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ORIGINAL ARTICLE

From injury to evidence: Radiological evaluation of nasal bone fractures in medicolegal cases.

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ABSTRACT… Objective: To determine the characteristics in the demographic profile, the causes and radiological investigations used for diagnosis of nasal bone fractures of medicolegal cases. **Study Design:** Cross sectional study. **Setting:** Department of Radiology, Mayo Hospital, Lahore. **Period:** 1st July, 2023 till 30th June, 2025. **Methods:** All medicolegal cases of both genders and all ages with history of nasal fracture referred for radiological investigations are included in the study. **Results:** The study included 77 cases with nasal fractures. The age ranged from 15-60 years with mean age 35.84 ±11.59 years. The most affected group was 21-30 years (36.36%). Highest incidence of cases occurred in summer 42%. Most of the injuries 72 (94%) were sustained through physical violence. Conventional radiography was the investigation most commonly used to diagnose nasal fractures (81.81%). **Conclusion:** Nasal fractures are most common in males, in young age group. The most common cause is physical violence with higher prevalence in summer. Most of the cases are diagnosed on X-ray.

Key words: Medicolegal, Nasal Fracture, Radiography.

INTRODUCTION

A small, yet an important and most conspicuous part of face is the nose. The bony framework of nose comprises of a pair of small, rectangular in shape flat bones present on each side of midline medial to frontal process of maxilla. The two nasal bones articulate with each other in the midline at the internasal suture. This articulation forms the bridge of the nose. Underneath the bridge lies the nasal septal cartilage. The bony skeleton of nose has an upper thick portion where the nasal bones articulate with the nasal process of frontal bone forming the rigid fibrous frontonasal suture and lower relatively thin part comprising of lower one third of nasal bone. A line joining the right and left canthus indicates the junction of these two zones.[1]

The human skeleton consists of 206 bones. These bones tend to fracture when subjected to undue stress. Fracture of the nasal bones is the third most common fracture among human bones while it is the commonest among the fractures of facial bones.[1-7] This is because nose occupies the central unprotected region of the face protruding from it. The amount of physical force required causing fracture of nasal bones and underlying septal cartilage is considerably less due to their brittle nature. The most common causes of nasal fractures are road traffic accidents, falls, sports injuries, and physical assault.[8]

Nasal bone fractures present with pain, bleeding from nostrils, swelling, deformity of nose sometimes accompanied by signs of physical violence such as bruise, lacerated wound, abrasion etc. On clinical examination of the fractured area, there is presence of crepitus and tenderness. Though in routine practice, the diagnosis can be made easily on physical examination but sometimes, the hematoma and edema of the surrounding tissue pose some difficulty in diagnosis. In such cases, radiology will be of help. Forensic radiology is an integral part of medicolegal examination since documentary evidence is of crucial importance in such cases.

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Therefore, while conducting examination of medicolegal cases of physical trauma, where nasal bone fracture is suspected on clinical examination, it must be supported with radiologic investigations like X-ray or computed tomography to determine whether there is a fracture or not because this radiologic imaging will provide documentary evidence to be presented in court of law. It will later prove very beneficial in providing justice to the victim of physical violence and punish the assailant. No study has been conducted previously

OBJECTIVES

- To evaluate the characteristics in the demographic profile of medicolegal cases with nasal bone fractures
- To determine the most common causes of the trauma
- To analyze the radiological investigations used for diagnosis of nasal fractures

METHODS

Study Design

This cross sectional study was conducted at Radiology Department, Mayo Hospital, Lahore in collaboration with Radiology department, Combined Military Hospital, Lahore for Two years from 1st July, 2023 till 30th June, 2025. The sampling technique was use Non-probability, purposive sampling. This study was approved by ethical committee (476/2023).

SELECTION CRITERIA

Inclusion Criteria

All medicolegal cases with history of nasal fracture of both genders and all ages referred to Radiology department for radiological investigations.

Exclusion Criteria

- Patients with nasal trauma associated with other maxillofacial bone fractures.
- Patients with nasal trauma with no medicolegal perspective.
- Patients with no nasal fracture

Data Collection Procedure

Records of seventy seven medicolegal cases referred to the department of Radiology, Mayo hospital, Lahore fulfilling inclusion criteria were analyzed. Demographic data (including gender, age, and seasonal distribution), etiology of nasal bone fracture and radiological investigations and their findings were recorded. All the radiological investigations were again reviewed and confirmed by the consultant of Radiology Department, Combined Military hospital, Lahore having at least four years experience.

Data Analysis Procedure

All the collected data was entered into SPSS version 14 and analyzed through it. Descriptive statistics; frequency, percentage, mean, standard deviation (SD), minimum (min), maximum (max) values were presented.

RESULTS

The study included 77 cases with nasal fractures. The age ranged from 15-60 years with mean age 35.84 ±11.59 years as shown in Table-I.

The most affected group was 21-30 years (36.36%). Majority of cases were males 68 (88.31%) while females were only 9 (11.68%) shown in Table-II.

Highest incidence of cases occurred in summer 42% followed by autumn 29% and winter 22% respectively (Figure-1).

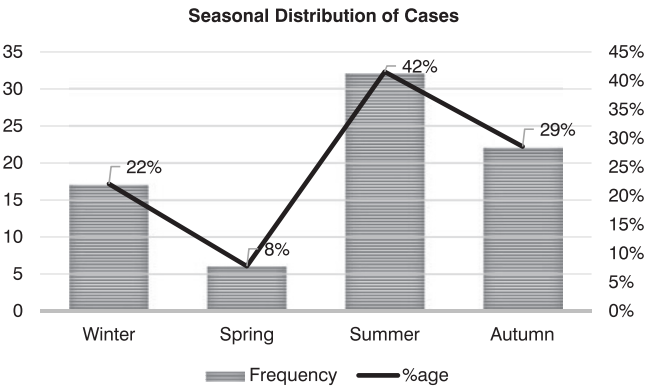

Figure-1. Seasonal distribution of cases

	No	Minimum	Maximum	Mean	Std. Deviation
Age	77	15.00	60.00	35.8442	11.59522
Male	68	15.00	60.00	36.132	12.08169
Female	09	25.00	45.00	33.667	6.98212

Table-I. Distribution of cases according to age

Age Group	Male		Female		Total N (%)
	No	%	No	%	
11-20	4	5.88	0	0	4 (5.19)
21-30	23	33.82	5	55.55	28 (36.36)
31-40	18	26.47	3	33.33	21 (27.27)
41-50	12	17.64	1	11.11	13 (16.88)
51-60	11	16.17	0	0	11 (14.28)
Total	68	88.31	9	11.68	77 (100)

Table-II. Distribution of cases according to age groups and gender

Most of the injuries 72 (94%) were sustained through physical violence, 6% through Road Traffic Accident (RTA) while there was no injury reported through falls and sports injuries as shown in Table-III.

Conventional radiography was the investigation most commonly used to diagnose nasal fractures (81.81%) while additional CT scan was required in 14.28% cases (Table-IV).

Sr. No.	Injury Type	Frequency	%age
1	Physical Violence	72	94%
2	RTA	5	6%
3	Falls	0	0%
4	Sports Injuries	0	0%
Total		77	100%

Table-III. Etiology of nasal fracture

Sr. No.	Investigation	Frequency	Percentage
1	X-ray	63	81.81
2	X-ray & CT	11	14.28
3	CT	3	3.89
Total		77	100

Table-IV. Distribution of cases according to radiological investigations

DISCUSSION

Nasal fractures are the most commonly occurring facial skeleton fractures accounting for 39% of all facial bony trauma cases. Nasal bone fractures can occur as simple isolated fractures or may be accompanied by fractures involving other facial bones involving maxillary, zygomatic or frontal bones.[9,10] Simple nasal bone fractures can be diagnosed easily by clinical evaluation (history and physical examination). However, in certain instances especially in medicolegal cases, radiological investigations like X-ray nasal bone lateral view, Computed Tomography of face can help to determine the presence, site and type of fractures.[11]

In our study, seventy seven medicolegal cases were included. Out of these, the males were present in majority (88.31) while females were only 11.48%. A study by Hosukler E. et al reported that two hundred sixty-four (83.8%) cases were males and 51 (16.2%) were females.[12] According to Juncar et al, male patients were more affected (88.30%) as compared to females (11.70%).[13] These studies are in line with our findings. The major preponderance of males can be explained by the fact that they are the bread earners of the family and are more exposed to the outside world than females and thus are more likely to be involved in scuffles sustaining injuries.[12]

The age range was between 15-60 years with mean age 35.68 ± 11.59 years which is comparable with other studies.[12] The peak incidence of cases was found in 21-30 year age group (36.6%) which is in agreement with another study conducted in

Lahore (35%).[14] Juncar et al also showed similar findings with the majority of the cases belonging to the 20–29-year age group (33.33%).[13] This young age group has extrovert personality and active life style with more involvement in outdoor activities which predispose them to such hazards.[15] However, in a study from Mardan[10], the commonest affected age group was 11-20 years which is not in line with our findings.

Almost all nasal fractures were caused by physical violence (94%) in the present study. Other studies have also documented violence as the major cause but with lower percentage.[12,14,16] In studies by Bajwa[14] and Hameed[10], road traffic accident was the leading cause while falls from height was most common in study by Akdag et al.[17] The higher prevalence of physical violence in our study is because it is conducted on cases brought for medicolegal examination of which majority are victims of physical brawl. The lower frequency of road traffic accidents may be due to under reporting of cases probably because the dispute is settled mutually between parties without involving law and order forces for which medicolegal examination is required.

Seasonal incidence was higher in the summer. This may be because duration of summer is longest of all the seasons in our country. Also, the days are longer and hotter. The situation is made worse by long hours of load shedding. All these factors contribute towards making people less tolerant and prone to conflict and fighting thus making them vulnerable to injuries including fractures.

In medicolegal cases especially of physical assault, the severity of injuries decides the fate of the case. So, the presence or absence of bony injury i.e. fracture becomes of paramount importance.[18] Therefore, majority of cases where fracture is suspected on history or physical examination are referred to radiology department for radiological investigations and expert opinion of a consultant radiologist. Expert opinion of a forensic radiologist thus becomes an important milestone in finalizing the case.[18] Therefore, it is the duty of the concerned radiologist to interpret the findings of radiological investigations meticulously and document them in comprehensive, detailed manner which helps the medicolegal examiner to give the final opinion about the severity of injury. According to the present study, conventional radiography was the investigation most commonly used to diagnose nasal fractures (81.81%) while additional CT scan was required in 14.28% cases. Nasal fractures were diagnosed by X-ray in 86.9% while both X-Ray and CT scan were used in 13.1% of patients by Stenner.[16] In study by Bajwa[14], most cases were diagnosed by clinical examination and plain x-rays of nasal bones (lateral and water view) which is in accordance with our results. Similar findings have also been reported in literature.[12,13,15-17]

CONCLUSION

In this study, it was determined that nasal fractures are most common in young age group with greater involvement of males. The most common cause is physical violence with higher prevalence in summer. Most of the cases are diagnosed on X-ray and only few cases require further radiological investigation like CT to confirm diagnosis. Diagnosis of fracture is not only important for treatment but also for medicolegal certification.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Mariam Arif:** Prepared the proposal, data collection, manuscript writing.
2	**Syed Rayyan Hamad:** Data collection, compilation.
3	**Syed Hamad Rasool:** Study design, data entry.