Objective

1. Establish the prevalence of concurrent intracranial (ICI) and cervical spine injuries (CSI) in a series of patients with temporal bone fractures (TBFs).
2. Identify statistically significant associations between current TBF classification systems and either ICI or CSI.

Introduction

Modern TBF classification systems can be valuable in predicting neuro-otologic sequelae, but they have not been shown to predict neurologic complications, such as ICI and CSI. Because TBFs comprise a substantial component of all head trauma seen in the United States, including 18-22% of all skull fractures1 and 18-40% of all cranial base injuries2, a system that could predict both otologic and neurologic outcomes would be highly useful to clinicians. The aims of this study are to determine the prevalence of concurrent ICI and CSI in a series of trauma patients with TBF, and attempt to identify any significant associations between TBF subtype and both ICI and CSI using two well-known TBF classification schemes.3,4

Materials/Methods

University Hospital Trauma Registry: database serving the University Hospital of Cincinnati, a tertiary-care level I trauma center
1,279 consecutive patients with a basilar skull fracture were evaluated from 1/1/2004 to 1/1/2009
- Excluded patients under 18 years old and those who died during initial hospitalization

Variables:
- Demographics
- Mechanism of injury
- Glasgow Coma Scale (GCS) score
- Serum alcohol and urine toxicology data
- Evaluation of CT scans of the head and temporal bones, C-spine plain films, and C-spine MRIs
- TBF classification using the traditional (longitudinal-transverse-mixed) and otic capsule (sparing vs. involving) systems
- “Miscellaneous” category of fractures was created for TBFs not meeting any of the traditional criteria

Results

202 patients with at least 1 TBF (218 total fractures)
- 16 (7.3%) patients with bilateral TBFs
- 98 (45.0%) left-sided and 120 (55.0%) right-sided TBFs
- Bilateral TBFs had statistically significant associations with otic capsule involvement (P=0.002) and positive serum alcohol (P=0.02)
- Of 60 patients with “miscellaneous” TBFs, 48 (80.0%) were isolated squamous fractures
- 184 (91.1%) patients (with 199 fractures) had evidence of ICI
- 18 (8.9%) patients (with 21 fractures) had evidence of CSI
- No statistically significant associations between all traditional and otic capsule TBF subtypes and mechanism of injury, positive alcohol and urine toxicology results, GCS score, and presence of ICI or CSI, except:
  - “Miscellaneous” TBF and CSI (P=0.002)
  - No additional associations noted among miscellaneous subcategories such as isolated squamous fractures

Conclusions

Over 91% of patients with TBFs presented with concurrent ICI, while nearly 9% sustained CSI. Traditional and otic capsule-involvement TBF classification systems do not significantly correlate with these neurologic outcomes. Research into an alternative system that encompasses radiographic and clinical findings and accurately predicts both neurologic and neuro-otologic sequelae is warranted.

References