EPH73

Analyzing Mental Health Outcomes Among Pediatric Patients with Auditory Processing Disorder Caused By Head Trauma Using Real-World Data

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OBJECTIVES

Chronic traumatic encephalopathy (CTE) is linked to repeated head trauma, and although not diagnosed until post-mortem, symptoms include irritability, impulsivity, and mood changes. Repeated head trauma is also linked to the development of hearing complications, either by direct injury to the ear or the auditory cortex. Auditory processing disorder (APD) is a deficit in the brain's ability to understand and interpret auditory stimuli and can result from head trauma. This study aims to ascertain whether the diagnosis of APD, following a specified number of head injuries, influences any subsequent diagnosis of mood or behavior disorders.

METHODS

This retrospective cohort study identified mood and behavior disorder diagnoses of two pediatric populations using the TriNetX federated network of deidentified health data and patient populations were identified through the platform's USA network. Patients with history of traumatic brain injury (TBI) were identified by use of ICD-10-CM S06 and had record of three or more instances of S06 in their electronic medical records (EMR) within the last five years. Two cohorts of patients were identified – Cohort 1 is comprised of patients with TBI history and a subsequent APD diagnosis at least one day following the satisfaction of the TBI criteria, while Cohort 2 is comprised of patients with TBI history and no record of APD diagnosis. In both cohorts, patients must be 18 years or younger at the time of analysis and patients were excluded that were pregnant within the last year, have history of detectable HIV-1 viral load, or are deceased. Both cohorts were analyzed for the outcome of mood and behavior disorder diagnoses, including anxiety disorder (unspecified), generalized anxiety disorder, and major depressive disorder, following meeting the respective cohort criteria. Patients were propensity score matched for sex, race, and ethnicity in order to prevent confounding from any demographic variables.

Figure 1. Measures of Association for Cohorts 1 and 2

		Cohort Statistics		
	Cohort	Patients in Cohort	Patients with Outcome	Risk
1	USA PEDS APD	710	270	38.028%
2	USA PEDS NO APD	710	170	23.944%

	Risk Difference				Risk Ratio		Odds Ratio	
	Risk Difference	95 % CI	z	p	Risk Ratio	95 % CI	Odds Ratio	95 % CI
	14.085%	(9.33%,18.839%)	5.739	< 0.0001	1.588	(1.352,1.866)	1.949	(1.549,2.452)

Figure 2. Risk of Outcome in Cohorts 1 and 2

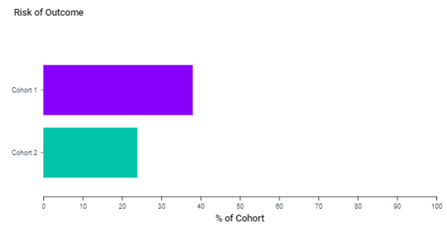

Figure 3. Kaplan-Meier Survival Curve

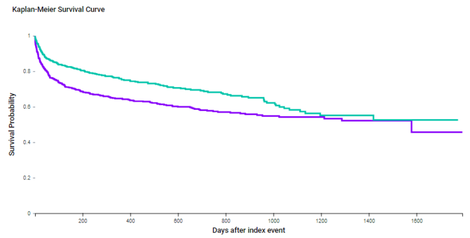

Table 1. Baseline Patient Characteristics

	Age (mean, SD)	Male (%)	Female (%)	White (%)	Black or African American (%)	American Indian or Native American (%)	Native Hawaiian or Pacific Islander (%)	Asian (%)	Hispanic or Latino(%)	Not Hispanic or Latino (%)
Pediatric patients with TBI history and APD diagnosis (Cohort 1)	9 (5)	64	36	56	21	1	1	1	20	72
Pediatric patients with TBI history and no APD diagnosis (Cohort 2)	14 (5)	54	46	66	13	1	0	2	13	73

RESULTS

- After propensity score matching, 270 of the 710 pediatric patients (38.0%) meeting both the TBI and APD criteria also experienced diagnosis of mental or behavioral disorder following the record of TBI and APD in their electronic medical record, compared to 170 of the 710 pediatric patients (23.9%) who met the TBI criteria and lacked the APD criteria.
- The diagnosis of APD in pediatric patients was associated with an increased risk of being diagnosed with mood or behavioral disorder when compared to pediatric patients with similar head trauma history and absence of APD diagnosis (RR=1.59, 95% CI=1.35, 1.87; p<0.0001).
- Kaplan-Meier survival curve of both cohorts shows a lower survival probability in Cohort 1, indicating diagnosis of outcome closer to date of index event in Cohort 1 when compared to Cohort 2.

CONCLUSION

Pediatric patients with an APD diagnosis and a defined number of documented head injuries are more likely to be diagnosed with mood or behavioral disorders compared to pediatric patients with similar head injury history and absence of an APD diagnosis. This may be indicative of progressive brain damage, making this cohort ideal for longitudinal study of CTE development throughout the life course.

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