Otolaryngologic Diagnoses Following Pediatric Traumatic Brain Injury: Incidence, Timing, and Referral Patterns

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BACKGROUND

Pediatric traumatic brain injury (TBI) is a major cause of childhood morbidity, and resulting otolaryngologic sequelae can affect recovery, development, school performance, and quality of life; however, prior work has largely characterized otolaryngologic injury within high-risk subgroups (e.g., temporal bone or skull fractures), and population-level data along with standardized guidance for OHNS screening and referral remain lacking.[1–3]

AIM

To characterize the frequency and timing of newly documented OHNS diagnoses following pediatric TBI and quantify subsequent OHNS and related-specialty referral within one year.

METHODS

Population: Patients <18 years with TBI at an urban tertiary academic medical center, using the UCSF Health De-Identified Clinical Data Warehouse and UCSF DeID OMOP, from 2015–2020 (N = 3,214)

Outcomes

- Newly documented OHNS diagnosis within 365 days of Index TBI diagnosis
- Timing of diagnosis
- First referral to OHNS, Audiology, Sleep Medicine/Sleep Lab, Physical Therapy, Vestibular Rehabilitation, or Speech Language Pathology within 365 days

Domains studied

Vestibular / Balance | Hearing | Dysphagia | Voice / Laryngeal | Other Ear | Sleep Apnea | Facial Nerve | Olfactory

Analysis: Descriptive statistics to summarize incidence, timing, and referrals by diagnostic domain.

RESULTS: INCIDENCE OF NEW OHNS DIAGNOSES

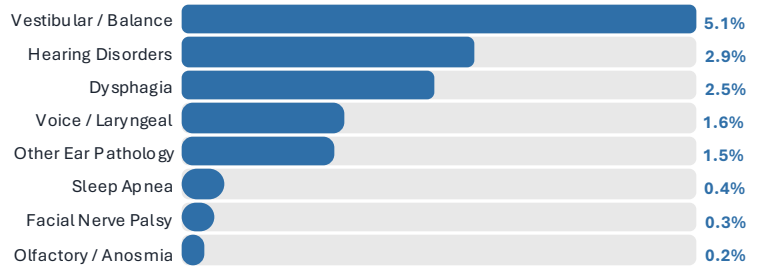
Cohort: N = 3,214 pediatric patients with TBI | Mean age 11.5 ± 4.8 years | 54.9% male

284/3,214 (8.8%) had ≥1 newly documented OHNS diagnosis within 1 year after TBI

~ 1 in 11 patients

NEWLY DOCUMENTED OHNS DIAGNOSES BY DOMAIN

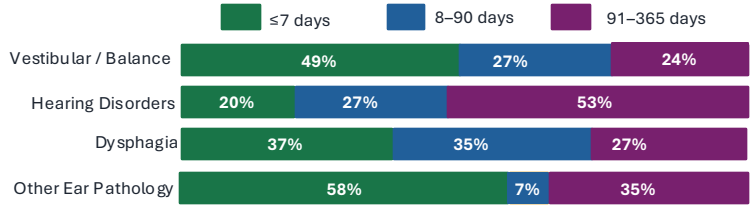
(% of all 3,214 patients with TBI)



RESULTS: TIMING OF NEW DIAGNOSES

TIMING OF NEW DIAGNOSES BY DOMAIN

Percentage documented ≤7, 8–90, or 91–365 days after TBI



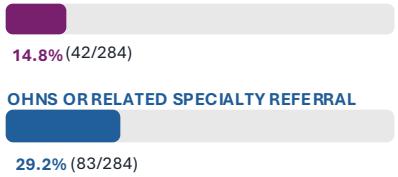
Overall median time to diagnosis: 14.5 days (IQR 0–124 days)

38% of all diagnoses were documented within the first week.

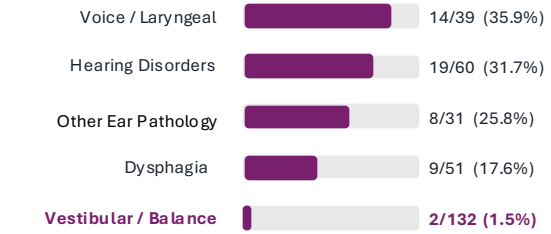
RESULTS: REFERRAL PATTERNS

REFERRAL PATTERNS WITHIN 1 YEAR

(among patients with ≥1 OHNS diagnosis)



DIRECT OHNS REFERRAL BY DOMAIN



KEY FINDINGS

1 in 11 pediatric TBI patients had a newly documented OHNS diagnosis within 1 year

Timing varied by domain: Vestibular, swallowing, and other ear diagnoses tended to be documented earlier, while 53% of hearing diagnoses occurred 91–365 days after TBI.

Specialty referral was uncommon: 14.8% received direct OHNS referral and 29.2% received OHNS or another captured related-specialty .

CONCLUSION

The variable timing of new OHNS diagnoses, with many hearing and vestibular diagnoses appearing weeks to months after injury, suggests that a single acute assessment may be insufficient. Combined with low observed referral rates, these findings support longitudinal, domain-specific screening and standardized OHNS referral pathways after pediatric TBI, consistent with documented gaps in post-TBI follow-up care

LIMITATIONS

- Retrospective EHR data; potential coding error and is classification.
- Documented diagnoses likely underestimate true symptom burden.
- GCS was inconsistently recorded, precluding severity stratification
- Referral tracking may not capture care delivered outside the included specialties or outside the health system.

REFERENCES

1. Baticulon RE, et al. Global incidence of pediatric traumatic brain injury: a systematic review and meta-analysis. Childs Nerv Syst. 2026.
2. Kozin ED, Knoll RM, Bhattacharyya N. Association of pediatric hearing loss and head injury in a population-based study. Otolaryngol Head Neck Surg. 2021.
3. Manley GT, Albert GW, Brophy GM, et al. Best practices in the management of traumatic brain injury (ACS TQIP). American College of Surgeons; 2024.

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*Additional references and coding definitions available upon request