Evaluation of Two Techniques in Management of Anterior Wall Frontal Sinus Fractures

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*I dedicate the whole work to my wife, **Dalia,** for her patience, quite support under **considerable** duress, once again thank you for your exceptional care.*

Evaluation of Two Techniques in Management of Anterior Wall Frontal Sinus Fractures

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Key Words: Frontal sinus- Sinus obliteration- Transantral drainage

Abstract:

Introduction: Frontal sinus fractures pose an interesting and challenging problem, as optimal treatment strategies for the management of frontal sinus fractures remain controversial. These fractures peculiarity is that a wrong treatment not only could it encompass functional or aesthetical problems but also more dangerous complications. Various techniques have been advocated to repair or remove the frontal sinus that largely depends on the mechanism and extent of the injury and the status of the nasofrontal duct (NFD). These operations include ablation, open reduction and internal fixation of the anterior table, obliteration, and cranialization. The lack of consensus regarding the treatment options may provide a motive to compare two different modalities in management of the comminuted anterior table fractures of the frontal sinus affecting nasofrontal duct i.e. obliteration of the sinus versus achieving transantral drainage to assess the efficacy of different modalities.

Patients & Methods: This study was carried out on 20 patients selected from the Oral & Maxillofacial department, Faculty of Oral & Dental Medicine, Cairo University and the Cranio & Maxillofacial department, Naser Institute. The selected patients suffered of unilateral anterior wall fracture of their frontal sinuses approximating the nasofrontal duct and having intact posterior walls of their frontal sinuses. The selected subjects were randomly divided into two groups, **Group I:** (sinus Obliteration Group). **Group II:** Transantral Drainage Group where inter sinus septum (a) was removed to the level of the sinus floor and thus rendering the injured sinus in patent communication with the intact sinus.Clinical & radiographic evaluations were carried out at immediate post-operative, and at 6 & 12 months post operatively. Radiographic evaluation of the cases was done using computerized tomography (CT) scanning.

Results: In the current study 90% of the included subjects were males and the mean age was 34years. In 60% of the studied sample the frontal sinus fracture was associated with other maxillofacial fractures, and in 40% of the series the frontal sinus fracture was unassociated with other fractures. In the present study the obliteration group has revealed a rate of total 40% complications. Whereas transantral drainage group in the current study has revealed a rate of 30 % complications, When the two groups were inter-related the difference was statistically insignificant this may point out the lack of consensus regarding the best management modality. The results of this study indicate that a functioning sinus can be preserved in the majority of patients with frontal sinus fractures. Also it could be concluded that frontal sinus obliteration will continue to be a workhorse operation in trauma management of anterior wall frontal sinus fracture. Moreover, Transantral Drainage could be a valid and conservative alternative in management of unilateral anterior frontal sinus fractures.

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Introduction

Though incidence of frontal sinus fractures are relative low when compared to the remaining types of fractures involving the cranio-maxillofacial district. These fractures pose an interesting and challenging problem, as the optimal treatment strategies for the management of frontal sinus fractures remain controversial.

In order to reduce the risk of infectious-related complications and to keep the functional and aesthetical alterations at minimum, the necessity to recognize precociously and rightly the type of fracture and the intervening involvement of the adjacent structures to perform a proper surgical treatment according to the specific case, would present an integral part of the maxillofacial practice.

Various techniques have been advocated to repair the frontal sinus fractures. Yet with no consensus on when and if surgical intervention is to be carried out.

With the improvement in diagnostic imaging and surgical technology, a wide variety of philosophies, protocols, and procedures are suggested in the treatment of frontal sinus injuries, each with the goal to provide an esthetic outcome, restore function, and prevent complications.

Maxillofacial surgeon will always peruse treatment modalities that could result in predictable healing, favorable esthetics, and few short-term complications for the majority of patients.

Frontal sinus obliteration is considered the corner stone of frontal sinus fracture management , yet never short of complications. Transantral drainage could present an alternative approach that can be re- presented as being not a novel technique but rather as an attempt to provide a practical, safe rationale for the management of frontal sinus injuries.

Review of Literature:

Embryology & Anatomy:

Development of the frontal sinus begins between the ages of two and four when the anterior ethmoid cells expand into the frontal bone. The frontal sinus occupies the junction between the splanchnocranium and the neurocranium, placed between the anterior cranial fossa and the nasoorbito-ethmoid region. The frontal sinuses are radiographically evident by ages five to eight and reach full adult size between ages twelve and eighteen. The frontal sinus varies markedly in its development. Occasionally, it may be poorly developed or markedly pneumatized to involve adjacent bone. Approximately 10% of the population has only a unilateral development of the frontal sinus, and in 4% of the population, there is bilateral agenesis ***(Hollinshead ,1982- Gonty et al., 1999)***.

The anatomy of the frontal sinus is highly variable. They are funnel shaped sinuses and communicate with the middle meatus via an hourglass-like narrowing called the nasofrontal duct. Mucus in the frontal sinus flows up the medial wall, laterally across the roof, medially along the floor, and down the nasofrontal duct into the middle meatus. The frontal sinus has a thick, strong arch-shaped anterior wall, a thin fragile floor and posterior wall. The floor is the roof of the orbit. The posterior wall forms the anteroinferior wall of the anterior cranial fossa. The superior sagittal sinus emanating from the foramen cecum lies directly against the posterior wall of the frontal sinus in its early course, rendering it vulnerable to injury in penetrating injuries or fracture dislocations of the posterior wall. Rupture is fortunately uncommon because the dura is tough and resilient. The sinus commonly has a vertical septum placed approximately in