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Original Research Article

Satisfaction level in patients with nasal bone fracture following closed reduction: a follow-up single-centre study from New Delhi, India

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ABSTRACT

Background: Nose, because of its prominence and central location in the face is more prone to injury. Nasal bone fractures (NBFs) are one of the most common fractures in patients with maxillofacial injuries. The closed reduction of NBFs is well documented and results in varied clinical outcomes. There is paucity over detailed reports on patient satisfaction in terms of functional and aesthetic aspects as well as the reasons for dissatisfaction of the same.
Methods: We had conducted a prospective cohort study of previously treated patients to evaluate the postoperative functional and aesthetic outcomes like patient satisfaction following closed reduction of NBFs in the department of plastic surgery.
Results: The average age of patients was 40.61 years (SD±15.83), of which 63.7% were male and 36.21% female. The major cause of fracture was found to be RTA (55.17%). The satisfaction as happy (9-10 score) reported by 60.34% patients for functional aspect and 41.38% patients for the aesthetic aspect of closed reduction of NBFs.
Conclusions: Our study demonstrated comparatively good satisfaction results in terms of functional and aesthetic aspects following closed reduction. Closed reduction technique of nasal bone fracture is simple, safe, and easy to perform with minimal potential morbidity.

Keywords: Nasal bone fracture, Closed reduction, Patient satisfaction

INTRODUCTION

Nose, because of its prominence and central location in the face is more prone to injury.[1] Nasal bone fracture (NBFs) is one of the most common fractures in patients with maxillofacial injury.[2,3] It constitutes 39% of maxillofacial bone fractures and is more common in males than in females.[2] The high prevalence of such injuries emphasizes the necessity of epidemiologic surveys and optimal management. An epidemiologic survey has indicated that the causes of NBFs vary according to geographic region, socioeconomic status, culture, and religion.[4]

Management of a nasal trauma is dependent upon multiple factors including the age of the patient, time since injury, a necessity for acute versus delayed reduction, choice of anesthesia, and approach (open vs closed reduction). It should, however, be noted that the fracture should be carefully classified and diagnosed before any management attempt.[5] Out of 2 modalities of treatment of NBFs, the

majority of fractures are managed using closed reduction and various types of intranasal packing.[6-8]

Closed reduction is usually reserved for simple, non-comminuted nasal fractures, although exceptions can be made.[5] However, closed reduction conducted blindly and may lead to under correction, new fractures, mucosal damage, and nasal hemorrhage.[9] Comminuted fractures with severe loss of nasal support, severe septal injuries, associated maxillary or frontal bone fractures and injuries with considerable soft tissue damage should be addressed with full exposure as the advantages of open reduction are many.[5] Because of a high incidence of nasal fractures, demands for cost-effectiveness, decreased treatment time, and less bed occupancy, the closed reduction under local anesthesia is becoming a lucrative option. However, the use of a closed or open approach usually depends on the extent of the injury. Some of the advantages of closed reduction are that the technique is simple, safe, easy to perform, and minimal potential morbidity.[10] It is unlikely that the patient will have a 'perfect' result, so the primary goal is to minimize deformity and functional impairment.[5]

Closed reduction of NBFs is well documented and results in varied clinical outcomes. However, only a few studies have investigated detailed reports on patient's satisfaction in terms of functional and aesthetic aspects.[9] Therefore, we have conducted a follow up cohort study of previously treated patients. The aim of the study was to evaluate the postoperative functional and aesthetic outcomes like patient satisfaction following closed reduction of NBFs.

METHODS

Study population and study design

We conducted a follow-up study of 58 patients, who had been operated with closed reduction under general anesthesia for NBFs in the department of plastic surgery (data present in computerized patient record system). We have conducted a prospective cohort study of previously treated patients to evaluate the postoperative functional and aesthetic outcomes like patient satisfaction following closed reduction of NBFs.

The Institutional Ethics Committee approved the study and written informed consent has been obtained from every participant. The inclusion/exclusion criteria are mentioned in Figure 1.

The patients who had completed at least 3 months of postoperative follow up were asked for participation in this study. For measurement of satisfaction we were used a 10-point scale as done by Das et al and the percent of patients in various categories were obtained along with their 95% confidence interval.

In addition, we will also report average satisfaction score and their standard deviation.[10]

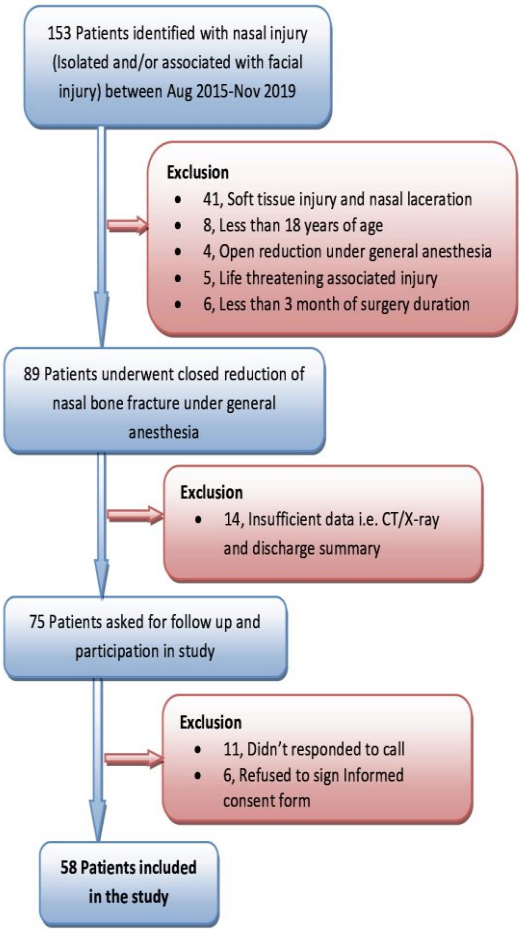

Figure 1: Enrolment of patients.

Operative procedure and evaluation

After complete evaluation with history, clinical examination and CT/X-ray diagnosis of NBFs were made in patients presenting with facial injuries in the emergency department. In our study, upon confirmed diagnosis, all cases were managed with closed reduction under general anesthesia. Local anesthetic mixture (lignocaine with adrenaline and bupivacaine) was used for local infiltration which helped in local vasoconstriction and prolonged post-op pain control. Nasal reduction forceps such as Walsham's forceps and Asch's forceps were used for closed reduction. After necessary bony reduction, adrenaline-soaked gauze piece packs were placed intranasally for hemostasis which was subsequently replaced with merocele sinus and nasal packs. Minor digital manipulations were done to confirm the symmetrical alignment of the nasal pyramid. Intra nasal splint was removed in 48-72 hours after placement. Any lacerations over nose if the present were repaired and covered after which plaster of Paris was used for splinting by taking support from the forehead. Post-op analgesics and antibiotics were prescribed for initial 3-5 days. The nasal splint was maintained for about 3 weeks where for the initial 10 days it was retained for 24 hrs of the day and in the next 10 days; it is for night time only. The patients

were followed up regularly to monitor for healing and recovery. We evaluated patient satisfaction scores following closed reduction of NBFs, after a minimum follow-up of 3 months. The modified Murray classification system (Table 1) has been used to classify NBFs as type I simple without displacement, type II simple with displacement/without telescoping (type IIA unilateral, type IIAs unilateral with septal fracture, type B bilateral, type IIBs bilateral with septal fracture) and type III comminuted with telescoping or depression.[11,12] The postop patient's satisfaction score was measured by 10 point scale; 1-5 not satisfied, 6-8 satisfied, and 9-10 happy in terms of both functional and aesthetic outcome of closed reduction of NBFs.[10]

Table 1: Modified Murray classification system.

Type of nasal bone fracture	Characteristics
Type I	Simple without displacement
Type II	Simple with displacement/without telescoping
Type IIA	Unilateral
Type IIAs	Unilateral with septal fracture
Type IIB	Bilateral
Type IIBs	Bilateral with septal fracture
Type III	Comminuted with telescoping or depression

RESULTS

During study duration, 58 patients fulfilled the inclusion/exclusion criteria; had been enrolled in the study (Figure 1). The average age of patients was 40.61 years (SD±15.83), of which 63.7% were male and 36.21% female. About all the patients (98.3%) belong to the urban area of residence except one. In our study, we found that 89.65% of the patient didn't have any co-morbidity whereas some patients reported having hypertension (6.89%) and diabetes (3.44%). The average follows up duration was 24.51 (SD±10.73) months. It was found that 34.48% of patients reported Type IIBs type of fracture (Figure 2). Out of the total, 60.34% of patients reported no associated facial fracture whereas blowout fracture (13.83%), maxillary fracture (13.03%), and other (15.51) associated facial fractures had been reported. The major cause of fracture was found to be RTA (55.17%). The maximum incidence of NBFs was reported in 26-35 years of the age range (Figure 3). The average functional satisfaction score was reported as 8.41 (SD±1.49) and the average aesthetic satisfaction score as 7.71 (SD±1.92). The satisfaction as happy (9-10 score) reported by 60.34% patients for functional aspect and 41.38% patients for the aesthetic aspect of closed reduction of NBFs (Figure 4). The major aesthetic causes for dissatisfaction were shape, symmetry, and the presence of scar (Table 2).

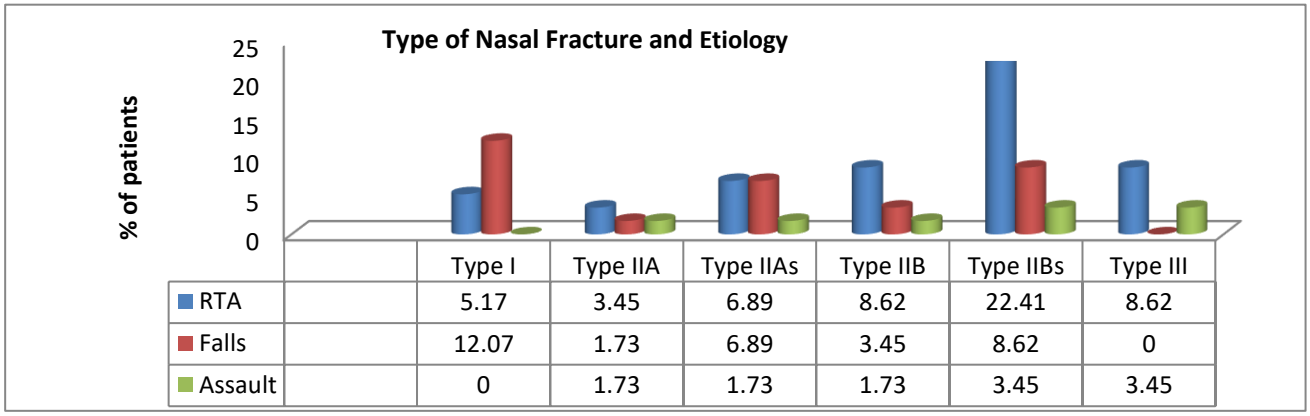

Figure 2: Type of nasal bone fracture and aetiology.

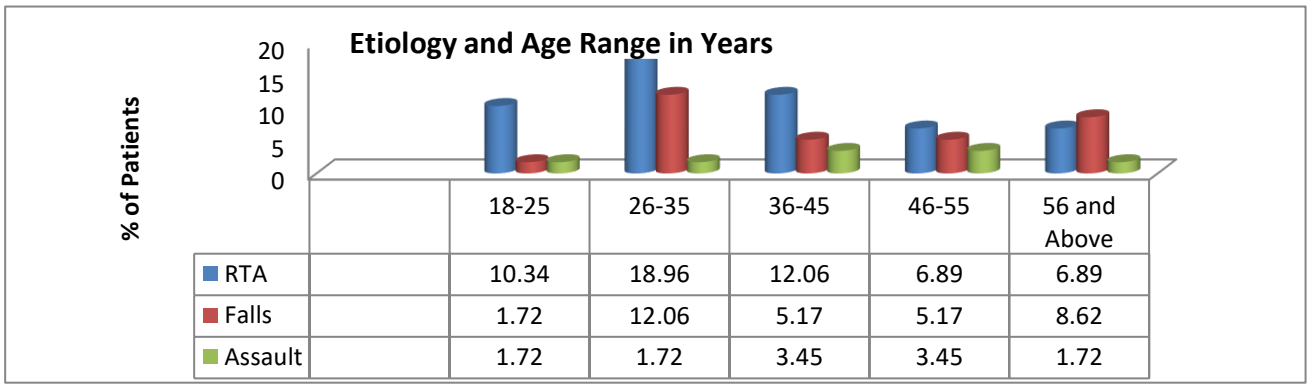

Figure 3: Age range in years and aetiology of nasal bone fracture.

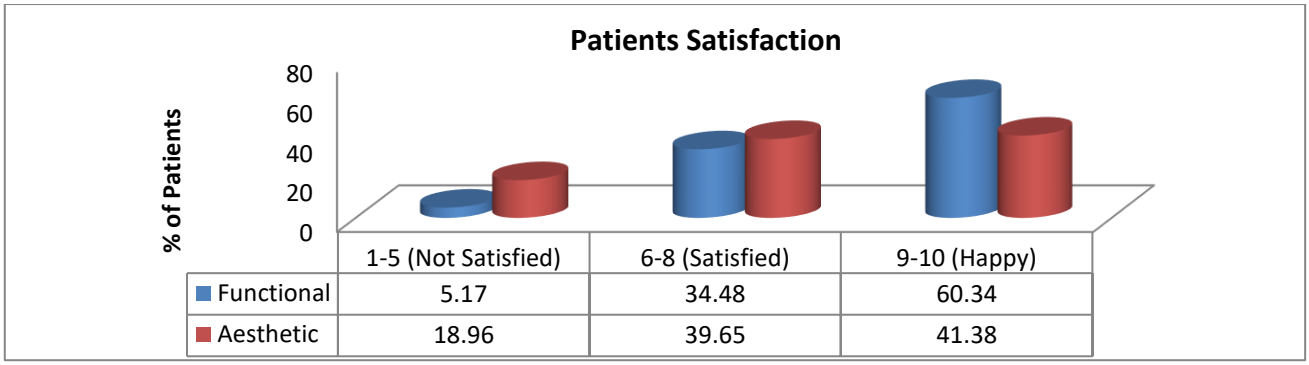

Figure 4: Patients satisfaction after closed reduction.

Table 2: Cause for dissatisfaction.

Functional dissatisfaction*	Number of respondents	Aesthetic dissatisfaction*	Number of respondents
Pain	1	Size	0
Nasal secretion	1	Shape	5
Nasal obstruction	1	Symmetry	3
Others	0	Scar	3

*Multiple responses.

Consecutively, a 26 years old male patient had RTA and sustained NBF Type IIA, underwent closed reduction under GA reported post-operative satisfaction score as 9 in terms of both functional and aesthetic outcomes (Figure 5-7).

Figure 5: Post RTA NBF with nasal deformity (A) Caudal view; (B) Frontal view.

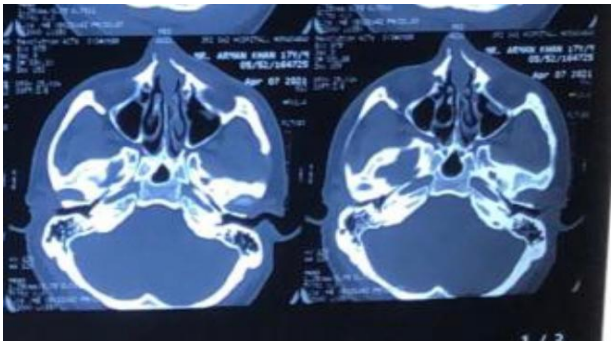

Figure 6: Pre-operative CT scan showing nasal bone deformity.

Figure 7: Post-operative closed reduction of NBF on follow-up of 4 months (A) frontal view; and (B) caudal view.

DISCUSSION

In our study, it was found that male (63.7%) patients are more prone to NBFs compared to the female which seemed to be similar to previous findings.[13,14] The reason behind this may due to more outdoor activities and manual work by males compared to females.[15] Because our institution is in a thickly populated urban area, the majority of cases reported were in the urban population which is higher than other studies i.e. 68.5% by Sadhoo et al.[16] In our study, NBFs were most frequently associated with RTA (55.17%) followed by fall (32.75 %) and assault (12.68%). An Indian study by Chhaya et al reported 35.29% of RTA followed by 29.35% violence.[13] However, Renkonen et al reported violence (43.3%) as major etiology of NBFs.[17] Patients of middle age groups reported a higher incidence of NBFs. The previous findings also reported similar results.[13,14]

Most of the NBFs in our study were type IIBs (34.48%) fracture followed by type I (17.24%). In a Korean study, type IIA fracture was most commonly noted (38.17%) followed by type I (23.65%), type IIB (14.51%), type IIBs (9.14%) and type III (6.99%).[18] Very few studies reported the standard classification system to showcase the pattern and severity of NBFs considering closed reduction.[11]

The majority (94.82%) of patients reported being satisfied with functional outcomes whereas, 81.03% of patients were satisfied with aesthetic outcomes. A study by Das et al reported 95% of patients satisfied with their postop functional and aesthetic outcomes.[10] Abu et al reported that 75% of patients were satisfied following closed reduction.[19] Love et al reported 88% and 86% patient satisfaction for functional and aesthetic outcomes respectively.[20] Closed reduction of nasal bones is by far the most commonly practiced method of management around the globe and is known to give significantly satisfactory results even in the absence of any standardization.

In our study, 5.17% and 18.96% of patients were dissatisfied with functional and aesthetic outcomes respectively. Post reduction patient dissatisfaction with aesthetic outcomes reported as 14% by Sharma et al, 5% by Das et al, 12.5% (dissatisfaction with closed reduction) by Abu et al, and Terry et al.[10,18,19,21] reported 13% and 21% of patients were dissatisfied with functional and aesthetic outcomes respectively which seemed to be higher than our findings.

Even though most of the patients present with satisfactory results there is a small percentage of patients who are displeased with surgical outcomes. Functionally it could be nasal obstruction, persistent pain and nasal secretions due to chronic sinusitis noticed in associated maxillary and frontal bone fractures. When it comes to aesthetic concerns things may vary from altered size, shape, symmetry, and scarring (due to associated nasal lacerations). Few patients also had a belief of altered nasal shape before injury which got worsened after the intervention. Few females showed increasing concern about the shape of nose as it altered their confidence levels on social media platforms.

There is very limited data available on the cause for dissatisfaction following closed reduction. Our findings are similar to previous studies as they stated that the patients were more concerned about aesthetic outcomes compared to functional outcomes.[21] The increasing number of patients requesting reconstructive or corrective surgeries for post-traumatic deformity is thought by some to reflect a high incidence of unsatisfactory results following simple manipulation of nasal fractures.[22] However, it was reported that not all the patients who were dissatisfied had post-reduction complications.[23] In our study, the patients who reported being unhappy with post reduction outcomes were suggested for revision surgery though not many patients opted for revision surgery.

In our clinical practice, we come across a wide variety of maxillofacial injuries which most often have associated NBFs of varying severity. We manage a majority of the NBFs by closed reduction under general anesthesia. We feel that it's a simple solution to a complex problem. It is technically not challenging and also has advantages of avoiding implants and associated complications. As a known fact there is no widely accepted standard protocol for the management of NBFs with closed reduction. Even though there are minor variations in the reduction and splinting process; results following such reductions are widely acceptable. This implies that closed reduction is a fairly simple and effective procedure.

CONCLUSION

Closed reduction technique of nasal bone fracture is simple, safe, and easy to perform with minimal potential morbidity. Our study demonstrated good satisfaction results in terms of functional as well as aesthetic aspect following closed reduction technique. We recommend this technique for management of almost all nasal bone fracture.

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Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Yilmaz MS, Guven M, Varli AF. Nasal fractures: Is closed reduction satisfying?. J Craniofac Surg. 2013;24(1):36-8.
2. Mohammadi A, Mohammad GR. Nasal bone fracture- ultrasonography or computed tomography?. Med Ultrason. 2011;13(4):292-5.
3. Saiki T, Ogawa T, Kuroda K, Miyahara S, Makino T, Koyama T. A clinical study on 299 cases of nasal bone fractures. Pract Otorhinolaryngol. 2019;112(7):471-7.
4. Hwang K, Ki SJ, Ko SH. Etiology of nasal bone fractures. J Craniofac Surg. 2017;28(3):785-8.
5. Kelley B, Downey C, Stal S. Evaluation and Reduction of Nasal Trauma. Semin Plast Surg. 2010;24(04):339-47.
6. Yu SS, Cho PD, Shin HW, Rhee SC, Lee SH. A comparison between K-wire splinting and intranasal Gauze Packing in nasal bone fracture. J Craniofac Surg. 2015;26(5):1624-7.
7. Kyung H, Choi JI, Song SH, Oh SH, Kang N. Comparison of Postoperative Outcomes between Monitored Anesthesia Care and General Anesthesia in Closed Reduction of Nasal Fracture. J Craniofac Surg. 2018;29(2):286-8.
8. Jang N, Shin HW. Are postoperative prophylactic antibiotics in closed reduction of nasal bone fracture valuable?: prospective study of 30 cases. Arch Craniofac Surg. 2019;20(2):89-93.

9. Lee YJ, Lee KT, Pyon JK. Finger reduction of nasal bone fracture under local anesthesia: Outcomes and patient reported satisfaction. Arch Craniofacial Surg. 2019;20(1):24-30.
10. Das TA, Aslam AS, Mangalath U, Abida R, Nair RB, Soman S. Evaluation of treatment outcome following closed reduction of nasal bone fractures. J Contemp Dent Pract. 2018;19(10):1174-80.
11. Jeon M, Kim Y. Correlation Between the Existing Classifications of Nasal Bone Fractures and Subjective Patient Satisfaction. J Craniofac Surg. 2018;29(7):1825-8.
12. Hwang K, You SH, Kim SG, Lee SI. Analysis of nasal bone fractures; a six-year study of 503 patients. J Craniofac Surg. 2006;17(2):261-4.
13. Chhaya VA, Patel R, Barot DA, Modi N, Maniyar H, Patel P, et al. Nasal Bone Fracture Reduction. World Articles in Ear, Nose and Throat. 2010;3(2):1-16.
14. Pati S, Swain S, Nayak A, Sahoo P, Ojha B. Management of Fracture Nasal Bone By Closed Reduction in a Tertiary Care Hospital. Int J Adv Res. 2019;7(9):1249-54.
15. Ashoor AJ, Alkhars FA. Nasal bone fracture. Saudi Med J. 2000;21(5):471-4.
16. Sadhoo A, Sharma M, Singh P. Nasal Bone Fracture Management- Our Experience. J Evid Based Med Health. 2017;4(13):717-22.
17. Renkonen S, Vehmanen S, Makitie A, Blomgren K. Nasal bone fractures are successfully managed under local anaesthesia - experience on 483 patients. Clin Otolaryngol. 2016;41(1):79-82.
18. Sharma SD, Kwame I, Almeyda J. Patient aesthetic satisfaction with timing of nasal fracture manipulation. Surg Res Pract. 2014;2014:238520.
19. Abu SM, Selmi G, Mansy H, Agha M. Role of intra-operative ultrasound-guided reduction of nasal bone fracture in patient satisfaction and patient nasal profile (a randomized clinical trial). Eur Arch Otorhinolaryngol. 2011;268(4):541-6.
20. Love RL. Nasal fractures: patient satisfaction following closed reduction. N Z Med J. 2010;123(1321):45-8.
21. Terry H, Waitsz C, Vlantis AC, Tong MCF, Van Hasselt CA. Patient satisfaction after closed reduction of nasal fractures. Arch Facial Plast Surg. 2007;9(1):40-3.
22. Crowther JA, Donoghue GM. The broken nose: does familiarity breed neglect? Ann R Coll Surg Engl. 1987;69(6):259-60.
23. Kang CM, Han DG. Correlation between Operation Result and Patient Satisfaction of Nasal Bone Fracture. Arch Craniofac Surg. 2017;18(1):25-9.

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