National Analysis of Risk Factors for Nasal Fractures and Associated Injuries in Trauma

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Abstract

Nasal fractures account for up to 58% of facial fractures. However, the literature characterizing associated injuries and risk factors for nasal fractures is sparse and is mostly composed of single-center experiences. This study sought to provide a large descriptive analysis and identify associated injuries and risk factors for nasal fractures in trauma using a national database. A retrospective analysis of the National Trauma Data Bank (NTDB) from 2007 to 2015 was performed. Patients ≥18 years of age with nasal fractures were included. A multivariable logistic regression model was used to identify predictors for nasal fracture in trauma. Of 5,494,609 trauma patients in the NTDB, 255,533 (4.6%) had a nasal fracture. Most were male (74.8%) with a mean age of 45.6 years. Blunt trauma accounted for 90.5% of fractures, with motor vehicle accident being the most common mechanism (27.5%). Closed fractures occurred in 93.0% of patients. Concomitant injuries included traumatic brain injury (TBI; 56.9%), malar/maxillary fracture (27.9%), and open wound of the face (38.6%) and nose (9.5%). Of all patients, 10.1% underwent closed or open reductions at index hospitalization. The strongest associated injuries with nasal fracture included open wound of the nose (odds ratio [OR]: 8.71, 95% confidence interval [CI]: 8.49–8.94, $p < 0.001$), epistaxis (OR: 5.26, 95% CI: 4.59–6.02, $p < 0.001$), malar/maxillary fracture (OR: 4.38, 95% CI: 4.30–4.45, $p < 0.001$), and orbital fracture (OR: 3.99, 95% CI: 3.91–4.06, $p < 0.001$). Nasal fractures are common traumatic injuries with more than 90% occurring by blunt mechanism and over half suffering from a concomitant TBI. The strongest associated injury with nasal fracture is an open wound of the nose.

Keywords
- nasal fractures
- facial fractures
- risk factors
- trauma
- National Trauma Data Bank
- epidemiology

Nasal fractures are the most common type of facial fracture, accounting for *40 to 58%* of facial fractures.[1–3] The nasal bone is also the third most commonly broken bone in the body.[4] For patients with multiple system injuries, attention to life-threatening injuries takes precedence over injuries, such as nasal fractures. However, a nasal fracture may be an indicator of underlying serious facial and head trauma, or other concomitant lethal injury. Additionally, there are also serious sequelae of these injuries including unrelenting epistaxis, nasal airway compromise, or secondary deformity. Functional and cosmetic defects have been associated with delayed time to treatment.[5] Thus, early diagnosis and management is crucial.

Physical examination and the mechanism of injury influence a physician's decision to pursue imaging. Hence, identifying associated injuries and risk factors for nasal fractures is helpful in guiding this evaluation, especially when physical examination may be unrevealing.[2]

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In prior studies and populations, the descriptive epidemiology and demographics of patients who sustain facial fractures, including nasal fractures, have varied significantly.[6–11] The most common mechanisms of injury identified to cause nasal fractures include motor vehicle accidents (MVAs), assaults, and falls depending on the age, gender, and other demographics of the population studied.[2,6,8,10] These studies, however, were often from a single center and utilize a relatively small population size.[8,12–17]

Therefore, we sought to perform a large descriptive analysis of demographics, concomitant injuries, surgical interventions, and outcomes associated with nasal fractures in patients who present as trauma activations. Second, we aimed to identify associated injuries and risk factors for nasal fractures in trauma.

Materials and Methods

National Trauma Data Bank

A retrospective analysis of the National Trauma Data Bank (NTDB) between 2007 and 2015 was performed. The NTDB, managed by the American College of Surgeons, is the largest aggregated database of trauma patients in the United States and is considered one of the leading performance improvement tools for trauma care.[18] The NTDB encourages voluntary participation from trauma centers across the nation, and includes data regarding patients who presented to the hospital as trauma activations. As of 2018, the NTDB includes data from over 850 trauma centers across 50 states. This study utilizes de-identified data and was exempt by the Institutional Review Board at the University of California, Irvine School of Medicine.

The NTDB was queried for all patients ≥18 years of age with nasal fractures. International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) codes were used to identify adult patients with both closed (802) and open (802.1) nasal bone fractures. Baseline patient characteristics were collected, including age, sex, social history, and whether hypotension (systolic blood pressure <90 mm Hg) on admission was present. Severity of overall trauma was assessed using the injury severity score (ISS) and the abbreviated injury scale (AIS) score for each body region.[19,20] Various comorbidities, mechanisms of injury, and associated injuries were also queried in our analysis. Facial fractures were categorized by location—for example, the mandible, malar/maxilla, and orbital bone. Panfacial fracture was defined in patients with the combination of mandible, maxilla, and orbital fracture. Open wound of the nose included the nose, nasal septum, nasal cavity, and nasal sinus. Open wound of the face included those of the cheek, forehead, lip, jaw, and other sites of the face. Outcome measures of mean length of stay (LOS), intensive care unit (ICU) LOS, ventilator days, open or closed nasal reduction, complications, and mortality were also evaluated. Furthermore, we analyzed demographics and outcomes in patients with an isolated nasal fracture. This was defined by patients presenting with a nasal fracture, without an orbital, maxilla, mandible, or other facial fracture.

Statistical Analysis

A univariable logistic regression was performed to identify associated injuries and predictors for adult trauma patients with nasal fracture. After adjusting for covariates, a multivariable logistic regression was performed to more accurately identify associated injuries and predictors for nasal fracture. Comparisons were considered statistically significant at a two-sided *p*-value of less than 0.5. All statistical analyses were performed with IBM SPSS Statistics for Windows, Version 24 (IBM Corp, Armonk, NY).

Results

Demographics

Of 5,494,609 patients in the NTDB during the years of this study, 255,533 (4.6%) had a nasal fracture (►**Table 1**). The majority of these patients were male (74.8%) with a mean age of 45.6 years. The most commonly associated comorbidities

Table 1 Demographics of adult trauma patients with nasal fracture

Characteristic	($n = 255{,}533$)
Age, y, mean (SD)	45.6 (19)
Male, *n* (%)	191,076 (74.8%)
ISS, median (IQR)	10.0 (6)
Hypotensive on admission (SBP < 90 mm Hg)	827 (19.1)
Comorbidities, *n* (%)	
Congestive heart failure	4,724 (1.8%)
Tobacco use	40,557 (15.9%)
Positive serum alcohol level	80,667 (50.8%)
End-stage renal disease	1,053 (0.4%)
Cerebrovascular accident	3,648 (1.4%)
Diabetes	20,008 (7.8%)
Hypertension	52,375 (20.5%)
Chronic obstructive pulmonary disease	12,728 (5.0%)
Mechanism of injury, *n* (%)	
Blunt	231,318 (90.5%)
Penetrating	3,280 (1.3%)
Motor vehicle accident	70,176 (27.5%)
Motorcyclist	17,130 (6.7%)
Bicyclist	7,906 (3.1%)
Fall	65,031 (25.4%)
Pedestrian-struck	12,585 (4.9%)
Gunshot wound	2,795 (1.1%)
Stab wound	3,312 (1.3%)
Assault	7,582 (3.0%)
Suicide	3,368 (1.3%)

Table 1 (*Continued*)

Characteristic	(*n* = 255,533)
Nasal fracture, *n* (%)	
Open	17,994 (7.0%)
Closed	238,686 (93.0%)
Associated injuries, *n* (%)	
Mandible fracture	22,110 (8.7%)
Malar/Maxillary fracture	71,408 (27.9%)
Orbital fracture	51,204 (20.0%)
Panfacial fracture	13,050 (5.1%)
Other facial fracture	62,379 (24.4%)
Open wound of the nose	24,307 (9.5%)
Open wound of the face	98,515 (38.6%)
Traumatic brain injury	145,384 (56.9%)
Epistaxis	1,018 (0.4%)
Deviated septum	228 (0.1%)
CSF rhinorrhea	48 (<0.01%)
Disturbances of smell and taste	2 (<0.01%)
Severe[a] AIS, *n* (%)	
Head	50,247 (19.7%)
Spine	2,551 (1.0%)
Abdomen	3,070 (1.2%)
Thorax	10,026 (3.9%)

Abbreviations: AIS, abbreviated injury scale; IQR, interquartile range; ISS, injury severity score; SBP, systolic blood pressure; SD, standard deviation.
[a]Grade >3.

were positive serum alcohol level (50.8%), hypertension (20.5%), tobacco use (15.9%), and diabetes (7.8%).

Mechanism of Injury

Blunt trauma accounted for 90.5% of nasal fractures with the most common mechanism being MVA (27.5%, $n = 70{,}176$), followed by motorcycle collisions (6.7%, $n = 17{,}130$) and bicycle accidents (3.1%, $n = 7{,}906$; ►**Table 1**). Penetrating trauma accounted for only 1.3% of patients with a nasal fracture ($n = 3{,}280$).

Injuries Sustained

Closed nasal fractures occurred in 93.0% ($n = 238{,}686$) of patients, while open nasal fractures occurred in the remainder (►**Table 1**). Patients with a nasal fracture presenting as a trauma activation had a median ISS of 10.0 (interquartile range: 6). Traumatic brain injury (TBI) (56.9%, $n = 145{,}384$) was an associated injury in more than half of nasal fracture cases. Additional facial fractures included malar/maxillary fractures (27.9%, $n = 71{,}408$), orbital fracture (20.0%, $n = 51{,}204$), other facial fracture (24.4%, $n = 62{,}379$), panfacial fracture (8.7%, $n = 13{,}050$), and mandibular fracture (5.1%, $n = 22{,}110$). Although open wound of the face was associated with 38.6% of patients with nasal fractures, open wound of the nose was associated with only 9.5%. Deviated septum was diagnosed in 0.1% of patients. Other complications such as loss of smell/taste ($n = 2$, <0.01%) and cerebrospinal fluid rhinorrhea ($n = 48$, <0.01%) were rare.

Outcomes

Of all patients, 10.1% underwent some form of surgical intervention during index hospitalization: 7.5% underwent closed reduction and 2.6% underwent open reduction (►**Table 2**). The mean overall LOS was 6.9 days (standard deviation [SD]: 11) and mean ICU LOS was 6.5 days (SD: 9). Similarly, the mean days of ventilator use was 6.7 days (SD: 9). The mortality rate in patients with nasal fractures was low at 4.4%. Although complications were generally low, the most common complication was pneumonia (4.3%), followed by acute respiratory distress syndrome (ARDS; 2.0%; ►**Table 2**). Osteomyelitis occurred only in 41 (<0.1%) of the 255,533 included patients with nasal fractures.

Demographics and Outcomes of Isolated Nasal Fractures

Of those with nasal fractures, 131,967 (51.6%) were isolated nasal fractures, with 93.7% as closed fractures (►**Table 3**). Most were male (70.7%) with mean age of 47.2 years. The most commonly associated comorbidities were positive serum alcohol level (31.8%), hypertension (22.7%), tobacco use (14.6%), and diabetes (8.8%). Blunt trauma accounted for 92.1% of isolated nasal fractures with the most common

Table 2 Analysis of clinical outcomes in adult trauma patients with nasal fracture

Outcome	
LOS, days, mean (SD)	6.9 (11)
ICU, days, mean (SD)	6.5 (9)
Ventilator, days, mean (SD)	6.7 (9)
Nasal reduction, *n* (%)	
Open	6,715 (2.6%)
Closed	19,129 (7.5%)
Complication, *n* (%)	
Acute kidney injury	1,832 (0.7%)
ARDS	4,983 (2.0%)
Deep vein thrombosis	3,462 (1.4%)
Pulmonary embolism	1,115 (0.4%)
Osteomyelitis	41 (0.0%)
Superficial infection	574 (0.2%)
Urinary tract infection	2,498 (1.0%)
Myocardial infarction	631 (0.2%)
Pneumonia	10,933 (4.3%)
Severe sepsis	747 (0.3%)
Mortality, *n* (%)	11,261 (4.4%)

Abbreviations: ARDS, acute respiratory distress syndrome; ICU, intensive care unit; LOS, length of stay; SD, standard deviation.

Table 3 Demographics and outcomes for isolated nasal fracture in adult trauma patients

Characteristic	(n = 131,967)
Age, y, mean (SD)	47.19 (20.4)
Male, *n* (%)	93,270 (70.7%)
ISS, median (IQR)	9.0 (7)
Comorbidities, *n* (%)	
Congestive heart failure	3,049 (2.3%)
Tobacco use	19,328 (14.6%)
Positive serum alcohol level	80,667 (50.8%)
End-stage renal disease	694 (0.5%)
Cerebrovascular accident	2,260 (1.7%)
Diabetes	11,673 (8.8%)
Hypertension	29,955 (22.7%)
Chronic obstructive pulmonary disease	7,021 (5.3%)
Mechanism of injury, *n* (%)	
Blunt	121,547 (92.1%)
Penetrating	1,997 (1.5%)
Motor vehicle accident	39,361 (29.8%)
Motorcyclist	(6.7%)
Bicyclist	3,954 (3.0%)
Fall	39,693 (30.1%)
Pedestrian-struck	6,527 (4.9%)
Gunshot wound	842 (0.6%)
Stab wound	2,026 (1.5%)
Assault	3,606 (2.7%)
Suicide	844 (0.6%)
Outcome	
LOS, days, mean (SD)	5.7 (9.4)
ICU, days, mean (SD)	5.6 (8.2)
Ventilator, days, mean (SD)	6.0 (8.9)
Nasal reduction, *n* (%)	
Open	1,577 (1.2%)
Closed	6,904 (5.2%)
Complication, *n* (%)	
Acute kidney injury	908 (0.7%)
ARDS	1,954 (1.5%)
Deep vein thrombosis	1,399 (1.1%)
Pulmonary embolism	464 (0.4%)
Osteomyelitis	18 (0.0%)
Superficial infection	233 (0.2%)
Urinary tract infection	1,169 (0.9%)
Myocardial infarction	631 (0.2%)
Pneumonia	4,148 (3.1%)
Severe sepsis	330 (0.3%)
Mortality, *n* (%)	4,525 (3.4%)

Abbreviations: ARDS, acute respiratory distress syndrome; ICU, intensive care unit; IQR, interquartile range; ISS, injury severity score; LOS, length of stay; SD, standard deviation.

Table 4 Univariable analysis of associated injuries and predictors for nasal fractures in adult trauma patients

Predictors	OR	95% CI	*p*-Value
Blunt vs. penetrating mechanism	3.50	3.38–3.62	<0.001
Epistaxis	13.84	12.78–14.98	<0.001
Mandible fracture	4.50	4.43–4.56	<0.001
Malar/Maxillary fracture	14.05	13.91–14.19	<0.001
Orbital fracture	14.54	14.37–14.71	<0.001
Panfacial fracture	11.68	11.43–11.93	<0.001
Open wound, nose	16.98	16.69–17.27	<0.001
Open wound, face	5.82	5.77–5.87	<0.001
Tobacco use	1.27	1.26–1.29	<0.001
Positive serum alcohol level	1.88	1.86–1.90	<0.001
Male	1.75	1.73–1.76	<0.001
Age ≥ 65	0.59	0.58–0.59	<0.001
ISS ≥ 25	1.90	1.87–1.92	<0.001

Abbreviations: CI, confidence interval; ISS, injury severity score; OR, odds ratio.

mechanism being fall (30.1%, $n = 39{,}693$), followed by MVA (29.8%, $n = 39{,}361$). Of patients with isolated nasal fractures, 5.2% underwent closed reduction and 1.2% underwent open reduction. The mean overall LOS was 5.7 days (SD: 9.4) and mean ICU LOS was 5.6 days (SD: 8.2). The mortality rate was low at 3.4%, with the most common complication being pneumonia (3.1%), followed by ARDS (1.5%).

Associated Injuries and Predictors

Univariable analysis identified the presence of an open wound to the nose as the strongest associated injury for nasal fractures (odds ratio [OR]: 16.98, 95% confidence interval [CI]: 16.69–17.27, $p < 0.001$; ►**Table 4**), followed by orbital fractures (OR: 14.54, 95% CI: 14.37–14.71, $p < 0.001$), malar/maxillary fractures (OR: 14.05, 95% CI: 13.91–14.19, $p < 0.001$), and epistaxis (OR: 13.84, 95% CI: 12.78–14.98). Blunt trauma mechanisms (OR: 3.50, 95% CI: 3.38–3.62, $p < 0.001$) and ISS ≥ 25 (OR: 1.90, 95% CI: 1.87–1.92, $p < 0.001$) were also associated with higher odds of nasal fracture.

After adjusting for covariates in a multivariable logistic regression model (►**Table 5**), the strongest independent associated injury for nasal fractures continued to be an open wound of the nose (OR: 8.71, 95% CI: 8.49–8.94, $p < 0.001$). Epistaxis was the second strongest independent association (OR: 5.26, 95% CI: 4.59–6.02, $p < 0.001$). Similarly, malar/maxillary fractures (OR: 4.38, 95% CI: 4.30–4.45, $p < 0.001$) and orbital fractures (OR: 3.99, 95% CI: 3.91–4.06, $p < 0.001$) had the next highest odds.

Discussion

This retrospective review of 255,533 nasal fractures identified the epidemiology, outcomes, associated injuries, and

Table 5 Adjusted odds ratio for associated injuries and predictors for nasal fracture in adult trauma patients

Predictors	OR	95% CI	*p*-Value
Blunt vs. penetrating mechanism	3.70	3.55–3.86	<0.001
Epistaxis	5.26	4.59–6.02	<0.001
Mandible fracture	1.39	1.35–1.42	<0.001
Malar/Maxillary fracture	4.38	4.30–4.45	<0.001
Orbital fracture	3.99	3.91–4.06	<0.001
Open wound of the nose	8.71	8.49–8.94	<0.001
Open wound of the face	2.70	2.67–2.74	<0.001
Tobacco use	1.05	1.04–1.07	<0.001
Positive serum alcohol level	1.59	1.57–1.61	<0.001
Male	1.31	1.29–1.32	<0.001
Age > 65	0.85	0.83–0.86	<0.001
ISS ≥ 25	1.25	1.23–1.28	<0.001

Abbreviations: CI, confidence interval; ISS, injury severity score; OR, odds ratio.

risk factors for nasal fractures using data from trauma centers across the United States. To our knowledge, this study is the largest national study evaluating nasal fractures with these fractures affecting 4.6% of the subjects in the database. Over 90% of these nasal fractures occurred by blunt trauma, with 27.5% by MVAs. The most commonly associated injury was a TBI, which occurred in over half of the patients. Independently associated injuries for nasal fractures included open wound to the nose, epistaxis, and associated facial fractures, most significantly malar/maxillary and orbital fractures. About 10% of patients underwent some form of surgical intervention during the index hospitalization.

In our study, physical exam findings of open wounds to the nose and epistaxis were the strongest clinical indicators of a nasal fracture. Although an open wound of the nose was seen only in 9.5% of cases, its presence had greater than eight times increased odds for nasal fracture. Although the literature describing the prevalence of comorbid findings in nasal fractures is scarce, this similar association was demonstrated in a retrospective review by Pérez-Guisado and Maclennan.[21] This study of cases in a hospital specializing in occupational injuries found that the presence of a nasal wound was clinically useful in the diagnosis of nasal fracture, with an increased odds of 2.35 times. These findings suggest that the force and trauma needed to create an open wound is strong enough to additionally cause a fracture.[22] Hence, patients who sustain open wounds of the nose should undergo careful examination and consideration of imaging. Additionally, epistaxis has been documented in previous studies to be associated with nasal fractures.[21,23,24] Interestingly, the same single-hospital study by Pérez-Guisado and Maclennan found that patients with epistaxis had a 25 times increased risk of nasal fracture, with a sensitivity of 69% and specificity of 94%.[21] Though the study populations were different, our study demonstrated that epistaxis was associated with a greater than five times increased risk of nasal fracture. Future prospective studies using associated injuries such as open nasal wound and epistaxis should be conducted to determine if these clinical indicators can be utilized to determine which patients do and do not need imaging to evaluate for nasal fractures.

In our population, TBI was found in over half of all patients with nasal fractures. Previously, it has been thought that facial bones protect the brain from injury, playing a role in shock absorption and deceleration.[25] However, many studies have similarly found an association between facial fractures and TBI, and that facial fractures actually do not carry a protective role.[23,26–28] Davidoff et al reported the incidence of concomitant closed head injury (defined as a loss of consciousness and/or posttraumatic amnesia) among patients with nasal fractures was greater than 50%.[27] In a case–control study, Smith et al found that TBI was more prevalent in those with midface fractures than those without midface fractures ($p = 0.041$). Furthermore, more severe facial damage, as indicated by higher facial ISS, has been associated with worse initial neurological condition and higher rates of parenchymal damage, edema of brain, and cerebral hematoma.[6,29] The presence of a nasal fracture and other midface fractures may indicate that a higher force of impact was present. Therefore, although the presence of a nasal fracture alone may not warrant computed tomography imaging of the head, it certainly should be incorporated in the decision making of the provider given the significant risk (>50%) of concomitant TBI that our study and others have demonstrated.

Blunt trauma was found to be significantly associated with nasal fractures and MVAs were the most common mechanism of injury in the NTDB. The most common cause of nasal fractures reported in previous studies varies depending on the center and study population and includes assaults, MVAs, sports injuries, or falls.[1,2,7,8,30] One possible reason for the discrepancy between our study and other studies is that the NTDB evaluates subjects categorized as trauma patients, which differs from other studies that may evaluate all patients who present to an institution, including simple falls and sports injuries which commonly are managed by emergency room physicians, or plastic surgeons and otolaryngologists in the ambulatory setting.[8,11] We do note that in our study, of those with isolated nasal fractures, falls were the most common mechanism. However, in evaluating trauma patients with nasal fractures (both isolated and nonisolated), our results are similar to a retrospective multicenter study by Greathouse et al, which found that 61.7% of facial fracture patients evaluated by the trauma service sustained a nasal fracture from a MVA.[1] Their study saw a twofold higher prevalence of nasal fractures from MVAs compared with our NTDB study, likely due to their location at the crossroads of several major roadways. Comparatively, a meta-analysis by Hwang et al found that the most frequent cause of nasal fractures was assaults, followed by MVAs, sports injuries, and falls.[8] Although previous literature shows that the rate of facial fractures from MVA is decreasing due to new safety methods in cars, such as airbags and seatbelts, the protective effect is far less for nasal fractures.[1,28,31,32] Mouzakes et al suggested that airbags alone may even pose an increased risk of nasal fractures.[33] However, the majority of literature suggests that airbags and seat belts are paramount to injury prevention, especially the reduction of significant morbidity and mortality overall.[32,34,35]

Our surgical intervention rate in trauma patients with nasal fractures was 10.1%, with closed reduction accounting for approximately three-fourths of interventions. In isolated nasal fractures, the intervention rate was even lower at 6.4%, with 93.7% accounting for closed reductions. Our intervention rate in the NTDB was about half of previous studies in North America evaluating patients with nasal fractures.[1,36] When compared with a single-institution study evaluating only severely injured nasal fracture patients with ISS greater than 12, our intervention rates were substantially smaller than theirs (10.1 vs. 78.3%).[6] Greathouse et al evaluated all operations performed across three Level I trauma centers and one independent surgical center for trauma patients with facial fractures and found that 25.2% of patients with nasal fractures received surgical intervention at a mean of 8.9 days following injury.[1] They also included operations after discharge, while the NTDB only includes operations on the index hospitalization. Since our average hospital LOS was 6.9 days (i.e., longer than would be expected for nasal fracture alone) and due to the lack of follow-up data, our study did not capture all patients who eventually received treatment for their fracture at a later date.[1] However, previous studies of trauma patients have demonstrated poor rates of outpatient follow-up.[37,38] Stewart and Chen found that 66% of patients with isolated facial trauma attended their first follow-up appointment, but only 46% kept their recommended follow-up care.[39] Thus, given the low rate of follow-up, future multicenter studies on facial fractures that include follow-up data are needed to further evaluate whether our findings are representative of actual national rates of interventions in trauma subjects.

As the NTDB is a substantial aggregated database, it has several limitations that need to be considered. Emergency department visits, outpatient evaluations, and other non-trauma activations are not included in the database; therefore, the NTDB does not capture all patients with nasal fractures. Furthermore, outcomes of the study such as ARDS, osteomyelitis, LOS, and mortality should be interpreted specific to trauma patients, who often have concomitant injuries in addition to nasal fractures that are certainly more likely the reason for these significant complications than the nasal fracture itself. In addition, as the NTDB only describes the index hospitalization, information regarding follow-up, outpatient operative management, long-term complications, and long-term functional or cosmetic data are unavailable. Furthermore, important data fields are lacking such as the timing of any consultant services, specialty of consultant (i.e., plastic surgery, otolaryngology, and/or oral maxillofacial surgery), whether the patient was deemed appropriate for surgery based on other concomitant injuries, and other physiologic information that may affect interventions and outcomes. However, our study has the advantage of a large multi-institutional, nationwide population that allows us to more accurately describe the epidemiology and risk factors associated with nasal fractures in patients who present as trauma activations at trauma centers across the country. This diversity allows the findings to be more generalizable, compared with single-institution studies, and provides valuable information applicable to multiple specialties involved in the care of facial trauma (i.e., emergency medicine, trauma surgery, plastic surgery, otolaryngology, and oral and maxillofacial surgery).

Conclusion

In this study, nasal fractures were found to have an incidence of 4.6% of traumas, with more than 90% occurring by blunt mechanism and over half suffering a concomitant TBI. Only ~10% of patients received any form of surgical intervention during their index stay, with the majority undergoing closed reduction. The strongest associated injury with increased odds for a nasal fracture was an open wound of the nose followed by epistaxis. Understanding the epidemiology, outcomes, and risk factors associated with nasal fractures may help clinicians better diagnose and treat this injury. Future prospective multi-institutional studies are needed to investigate the follow-up rate of this population and long-term functional and cosmetic outcomes.

Conflict of Interest

None.

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