

NASAL BONE FRACTURE - MANAGEMENT

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Abstract: Nasal bone fractures are the most common type of facial fractures, accounting for ~40% of facial fractures 1. Nasal bone fractures, when isolated, are most commonly a displaced fracture of one of the paired nasal bones. There is often association with other facial fractures and this requires careful assessment 3, it should be noted that cartilaginous injuries cannot be detected radiologically and that imaging of simple nasal bone fractures often add little to patient management. Treatment of such fractures ranges from using a simple, closed reduction technique to aggressive open reduction and internal fixation techniques⁵. The use of a closed or open approach will then depend on the extent of the injury. This study was conducted from MAY 2016 to APRIL 2018 at skims mch, Srinagar. The study included 110 patients who were diagnosed with nasal fracture. Treatment methods of nasal fractures differs from patient to patient according to some critical factors including, age of patient, trauma time, anesthesia type, necessity for acute versus delayed reduction, and surgical approach. The patients were assigned to one of the four groups according to their fracture type. According to our study, the closed reduction technique is used to manage closed, simple, unilateral and bilateral nasal bone fractures with good (89%) satisfactory results. In cases with NOE, no technique other than open reduction and direct fixation is suitable to obtain good results. The use of a closed or open approach will then depend on the extent of the injury. It is mandatory to determine the appropriate technique according to the type of nasal fractures.

Keywords: fracture nasal bone, transnasal fixation

Abbreviation: closed reduction (CR), open reduction (OR), transnasal fixation (TNF), and naso-orbito-ethmoidal (NOE)

INTRODUCTION

Nasal bone fractures are the most common type of facial fractures, accounting for ~40% of facial fractures 1, and are often missed when significant facial swelling is present. Unsurprisingly, nasal bone fractures occur when the nose impacts against a solid object (e.g. fist, forehead, dashboard, etc.). Lateral impact injuries are the most common type of nasal injury leading to fracture. Nasal bone fractures, when isolated, are most commonly a displaced fracture of one of the paired nasal bones. There is often association with other facial fractures and this requires careful assessment 3. It should be noted that cartilaginous injuries cannot be detected radiologically and that imaging of simple nasal bone fractures often add little to patient management. However, imaging can be useful in documentation, assessing the extent and associated facial fractures and/or complications. Diagnosis of a nasal fracture depends on the history of trauma; the results of an examination of the external nasal structure looking for depression, asymmetry, deviation, protuberances, or step-off deformities; examination of the intranasal structures to exclude any septal injuries; septal hematoma or airway obstruction; and radiological investigations, such as X-ray or CT scans, to assist in accurate diagnosis and to exclude or confirm the presence of any associated bony fractures³. Nasal fractures can be treated either immediately or after all the edema present has resolved, which may take 5–7 days and may extend to 2–3 weeks before significant healing occurs⁴. Treatment of such fractures ranges from using a simple, closed reduction technique to aggressive open reduction and internal fixation techniques⁵. Closed reduction is simple, easy, and can be performed under local anesthesia; however, accurate contouring may not be obtained, leading to posttraumatic nasal deformity that is difficult to correct. More aggressive, open reduction techniques were adopted to treat such fractures and avoid potential nasal deformity. The goal of treatment for nasal fractures is to restore the pretraumatic state and normal function. The decision by the surgeon regarding the surgical approach should be based on the degree of injury, the presence of concomitant facial injuries, patient compliance, training of the surgeon, and the presence and degree of septal injury. The use of a closed or open approach will then depend on the extent of the injury.

Materials and Methods

This study was conducted from MAY 2016 to APRIL 2018 at skims mch, Srinagar. The study included 110 patients who were diagnosed with nasal fracture. The clinical evaluation is the first base of the diagnose. A detailed patient history and examination is critical for the process. The following patient details were recorded: age, sex, cause of trauma, clinical presentation, type of fracture, associated injuries, the results of imaging studies (X-ray and if needed NCCT radiological examinations) and surgical procedures, patient follow-up, and any complications. Presence of a significant rhinorrhea should be evaluated for Cerebrospinal Fluid (CSF) leak by testing fluid levels of either glucose or β -transferri. On the basis of type and extent of injury, patients were classified as follows: Type I, closed simple nasal bone fracture, including patients with unilateral or bilateral, lateralization or depression of the nasal bone that was not associated with overlying skin lacerations; Type II, closed comminuted nasal bone fracture including patients with unilateral or bilateral comminuted nasal bone fracture that was not associated with overlying skin lacerations; Type III, complex nasal bone fracture including patients with nasal bone fractures that extended to involve the NOE area but was not associated with overlying skin lacerations; and Type 4 patients with open nasal bone fracture including any fracture that was associated with overlying skin lacerations.

Classification of Nasal Fractures

Stranc and Robertson categorized nasal fractures based on the vector of force and clinical findings. Murray et al., described nasal fractures based on pathologic criteria [2].

Type I: Injury restricted to soft tissue

Type IIa: Simple, unilateral nondisplaced fracture

Type IIb: Simple, bilateral nondisplaced fracture

Type III: Simple, displaced fracture

Type IV: Closed comminuted fracture

Type V: Open comminuted fracture or complicated fracture [2,4].

Nasal bone fractures was classified into following types according to CT scans

Type I: Simple without displacement.

Type II: Simple with displacement.

IIA Unilateral with septal fracture

IIB Bilateral with septal fracture

Type III: Closed Comminuted with telescoping or depression [25]

Type IV: Open comminuted fracture or complicated fracture

Treatment methods of nasal fractures differs from patient to patient according to some critical factors including, age of patient, trauma time, anesthesia type, necessity for acute versus delayed reduction, and surgical approach. Management of very young and very old patients is difficult. Timing of Reduction within 5 to 10 days after injury the nasal bones can become somewhat adherent and difficult to move. Fixation is usually observed within 2 to 3 weeks. The surgeon should choose a proper time for reduction when evaluation can be accurate and the bones are still mobile. The usual recommendation is that closed reduction be carried out within 3 to 7 days for children and within 5 to 10 days for adults [5].

Closed Reduction: It is suitable for the simple, non-comminuted nasal fractures. The critical manipulation is to maintain a force opposite to the vector of trauma. In this way a successful reduction should be performed. A Goldman elevator can be used to perform. It is useful for manual reposition of bones. Attention should be made to the cribriform plate for the injury possibility. The closed technique of the nasal fracture depends on the capability of reversing the vector of force that resulted in the injury. At first step is to reduce the nasal bone and second step reduction and stabilization of septum. A Goldman bar should be inserted into the nose up underneath the nasal bones and upward outward pressure exerted. The external digital manipulation and intranasal pressure maintain the adequate force to reduce the nasal pyramid. Incomplete fractures may require osteotome mobilization for appropriate reduction [4].

Open Reduction: The method is necessary for patients can not be sufficiently managed with a closed reduction. Comminuted fractures with severe loss of nasal support, severe septal injuries, need to be exposed by open techniques. Open techniques may provide a detailed, excellent exposure. The process allows easier anatomical examination and reformation of nasal structures. Adequate exposure of septum, dorsum and tip provides a successful operation [2]. In severe nasal injuries early full septorhinoplasty method is necessary, because the result of closed reduction are unsatisfactory and an early correction should be performed, before scarring has taken place [6]. Incidence of deformities occurred after closed reduction of a nasal fracture that require rhinoplasty has been reported to range from 14% to 50% [7]. As a result of nasal fracture, the deviation of the nasal septum places stress on the nasal bones, this causes the nasal bones to displace after reduction. In summary the nasal bones follow the position of

Splinting and Packing: Both open and closed techniques require splinting postoperatively. Splints should be internal and external. Doyle nasal splints are useful for internal splinting. They maintain internal septal stabilization and prevent synechiae after surgery [8]. Extranasal splinting maintain stabilization of reduced bones and cartilage, often after an open surgery. Packing is an old method, is used less frequently now. It is being accused for postoperative pain, discomfort, soft palate laceration, septal perforation, and even toxic shock [9]. Intranasal splinting should be lasted for 2 to 3 weeks postoperatively and packing should be no longer than 72 hours. Follow-up should be 6 to 12 weeks postoperatively. This time is critical for structural integrity of the nose. The patient should be evaluated for the possibility of nasal collapse, loss of tip support. A future septorhinoplasty may be necessary for these situations. Cartilaginous spreader graft may be useful for these cases. The rib graft can be used as a columellar strut graft to improve and maintain projection in the loss of tip support. Bilateral batten grafts are becoming popular for maintaining nasal straightness [2].

Results

From May 2016 to April 2018, 110 consecutive patients with nasal bone fractures were treated. The study included 74 males and 36 females TABLE:1. Their ages ranged from 9–82 years.

TABLE 1

MALE	74 (67%)
FEMALE	36 (33%)

The patients were assigned to one of the four groups according to their fracture type. With Type I and type II cases, both unilateral and bilateral cases were treated using the closed reduction technique. Good contours were obtained for 78 patients (92%). Among the Type II cases, there were 24 unilateral and 10 bilateral cases. All the unilateral cases were treated by closed reduction with good and stable reduction. Good contour was obtained with 28 patients(82%). The remaining patients showed minor nasal deformity that was acceptable to the patients; hence, no further intervention was required. For the bilateral cases, closed reduction alone was not sufficient to obtain an intraoperative stable reduction; was used to obtain a stable reduction and 4 patients showed good contour. Two patients had a minor deformity that was accepted by the patients. Only one patient in this group showed a major deformity in the form of persistent lateral nasal deviation. This patient underwent septorhinoplasty 6 months later. There were 16 cases with a Type III complex nasal bone fracture. All these patients underwent open reduction (Rhinoplasty). Overall, 13 patients (81%) achieved good satisfactory results, whereas one patients had an ugly scar. There were 10 Type IV cases with an open nasal bone fracture and skin lacerations over the fracture. Direct fixation was performed regardless of whether the fracture was unilateral or bilateral or whether or not it was comminuted. Good satisfactory results were obtained in 8/10cases (80%). Two patients suffered an infection,and both patients had an ugly scar.

NUMBER OF PATIENTS, ACCORDING TO SEVERITY OF INJURY

TYPE OF INJURY	NO. OF PATIENTS
TYPE 1	50
TYPE 2	34
TYPE 3	16
TYPE 4	10

DISCUSSION

Nasal bone fractures commonly referred to as broken nose is a fracture of one of the bones of nose. It is more frequently occurring facial bone fractures and secondary deformity can be easily noticeable if fracture is not appropriately treated.

If fractures of nasal bone are left uncorrected it could lead to loss of structural integrity and soft tissue changes that may lead to both unfair appearance and function. Several classification systems have been described for nasal fractures; however, no uniform system is advocated or applied. suggested that lateral forces accounted for the majority of nasal bone fractures. Stranc and Robertson¹⁰ classified nasal fractures into lateral, oblique, and frontal based on the direction of the force. The closed reduction technique has several advantages, it is simple, and can be performed under local anesthesia; however, accurate contouring may not be obtained, and the nasal packing may result in overcorrection and widening of the nasal bridge. The closed reduction technique is most frequently used to treat these fractures⁵. But in severely comminuted fractures or those associated with NOE fractures, the closed reduction technique is not sufficient and may lead to posttraumatic nasal deformity that is difficult to correct; thus, more aggressive techniques were adopted to treat these fractures and avoid nasal deformity. However, such aggressive techniques may be costly, require advanced facilities and more experienced staff, and can be associated with additional morbidity because it may cause a scar and affect the patient's facial aesthetic⁹. In an attempt to overcome the morbidity associated with the closed method and the complexity of the open method, some authors have described a minimally invasive method, percutaneous transnasal fixation⁸. Therefore, it is mandatory to determine the appropriate surgical technique according to the type of nasal fracture. According to our study, the closed reduction technique is used to manage closed, simple, unilateral and bilateral nasal bone fractures with good (89%) satisfactory results. For closed, unilateral comminuted nasal bone fractures, closed reduction was used with good (92%) satisfactory results. This finding is consistent with the results obtained by others who reported a success rate of 60%–90% with the closed reduction technique³. In closed, bilateral comminuted nasal bone fractures, we found that the closed reduction technique alone provides unsatisfactory results; at the same time, open reduction for these cases is costly with associated postoperative morbidity in the form of scars but were achieving good results(81%). Closed reduction technique has the advantages of being easy, simple, less costly, no postoperative scars, and provides good results. In cases with NOE, no technique other than

open reduction and direct fixation is suitable to obtain good results. This finding is in agreement with that of others who stated that to achieve good results, one must emphasize early treatment, wide exposure through esthetic incisions, and reconstruction using rigid fixation and bone grafting where appropriate [1]. In cases with open fracture, the nasal bones are already exposed; hence, scars will be present; the best results are obtained by direct fixation.

Conclusion

The most important goal of treatment for nasal fractures is to restore the pretraumatic state and normal function. The decision by the surgeon regarding the surgical approach should be based on the degree of injury, the presence of concomitant facial injuries, patient compliance, training of the surgeon, and the presence and degree of septal injury. The clinical evaluation and management should be individualized for the type and severity of injury. The use of a closed or open approach will then depend on the extent of the injury. It is mandatory to determine the appropriate technique according to the type of nasal fractures.

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