

OUTCOME OF CLOSED REDUCTION IN NASAL BONE FRACTURE

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ABSTRACT

Objective: To analyse nasal bone fractures with regards to its clinical features, diagnosis, treatment, classification and post reduction outcome.

Material and Methods: This descriptive study on 102 patients was conducted at the Departments of Ear, Nose, Throat, Lady Reading Hospital and Khyber Teaching Hospital, Peshawar from June 2010 to June 2011. All patients underwent a detailed history, physical examination, photographic and radiographic evaluation. Adult patients with a displaced fracture of nasal bone and septum underwent closed reduction under local anaesthesia, while in children general anaesthesia was used. Follow up was done for one year.

Results: Out of 102 patients, 85 (83.34%) of patients were males and 17 (16.66%) of patients were females, with a male to female ratio of 5:1. The age of the patients ranged from 08-60 years with mean age of 30.55 + S.D 19.88 years. The common age group was 11-30 years (67.64%). Violence was the most common cause (41.18%). Displacement was the common type of nasal bone fracture (72.55%). The mean time-to-reduction after injury was 2.30 hours. Most of the patients were satisfied with the results of closed reduction.

Conclusion: closed reduction of nasal bone fracture soon after trauma provides good cosmetic results.

Key Words: Nasal trauma, nasal bone fracture, close reduction, cosmetic outcome.

INTRODUCTION

The nose is the most projecting central aesthetic structure of the face and nasal bones are small thin bones¹. This makes it more susceptible to traumatic injuries in day to day life. Due to the cosmetic importance for the patients, it causes a great deal of social and psychological problems. Nasal bone fractures are the most common facial injuries, comprising up to 40% of all facial fractures². Nasal bones fractures are usually due to violence, vehicular accidents, falls, and sports injuries³. A direct frontal blow is less common (20%), more violence, depresses the dorsum of the nose. Laterally directed blow is more common (80%) and less severe, causes a depression on the side of blow and outward displacement on the opposite side of the nose and may cause septal deformation⁴. The nasal fractures lead to external nasal deformity and breathing difficulty through the nose⁵. Attempts at nasal fracture restoration was started around 3000 BC, when the broken noses were treated by nasal packing and external adhesive plaster found in Edwin Smith Surgical papyrus, by great Egyptian physician Imhotep⁵. The standard treatment for a nasal bone fracture is closed reduction within 3 hours

after injury or 10 days post injury once the initial swelling has subsided; this should be done within 7-14 days in adults and 3-7 days in children^{6,7}. Any delay beyond 7-14 days may result in significant bone healing which make precise close reduction more difficult and may require open reduction in the form of rhinoplasty (osteotomies) or septorhinoplasty at later stage^{8,9}.

MATERIAL AND METHODS

This descriptive study was conducted at the Departments of Ear, Nose, Throat, Lady Reading Hospital and Khyber Teaching Hospital, Peshawar from June 2010 to June 2011. All patients with nasal bone fracture were admitted to our unit either through the outpatient department or casualty. The study included 102 patients who underwent closed reduction. Only those patients having nasal bone fracture free of any other life-threatening injuries and with a stable neurological condition were included in the study. Those patients with previous history of nasal surgery, recently infected cases, fracture involving more than nasal unit of face and fractures examined 2 weeks or longer after the injury occurred were excluded from the study. Approval of the Hospital Ethical Committee was taken before studying the cases. Complete history was taken to know the responsible object, the direction and strength of force sustained by the nose. The appearance and function of the nose before the injury was ascertained and were also inquired about

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prior nasal obstruction and fracture to avoid confusion about pre-existing deformities with an acute nasal injury. A thorough examination of the surrounding structures was done to exclude skull base, orbital, cervical injuries and malocclusion. Nasal bones were palpated to detect tenderness, crepitation, depression, or widening of the nasal base which confirms the presence of a nasal bone fracture and displacement. Anterior rhinoscopy was done to evaluate airway patency, mucosal laceration, and septal deformity and to exclude septal haematoma and cerebrospinal fluid rhinorrhoea. All patients underwent radiographic evaluation with lateral and water's views of the nose for the medico-legal documentation, to evaluate the type and extent of fracture and for comparison with post reduction outcome. The preoperative and postoperative photographs of nasal deformity were taken to measure treatment success. The nasal cavities were packed with ribbon gauze impregnated with 4% xylocain mixed with 1 in 10,000 adrenaline, for 15-20 minutes before reduction. This was supplemented with external nasal field blocks using 2% xylocain with 1:200,000 adrenaline along the nasal dorsum, lateral to the nasal pyramid, and at the base of the anterior septum to block the external nasal, infratrochlear, nasopalatine and infraorbital nerves. In children, reduction was done with general anaesthesia. Closed reduction of nasal bone fracture was performed manually and/or with instruments. Manually the thumbs of both hands were laid on top of each other on the convex side of the fractured bony framework and pressed hard against the nose until the nose springs back into the midline. When one side of the nose was depressed, one blade of Walsham's forceps is inserted into the nasal cavity beneath the nasal fragments. The displaced bone segments were mobilized and lifted with careful upward and outward elevatory movement and replaced in its proper position. When both bony walls of the nose were displaced, the forceps with a piece of gauze under the outer blade to prevent skin damage was placed on the convex side of the nasal cavity while inner blade of Walsham's forceps was inserted intranasally to a point 1cm caudal to the nasofrontal angle. Next, the fracture was first disimpacted by the outward movement with Walsham's Forceps, then impacted back by the inward movement. Usually there was a click sound when the fracture was reduced. A similar procedure was repeated on the concave side to do disimpaction and realignment of nasal bone so that the original shape of the nose was reconstructed. Then Asch's forceps was used to bring the fractured septum back to its original position. Anterior rhinoscopy was performed to evaluate the final position of the septum and also nasal patency. External nasal wound was closed with 4/0 prolene suture when present. At the end of operation, all adult patients were shown the final result with a mirror and asked to reconfirm whether the nose is back to its

normal position or not. After satisfactory repositioning, the nasal cavity was packed loosely with antibiotic impregnated cream for 3 days to support the bone fragments. Externally, the nose was fixed with overlapping strips of tape and immobilized with plaster of Paris cast for 10 days to protect the nose. The nasal packing was removed on the third day and cast on tenth day. Patients were advised to avoid blowing the nose for two weeks. These patients were followed at one month, three months, six month and one year intervals.

RESULT

Our study included 102 patients, who underwent closed reduction of nasal fractures. The age and gender distribution is shown in Table 1. Road Traffic accidents were the most common cause in males (35.29%) while violence was the most common cause in females (11.77%). Overall violence was more common (41.18%) than traffic accidents (38.24%). Accidental fall (13.72%) and sports injury (6.86%) were commonly found in children Table 2. The common clinical features were nasal deformity (70%), nasal swelling (30%), external nasal lacerations (32%), tenderness (100%), nasal bleeding (76%), nasal obstruction (20%) and septal deviation (22%). The most common type of nasal bone fracture was the displacement type accounting for (72.55%) of the cases, depressed type (12.75%), mixed type (07.84%), and non-deformation type (6.86%). Eighty patients (78.43%) presented within three hours of the injury before development of significant oedema, all of them underwent immediate closed reduction with a mean time-to-reduction of 2.30 hours after nasal trauma. The remaining twenty two patients (21.57%) presented after three hours to four days after injury with significant post traumatic oedema. Closed reduction was done after oedema subsided with mean time to reduction of 5 days. Overall, the mean time-to-reduction was 2.30 hours. The mean operating time was approximately 20 minutes (15-30 minutes). Eighteen (17.64%) patients having residual nasal defects were admitted for open reduction revision surgery. Nine (8.82%) patients had deviated nasal pyramid

Table 1: Age and gender distribution

Age in years	No. & %age of male patients	No. & %age of female patients
8 -10	09 (08.83%)	2 (01.96%)
11 – 20	22 (21.57%)	6 (05.88%)
21 – 30	36 (35.29%)	05 (04.90%)
31 – 40	09 (08.83%)	4 (03.92%)
41 - >	09 (08.92%)	0 (0%)
Total	85 (83.34%)	7 (16.66%)

Table 2: Type of injury and gender distribution

Type of	Male	Female	Total
Violence	30 (29.41%)	12 (11.77%)	42 (41.18%)
Road accident	36 (35.29%)	3 (02.94%)	39 (38.24%)
Accidental fall	12 (11.77%)	2 (01.96%)	14 (13.72%)
Sports injury	7 (06.86%)	0 (0%)	7 (06.86%)
Total	85 (83.33%)	17 (16.67%)	102 (100%)

underwent rhinoplasty (osteotomies) and 5 (4.90%) patients with deflected nasal septum underwent septoplasty. while in 4 (3.92%) patients septorhinoplasty was done for combined deviated nasal pyramid and deflected nasal septum.

DISCUSSION

According to the literature, the nasal trauma has been increasingly progressed during recent five decades due to increasing incidence of vehicle accidents and civil violence. Males are more commonly involved in traffic accidents and violence, thus, nasal bone fractures show a male predilection. In our study, we found a male preponderance of 5:1 which is in agreement with the reports of Stephen W. et al, (3:1)¹⁰ and Hussain SS, et al, (6:1)¹¹. The majority of our patients were found in the age group of 11 to 30 years (67.64%) similar to the study done by Green KM (15-30 years)¹² and also reported by Stephen et al (15-40 years)¹⁰. In our study, the most common causes of nasal fractures in descending order were violence (41.18%), traffic accidents (38.24%), accidental fall (13.72%) and sports injury (6.86%). Park CH et al¹³, in their series noted the most common causes being violence (46.67%), traffic accidents (26.66%), and accidental fall (20%) in that order. Hwang K; et al, noted the most common causes being fights (34%), accidents (28%), and sports injuries (23%) in his study of 236 cases¹⁴. According to Khan SU, the most common cause was road traffic accident 168 cases(56%), followed by accidental fall 69 cases (23%), gunshot injuries 27 cases (9%), sports related injuries 15 cases (5%), and injury associated with a fight 12 cases (4%); there were only 9 cases of animals related injuries (3%)¹⁵. We have followed the more simple classification as used by Ogava T., et al¹⁶. In our study, the most common type of fracture in descending order are displacement type (72.55%), depressed type (12.75%) mixed type (07.84%) and non-deformation type (06.86%). Ogava T., et al, in their study found the incidence of these types to be 36.64%, 24.14%, 13.79%, & 13.79% respectively¹⁶. In our study, the mean time-to-reduction after nasal injury was 2.30 hours as opposed to Park CH et al, who had a mean

time to reduction of 2.3 days¹³. This is because in our study 78.48% of the patients presented within three hours of injury. Different studies stated that plain radiographs are not helpful in the diagnosis or management of nasal fractures in isolated nasal injury because it fail to reveal 50% of clinically evident fracture since it will not show cartilage fracture and vascular markings are easily confused with a fracture^{17,18,19,20}. The nasal radiograph was primarily done for medico-legal purposes. However we do not agree with the insignificance of nasal radiograms. Because at times, patients do not complain of any deformity or deviation but nasal radiogram shows a fracture line at the nasal bone, but without any displacement. Such cases were labelled as a nondisplaced fracture. Radiological examination is also very important as once the fracture is reduced; the evidence of the fracture can no longer be detected. Moreover it is used to differentiate lateral type of fracture from frontal type and helpful in diagnosing concomitant sinus or orbital rim fracture. Most of the time patients often feel that their treatment is not adequate unless they have had an X-ray²¹. Rohrich R J and Brain P et al reported 9 to 17% and 50% incidence of post reduction nasal deformities requiring open reduction^{8,9}. We encountered post reduction residual nasal deformities in 18 patients (17.64%) who underwent rhinoplasties (osteotomies) and septorhino-plasties at later stage.

CONCLUSION

Closed reductions of a nasal bone soon after injury is the treatment of choice in uncomplicated nasal bone fractures and provide good cosmetic and functional results with minimal post reduction deformities.

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