Case Report

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Surgery Section

Management of Residual Post-traumatic Palatal Defect Resulting in Palatal Fistula: A Case Report

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ABSTRACT

The typical skeletal framework that directs anatomical reductions after fixing is absent from pan facial fractures, which have a complicated pattern and are often associated with post traumatic deformities of face. Management of such conditions like depressed forehead, temporal hollowing, nasal deviation, telecanthus, loss of facial width, palatal fistulas, malocclusion is crucial when they involve functional abnormalities. Palatal fistulas following trauma, benign or malignant pathologies are debilitating conditions rendering patients difficulty in swallowing and speech impairment. This case report mainly emphasises on the management of one such defect, post traumatic residual palatal fistula. Here, a case of 43 year old male patient who was operated for facial bone fractures along with the neurosurgery team, developed a postoperative palatal fistula. Later after a month, second surgery was done, under General Anaesthesia (GA), fistula repair with palatal pedicle advancement flap was done. Postoperative outcome was satisfactory for both patient and the surgeon. Palatal pedicle advancement flap provides a robust, well vascularised, local tissue cover that allows tension free, single stage closure of the defects with good tissue match and minimal donor site morbidity.

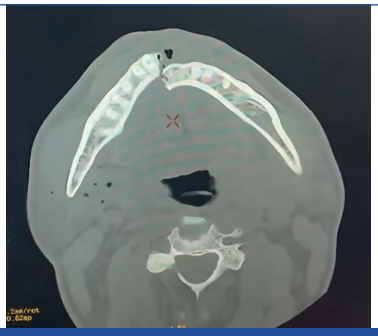
Keywords: Deformity, Functional abnormalities, Palatal pedicle advancement flap, Vascularised flap

CASE HISTORY

A 43-year-old male patient presented to the emergency department with complaints of pain which was insidious in onset, continuous in nature and throbbing type with active bleeding followed by swelling which was diffuse and led to gross asymmetry of the face within one hour after a Road Traffic Accident (RTA). He experienced loss of consciousness for 30 minutes after the accident and was initially stabilised neurologically at the casualty department. Subsequently, he was referred to the Department of Oral and Maxillofacial Surgery for management of his facial injuries, where treatment for his facial fractures was performed in a multidisciplinary manner along with neurosurgery team for pan facial trauma.

Clinical examination of the intubated patient revealed loss of consciousness, facial asymmetry, disturbed occlusion, maxillary segmental mobility and an open bite and his GCS score was 13/15. Radiographic assessment via CT facial bones scan with 3D reconstruction indicated a subdural haemorrhage on the right side, a comminuted fracture of the frontal bone involving both outer and inner tables with haemosinus [Table/Fig-1], displaced fractures involving the right parasymphysis [Table/Fig-2] and bilateral Frontozygomatic (FZ) regions [Table/Fig-3], as well as a displaced nasomaxillary segment with a midpalatal split [Table/Fig-4]. Patient's situation and urgency of intervention was explained to their attendants and informed consent was obtained for the surgery.

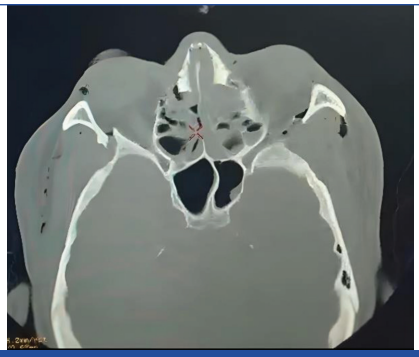
The surgical treatment was planned accordingly. After adequate preparation of the patient, under strict aseptic conditions, general anaesthesia was induced. Initially, the maxillary segment was reduced using Rowe's maxillary dismpaction forceps and transpalatal wiring was done to approximate the posterior maxillary segment (which was cut one day postoperative as stainless steel material causes blurred images in MRI scan). Later, intraoral maxillary anterior flap was raised by giving vestibular incision from the maxillary right canine to left canine. Anterior maxillary fracture fragment was exposed labially and fixed by plating using 1.5 mm 4-holed miniplate with 8 mm screws in the nasomaxillary segment [Table/Fig-5]. In this multidisciplinary approach, a bicoronal incision was planned by the neurosurgeon, extending from right temporal region to left temporal region with subperiosteal dissection exposing the cranium with



[Table/Fig-1]: Preoperative axial CT scan showing comminuted displaced fracture of outer table, inner table of frontal bone with haemosinus.

[Table/Fig-2]: Preoperative axial CT scan showing displaced fractures involving the right parasymphysis.

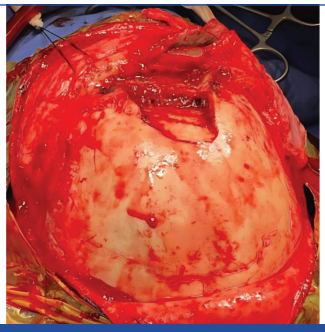
[Table/Fig-3]: Preoperative axial CT scan showing bilateral Frontozygomatic (FZ).



[Table/Fig-4]: Preoperative axial CT scan a displaced nasomaxillary segment with a midpalatal split.

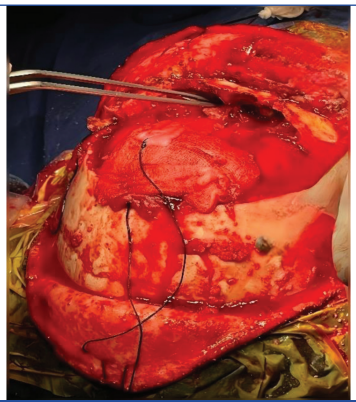
[Table/Fig-5]: Intraoperative picture showing fixation of anterior nasomaxillary segment using 1.5 mm 4-holed straight mini plate with gap and 1.5×8 mm screws.

frontal bone [Table/Fig-6] and bilateral front ozygomatic regions, providing access to the fracture fragments.

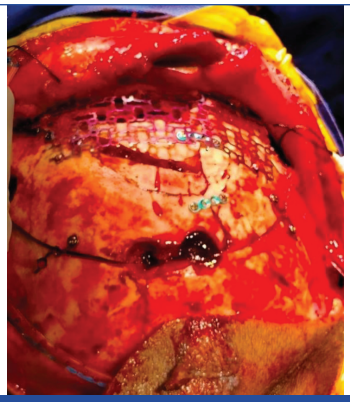


[Table/Fig-6]: Intraoperative picture showing exposed cranium with fractured frontal bone.

Fracture fragments reduced anatomically, fixation was done irt right and left FZ regions of which each received two 1.5 mm 4-holed mini plates. Frontal bone was exposed, frontal sinus debridement and curettage done, grafting done with temporalis fascia [Table/Fig-7] and a 1.5 mm titanium mesh was placed [Table/Fig-8]. For the right mandibular parasymphysis fixation, fracture site was exposed through right intraoral vestibular incision. Reduction was achieved by direct interdental wiring and fixation was done using two 2.5 mm 4-holed titanium plates as per Champy's guidelines of osteosynthesis [Table/Fig-9].



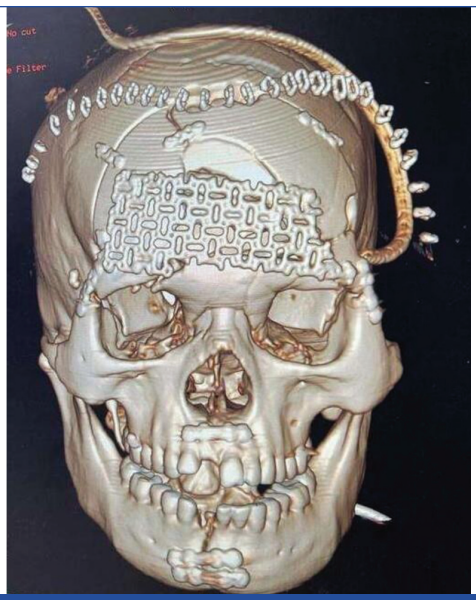
[Table/Fig-7]: Intraoperative picture showing frontal sinus debridement and curettage of sinus, grafting with temporalis fascia.



[Table/Fig-8]: Intraoperative picture showing fixation of frontal bone with 1.5 mm titanium mesh and 6 mm screws

[Table/Fig-9]: Intraoperative picture showing fixation of right mandibular parasymphysis using two 2.5 mm 4-holed titanium miniplates with 2.5×8 mm.

Wound closure was done with 3–0 resorbable sutures in the maxilla and mandible followed by layered closure, submucosa and mucosa with simple interrupted sutures using 3-0 vicryl and layered closure of scalp with simple continuous sutures in the connective tissue followed by surgical staples in the skin of scalp. On second postoperative day, CT scan was taken [Table/Fig-10] which revealed splaying of palatal fracture fragments [Table/Fig-11] and on examination, a palatal opening was noticed in the posterior palate. As the patient complained of difficulty in eating and fluid leakage through the nose, a palatal obturator was given temporarily as any further repair planned has to be executed at a later stage considering the patient's systemic and neurologic condition rendering adequate recovery and comfort to the patient and the same has been explained to the patient.



[Table/Fig-10]: Postoperative CT scan with 3D reconstruction.

[Table/Fig-11]: Postoperative CT scan reveals splaying of palatal fracture fragments and transpalatal wire.

Patient was discharged on fifth postoperative day and followed up once a week for 1 month During this period, the palatal defect could be diagnosed as a palatal fistula after series of examinations [Table/Fig-12,13]. After 1 month, when the patient is fit systemically and psychologically, secondary surgery for repair of palatal fistula has been planned and informed consent was taken. Under all aseptic conditions, general anaesthesia along with left nasal intubation was done, draping, intraoral and extraoral betadine painting done. Dingmans retractor was positioned, thorough intraoral irrigation and debridement was done, local infiltration injection with 2% Lignocaine and adrenaline was administered to reduce the bleeding around the fistula. Epithelialized margins around the fistula opening were excised to induce the fresh bleed.

[Table/Fig-12]: Two weeks postoperative palatal defect.

[Table/Fig-13]: Palatal fistula after 1 month postoperative.

A palatal flap design was planned based on the course of greater palatine artery and marked according to the site and size of the defect [Table/Fig-14]. A full thickness flap was raised and advanced medially to cover the existing defect by properly undermining adjacent palatal tissue wherever necessary [Table/Fig-15]. The flap was then secured in its new place using 3-0 vicryl resorbable simple interrupted sutures [Table/Fig-16]. The donor area was left open for a secondary epithelialisation. One week postoperative review showed that the defect area healing without infection and dehiscence (Table/Fig-17]. Postoperative checkup after 1 month revealed satisfactory results [Table/Fig-18].

[Table/Fig-14]: Marking and incision of the mucosa.

[Table/Fig-15]: Full thickness palatal lateral pedicle flap raised to advance medially to the defect.

[Table/Fig-16]: Closure done.

[Table/Fig-17]: Postoperative healing after one week.

[Table/Fig-18]: Complete healing at 1 month recall.

DISCUSSION

Managing comminuted fractures of the facial skeleton requires meticulous planning and approach during the primary surgery, failing to do so, because of various reasons resulting in post traumatic deformities, one of which is palatal fistula [1]. The main objective of this study is to propose a minimally invasive and relatively simple procedure to close the palatal fistula.

The principal goals of reconstruction are to: (a) restore anatomical alignment of the bony skeleton (b) ensure proper skeletal support before addressing the soft tissue, and (c) replace missing tissue with similar tissue [2]. The management of residual post-traumatic palatal defects and associated fistulas requires a tailored approach, considering factors such as defect size, patient health status, and previous treatments. Surgical techniques such as the anterior-based and dorsal pedicled tongue flaps [3], buccal mucosal flap [4], hinge flap [5], facial artery musculomucosal flap [6], and some recent advances such as total palatal mobilisation with multilamellar suturing [7] and the buccinator musculomucosal flap [8], tongue flap with parachute suturing, use of collagen matrix offer reliable solutions for soft tissue reconstruction [9].

The palatal fistulas according to their greatest diameter into small 1-2 mm, medium 3-5 mm, large >5 mm and used a double flap palatoplasty technique which provided airtight closure and almost no recurrence or wound dehiscence was encountered [10]. A two layered mucoperiosteal closure of highly recurring palatal fistulas. Relative outcomes were successful with less recurrence [11]. The size and location of the defect are key when planning tongue flap extensions. The flap should be about 20% larger than the defect and at least 3 mm thick to ensure good blood supply and tension-free closure [12]. An anterior-based tongue flap and Facial Artery Musculomucosal (FAMM) flap was used to close the posterior palatal fistula leaving its drawback of two-staged procedure and transient patient discomfort [13]. The free radial forearm flap demonstrated that radial forearm flap was found to be sufficient in the closure of wide fistulas after repeated failure of local flaps [14]. Repair of palatal fistulas can be achieved using either autogenous or alloplastic grafts. Onlay grafts are placed onto the existing defect, where the recipient bed may be poorly vascularised. To enhance the wound healing autogenous platelet products and/or purified growth factors were added [15].

Palatal pedicle advancement flap technique is opted for this case because of its various advantages over other flaps such as matching tissue with proper thickness, proximity to the donor site, single-stage procedure, lower donor-site morbidity, and less interference with the vestibular sulcus and dentition, whereas in contrast, buccal mucosal flap offers donor site morbidity and reduction in vestibular depth [5], FAMM flap involves more complex surgery [3], tongue flaps includes 2-stage procedure [9], buccal fat pad free flaps being much more complex with long operating time and high donor site morbidity.

CONCLUSION(S)

The palatal pedicle advancement flap technique represents a reliable, well-vascularised, and tissue-matched local option for closure of post-traumatic palatal fistulae. When properly designed with a broad pedicle, minimal tension, and good donor site care, this flap offers high success rates with low morbidity and showed superior outcome in providing tension free closure for small to medium defects of the posterior palate . It also preserves speech function, minimises donor-site complications, and avoids more complex or distant flap procedures. It can be used as an effective approach for smaller defects minimising morbidity whereas this may not serve a great purpose in larger defects. Therefore, in appropriately selected cases (moderate size, good remaining palatal tissue, no active infection), it should be considered a first-line surgical option.

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