An Unusual Football Injury and Facial Nerve Palsy Due to Temporal Bone Fracture: A Case Report and Review Literature

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Abstract

The prevalence of facial nerve paralysis secondary to temporal bone fracture is the second most common to Bell's palsy. It is rare with blunt football injury but commonly seen with vehicular accidents. Longitudinal fractures are more common 80% with 10-20% facial palsy. The fracture line across the facial nerve canal is excellently depicted in CT scan. Though, it is controversial, best out-come is anticipated with earlier transmastoid facial nerve decompression, in injury distal to geniculate ganglion. We report a case of 27-year-old amateur football player sustained a blunt left side head trauma while responding to football in the air. He had left side longitudinal fracture of the temporal bone and delayed left facial nerve paralysis House – Brackmann (H-B) grade IV. The fracture line had been missed in immediate CT brain. Patient presented to ENT clinic for follow up after two weeks with left lower motor neuron facial palsy H-B grade IV. Repeated CT scan of temporal bone revealed left sided linear longitudinal fracture with opaque mastoid air cells and middle ear cavity. Transmastoid exploration and decompression was planned and noted fracture line and bony chips impinging the facial nerve. Bony spicules were cleared and epineurium was split to release the pressure. A month later, facial nerve palsy recovered to H-B grade I. In conclusion, blunt head trauma caused by sports like football, can cause temporal bone fracture with delayed facial nerve palsy. To achieve good facial nerve recovery, earlier transmastoid approach is important.

Keywords: Facial nerve paralysis; Head injury; Transmastoid decompression; Temporal bone fracture

Introduction

The incidence of facial nerve paralysis secondary to temporal bone fracture comprises second most common to Bell's palsy. In recent decades, they are increasing along with growing traffic and population [1]. The temporal bone fractures are approximately 22% of all skull fractures [2] and 7–8% are associated with facial nerve paralysis [2–4]. Almost 80% of all temporal bone fractures are longitudinal fractures and facial nerve injuries occur in 10–20%. While, Transverse fractures comprise only 20% but the incidence of facial nerve injuries is 50% [3]. Indication, timing and approach for facial nerve decompression in temporal bone fracture has been a subject of controversy for years. Earlier decompression and best out-come is expected by recognizing the extent and site of the facial palsy clinically as well as radiologically where the functional loss is approx 90–95% [5]. Transmastoid facial nerve decompression is more suitable and easy in cases of facial nerve injury distal to geniculate ganglion. We will discuss a case of football game and longitudinal fracture of the right temporal bone with facial nerve paralysis House – Brackmann (H-B) grade IV. Transmastoid facial nerve exploration and decompression was done after two weeks. The facial palsy in this patient recovered well with House – Brackmann (H-B) grade I after one-month post operatively.

Case Report

A 27-year-old amateur football player sustained a minor head blow injury while responding to football in the air. His head struck with his opponent on his right auricular and temporal area. Patient was brought to accidental and emergency department with history of loss of consciousness for 2–3 minutes, filling dizzy with nauseating sensation. On examination, noted bleeding from right ear as well as reduced hearing without any external open wound or bruises. Patient was kept under observation for 24 hours, CT scan of brain was done, reported normal. Patient was referred to ORL clinic for right ear bleeding and further follow up. After two weeks, patient presented with right lower motor neuron facial palsy (Figure 1) with mild conductive hearing loss. CT mastoid was done which showed right linear longitudinal fracture line parallel to the axis of petrous pyramid arising in the squamous part passing through tegmen tympani of the temporal bone. There was evidence of opaque mastoid air cells as well as middle ear cavity (Figure 2). Pure tone audiometry was done and showed right mild conductive hearing loss. Patient was diagnosed as delayed right facial nerve palsy secondary to blunt football trauma. Patient was planned for transmastoid exploration and decompression of the facial nerve. Intraoperatively, we noted fracture line impinging the facial nerve distal to first genu in transverse part. Bony spicules cleared, epineurium was split to release the edema. On follow up after one-month Post operatively, noted right facial palsy recovered well to House – Brackmann (H-B) grade I.

Discussion

Traumatic facial nerve palsy is a second most common cause of facial paralysis to Bell’s palsy. Sports like football players may have injury direct or indirect. The incidence of temporal bone trauma and associated facial nerve palsy has increased markedly in recent years.
In traumatic facial nerve paralysis, 90% or more of the facial nerve degenerates within six days of the onset of complete paralysis, is predictive of poor recovery unless decompression is performed. Significant prognostic criteria in traumatic facial paralysis include, extent and timing of onset of paralysis, types of hearing loss and electroneurography. In the facial nerve palsy usually, two types of the pathological changes were noted namely neural oedema and bony impingement. In our patient the right facial paralysis noted after two weeks with House – Brackmann (H-B) grade IV considering bony impingement and edema of the facial nerve.

Surgical approach for traumatic facial nerve palsy depends upon possible site of injured facial nerve segment as well as clinical and radiological information. Surgical management of traumatic facial palsy is controversial and challenging. High resolution CT Temporal bone is the imaging method of choice for evaluating the site and extent and timing of onset of paralysis, types of hearing loss and electroneurography. In the facial nerve palsy usually, two types of the pathological changes were noted namely neural oedema and bony impingement. In our patient the right facial paralysis noted after two weeks with House – Brackmann (H-B) grade IV considering bony impingement and edema of the facial nerve.

In surgical management, there are various approaches described like transmastoid, translabyrinthine and middle cranial fossa approach. Translabyrinthine or transmastoid-epitympanum approach can be used in case of hearing preservation is not important [9]. Transmastoid approach is suitable for patients with fracture line and nerve injury lies distal to geniculate ganglion. For better outcome, the nerve should be decompressed of its fracture line impinging the transverse part of the facial nerve distal to first genu.

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In present case, transmastoid approach is used and noted good recovery of the facial nerve function HB grade I/II.

Coker, et al. have reported fare recovery after facial nerve decompression in 14 out of 18 patients with longitudinal temporal bone fracture [10]. In present case, the fracture was longitudinal involving the tympanic or mastoid segments of the facial nerve with mild hearing loss and explored by transmastoid decompression approach to preserve the hearing.

The timing of surgery is still a matter of debate. Best out-come is expected with earlier decompression by recognizing the extent and site of the facial palsy clinically as well as radiologically where the function loss is app 90–95% [5]. In present case, without electroneurography, operated after two weeks of injury and noted improvement after one month postoperatively.

FISCH, in his study, advocated immediate exploration only in patients with delayed palsy with 90% degeneration demonstrated in electroneurograph [11,12]. Delayed exploration within 3 to 4 weeks should be performed in patients with acute palsy if they meet the surgical criteria. Patients with acute nerve palsy after trauma generally have other system injuries and the surgery should be delayed until the patient’s neurological condition is stable.

Although, many studies have shown that delayed decompression also gives good outcome, according to Chang and Cass, decompression surgery provides beneficial effects if performed within 14 days of injury and delayed surgery should be done if the facial nerve function does not show any recovery [13]. Uluc and Ulubil, in his short series of 10 patients have noted 83.33% rate of recovery within H-B grade I-II after total facial nerve exploration [9].

Conclusion
Blunt head injury in sport like football should be considered to cause temporal bone fracture and delayed facial nerve palsy. Along with CT scan brain, immediate CT scan of temporal bone may help to identify the fracture line in the mastoid cavity. To achieve better facial reanimation in cases with facial paralysis resulting from temporal bone fractures, the short time interval and transmastoid approach for surgical intervention may prove beneficial.

Limitations
It is unusual presentation so, difficult to find research articles on blunt head trauma and frequency of the facial nerve palsy in sports like football.

Future Directions
Need to do more research along with sport medicine to keep a tract about the blunt head trauma and facial nerve palsy.

Conflicts of Interest
Authors declared that they have no conflicts of interest.

References

Figure 2: CT temporal bone showing fracture right temporal bone.


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