Glial Fibrillary Acidic Protein Performance as A Biomarker for Mild Traumatic Brain Injury Among Children: A Meta-Analysis of Cohort Studies

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Introduction Traumatic brain injury (TBI) is common in children, affecting over 837,000 children each year. TBI is caused by a bump to the head, which disrupts the brain's normal function. In children, mild traumatic brain injury (mTBI) is usually asymptomatic. Therefore, mTBI may be undetected and may lead to memory and coordination disorders. The gold standard for detecting TBI is a computerized tomography (CT) scan. Unfortunately, the radiation from this modality in earlier life will expose children to danger. Hence, we wanted to analyze glial fibrillary acidic protein (GFAP) as a potential new biomarker for mTBI diagnosis.

Objectives To explore the utility of GFAP in the detection of mTBI by analyzing post-injury GFAP serum levels and evaluating the area under the curve (AUC) when used as a diagnostic tool.

Methods This review selects cohort studies on three databases (PubMed, Scopus, and ClinicalKey) systematically using the PRISMA guidelines. The search results were screened using established inclusion and exclusion criteria, before being included in qualitative and quantitative analysis. Critical appraisal and risk of bias were conducted using the STROBE checklist for cohort studies.

Results This review yielded four studies with a total of 379 subjects. The quantitative analysis showed a significant difference in GFAP serum level between case and control groups (MD:0.62; 95% CI: 0.48-0.75; p<0.001). AUC value ranges from 0.8-0.89, which is considered adequate. GFAP also had a higher AUC than other blood biomarkers for detecting

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mTBI. The heterogeneity between the studies was moderate (I2:59%; p<0.00001).

Conclusion In conclusion, GFAP is significantly higher in children with mTBI and exceeded other blood biomarkers. Therefore, GFAP may be proposed as a potential screening tool for mTBI.