The Economist INTELLIGENCE UNIT

Exploring future possibilities to improve evaluation and management of Traumatic Brain Injury

Traumatic Brain Injury (TBI) is the most common neurological disorder worldwide, contributing to more death and disability than any other traumatic injury

- 27 to 69 million annual cases globally[1,2]
- Annual economic burden is estimated to be 400B USD[3]
- Mild TBI (mTBI) accounts for 80% of all TBI cases[4]

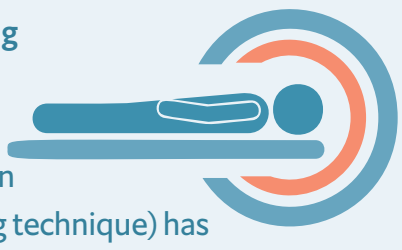
Barriers to effective mTBI management

Limitations in current approaches for mTBI evaluation and management:

Neuropsychological assessments

Poor access (particularly in remote areas) and lack of standard guidelines affect consistency and results of such tests[5]

Neuroimaging



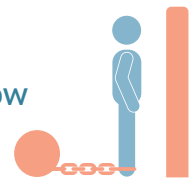
CT scan (the most common neuroimaging technique) has several disadvantages like radiation exposure, long wait times, and poor test outcomes.[6] Use of other advanced techniques like MRI is often limited by high cost and poor availability[7]

Glasgow Coma Scale

While extremely useful in clinical evaluation of TBI, its results can be often distorted by drug use, alcohol intoxication and low blood oxygen levels[8]

Other barriers include:

- Lack of standard definitions and consistency in clinical management guidelines which leads to ~50%-90% of mis– or underdiagnosed mTBI cases[9]
- Lack of awareness and education among physicians, patients and caregivers on how to identify and manage symptoms once discharged from Emergency Department



Advancements in biomarker research have the potential to transform the assessment and care of mTBI patients

Potential circulatory biomarkers to improve evaluation & management of mTBI

Glial markers	Axonal markers	Neuronal markers
S100B	Tau proteins	UCH-L1
GFAP	Neurofilaments	

Of all the biomarkers reviewed, the combination of GFAP and UCH-L1 appears to have potential in improving clinical management of mTBI due to its high accuracy in discriminating mTBI patients from healthy controls, thereby reducing the number of unnecessary CT scans.

It is however important to now focus on the clinical utility and the real-world application to further advance its use in TBI evaluation and care management.

Sponsored by Abbott

References:

1. GBD 2016 Traumatic Brain Injury and Spinal Cord Injury Collaborators. Global, regional, and national burden of traumatic brain injury and spinal cord injury, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. Lancet Neurol. 2019;18(1):56-87.
2. Dewan MC, Rattani A, Gupta S, et al. Estimating the global incidence of traumatic brain injury. Journal of neurosurgery. 2018;130(4):1080-97.
3. Menon D, Maas AI. Traumatic Brain Injury: Facts sheets and Policy brief Belgium: European Brain Injury Consortium, 2021. Available from: https://www.center-tbi.eu/files/news/21571f81-20b8-4860-a3dd-1f6e27d02b3d.pdf.
4. Silverberg ND, Duhaime AC, Iaccarino MA. Mild Traumatic Brain Injury in 2019-2020. Jama. 2020;323(2):177-8.
5. Kosaka B. Neuropsychological assessment in mild traumatic brain injury: A clinical overview. British Columbia Medical Journal. 2006;48:447-52.
6. Mondello S, Sorinola A, Czeiter E, et al. Blood-based protein biomarkers for the management of traumatic brain injuries in adults presenting to emergency departments with mild brain injury: a living systematic review and meta-analysis. J Neurotrauma. 2021;38(8):1086-106.
7. Aquino C, Woolen S, Steenburg SD. Magnetic resonance imaging of traumatic brain injury: a pictorial review. Emergency Radiology. 2015;22(1):65-78.
8. BrainLine. What Is the Glasgow Coma Scale? : BrainLine. Available from: https://www.brainline.org/article/what-glasgow-coma-scale#:~:text=The%20Glasgow%20Coma%20Scale%20(GCS,of%20an%20acute%20brain%20injury.
9. Prince C, Bruhns ME. Evaluation and Treatment of Mild Traumatic Brain Injury: The Role of Neuropsychology. Brain sciences. 2017;7(8):105.