

A Ten-year Retrospective Study of Nasal Bone Fractures at a Tertiary Care Hospital of Nepal

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ABSTRACT:

Introduction: Nasal bone fracture occurs due to its vulnerable position and reduced biomechanical resistance to traumas. If not timely treated, it can result in permanent functional and esthetic damage. **Methods:** A retrospective and cross-sectional study conducted in 91 patients above 17 years of age with nasal bone fractures in the Department of Otorhinolaryngology and Head and Neck surgery of a tertiary care hospital in Kavre. **Results:** Road traffic accident was the most common cause of fracture (45.1%) followed by fall (36.3%), violence (13.2%), sports related accidents (4.4%) and occupational accidents (1.1%). Class I fracture was seen in 70 (76.9%), Class II in 17 (18.7%) and Class III in 4 (4.4%). A closed reduction procedure was performed in 74 (81.30%) of the cases, closed reduction with septoplasty was done in 10 (11%), closed reduction with augmentation rhinoplasty was performed for 3 (3.3%), closed reduction with inferior turbino-plasty was required in 3 (3.3%) whereas closed reduction with debridement was done in 1(1.1%). **Conclusion:** Nasal bone fracture is a complex clinical issue which needs to be addressed early. Violence prevention programs along with drinking and driving campaigns need to be more strengthened to decrease the alarmingly high frequency of nasal bone fracture in the current scenario.

Keywords: Closed reduction; Complication; Nasal bone fracture

INTRODUCTION:

The nasal bone is commonly fractured due to its vulnerable position and reduced biomechanical resistance to traumas, fracturing even as a result of the action of wounding agents that develop low intensity kinetic energy.[1] Nasal bone fracture is the most common facial fracture, accounting for approximately 40% of all facial fractures.[2]

Submitted: 24 March, 2021

Accepted: 03 June, 2021

Published: 20 June, 2021

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If not properly and timely treated, nasal bone fractures can result in permanent functional and esthetic damage, lead to complications in the upper airway,[3] and necessitate septoplasty or augmentation rhinoplasty. It can also affect social activities and may result in economic and psychological problems.[4] There is paucity of data relating to nasal bone fractures in our region. Hence, the aim of this study is to analyze the socio-demographic factors, etiology and patterns of nasal bone fractures. Understanding about the patterns, etiology and complications can help the health planners and policy makers to specifically address the burden of nasal bone fractures.

How to cite this article:

Pokharel M, Karki S, Dhakal A, KC AK, Shrestha KS, Rajbhandari P, Neupane M. A Ten-year Retrospective Study of Nasal Bone Fractures at a Tertiary Care Hospital of Nepal. Journal of Lumbini Medical College. 2021;9(1):5 pages. DOI: <https://doi.org/10.22502/jlmc.v9i1.426>. Epub: June 20, 2021.



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METHODS:

This was a retrospective, cross-sectional study conducted in the Department of Otorhinolaryngology and Head & Neck Surgery at the Kathmandu University Dhulikhel Hospital between January 2010 to January 2020. The study population consisted of 91 adult patients more than 17 years with nasal bone fractures. Patients were excluded if they were ≤ 17 years, were pregnant or had undisplaced fractures which did not require correction. Patients who had Le Fort fractures, zygomaticomaxillary complex fractures, dentoalveolar fractures or mandibular fractures, previous facial fractures or aesthetic surgeries were also excluded. Similarly, patients with acute rhinosinusitis, malignancy of the nose and paranasal sinuses, soft tissue injuries were also not enrolled.

The age, gender, etiology, associated injuries, type of fracture and treatment offered, alcohol intoxication, time elapsed after fracture until surgery, presenting symptoms, drug abuse were recorded. Etiologies of fractures were grouped into road traffic collisions, fall, violence, sports accidents and occupational accidents. A detailed clinical data proforma was filled up.

In addition, assessment was done by using plain radiographs of the nasal bone in lateral view. In 48 patients, computed tomography scan of the nose, paranasal sinuses and the facial skeleton were taken for effective preoperative evaluations and to confirm the clinical diagnosis.

From the axial scan, a three dimensional reconstruction was performed using the Syngo via software using a volume and surface rendering technique in Siemens somatom perspective 128 slice Computed tomography scanner.

Nasal fractures were classified according to the Harrison's classification system into three categories depending on the degree of damage as Class 1, Class 2 and Class 3 fractures. Depressed fracture of nasal bone where very little force is sufficient to cause a fracture was defined as Class 1- Chevallet fracture. Fracture causing significant amount of cosmetic deformity in which not only the nasal bones were fractured, but the underlying frontonasal process of maxilla was also fractured and the fracture line involved the nasal septum was defined as Class 2. Then orbitoethmoid fractures

caused by high velocity trauma causing the most severe nasal injuries were defined as Class 3 fractures.[5]

In the current study, open reduction under general anesthesia was performed for more accurate nasal bone reduction and intraoperative pain reduction. All patients except for the type I group underwent closed reduction with external nasal splinting under general anesthesia. Intravenous antibiotics were prescribed and antiseptic impregnated ribbon gauze packing was done for two days. External nasal splint was applied to all patients for a total of 10 days.

Statistical analysis was performed using the IBM SPSS software (version 22.0; IBM Corp., Armonk, NY, USA).

Ethical approval was granted by Kathmandu University School of Medical Sciences Institutional Review Committee (No.-139/20)

RESULTS:

Of the 91 patients, 65 (71.4%) were males and 26 (28.6%) were females. The mean age of patients was 30.1 ± 11.2 years (range: 18-73 years). Table 1 shows the socio-demographic characteristics of the patients.

Table 1. Sociodemographic characteristics of the study population (N=91).

Variables	Frequency (%)	
Sex	Male	65 (71.4)
	Female	26 (28.6)
Alcohol intake at presentation	Yes	43(47.3)
	No	48(52.7)

Road traffic accident was the most common cause of fracture (45.1%) followed by fall (36.3%), violence (13.2%), sports related accidents (4.4%) and occupational accidents (1.1%) as shown in Table 2.

Our findings showed that physical assault was the most common cause of nasal bone fracture among people in their twenties, with its frequency decreasing with increase in age. Similarly, we also observed a striking decrease in the frequency of sports-related fractures among patients aged 40 years and above. In the age group analysis, the most

Table 2. Relationship between etiology of fracture and alcohol consumption during the time of occurrence of fracture.

Alcohol intake	Etiology					Total
	Road traffic collision	Fall	Violence	Sports related trauma	Occupational trauma	
Yes	32 (74.4%)	4 (9.3%)	7 (16.3%)	0 (0%)	0 (0%)	43(47.3%)
No	9 (18.8%)	29 (60.4%)	5 (10.4%)	4 (8.3%)	1 (2.1%)	48 (52.7%)
Total	41 (45.1%)	33 (36.3%)	12 (13.2%)	4 (4.4%)	1 (1.1%)	91 (100%)

common age group involved was 21-30 years. Class I fracture was seen in 70 (76.9%), Class II in 17 (18.7%) and class III in 4 (4.4%). Altogether 43 (47.3%) of patients who presented with fractures were under the influence of alcohol as shown in Table 2. Sixty four (70.3%) patients presented in <3 days, 18 (19.8%) presented within 3 days to 1 week, 2 (2.2%) in more than 1 week to 2 weeks, 2 (2.2%) in >2 weeks to 3 weeks and 5 (5.5%) presented in >3 weeks. A closed reduction procedure was performed in 74 (81.3%) of the cases, closed reduction with septoplasty was done in 10 (11%), closed reduction with augmentation rhinoplasty was performed for 3 (3.3%), closed reduction with inferior turbinoplasty was required in 3 (3.3%) whereas closed reduction with debridement was done in 1(1.1%). The various complications that occurred in our patients are depicted in Table 3.

Table 3. Complications occurring in patients with nasal bone fractures.

Complication	Class 1	Class 2	Class 3	Total
Hump nose	6	10	1	17 (18.7%)
Saddle nose	1	0	4	5 (5.4%)
Nasal widening	8	1	1	10 (10.9%)
Deviated nasal septum	13	3	0	16 (17.5%)
Hyposmia	12	2	1	15 (16.5%)
Pain	44	12	2	58 (63.7%)
Scar formation	18	15	3	36 (39.6%)

DISCUSSION:

The objective of this study was to analyze the socio-demographic factors, etiology and patterns of nasal bone fractures. In the present study, there was male preponderance in all age groups. This

may be attributable to the fact that males are more exposed to activities such as drinking, driving, and physical assault which entail a high risk of fracture as compared to females. Also, more social freedom given to men as compared to women may be a contributory factor for the same especially in a conservative country like ours. Our findings are comparable to previous studies.[6,7]

We found that patients in their twenties showed the highest incidence of fracture, with the frequency gradually decreasing with increase in age. This result is also consistent with the findings of a previous study.[7]

People in the age group of 20–29 years are often exposed to trauma because of their high levels of physical and social activities thus resulting in increase in their chances of being exposed to trauma and hence nasal bone fracture. However, our findings are different from another study which has reported an increasing rate of fractures in the elderly.[8]

Our findings showed that physical assault was the most common cause of nasal bone fracture among people in their twenties, with its frequency decreasing with increase in age. Similarly, we also observed a striking decrease in the frequency of sports-related fractures among patients aged 40 years and above. This may be explained due to the fact that younger aged individuals are more involved in physical and interpersonal activity under the influence of alcohol.

Surveys of facial injuries have shown that the etiology of fractures varies from one country to another and also within the same country depending on the prevailing socioeconomic, cultural and environmental factors.[9,10] In our study, road traffic accident was the most common cause of fracture followed by fall and violence. Sports related accidents and occupational accidents constituted a minority. This is in accordance with other studies.

[11,12,13] However, some other authors have reported the most common cause of facial fracture as assault or fall.[8,14,15] There may be many factors associated with increase in the rate of road traffic accidents in Nepal like violation of the traffic rules, unsuitable road conditions, use of alcohol or other intoxicating agents. Also, people in the villages climb mountains and trees to get leaves to feed their livestock which may be the reason for fall. Other than these reasons, the violence between people is also common in many societies due to consumption of alcohol and drugs.

Our study also has some limitations. Since it is a single centered study, our findings cannot be generalized. Another potential limitation is the retrospective nature of study. Moreover, this study excluded patients with a nasal bone fracture who received conservative treatment and were not admitted to the hospital. Also, those who belonged to pediatric age groups were excluded which explains the moderate sample size in our study.

CONCLUSION:

Nasal bone fracture is a complex clinical issue which needs to be addressed early. Reduction and alignment of nasal bone fracture should be carried out within 2-3 weeks time. Acute saddling may require early surgical intervention in order to restore the septal height for good aesthetic purpose. Our findings suggest that violence prevention programs along with drinking and driving campaigns need to be more strengthened to decrease the alarmingly high frequency of nasal bone fracture in the current scenario.

ACKNOWLEDGEMENT:

Dr. Laxmi Khadka.

CONFLICT OF INTEREST: The authors declare that no competing interests exist

SOURCE OF FUNDS: No fund was requested

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