reina Nakamura, M.D.
QUESTIONS...