



AN ANALYTICAL STUDY OF NASAL BONE FRACTURE AND ASSOCIATION WITH OTHER ADJACENT FRACTURE IN RURAL POPULATION ON TERTIARY CARE CENTRE

Otorhinolaryngology

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ABSTRACT

The nasal bone is one of the commonest bone which got fractured due to mid face injury. We study and evaluate the association of adjacent bone fracture as frontal process of maxillary bone, nasal septum and bones of the orbital walls and propose the new classification system. We reviewed retrospectively total 621 patients with mid facial injuries and bone fracture. Among these the bilateral fracture of nasal bone was the most common (73.91%) and coexistent fracture of the frontal process of maxilla was 62.47% with fracture of bony nasal septum was 32.68%. The involvement of orbital walls was 15.7%. In the study we observed that males were affected majorly and the RTA was the major cause of injury. On study we conclude that injury to mid face causing fracture of nasal bone also affect or cause the fracture of adjacent bone of mid face.

KEYWORDS

Nasal bone fracture, comminuted, maxilla

INTRODUCTION

Following the injury to the face, mid face Injury is common presentation. There is demographics and epidemiological effect on incidence of trauma their evaluation helps to prevent such fractures [1].

Mid facial fracture differ, in type, severity and cause, depending on the population [2].

Involvement of nasal bones is much more common among the mid bone fracture in otolaryngology department with traffic accidents, assaults and falls as the major causative factors [3]. Mid facial injuries with maxilla facial fracture commonly associated with fracture of adjacent bones most commonly orbital bones. These patients present with major ophthalmic sign and symptoms. Facial trauma is a major public health concern, both physically and psychologically, another and has significant effect on socioeconomic consequences due to do cost of treatment and loss of income due to gap in working days [4]

Plain radiograph of nasal bone (water View) used to diagnose the nasal bone fracture but it has the limited use to diagnose the medial or inferior orbital walls, and bony nasal septum. For better detailed evaluation we use CT head or CT head and Orbit [5].

The traditional classification system proposed by Markowitz et al widely used for the diagnosis and treatment of mid facial fractures.

MATERIALS AND METHODS

The study Carried out in the otorhinolaryngology department in Government medical College Saharanpur from 1st Jan 2022 to 31 Dec 2022. Total 736 patients had managed with mid facial injury and reviewed retrospectively. Out of these 736 patients 589 patients found to have fracture of nasal bone based on radiographic imaging.

The patients with nasal bone fracture divided in to the groups based on classification system of NOE fracture. Other than these there were 32 patients with comminuted midfacial fracture (type 2 or type 3 NOE fracture) caused by RTA or fall from height were enrolled for the study. The 147 patients diagnosed with no fracture of midfacial bone were excluded from the study.

We include all the demographic data as age, gender, aetiology of trauma. We evaluate all the associated coexisting fracture of frontal process of maxilla, bony nasal septum and orbital walls.

RESULT

Total no. of 621 patient ,534 male (85.6%) and 87 females (14.33%). Patients with age 18-60 years with facial bone fracture had attended and managed from 1st January 2022 to 31st December 2022.

These 621 patients include 589 patients which had mid facial injury with nasal bone fracture without comminuted midfacial fractures and there were 32 those patients included which had coexistent comminuted mid facial fracture.

The percentage for male and female patient were 85.6% (534 males) and 14.33% (87 females) irrespectively.

Table 1

		NO. Of patients	Percentage
1.	MALES	534	85.6%
2.	FEMALES	87	14.33%
	total	621	100%

In our study there was RTA which was the major cause of fracture or midfacial injury and comminuted fracture of mid facial bone. There were 408 patients (65.7%) were reported with injury due to RTA. There were 145 patients (23.34%) which had the fracture and injury due to assault and least no. of patients had the fracture due to fall from the height.

Table 2

S. No.	Cause of injury	No. of patients	Percentage
1.	RTA	408	65.7%
2.	Assaults	145	23.34%
3.	Fall from height	68	10.9%

Bilateral fracture of nasal bone was most common (459 cases ,73.91 %) and unilateral right or left side fracture of the nasal bone occurred in 94 (15.13%) and 68 cases (10.95%) respectively. Fracture in the distal portion of the nasal bone (484 cases, 77.93%) was more frequent than that in the proximal portion (137 cases, 22.06%) of nasal bone. There were 203 cases (32.68%) which had the fracture of bony nasal septum coexistent. But none of the patents developed the significant hematoma which requires drainage. Neither any patients developed any subsequent complications.

There were 98 cases (15.7%) reported with the involvement of orbital wall. Among these there were involvement of medial wall was higher than the inferior and lateral wall. There were 64 patients (65.3%) had the involvement of medial wall (36 patients had the fracture on right side and 22 patients have the fracture on the left side). There were 23 patients (23.46%) which had the fracture of inferior orbital wall. There were 3 patients reported with lateral orbital wall fracture having ipsilateral inferior orbital wall fracture along with (2 patients have fracture on the left side and 1 on the right side). Out of these 64 patients 6 cases having bilateral medial wall fracture. 8 patients having coexisting ipsilateral fracture of both the medial and inferior orbital walls.

There were 32 patients which have the co existent comminuted mid facial fracture. There was the involvement of the orbital walls along with nasal bone fracture, frontal process of maxilla. Bony septum and wounds for canthal insertion.

We categorise and subdivide the nasal bone fracture into 5 categories – 1.Type 1:

a) Unilateral or bilateral nasal bone fracture without bony displacement.

b) unilateral or bilateral nasal bone fracture with bony displacement.

2.Type 2:

a) Fracture of both the nasal bone and frontal process of the maxilla without bony displacement

b) Fracture of both the nasal bone and frontal process of the maxilla with bony displacement.

3.Type 3: Nasal bone fracture (with or without fracture of frontal process of maxilla.). with concomitant fracture of bony nasal septum

4.Type 4: In addition to fracture of nasal bone, the presence of co existent fracture of orbital walls

5.Type 5: Comminuted mid facial bony fractures

Table 3

	Category of fracture	No. of patients	Ratio (%)
1.	Type 1a	53	8.53%
2.	Type 1b	78	12.56%
3.	Type 2a	65	10.46%
4.	Type 2b	128	20.61%
5.	Type 3	196	31.56%
6.	Type 4	70	11.27%
7.	Type 5	31	4.99%

DISCUSSION

In the clinical practice it is far more common to have medium impact mid facial fracture. Although they are less severe but there are high chances of injuries of adjacent structures like frontal process of maxilla, Bony nasal septum and orbital walls. [6,7]

In case of assault and RTA there is high vulnerability to damage to nasal bone due to its location on the mid face. [8,9].

In our study there are much more incidence of bilateral nasal bone fracture rather than unilateral fracture. Agnihotri et al [10] also reported nasal bone as the most common site of injury.

In our study it is observed that there are high chances of fracture of frontal process of maxilla (62.47% patients) due to external force exerted over mid facial region causing nasal bone fracture.[11].

Other adjacent bones which are commonly got injured was the nasal septum. We reported the incidence of nasal septum fracture is 31.56%. The continuum of bony septum with nasal bone is the main cause for higher incidence of co fracture.

In our study we found that there is 11.27% of incidence of fracture of these orbital walls. These 589 patients did not report with any extraocular muscle entrapment and no vision affected in these patients. But 32 patients had comminuted fracture present with ophthalmic and otorhinolaryngological complains needs to be managed with multidisciplinary team to restore aesthetic and function.

The patients categorized from type 1 to type 4 did not need any immediate or open reduction. The patients fall in category type 1a and type 2a did not have any bony displacement so they managed only conservatively. Patients having type 1b and type 2b fracture usually required closed reduction immediately or within 7 days to 10 days after swelling decreased [12]. In case of type 3 fracture the patients had the fracture of coexistent fracture of nasal bone and bony nasal septum needs surgical intervention if there is nasal obstruction persist even after the swelling due to fracture nasal bone resolved. Patients with type 4 fracture managed conservatively. If there was disorder of ocular mobility, enophthalmos or vision reduction immediate ophthalmic evaluation and management done. The type 5 fracture needs open reduction or immediate surgical intervention.

CONCLUSION

Any trauma or midfacial injury leads to nasal bone fracture along with more provability of injury to adjacent bony structures including the frontal process of the maxilla, nasal septum and orbital walls. The classification proposed in the study helps to understand incidence of coexistence of adjacent bone fracture with nasal bone in midfacial trauma and it help in plan of treatment according the category of bony structures involved.

In our study we conclude that RTA was the leading cause of maxillofacial fracture followed by assault, fall from height. Majorly males are more prone to injury due to their more involvement of outdoor activity.

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