ABSTRACT

Title: Trauma patterns, symptoms, and complications associated with external auditory canal fractures

Educational Objective:
At the conclusion of this presentation, the participants should be able to discuss the incidence of external auditory canal fractures and their association with mandibular and temporal bone trauma, and demonstrate an increased awareness for their occurrence and possible complications.

Objectives:
External auditory canal trauma has been linked to mandibular and temporal bone trauma and can have long term adverse outcomes. However, as they are rare occurrences, they can easily be missed in the trauma setting and much remains to be known about their patterns, treatments, and outcomes. This study aims to investigate the frequency of external ear canal injury in association with mandibular and temporal bone trauma and to investigate clinical intervention strategies and complications.

Study design: A retrospective chart review study was conducted to identify external auditory canal fractures in patients who had sustained mandibular and/or temporal bone fractures.

Methods:
Charts from patients with external auditory canal fractures were identified based on ICD-9 codes for temporal and mandibular fractures from the year 2005 to 2013. Over 500 CT scan images were reviewed to identify external auditory canal fractures. These charts were further reviewed and patient demographics, presenting signs and symptoms as well as interventions were recorded. Finally, follow up data from the WSU Otolaryngology clinics was collected if present to follow long term sequelae.

Results:
36% of temporal bone fractures were found to involve the external auditory canal. Of 479 mandibular fractures that were reviewed, 36% were associated with an external auditory canal fracture and 9% of these fractures were associated with a fracture involving the condyle or subcondyle (p=0.002). One case was found with bilateral external auditory canal fractures despite only an isolated, unilateral condylar fracture.

Classification of temporal bone fracture and otic capsule involvement involved. "Otic capsule" involvement was defined as a statistically significant difference in association with EAC fractures. Patients sustaining EAC fractures included all age ranges, with a prediction for men aged 30-40s. No statistically significant difference was found between mechanisms of injuries including assaults, falls, MVA or bicycle use.

Methods:
Charts were identified for temporal and/or mandibular fractures. CT scan images were reviewed to identify external auditory canal fractures.

If present, charts were further reviewed for patient demographics, signs and symptoms and interventions were recorded.

Long-term follow up data was only available for 16% of patients. Hearing loss from otic capsule involvement or osseous chain disruption were the main follow up complaints, however one patient developed persistent canal stenosis and conductive hearing loss that eventually resolved by 6 months post-injury.

Conclusions: External auditory canal trauma is present in a significant proportion of mandibular and temporal bone trauma, including both condylar and non-condylar fractures with the potential of complications such as canal stenosis. Increased awareness with thorough physical examinations and close review of CT imaging can help diagnose these and guide treatments and intervention. Additional, outpatient follow up is still needed to help further elucidate long term complications and shape treatment recommendations.

INTRODUCTION

Objectives: To investigate the frequency of external ear canal injury in association with mandibular and temporal bone trauma and to investigate clinical intervention strategies and complications.

Background: External auditory canal (EAC) trauma has been linked to mandibular and temporal bone trauma and can have long-term adverse outcomes. However, as they are rare occurrences, they can easily be missed in the trauma setting and much remains to be known about their patterns, treatments, and outcomes.

In 1977, a 15% incidence of EAC fractures was found in association with condylar fractures. Despite this, there is a paucity of reports on EAC trauma secondary to mandibular trauma, in particular regarding treatment, potential complications, and long term sequelae.

Current treatment suggestions are not fully addressed in the literature, and packing with antibacterial ointment to prevent future stenosis in addition to treatment of the injured condyle seems to be the main intervention.

Long term sequelae are sparse, and most commonly include partial canal stenosis. Hearing loss is frequently cited as the presenting symptom that often resolves, yet particularly in temporal plate fractures can persist.

Study design:
• Retrospective chart review study to identify external auditory canal fractures in patients who had sustained mandibular and/or temporal bone fractures.

Methods:
• Charts were identified for temporal and/or mandibular fractures.
• CT scan images were reviewed to identify external auditory canal fractures.
• If present, charts were further reviewed for patient demographics, signs and symptoms and interventions were recorded.
• Long-term follow up data was only available for 16% of the patients. Hearing loss from otic capsule involvement or osseous chain disruption were the main follow up complaints, however one patient developed persistent canal stenosis and conductive hearing loss that eventually resolved by 6 months post-injury.

Results:
Demographics: Predilection for men aged 20-40s. Injury mechanisms were distributed among assaults, falls, and bicycle injuries for mandible associated trauma, falls, assault, and MVAs, without any statistical significance for one mechanism.

DISCUSSION

External auditory canal trauma is present in a significant proportion of mandibular and temporal bone trauma. Though significantly more common in temporal bone trauma, an overall 3% incidence was found in mandibular fractures and 9% in condylar fractures, with a statistically significant higher chance of EAC fractures in association with condylar vs non-condylar fractures (p=0.002). Interestingly, an isolated case was seen where no evidence of CT findings of an ipsilateral fracture were seen, yet exam under anesthesia revealed bony fragments and blood in the canal.

Blood in the EAC was the single most common presenting sign and symptom. We included patients who were evaluated by services other than otolaryngologists and thorough ear exams were not available for all patients. Furthermore, data on presenting symptoms was not collected for patients who arrived intubated or obtunded.

Most fractures were treated with otic drops and some stented with xerof orm gauze. However, due to the limited follow-up rates in our patient population, the sample size is too small for any statistically significant conclusions regarding efficacy of intervention and long term complications.

External auditory canal trauma is present in a significant proportion of mandibular and temporal bone trauma, including both condylar and non-condylar fractures with the potential of complications such as canal stenosis. Increased awareness with thorough physical examinations and close review of CT imaging can help diagnose these and guide treatments and intervention. Additional, outpatient follow up is still needed to help further elucidate long term complications and shape treatment recommendations.

REFERENCES