Frontonasal Trauma - A Challenge for Maxillofacial Surgeons

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Abstract
Traumatic isolated frontonasal injuries are seldom reported in literature as they are generally seen along with panfacial, high velocity accidents. A peculiar case, in which the patient reported with an isolated frontonasal injury due to a freak accident involving a hoe is presented here. After surgical intervention, titanium plates were used to fix the frontal bone. The sinus lining was preserved and the nasal bone was reduced and immobilized. The patient was discharged and kept on a weekly follow up.

Key words: Frontonasal injury, Hoe, Anterior table, Titanium plates.

Introduction
Isolated frontonasal complex injuries are rare as they are generally associated with panfacial trauma.¹ Serious injuries are associated with frontal sinus fractures in 75% of cases worldwide. Frontal sinus fractures require between 363 kg and 727 kg of force to fracture. Therefore they are generally seen due to high velocity car accidents, sports related injuries and assaults.²

Case Report
We report a special case of frontonasal injury due to a freak accident involving a hoe, when a farmer fainted due to extreme heat and fell directly on the blunt end of the instrument while ploughing his field.

The patient, 29 years old, healthy male, presented the next day with a small, 4 cm long, crescent shaped primarily sutured laceration over the right eye at a local hospital, displacement of the nose on the left side, depression over the frontal region and widening of the nasal bridge. (Fig.1) On examination he was hemodynamically stable and maintained adequate saturation in room air. Both pupils were equally reacting to light. There was no focal or lateralizing neurological deficit or evidence of seizure episode. No history of loss of consciousness, diplopia, intra oral or ear bleed was given. Glasgow Coma Scale (GCS) at the time of admission was 15. There was no cerebral spinal fluid (CSF) leak while nasal bleeding was minimal.

Computed Tomography (CT) face shows that the anterior table of the frontal bone was fractured and displaced inwardly and the nasal bridge showed a comminuted fracture. The posterior wall appeared to be normal. There were no other...
Fractures seen in the Le Fort II or Le Fort III regions. \(\text{(Fig. 2)}\)

A bicoronal flap was raised \(\text{(Fig. 3)}\) which adequately exposed the fractured frontal bone and nasal bridge area.

Communited and inwardly depressed fracture of the anterior table was visualized along with severely communited nasal bridge. \(\text{(Fig. 4)}\) The fracture of nasal bridge was reduced by asche septal forceps applied from the nasal cavities. The hemosinus was suctioned and cleared of clots and small bony pieces. The bone was elevated to regain the contour and titanium miniplates were utilized to fix the bony segments. No plating was possible for the nasal bridge as the segments were too small. \(\text{(Fig. 5)}\)

The nose was again visualized and slightly reduced to centralize it. \(\text{(Fig. 6)}\) A Vaseline ribbon gauze was inserted from the nasal cavities to stabilize the segment and plaster of paris was used for immobilization. The post-operative course was uneventful and the patient was discharged on day seven without any neurological deficit and wound infection. The follow up at 2\(^{nd}\) week and 4\(^{th}\) week were satisfactory and the patient was happy with his appearance.

**Discussion**

Traumatic frontal sinus fracture due to a patient falling on a hoe after fainting, has not been found to be reported in the literature. Management of frontal sinus fractures is dependent upon the involved tables of the cranial vault, the amount of displacement and involvement of the nasofrontal duct. The goals of treatment are well established: isolation of intracranial contents, correction of CSF leakage, prevention of infection and sequelae, restoration of functional integrity of involved structures whenever possible, and restoration of frontal contour and esthetics.\(^1\)\(^-\)\(^3\) The treatment algorithm for managing anterior table fractures as given by Chen et al is as follows:\(^4\)

1. Pre-operative assessment of the frontal outflow tract by high-resolution, thin-section CT with sagittal reconstructions;
2. Accurate restoration of the displaced bony fragments with internal rigid fixation;
3. Adjunctive post-operative broad-spectrum antibiotics for four weeks to treat potentially contaminated sinuses;
4. Serial post-operative CT scans to check for ventilation and restoration of mucociliary clearance of the frontal sinus;
5. Endoscopic frontal sinus surgery for persistent frontal outflow tract obstruction.

For isolated anterior table fractures, surgical treatment is indicated if the fracture is depressed or unstable which would result in a cosmetic deformity if not repaired. In such fractures, removal of the injured and devitalized tissue from the frontal sinus is sufficient, because the remaining healthy mucosa will heal as long as the sinus is healthy.\(^6\)\(^-\)\(^9\) Chen et al also reported that in 81% patients, the sinus could be preserved.\(^6\)

Management of comminuted anterior wall fractures often represents a problem, especially when the bone is missing.\(^7\) Adequate repair is only accomplished by means of direct reduction and fixation and it is not necessary to preserve periosteal attachments.\(^8\)

In general, anterior wall fractures are reconstructed, whereas posterior wall fractures and lesions to the drainage system are
treated via obliteration or cranialization of the sinus. According to John Rhee it's much better to have a functioning sinus that you can monitor than to have an obliterated sinus that is more difficult to monitor. In this case, as the lacrimal drainage system was clearly intact, the mucosa around the nasofrontal duct orifices was preserved and no attempt was made to cannulate the ducts.\textsuperscript{10,11}

Conclusion
The scope of oral and maxillofacial injuries has undergone a paradigm shift in the last few years. From simply treating pathologies like basic trauma and other minor surgical work, the maxillofacial surgeons now deal with severe panfacial trauma, cancers, orthognathic surgeries, clefts and distraction osteogenesis.

In rural areas, the causes by which severe facial injuries can occur are varied. Treating them poses a challenge as the object type, intensity and the direction of force, all play a major role in determining the gravity of the condition and the final treatment plan.

References