

ORIGINAL RESEARCH

Nasal bone fracture: mode of injury, management and complications at a tertiary care centre

¹Dr. Rupanjitasangma, ²Dr. Prakash Patel, ³Dr. Siddique Hassanul Masud

¹Head of Department, ^{2,3}Postgraduate Trainee, Department of Otorhinolaryngology, Assam Medical College and Hospital, Dibrugarh, Assam, India

Corresponding author

Dr. Prakash Patel

Postgraduate Trainee, Department of Otorhinolaryngology, Assam Medical College and Hospital, Dibrugarh, Assam, India

Received Date: 23 August, 2024

Accepted Date: 28 September, 2024

ABSTRACT

Background – Nasal bonefractures are most common fractures in facial trauma since it is most prominent structure of the mid face. Aim of the study was to analyse the mode of injury, management and complications of nasal bone fractures. Special attention was paid to age distribution, gender distribution, mode of injury, nature of injury, management and sequelae of nasal bone fractures. **Method** – This was a hospital based retrospective observational study carried out on 50 patients with nasal bone fractures attending the department of Otorhinolaryngology of a tertiary care centre during period of 1 year. Data were analysed in tabulated form with regard to age, gender, mode of injury, nature of injury, type & pattern of injury, management and complications of nasal bone fractures. **Results** – The average age of patients with nasalbone fracture was 35.2 years with predominance of male sex (74%). The main mode of injury was RTA (38%) followed by fall (24%). 74% patients found with undisplaced fractures were managed conservatively. Most common presentation was nasal bleed (52%). 42% patients found with septal fractures. septal deviation was found to be most common complication (62%). Under treatment of nasal trauma could lead to significant long-term problems like septal deformities (external nasal deformities). **Conclusion-** Theundisplaced fractures should be managed conservatively. Closed reduction is management of choice in displaced nasal bone fractures without complications. Open reduction to be done either Immediately in displaced nasal fractures using wide surgical exposure or delayed correction (usually > 6 months) of persistent nasal deformities using the standard techniques of rhinoplasty or septorhinoplasty (like osteotomy, dorsal rasping, cartilage graft augmentation).

Keywords- Clinical features, mode of injury, nasal bone fractures, management, complications, RTA(road traffic accident).

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

INTRODUCTION

The prominence and delicate structure of the nose make it vulnerable to a broad spectrum of injury, which accounts for why it is the most frequently fractured facial bone. Sports, falls, and assaults are the usual mechanisms responsible for the majority of nasal fractures, with alcohol consumption being an important contributing factor in many cases. Males are affected approximately twice as often as females in both the adult and paediatric populations. Deformity, swelling, epistaxis, and periorbital ecchymosis are signs that are suggestive of nasal fracture, whereas bony crepitus and nasal segment mobility are diagnostic.¹

Relatively little force is required to fracture the nasal bones, as little as 25–75 lb/in. Subsequent refracture rates of 5% have been reported. The peak incidence is in the 15–30-year age group when assaults, contact

sports and adventurous leisure activities are more common. In childhood, accident-prone toddlers not infrequently fracture their noses as well and these are often of a greenstick nature. Compound and comminuted fractures are more common in the elderly who are prone to falls.²

In addition to being a crucial diagnostic tool for nasal bone fractures, radiological reports serve as an objective legal record in criminal proceedings. Lateral nasal radiography is typically employed as the gold standard for supporting the clinical diagnosis of nasal fracture. Nevertheless, ultrasonography and computed tomography (CT) might also be utilized to support the diagnosis.³

The treatment of nasal fractures varies according to age, pattern of nasal fracture, involvement of septum, associated injuries to adjacent structuresor any other systemic comorbidities.Initial management include

control of epistaxis and closure of any external skin or internal nasal lacerations. Conservative management is recommended in patients with no obvious nasal deformity or airway obstruction. closed reduction recommended in case of nasal deviation and airway obstruction, with instrument like a Boies or Sayre elevator and walsham or asch forceps and a splint is applied to nasal dorsum. Openseptorhinoplasty to be delayed in initial period due to local edema and to be done 3 to 6 months post-injury.⁴

The complications divided in early (epistaxis, septal hematoma, csfrhinorrhoea, septal infection) and late (septal deviation, spur, synechia, saddle nose). Injuries in children may also lead to devastating growth retardation of the nose and midface. Thoughtful assessment and proper management of nasal injuries can reduce the risk of these sequelae, thereby reducing the need for delayed corrective septorhinoplasty.¹

AIMS AND OBJECTIVES

Aim of this study was to analyse the mode of injury in nasal bone fractures and management & complications of nasal bone fractures.

MATERIALS AND METHODS

This is a hospital based retrospective observational study. Patients with nasal fractures were taken in the study who presented in the department of otorhinolaryngology in a tertiary care centre in upper assam region. The study period was from November 2022 to October 2023 and the patient follow up period was 8 weeks. The data of patients were taken from the patient's medical records and divided into following variables – age, gender, mode of injury, nature of injury, type of fracture, pattern of fracture, management and complications.

INCLUSION CRITERIA

Patients with nasal bone fractures with computed tomography (CT) scan confirming the diagnosis, side and site of the fracture.

EXCLUSION CRITERIA

Patients with fractures other than nasal bone fracture (associated faciomaxillary fractures) and loss of post treatment follow up period of 8 weeks.

RESULTS AND OBSERVATIONS

After evaluation of medical records, 55 patients with nasal fractures were identified in the study period. From which 5 patients were excluded based on the exclusion criteria. The study inclusion criteria were met by 50 patients. The mean age of the patients was 34.8 years; 34% of the patients were in age group 31-40 years (fig. 1). Male were affected more than female; male female ratio – 2.8 (fig. 2). Most common mode of injury was road traffic accidents which was noted in 22(44%) patients (Table 1). 33(66%) of them presented with history of lateral blow to nose (Table 2, fig. 3). The type of fracture was undisplaced in 37(74%) patients in the study (Table 3, fig. 5). 28(56%) patients were diagnosed with unilateral nasal bone fracture (Table 4). 37(74%) patients were managed with conservative management (Table 5) and one patient undergone septorhinoplasty after 4 weeks of the injury (fig. 7). On follow up of 8 weeks 13(26%) patients developed post injury complications, out of that common early complication was septal hematoma and late complication was septal deviation which were found in 2(15.20%) & 8(62%) patients respectively (Table 6).

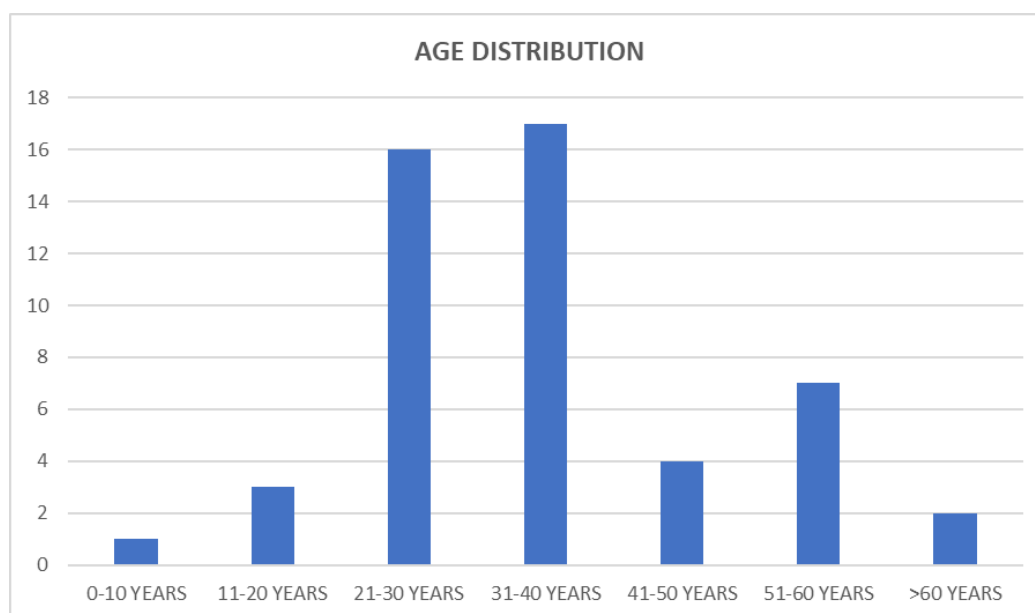


FIG. 1: THE FREQUENCY OF AGE GROUPS (mean age – 34.8 years)

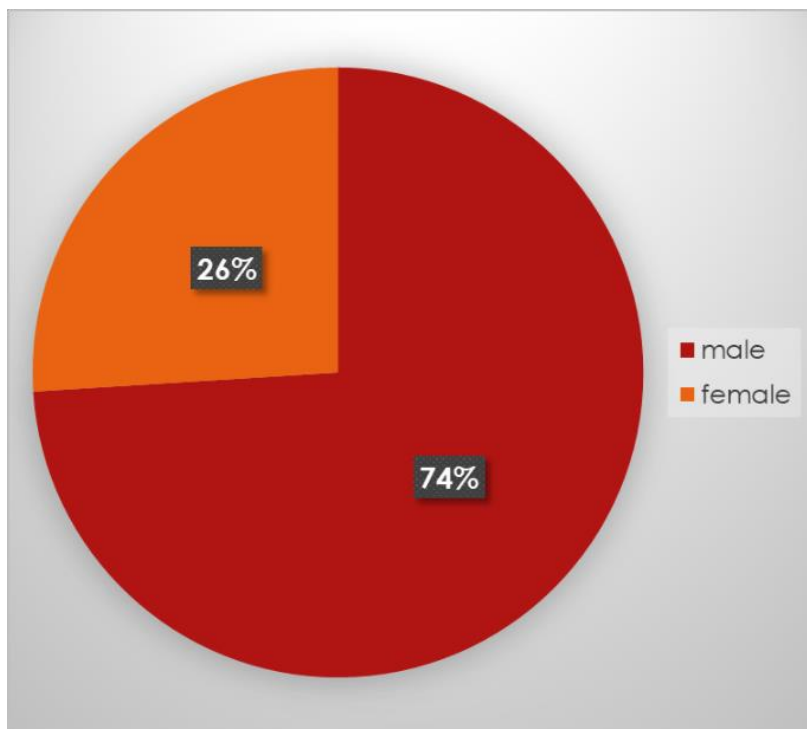


FIG. 2: GENDER DISTRIBUTION(MALE : FEMALE RATIO – 2.8, 37 MALE; 13 FEMALE)

TABLE 1: MODE OF INJURY

MODE OF INJURY	NO. OF CASES	PERCENTAGE (%)
SPORTS	5	10
FALL	14	28
ROAD TRAFFIC ACCIDENTS	22	44
ASSAULT	9	18
1. Domestic violence	6	12
2. Others	3	6

TABLE 2: NATURE OF INJURY

NATURE OF INJURY	NO. OF CASES	PERCENTAGE (%)
LATERAL BLOW	33	66
FRONTAL BLOW	17	34



FIG. 3: LATERAL BLOW (CROOKED NOSE DEFORMITY)



FIG. 4: FRONTAL BLOW (SADDLE NOSE DEFORMITY)

TABLE 3: TYPE OF NASAL BONE FRACTURES

TYPE	NO. OF CASES	PERCENTAGE (%)
UNDISPLACED	37	74
DISPLACED	13	26



FIG. 5: UNDISPLACED NASAL BONE FRACTURE

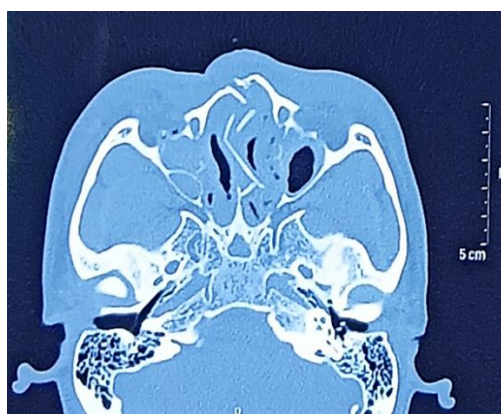


FIG. 6: DISPLACED NASAL BONE FRACTURE

TABLE 4: PATTERNS OF NASAL BONE FRACTURES

PATTERN	NO. OF CASES	PERCENTAGE (%)
UNILATERAL	28	56
BILATERAL	7	14
OPEN BOOK(SPLAYED)	2	4
IMPACTED	2	4
GREENSTICK	4	8
COMMUNUTED	7	14

TABLE 5: MANAGEMENT

MODE OF REDUCTION	NO. OF CASES	PERCENTAGE (%)
CONSERVATIVE	37	74
CLOSED REDUCTION	11	22
OPEN REDUCTION	2	4

**FIG. 7: CASE OF NASAL BONE WITH SEPTAL FRACTURE WHERE SEPTORHINOPLASTY WAS PERFORMED****TABLE 6: COMPLICATIONS**

COMPLICATIONS	NO. OF CASES	PERCENTAGE (%)
EARLY		
1. SEPTAL HEMATOMA	2	15.20
2. SEPTAL INFECTION	1	7.6
3. CSF RHINORRHEA	0	0
DELAYED		
1. SEPTAL DEVIATION	8	62
2. SPUR	0	
3. SYNECHIAE	1	7.6
4. SADDLE NOSE	1	7.6

DISCUSSION

In our study commonly involved patients were males (74%) ranging from age group of 31-40 years, mean age being 34.8 years. In similar study done by M. Bremke et al where they observed in their study that the mean age of the patients with nasal bone fractures was 29.6±15.6 years with dominance of the male (77%).⁵ In study by Tiffany T Pham et al male (74.8%) patients with a mean age of 45.6 years were found.⁶ In chiehchou et al mean age was 32.2 years with male predominance (66.5%)⁷ and in study done by M. Juncar et al common age group is 20-29 years with 88.3% male cases.⁸

The most common mode of injury in our study was road traffic accidents (44%), supported by Tiffany T Pham et al where also common mode of injury was RTA (27.5%).⁶ Similarly in a study by chiehchou et al also reported 49.5% cases with road traffic accidents in their study.⁷ Whereas in study by M. Juncar et al physical assault was the common cause (43.24%)⁸ and in study by M. Bremke et al. Observed in 2009 that main etiologies were falls (30%), in elderly patients often caused by cardiac syncopes (28%).⁵

In our study mostly patients diagnosed with unilateral (56%) & undisplaced nasal bone fractures (74%) in contrast M. Juncar et al found in their study that 81.10

% patients diagnosed with displaced nasal bone fracture.⁸

In our study most of the patients (74%) managed conservatively and one case was managed with closed reduction with septorhinoplasty where as in study done by M. Juncar et al 51.35% patients managed with closed reduction with septoplasty.⁸

In our study total 26% patients developed complications following nasal fracture out of that septal deviation was common delayed complication (62%). M. Juncar et al found malunion as most common postoperative complication (76.5%)⁸ and in study done by Min hyubchoi et al septal deviation was the most common complication (87.71%).⁹

CONCLUSION

The most common mode of injury in nasal bone fractures is road traffic accidents and young male population affected the most. Undisplaced fractures to be managed by conservative management and closed reduction is best for isolated, unilateral nasal bone fractures and open reduction to be done for bilateral, depressed fracture with septal involvement. Most appropriate timing for fracture reduction is 3 days to 2-3 weeks after the injury since in first 2-3 days local edema will subside and there will be fibrous

connective tissue development on further delay. The most common early complication was observed as septal hematoma & septal deviation was found to be most common delayed complication.

Contribution of authors

- All have contributed equally.
- This article is original & does not violate any copyright or any other right of any third party.
- This article is not published (whole or in part) elsewhere in any form, except as provided herein.
- All authors have reviewed the final version of this manuscript and approved for publication.
- Conflict of interest – none
- Financial disclosure – no financial support received

REFERENCES

1. Cummings Otolaryngology Head & Neck Surgery 5th Edition, volume 1, page no. 496-507.
2. Scott-Brown's 8th Edition of Otorhinolaryngology Head and Neck Surgery, volume 1, page no. 1183-1200.
3. Savas SA. The effect of a new topographic classification on determining the prognosis of nasal fracture and treatment modality. Turkish Journal of Trauma and Emergency Surgery. 2023; doi:10.14744/tjtes.2022.09406
4. Klinginsmith M, Katrib Z. Nasal Septal Fracture. [Updated 2022 Sep 26]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan.
5. Bremke M, Gedeon H, Windfuhr JP, Werner JA, Sesterhenn AM. Die Fraktur des Osnasale: Unfallmechanismen, Diagnostik, Therapie und Komplikationen [Nasal bone fracture: etiology, diagnostics, treatment and complications]. Laryngorhinootologie. 2009 Nov;88(11):711-6. German. Doi: 10.1055/s-0029-1224106. Epub 2009 Jun 26. PMID: 19562655.
6. Pham TT, Lester E, Grigorian A, Roditi RE, Nahmias JT. National Analysis of risk factors for nasal fractures and associated injuries in trauma. Craniomaxillofacial Trauma & Reconstruction. 2019;12(3):221–7. Doi:10.1055/s-0039-1677724
7. Chou C, Chen C-W, Wu Y-C, Chen K-K, Lee S-S. Refinement treatment of nasal bone fracture: A 6-year study of 329 patients. Asian Journal of Surgery. 2015;38(4):191–8. Doi:10.1016/j.asjsur.2014.09.002
8. Tent P, Juncar M, Juncar R, Harangus A, Rivis M. Etiology, pattern, and treatment of nose fractures: A 10-year cross-sectional cohort retrospective study. Nigerian Journal of Clinical Practice. 2021;24(11):1674. Doi:10.4103/njcp.njcp_52_21
9. Choi MH, Cheon JS, Son KM, Choi WY. Long-term postoperative satisfaction and complications in nasal bone fracture patients according to fracture type, site, and severity. Arch Craniofac Surg. 2020 Feb;21(1):7-14. Doi: 10.7181/acfs.2019.00626.