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NASAL BONE FRACTURE OVERVIEW AND ITS SURGICAL OUTCOME

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Abstract

Background: Nose is most prominent part of face and nasal bones are most commonly fractured during road traffic accident or accidental trauma. Many patients with nasal bone fracture do not take treatment so fracture may go undiagnosed. Nasal bone fracture leads to structural & functional abnormality of nose.
Aim & Objective: Aim of study was to evaluate operative outcome after close reduction according to type of nasal bone fracture.
Method: Study was conducted in Mahaveer Medical College, Bhopal Department of ENT. Total 157 patients were selected with fracture nasal bone, from February 2021 to 2022 (01 years), all underwent closed reduction.
Results: Post-Operative CT image showed 94 patients with excellent result, 49 with good result, 10 subject with fair result & 4 patients showed poor reduction of fracture nasal bone.
Conclusion: Fracture nasal bone reduction immediate after CT-Scan showed better result in FI, LI, LII type than FII and C Type.

Keywords: Fracture, nasal bone, fracture reduction, types of fracture

Introduction

In our body nose is most anteriorly protruding structure so it leads to most common bone fracture as compared to other bone fractures. Most of us are daily facing difficulty and challenges in diagnosis and treatment of nasal bone trauma. Nose is composed of cartilage and bone and nasal bone having superior thick part and inferiorly thin bone. Nasal trauma may be due to two types of impact lateral impact and head on impact [1-5].
Stranc and Robertson Classification of nasal bone fracture.

a) Frontal impact group (FI and FII)

Type-I [FI]: Only lower end of nasal bones fracture.
Type-II [FII]: Proximal portion of nasal bone and frontal process of maxilla fracture.

b) Lateral impact group (LI and LII)

Type-I [LI]: Unilateral displacement of nasal bone into nasal cavity.
Type-II [LII]: Moderate internal displacement of the ipsilateral nasal bone accompanied by some outward displacement of contralateral nasal bone.

c) Comminuted fracture group

[C] Multiple segmental fractures with depression.
Surgical outcome depends upon type of fracture [6-8]. Proper pre-operative consent should be taken before fracture reduction and patient should be informed that even with closed reduction he or she may need septorhinoplasty if nasal deformity persists after close reduction.

Aims & Objective

To evaluate surgical outcome of fracture nasal bone reduction according to type of nasal bone fractures.

Material &Method

Study was conducted in Department of Otorhinolaryngology in Mahaveer Medical College and Hospital, Bhopal from February 2021 to 2022 (01 years). Total 157 patients were taken with age group 15-45year who were having only isolated nasal bone fracture. Close reduction was done under local anesthesia by same surgeon. Plain X ray nasal bone lateral view bilateral side was in our baseline investigation. CT scan nose and surrounding area was done both pre and post operatively in all patients.
Patient who needed revision nasal surgery or open reduction or age less than 15 years were excluded from our study
All patient in our study were admitted, routine investigation done for close reduction under local anesthesia of a 2% lidocaine with adrenaline solution at a concentration of 1:200,000 and intranasal 10% lidocaine spray. Asch and Walsham forceps is used for fracture reduction and plaster of paris dressing is applied for minimum seven days. Each Patient subjected to computed tomography (CT) Scan with 1 mm thickness slice before & immediate after surgery to compare outcome of surgery.
We classified patients as Excellent, Good, Fair and Poor on the basis of post-operative CT scan nose after closed reduction of fracture nasal bone. [Table 1].Meyeres grading [9] was used for aesthetic and functional outcome as Excellent, Very good, Good Average and poor result. [Table 2]

Post-operative surgical outcome was evaluated as

Excellent-Nasal deviation is absent.
- Arch shape is Smooth.
- No malalignment of the fracture segment.

Good-Nasal deviation is absent.
- Arch shape is Smooth.
- Fracture segment is malalign (one segment)

Fair-Nasal deviation is absent.
- Arch shape is Smooth.
- Fracture segment is malalign (both segment).

Poor-Nasal deviation is present.
- Arch shape is not smooth.
- Both segments are malalign.

Table 1: The classification criteria according to the results of closed reduction [1]

Criteria	Excellent	Good	Fair	Poor
Deviation	-	-	-	+
Overall shape of arch	Smooth	Smooth	Smooth	Irregular
Misalignment of fracture segment	-	+	+	+
Bony irregularity	-	One segment or	One segment and	One or two segment and
Bony displacement	-	One segment	One segment	One or two segment

Results

Out of 157 patients 99 were male & 58 were female with mean age was 30.4 years. 58 fractures were caused by road traffic accident, 32 by bumping caused by slips or falls, 20 were caused by assault and 47 were caused by Sports activity.

Out of 157 patients FI-42, FII-13, LI-47, LII-43, C-12 post-operative results shows 94 patient with excellent result, 49 with good result, 10 with fair result & 4 patient showed poor reduction of fracture nasal bones.[Table 3]

The proportion of excellent results in each type were 66.7% in FI, 53.8% in FII, 61.7% in LI, 62.7% in LII, and 25% in C type. The p value of the difference between each proportion of excellent results by fracture type was <0.001 which is significant. Overall the patients without septal fracture the result was better.

22 patients had post-operative complications like nasal deviation in 10, saddle nose in 3, nasal widening in 4, hump nose in 2 patients, nasal airway obstruction in 2 and temporary hyposmia in 1 patients. [Table 4]

Table 2: Operation result

Operation result	Aesthetic status			Functional status		
	Pre Op	Post Op	P Value	Pre Op	Post Op	P Value
Excellent	0	57	<0.0001	0	59	<0.0001
Very Good	0	40		0	40	
Good	0	37		0	38	
Fair	0	9		0	10	
Poor	0	14		0	10	
Total	0	157		0	157	

Table 3: Operation result

Operation result	FI			FII			LI			LII			C			Total
	-	+	Sub total	-	+	Sub total	-	+	Sub total	-	+	Sub total	-	+	Sub total	
Excellent	14	14	28	1	6	7	20	9	29	3	24	27	1	2	3	94
Good	3	6	9	1	3	4	10	7	17	1	14	14	0	5	5	49
Fair	1	2	3	0	2	2	0	1	1	0	1	2	0	2	2	10
Poor	1	1	2	0	0	0	0	0	0	0	0	0	1	1	2	04
Total	19	23	42	2	11	13	30	17	47	4	39	43	2	10	12	157

FI-Frontal impact group type I; FII, frontal impact group type II; LI, lateral impact

group type I; LII,lateral impact group type II; C, comminuted fracture group;- no presence of septal fracture or deviation; + presence of septal fracture or deviation.

Table 4: Complications

Complications	FI		FII		LI		LII		C		Total
	-	+	-	+	-	+	-	+	-	+	
Hump nose	0	0	0	1	0	0	0	1	0	0	2
Saddle nose	0	1	0	0	0	0	0	2	0	0	3
Nasal widening	0	1	0	0	0	2	0	1	0	0	4
Deviated nose	1	0	0	0	0	1	1	4	0	3	10
Nasal airway obstruction	0	0	0	1	0	0	0	1	0	0	2
Hyposmia	0	0	0	0	0	0	0	1	0	0	1
Total	2	3	0	1	2	3	1	7	0	3	22

FI-Frontal impact group type I; FII, frontal impact group type II; L-lateral impact group typeI; LII- lateral impact group type II; C-comminuted fracture group; -No presence of septal fracture or deviation; +Presence of septal fracture or deviation.

Discussion

Nasal bone fracture is most commonly involved fracture during facial trauma because of its natural projection anterior most. Road traffic accident is most common cause followed by sports injury, bump and physical assault[1].

Our study shows nasal bone fracture is more in male than female with ratio of 1.7:1. Study of MK change *et al*.[1] also showed same result. Mean age in our study is 31.4 years. Study of Koirala KP [10] showed mean age 26.2 years.

Rhee *et al*. [11] study shows that there is difference between the radiological findings and peri operative findings in the degree of septal fractures. In our study we performed CT Nose to visualize septal fracture also visualized preoperatively and fracture is reduced.Outcome again evaluated after surgery.

Prevalence of complications in FI 11.9%, FII7.6%, LI10.6%, LII 18.6% and C type was 25% similar result also found in study of Park and Lim *et al*.[12, 13].

Radiological investigations like X-ray nasal bone lateral view bilateral side and CT Scan nose and PNS play important role in not only accurate diagnosis of fracture nose but also post-operative evaluation of accuracy of surgery. In our study patient satisfaction rate is 87.2% whereas study of Love RL [14] showed satisfaction rate 88%. Most common complication presented post operatively were hump nose, saddle nose, nasal obstruction, deviated nasal septum and anosmia [1].

Routine bronchoscopic assessment of patients with mediastinal lymphadenitis can be attempted. Bronchoalveolar Lavage can be taken and cultures can reveal some infectious pathology and cytology may sometime point towards malignant etiology or rarely conditions like sarcoidosis. BAL is safe and inexpensive but is a very low yield procedure, previously necessitating surgical biopsy (cervical mediastinoscopy) to achieve microbial diagnosis in such case.Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) is a minimally invasive technique allowing sampling of mediastinal lymph nodes via fine needle aspiration under direct sonographic visualization. It has a low rate of morbidity and good diagnostic yield[3, 4].

Conclusion

Nasal bone fracture typically affects young adults mostly male due to more physical aggression. Closed reduction under local anaesthesia significantly gives good satisfaction rate both aesthetically and functionally. Fracture nasal bone reduction immediate after CT-Scan

showed better result in FI, LI, and LII than FII and C Types.

References

1. Change MK, Dong GH. Objective outcome of closed reduction according to the type of nasal bone fracture. Arch Craniofac. Surg., 18(1):30-36.
2. HK, Park YJ, Kim HS, Ryu JY, Kook MS, Park HJ, *et al*. A recent 5-year retrospective study on nasal bone fracture. J Korean Assoc. Oral Maxillofac Surg. 2008;34:230-6.
3. Chung SH, Park J, Choe J, Back SM. Clinical analysis of satisfaction of nasal bone reduction. J Korean Soc. Plast. Reconstr. Surg. 1994;21:98-1-90.
4. Hong SR. Choi BW, Suh IS, Ha JH. Clinical& radiological evaluation of the nasal bone fractures. J Korean Soc. Plast. Reconstr. Surg. 1996;23:1572-82.
5. Lee JH, Park WY, Nam HJ, Kim YH. Complications of the nasal bone fractures according to the stranc classification. J Korean Cleft Palate-Craniofac. Assoc. 2008;9:62-6.
6. Muraoka M, Nakai Y. Twenty years of statistics and observation of facial bone fracture. Acta Otolaryngol Suppl. 1998;538:261-5.
7. Han DG, Kim TS. The effect of half day nasal packing in results of closed reduction of nasal bone fracture. Arch Craniofac. Surg. 2012;13:119-24.
8. Stranc MF, Robertson GA. A Classification of injuries of the nasal skeleton. Ann Plast. Surg. 1979;2:168-74.
9. Lee BM, Han DG. Acute bone remodeling after reduction of nasal bone fracture on computed tomography imaging. Arch Craniofac. Surg. 2014;15:63-9.
10. Koirala KP, Sharma V. Post-Operative Outcome of Closed Reduction of Fracture Nasal Bone. International Journal of Anatomy, Radiology and Surgery. 2015 Oct;4(4):1-4.
11. Rhee SC, Kim YK, Cha JH, Kang SR, Park HS. Septal fracture in simple nasal bone fracture. Plast. Reconstr. Surg. 2004;113:45-52.
12. Park WY, Kim YH. A clinical study of the nasal bone fracture according to stranc classification. J Korean SocPlastReconstr Surg. 2008;35:289-94.
13. Lim KR, Kim HI, Ahn SM, Hwang SM, Jung YH, Song JK. Clinical analysis of the nasal bone fracture. J Korean Cleft Palate-Craniofac Assoc. 2011;12:81-5.
14. Love RL. Nasal fractures: Patient satisfaction following close reduction.NZ Med J. 2010;123(1321):45-48.

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