

Nasal bone fracture

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ABSTRACT

Objective: To study fracture nasal bone at King Faisal Hospital University in Al-Khobar from various aspects, to present our experience and to compare the result with previous works.

Methods: A prospective study conducted from January 1997 to May 1998 including all new cases of fracture nasal bone presented at our emergency department. Plain x-ray of the nose is requested for all patients except one in whom pregnancy is suspected. Reduction of fracture nose was carried out 2-7 days post injury by closed technique under general or local anesthesia with application of nasal cast for 2 weeks. Follow-up of those patients in our clinic is evaluated regarding shape, patency and satisfaction.

Results: Eighty six patients included in our study with peak incidence at age 1-30 years with male being dominant. Fall down and road traffic accidents were the common cause of fracture nasal bone. The common presentation was swelling and tenderness in all patients

followed by deformity (30.5%) nasal obstruction (40%), and deviated nasal septum (15%). Negative x-ray finding was noticed in 30%, and computerized tomography scan was required for evaluating complicated cases. Only 30 patients (35%) required reduction by closed technique, 23% had poor outcome and were considered as failure.

Conclusions: This paper stresses the importance of early evaluation of fracture nose in order to avoid complications. The diagnosis is made mainly based on clinical judgement. Closed reduction technique under general anesthesia within 2-10 days post injury is the standard treatment if needed. Failure by closed technique can be managed by septorhinoplasty months later.

Keywords: Fracture nose, nasal bone, nasal fracture, face trauma.

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Fracture nasal bone is considered the most common site specific bony injury of the facial skeleton. Since its prominent position, central location and low breaking strength of its skeletal support, the nose is susceptible to fracture.

Swearinger¹ determined that the nasoethmoidal complex has maximum tolerable impact force before fracture of 35-80g. Murry et al² demonstrated experimentally that a lateral force of 10-66 kilopascals to cadaver nose would cause lateral displacement of dorsum compared to 114-312 kilopascals when the force applied frontally.

Dingmann³ reported that in general, younger patients are more prone to fracture dislocation of larger nasoseptal segment while elderly patients with brittle osteoporotic bone are more susceptible to

comminuted fracture. Kazanjian and Converse⁴ showed that approximately 80% of nasal fractures occur at the transitional zone between the thicker proximal and the thinner distal segments in the lower $1/3-1/2$ of nasal bone.

Harrison⁵ classified fracture nasal bone to fracture nasal lip, fracture anterior nasal spine, fracture dorsum plus septal deflection and comminuted fracture. The recommended management is closed reduction within 3-7 days for children and 5-10 days for adults.

Since no previous record about nose fractures in our region has been published before, a prospective study was carried out at KFHU in Al-Khobar from January 1997 to May 1998 with the aim to study

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Table 1 - Age distribution of patients with fracture nose.

Age/Years	No. of patients		Total (%)
	Male	Female	
1-14	13	7	20 (23)
15-30	44	6	50 (59)
>30	12	4	16 (18)
Total	69	17	86 (100)

Table 2 - Common causes of nasal fracture.

Cause of trauma	Number of patients (%)
Fall down	25 (31)
Road Traffic Accident	17 (19)
Football trauma	14 (16)
Assault	13 (15)
Other	17 (19)

Table 3 - Signs/symptoms post nasal fracture.

Signs/symptoms	Number of patients (%)
Swelling/tenderness	86 (100)
Deformity	26 (30.5)
Nasal obstruction	40 (46)
Deviated nasal septum	13 (15)
Septal hematoma	3 (4)
Saddle nose	1 (1)
Others	3 (4)

Table 4 - Plain x-ray finding of fracture nose.

Plain x-ray finding		
	Anterior nasal spine fracture	11
Fracture nasal tip	31	(36)
Fracture dorsum + septum	14	(16)
Comminuted	3	(4)
Negative x-ray finding	26	(30)
X-ray not carried out	1	(2)

various aspects of fracture nasal bone, illustrate our experience and to compare the results with previous reports.

Methods. The study was carried out at KFHU from January 1997 to May 1998. During this period 86 cases of fracture nasal bone were studied regarding age, sex, cause of injury, presentation, investigation, management and outcome.

All patients had plain x-ray of their nose (water, lateral) except one patient in whom pregnancy was suspected. Fracture nasal bone were classified according to Harrison's classification.⁵ Reduction of nasal bone was carried out within 2-7 days post trauma and patients left the hospital the next day with nasal cast for 2 weeks.

Two patients had reduction of their nasal bone under local anesthesia with sedation.

Patients who had nasal reduction under general anesthesia were admitted to the hospital one day before surgery and were discharged after 2-3 days. Reduction of nose was carried out using Walsham's and Asches forceps, followed by packing of the nose with a vaseline pack for 24 hours and a cast for 2 weeks. During follow-up in OPD, patients were evaluated regarding shape, patency of the nose and their satisfaction.

Results. Age of the patient ranged from 1-51 years with a peak at 15-30 years as seen in Table 1. Males (Table 2). The cause of injury varies largely but the common cause was fall down in 31%, followed by Road Traffic Accident (RTA) in 19% (Table 2).

On examination, swelling over and around the dorsum of the nose and tenderness was nearly present in all patients followed by nasal obstruction in 46% and deformity in 30.5% (Table 3). Other findings such as black eye or lacerated wound over the nose were noticed only in 10% of patients. The majority of patients (68%) had positive x-ray findings and only 30% showed negative findings. One patient had no x-ray due to suspicion of pregnancy and 2 required CT scan for further evaluation (Table 4).

The diagnosis and indication for surgery was based not on x-ray finding but mainly on clinical judgment. Out of 86 patients with nasal fracture, only 30 (35%) required closed reduction under general anesthesia and other 2 were carried out under local anesthesia. The remaining 52 (60%) did not require any reduction of their fracture nose as clinically there was no obvious deformity. Four patients refused the operation in spite of the obvious deformity they had.

In the operated group 1 patient with Saddle nose required external fixation and bilateral silastic sheet insertion. On follow-up, 23 (77%) had very good outcome and 7 (23%) had poor outcome and were considered failure (were not satisfied). Of the failure group 3 patients were still having DNS and one of

them required septoplasty 6 weeks later. Three still have nasal deformity, one patient developed step ladder deformity but none of them required septorhinoplasty

Discussion. Nasal fracture is very common in facial trauma and should not be considered a minor injury till they are fully assessed as advised by Bartkiw et al.⁶ Lundin et al⁷ reported that fractures of the nose makes 39% of all maxillo facial trauma.

High incidence has been observed in particular in newborn children by Courtiss⁸ and in middle age adults by Holt.⁹ Similar findings were observed in our study with peak incidence at age 1-30 years. Dickson and Sharp¹⁰ reported that fracture of the nose has sexual predilection in favor of male with a ratio of 2:1 and with high incidence at age 15-30 years. In our study the incidence was male predominant with ratio 4:1. This high male predominancy in our country could be explained, as women are not participating fully in outdoor life and sport activities as in western countries. This could also explain partially why most of fracture nasal bones were caused by fall down, RTA, football trauma and assault.

In our study the common sign and symptoms were nasal obstruction followed by deformity of the nose whereby swelling and tenderness were found in all patients. This could be confirmed by Mayell et al,¹¹ who noted that 30% of their patients had pre-existing deformity of the nose and hence photography of the patient taken before injury could be helpful in providing a gross baseline of nasal contour and midline relationship.

Deviated nasal septum (DNS) was found in 15% of our patients and this abnormal position of the septum is not probably the result of septal fracture or dislocation rather than a normal variation as stated by Illum.¹²

One of the serious complications of fracture of the nose is septal hematoma (3.8% in our study) especially if it is not treated immediately. Ginsberg Cla¹³ reported that septal hematoma is rare but potentially a serious complication and management consists of surgical evacuation and antibiotics treatment if secondary infection is suspected.

Thirty percent (30%) of our patients had negative x-ray findings inspite of clinical diagnosis of fracture nose. This finding has been confirmed by Clayton and Lesser¹⁴ who showed that 25% of their patients required surgical intervention based on clinical evaluation despite having negative x-ray finding.

In children, x-ray evaluation of nasal trauma prove to be of even less value than adults because the bones are small and not fused completely and this will complicate the interpretation. A CT scan could be considered when extensive fracture is present. Most of our patients did not required surgical intervention

because they had either green stick fracture with no obvious deformity or functional abnormality or no displaced fracture.

In 5-10 days after injury, the nasal bone becomes adherent, difficult to move and fixation is observed in 2-3 weeks. Martinez¹⁵ noted that fixation of fracture in children requires only 1/4-1/2 the time required for adults. Hence the usual recommendation is that closed reduction be carried out within 3-7 days for children and 5-10 days for adults.

Illum¹² reported that closed reduction is adequate for most fracture nasal bone, but if reduction is not maintained, then open reduction can be carried out months later by traditional septorhinoplasty. In our study, we recorded a failure rate of 23% after closed reduction and all of them were adult. Murray et al² reported a failure rate after closed reduction of up to 30-40% and attributed their failure to inter locking of fracture septal segment which drag the mobile fracture nasal bone segment toward their initial displaced position. Stucker et al¹⁶ pointed out the difficulties in determining when complete reduction has been achieved after closed reduction in children. He stated that in children, nasal skeleton is largely cartilagenous making mobilization and recognition of proper position very difficult. The indication for open technique is when there is significant displacement of the nasal septum and bilateral fracture or unsatisfactory reduction of nasal septum following an attempt with the closed method as demonstrated by Dickson and Sharp.¹⁰ Finally adequate reduction using closed technique in children would prevent disturbance of nasal growth as mentioned by Chemielik et al.¹⁷

In conclusion early evaluation of traumatic nose fracture can avoid unwanted complications of septal hematoma. Closed reduction is the preferred technique especially in children and usually carried out 2-10 days post injury. Failure of reduction by closed technique can be managed by conventional septorhinoplasty months later.

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