

FRONTAL BONE FRACTURE- OPEN REDUCTION AND FIXATION

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Abstract

Presence of head injuries in patients with maxillofacial trauma are life threatening conditions. Head and neck fractures are common in high velocity vehicles. Frontal bone fractures comprise a small but significant portion of the facial fractures. Over the years several treatment modalities have been suggested such as wait and watch, open reduction and fixation, cementation, grafting, etc. the aim of the treatment is to reduce the complication risks and to maintain the aesthetics of the face. The article reports a case of trauma patient due to road traffic accident who complains of numbness over right eye lid and adjacent forehead area. The patient received primary care at a local hospital with suturing of the wound extending from right supraciliary area upto the forehead. A CT scan was performed which confirmed the fracture of right frontal bone extending from the medial nasal to frontal bone and laterally into right orbit and medially upward. The patient was treated with open reduction and fixation using bone plating.

Keywords: Frontal, Fracture, Trauma, Plating.

Introduction

Facial fractures make up a majority of trauma. Areas of the face affected include frontal, nasal, temporal, orbit, zygoma, maxilla and mandible. Overall incidence of fracture of frontal bone is between 5-15%.¹ The effect of these fractures can be fatal due to brain proximity and can cause cosmetic deformity. The fracture may also result in meningitis, mucopyocele, encephalitis and cerebral abscess.² Before treating such cases any possibility of brain injury, orbital injury, etc. is needed to be ruled out by CT scan. Among the several causes are RTA (Road Traffic Accident), physical assault, industrial accidents and sports injury. Several attempts of classification of frontal bone fracture have been made such as

- Classification of frontal bone fracture :³

1. Anterior table fracture

With / without displacement

With / without outflow tract injury

2. Posterior table fracture commonly (occurs in combination with anterior table fracture)

With / without displacement

With / without dural injury / CSF leak

With / without outflow tract injury.

- Classification of frontal bone fracture:⁴

Type 1: Frontal sinus fracture without vertical extension.

Type 2: Vertical fracture through the orbit without frontal sinus involvement.

Type 3: Vertical fracture through the frontal sinus without orbit involvement.

Type 4: Vertical fracture through the frontal sinus and ipsilateral orbit.

Type 5: Vertical fracture through the frontal sinus and contralateral or bilateral orbits.

Case Report

A 26 year old male patient reported to our facility with history of RTA which was 2 days old. He had received primary care at a local hospital with suturing of the wound extending from right supraciliary area upto the forehead. Ecchymosis of right eye with laceration of lateral portion of eyelid was seen. Patient complains of numbness over right forehead and eyelid. On palpation a step was present in the same area suggestive of a frontal bone fracture. (Figure 1)

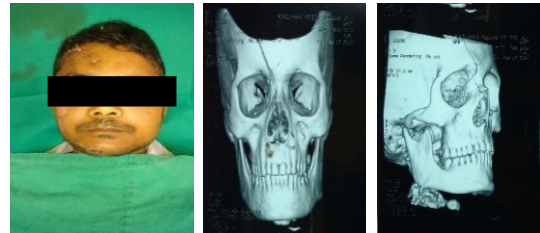


Figure 1: Preoperative

A CT scan was procured which confirmed the fracture of right frontal bone extending from the medial nasal to frontal bone and laterally into right orbit and medially upward. As the fractured segment were not aligned and open reduction was planned. After the proper investigation and consent patient was operated under GA following proper scrubbing of operating field and draping, 2% lignocaine with adrenalin 1:80000 was infiltrated. The fracture site was exposed through the existing laceration. The defect was flushed and thoroughly cleaned. The fracture was depressed and displaced laterally. Digital approximation was done and decompression of supraorbital nerve entrapped in the fracture segments was done. Two holes with gap and X-shape plate were properly adapted and secured with the help of 2x6 mm screws. Later closure in layers was done by approximation of underlying muscle with 3-0 vicryl and overlying skin was sutured using 4-0 prolene. (Figure 2)

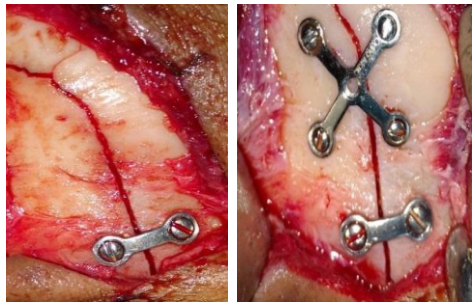


Figure 2: Intra-operative

The patient was discharged after 3 days with proper medication. The patient recalled after 15 days, 1 month and 3 months. Post-operatively the complaint of numbness reduced and the healing was uneventful. (Figure 3)

Discussion

Basic anatomy of the frontal bone includes three vital areas

1. Anterior table
2. Posterior table
3. Frontal sinus outflow tract



Figure 3: Post -Operative

Anterior table fractures are commonly caused by low energy trauma⁵. Fracture of posterior table might include brain injury and leakage of CSF (CerebroSpinal Fluid). The treatment goal should include correction of any deformity, precaution of later communication, control of CSF leaks and prevent further injury to intracranial structures. If the displacement is minimal then observation is sufficient but if the fracture is displaced communitied or aesthetically compromising then open reduction should be undertaken.

Approaches for open reduction may include

1. Supraciliary
 2. Bicoronal
- Existing laceration

Since the case presented here has an existing laceration it was utilized for the procedure. The treatment modality may include bone plating or use of Gentamicin impregnated PMMA (Poly methyl methacrylate) bone cement^{6,7,8}. Other alloplastic materials⁹ may include

hydroxyapatite, silicon rubber, acrylic metal plates, proplast, etc.

Numbness of the area involved with frontal bone fracture may be due to injury to Supraciliary, Supratrochlear branches of Frontal branch of Ophthalmic branch of Trigeminal nerve. Sometimes decompression of nerve is done.

Conclusion

A proper diagnosis is necessary for successfully treating frontal bone fracture. Any involvement of intracranial components has to be ruled out.

References

1. Gonty, AA, RD Marciani, DC Adornato. Management of frontal sinus fractures: A review of 33 cases. J Oral Maxillofac Surg 1999;57(4): 372-9
2. Luce EA. Frontal sinus fractures: guideline to management. Plast Reconstr Surg 1987; 80: 500-8.
3. Thiagarajan B. Fracture frontal bone and its management. Otolaryngology online journal. 2013;3(1.5):1-11
4. Garg RK, Ahmed M, Gassner J, Hartman MJ, leverson G, King TW et al. A novel classification of frontal bone fractures: The prognostic significance of vertical fracture trajectory and skull base extension. J Plast Reconstr Aesthet Surg. 2015;68(5):645-53
5. Kamoshima Y, Terasaka S, Nakamaru Y, Takagi D, Fukuda S, Houkin K. Giant Frontal Mucocele Occurring 32 Years after Frontal Bone Fracture: A Case Report Case Rep Neurol. 2012;4:34-7
6. Esthetic correction of depressed frontal bone fracture, J. dayashankara Rao, Vijaylaxmi Malhotra, Ravi S. Batra, and Abhishek Kukreja, Natl J Maxillofac Surg. 2011 Jan-Jun; 2(1): 69-72.
7. Elshahat A. Correction of craniofacial skeleton contour defects using bioactive glass particles. Egypt J Plast Reconstr Surg. 2006;30:113-9.
8. Chen TM, Wang HJ, Chen SL, Lin FH. Reconstruction of post-traumatic frontal bone depression using hydroxyapatite cement. Ann Plast Surg. 2004;52:303-8.
9. Roberson JB, Rosenberg WS. Traumatic cranial defects reconstructed with the HTR-PMI cranioplastic implant the. J Craniomaxillofac Trauma. 1997;3:8-13.

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