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BACKGROUND

Mild Traumatic Brain Injury (mTBI) is heterogenous in nature; many factors influence symptoms and recovery. The presence of brain-imaging abnormalities (complicated mTBI i.e. cmTBI) may affect outcome¹. Research in this area yields conflicting results and has not been comprehensively reviewed^{2,3}.

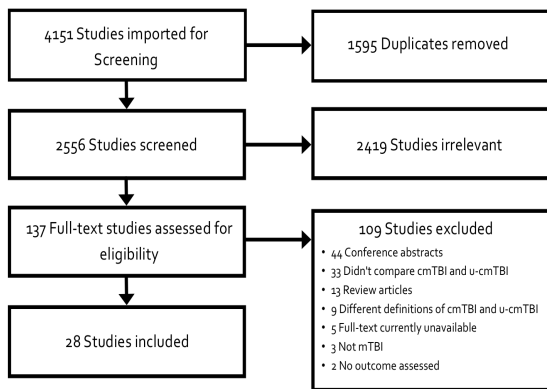
OBJECTIVE

To identify trends and gaps in the literature examining the differences in outcome between patients suffering from complicated versus uncomplicated mTBI.

METHODS

- Medline, PsycInfo, Embase, and Cochrane Central were searched using the keywords "complicated" "uncomplicated" "mTBI", and other synonyms.
- The articles identified were screened against the study inclusion and exclusion criteria
- Data was extracted from the included articles and summarized

Figure 1. PRISMA Flow Diagram



INCLUSION CRITERIA:

- Any human participants with an mTBI/concussion clearly defined as complicated or uncomplicated based on imaging
- mTBI defined as one of: GCS 13-15, LOC <30min, PTA <24h
- Studies that defined cmTBI as having trauma-induced lesions
- Studies that compared outcome following cmTBI vs u-cmTBI

EXCLUSION CRITERIA:

- Studies with participants with a brain injury more severe than mTBI that hasn't been distinguished from the mTBI groups
- Studies with participants that have not undergone imaging
- Studies with mTBI participants that had imaging but were not classified as having either cmTBI or u-cmTBI

RESULTS

Figure 2. Participants' Country

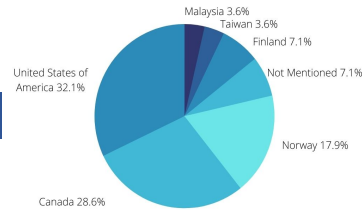


Figure 3. Time between Injury & Last Follow-Up

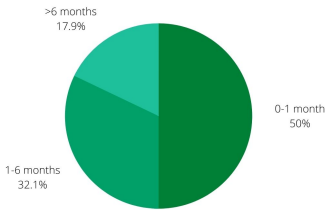
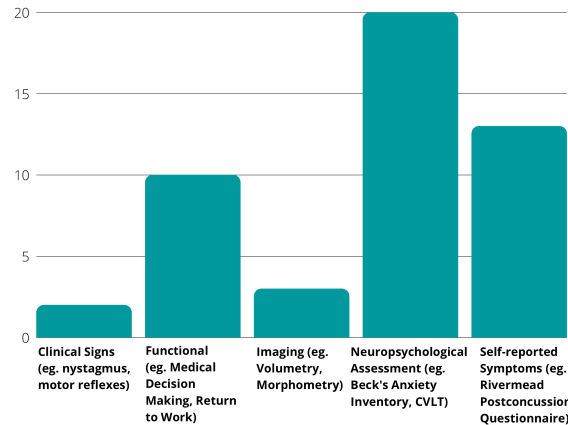


Figure 4. Types of Outcome Measures (N = 28)



- 28 studies met our inclusion criteria, of which >80% were published in 2010 onwards
- 50% of the studies assessed outcome between 0 and 1 month, while only 17.9% assessed outcome at >6 months
- Neuropsychological Assessment was the most common type of outcome measure
- >50% of the studies were on populations from North America

REFERENCES

1. Williams DH et al. (1990). Mild head injury classification. *Neurosurg*, 27(3), 422-8.
2. Voormolen DC, et al. (2019). Post-Concussion Symptoms in Complicated vs. Uncomplicated Mild Traumatic Brain Injury Patients at Three and Six Months Post-Injury: Results from the CENTER-TBI Study. *J Clin Med*, 8(11), 1921.
3. Julien J, et al. (2017). Highlighting the differences in post-traumatic symptoms between patients with complicated and uncomplicated mild traumatic brain injury and injured controls. *Brain Inj.*, 31(13-14):1846-1855.

RESULTS cont'd

Table 1. Study Characteristics (N = 28)

Variable	Frequency N (%)
Year of Publication	
2000-2009	3 (10.7%)
2010-2019	18 (64.3%)
2020-2021	7 (25%)
Imaging Modality	
CT	16 (57.1%)
MRI	1 (3.6%)
CT and/or MRI	11 (39.3%)
Study Design	
Cross-Sectional	21 (75%)
Longitudinal	7 (25%)
% Complicated	
0-25%	5 (17.9%)
26-50%	18 (64.3%)
>50%	5 (17.9%)

Among the 28 included studies, a total of 48 outcomes were assessed. Of these, 8.3% found a significant difference in outcome following complicated versus uncomplicated mTBI, 54.2% found no difference, and 35.4% had mixed results (Table 2).

Table 2. Study Results

Variable	Significant Differences in Outcome Between Complicated and Uncomplicated			Total N
	Yes	No	Some	
Length of Follow-Up				
0-1 months	2 (8.7%)	13 (56.5%)	8 (34.8%)	23
1-6 months	2 (13.3%)	5 (33.3%)	8 (53.3%)	15
>6 months	0 (0%)	8 (80%)	2 (20%)	10
Study Design				
Cross-sectional	3 (8.8%)	18 (52.9%)	13 (38.2%)	34
Longitudinal	1 (7.1%)	8 (57.1%)	5 (35.7%)	14
Outcome Measure				
Clinical Signs	0 (0%)	0 (0%)	2 (100%)	2
Functional	2 (20%)	5 (50%)	3 (30%)	10
Imaging	0 (0%)	2 (66.7%)	1 (33.3%)	3
Neuropsychological	0 (0%)	11 (55%)	9 (45%)	20
Symptoms	2 (15.4%)	8 (61.5%)	3 (23.1%)	13
TOTAL Outcomes	4 (8.3%)	26 (54.2%)	17 (35.4%)	48

Table 2. Differences in outcomes between complicated and uncomplicated mTBI groups. Of the 28 papers, many assessed more than one outcome measure, resulting in a total of 48 possible results.

DISCUSSION AND CONCLUSION

- Our preliminary findings emphasize the mixed nature of the literature on outcome after cmTBI vs u-cmTBI
- We intend to further analyze the data with respect to trends in the study results
- The same process will be followed to potentially identify additional eligible studies through a backwards citation search