

Arcuate Fasciculus And Language Performance Outcome In Mild Traumatic Brain Injury

Aditya Tri Hernowo¹, Dharmendra Ganesan², Vigneswaran Veeramuthu³, Vairavan Narayanan²

¹*Division Of Neurosurgery/ University Of Malaya/ Malaysia,*

²*Department Of Surgery/ University Of Malaya/ Malaysia,*

³*School Of Psychology/ University Of Reading Malaysia/ Malaysia*

Purpose

Mild traumatic brain injury (TBI) is known to affect cognitive performance adversely. The long term cognitive outcome from such injury varied. Here, we investigate the property of the left arcuate fasciculus (AF) as a predictor of the long term outcome of a mild TBI.

Materials And Methods

Subject suffering from TBI with GCS score of 13 and higher is recruited. Within 24 hours following the trauma, cognitive function (including language) was assessed using Neuropsychological Assessment Battery-Screening Module (S-NAB), as well as 32-directions diffusion tensor imaging (DTI). Fiber tracking was done using Diffusion Toolkit and Trackvis. Both examinations were repeated six months thereafter. Association analyses were done subsequently with Bayesian and frequentist statistics.

Results

Twenty-three subjects completed both examinations at admission and at the six-month follow up. There was an extremely strong likelihood that the left AF fiber length at admission (I0) was strongly correlated with the language standard score at 6-month follow up (ffol) ($r = 0.757$; $BF+0 = 403.3$). Regression found I0 as a predictor of ffol ($R^2 = 0.406$).

Conclusion

The long term (6 month) outcome of the language performance may be grossly predicted by the length of the AF fiber measured immediately following a mild TBI. Additional studies are expected to validate this finding and thus, prudence must be exercised prior to making the prognosis clinically. Nonetheless, our results provided sufficient motive to investigate further neuroimaging-based findings as diagnostic and/or prognostic factors for functional outcomes in TBI.