



SURGICAL OUTCOME OF NASAL BONE FRACTURES FOLLOWING CLOSED REDUCTION WITH EXTERNAL NASAL SPLINTING

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Dr Manjunath K Professor and Hod, Department Of ENT, Subbaiah Institute Of Medical Sciences

Dr Mirza Hassan Abbas Assistant Professor, Department Of ENT, Subbaiah Institute Of Medical Sciences

Dr Chandaa V J Senior Resident, Department Of ENT, Subbaiah Institute Of Medical Sciences

Dr Shwetha D Naik Senior Resident, Department Of ENT, Subbaiah Institute Of Medical Sciences

ABSTRACT

Introduction: The closed reduction of a displaced nasal fracture is a preferred method in Otorhinolaryngology. This prospective study was conducted to evaluate the surgical outcome following closed reduction of nasal bone fractures. **Materials and Methods:** A total of 40 patients with nasal bone fracture who underwent closed reduction were included in the study. The cases were operated under local or general anaesthesia. The outcome of treatment was evaluated pre- and postoperatively through systematic follow-ups. Clinical assessment was done to evaluate functional (airway patency, nasal obstruction, crepitus) as well as esthetic parameters (facial symmetry, swelling, and nasal deviation). Functional and esthetic satisfaction of patients was assessed using visual analog scale (VAS) pre- and post-operatively. **Results:** It was observed that there was significant improvement in both functional and esthetic parameters following closed reduction of nasal fractures. **Conclusion:** The present study suggested that closed reduction of nasal bone fracture is very effective in the management of nasal bone fractures. However, further studies with larger sample size in different clinical situations should be considered to confirm the efficacy of the same. **Clinical Significance:** Closed reduction can be a viable and more conservative alternative in management of nasal fractures.

KEYWORDS

Closed reduction, Nasal Bone fracture, External Splinting

INTRODUCTION

The most common facial fracture and third most common fracture of the human skeleton is nasal fracture comprising of 39% of the patients with maxillofacial trauma,¹ caused by motor vehicle accidents, sports injuries, and physical alterations.

Most of the injuries in the paediatric and geriatric group, both in males and females, result from falls and accidents.² Nasal fractures usually are not promptly diagnosed, as they occur along with multiple facial trauma.

This results in inadequate therapy of the nasal pyramid, thereby affecting aesthetics and functions due to secondary nasal deformities and chronic nasal obstructions respectively. There is no consensus regarding use of closed vs open techniques, timing of repair and use of local vs general anaesthesia for management of fractures of nasal complex.

MATERIALS AND METHODS

The present study was conducted in the Department of Otorhinolaryngology, Subbaiah Institute of Medical Sciences-SUIMS, Shivamogga. The study was approved by Institutional Ethical Committee, the surgical procedures and possible complications were explained to the patients and written informed consent to undergo surgical correction by closed reduction with external splinting (Plaster Of Paris) and periodic follow-up was obtained prior to surgery.

This study was conducted from July 2024 to December 2024 for 6 months duration. Forty patients (28 male patients and 12 females) with nasal fracture and complains of tenderness over nose were included in the study.

All patients underwent closed reduction with external splinting of nasal bone fracture between 2 and 12 days after trauma. Age of the patients ranged from 18 to 54 years, with the mean age being 34 years. 14 patients were operated under general anaesthesia and 26 patients under local anaesthesia. Paediatric patients and patients with associated head injury or uncontrolled systemic illness were excluded from this study.

Surgical Outcome Following Closed Reduction With External Nasal Splinting (POP)

Closed reduction was done using digital manipulation. Fourteen patients were operated under general anaesthesia and twenty six patients under local anaesthesia. Walsham's nasal reduction forceps and Asch's septal forceps were used to manipulate the nasal bone and

frontal processes of maxillae and septum respectively. Local anaesthesia (2% lignocaine hydrochloride) containing 1:100,000 epinephrine was administered in order to achieve adequate anaesthesia.

External splinting was done using Plaster of Paris splint of optimum size. Following closed reduction using forceps, the plaster was then carefully moulded to the forehead, glabella, the nasal bridge line, and upper two thirds of the nose. It was ensured that plaster engaged the skin just medial to the inner canthus of each eye where it was gripped between forefinger and thumb.

While plaster was setting the edges, particularly near the eyes, the area along the side and over tip of the nose was smoothened to prevent subsequent soreness of the adjacent skin. When plaster had set, it was secured to the forehead and cheeks with adhesive tapes. Patients were called on the 3rd postoperative day and splint was rechecked to rule out ill-fitting of splint. Airway patency and nasal obstruction were assessed pre- and postoperatively to evaluate the functional outcome of the treatment (Figures 1-10).

RESULTS

During the execution of the procedure in the 40 patients, it was found that 30% (12/40) had developed bleeding intraoperatively which was managed by anterior nasal packing. Similarly, 10% (4/40) developed signs of syncope, but did not result in loss of consciousness. Both the patients recovered within a short period of time. They required postural repositioning which was done by elevating the lower limbs to the plane of the trunk. Both these complications did not interfere in the outcome of treatment.

The highest percentage of patients were in their 2nd and 3rd decade of life (45%), while patients above 50 years were comparatively lowest in number (10%). Among the 20 patients examined, 28 were males (70%) and 12 females (30%), which showed that the incidence of nasal bone fractures were twice more common in males than in females. While assessing the cause of injury, road traffic accident was the most common (35%), followed by assault and sports injury (20% each). There was no significant relationship between the effectiveness of close reduction treatment and age, gender, cause of trauma, and type of nasal fracture. Based on the type of fracture, 18 out of 20 cases had simple unilateral nasal fractures while the remaining 22 had bilateral fractures. No case included in this study was associated with septal injury.

Data recorded were analysed and performed with Statistical Package

for the Social Sciences, version 21. Paired t-test was used to compare pre- and postoperative evaluation of functional components and also the degree of aesthetic and functional satisfaction (Table 1). A p-value less than 0.05 was considered to be significant.

Comparison of pre- and postoperative functional components was found to be statistically significant ($p < 0.05$). Following the treatment, considering, 24 patients (60%) were happy with the treatment and gave a score between 9 and 10 on VAS while 14 patients (35%) were satisfied (5-8 in VAS) and two patients were not satisfied and were given appointment for open reduction later.

DISCUSSION

In this study, nasal fractures of male patients were twice as female patients which is in concordance with studies of Faryabi et al.⁷ and Murray et al.³ The data from the current study are in concordance with those of Bakardjiev and Pechalova⁴ and Wulkan et al.,⁵⁻¹⁰ which emphasize the predominance of male subjects having nasal fracture or injury.

If the fractured nasal bones are impacted or unable to reduce by this method, then we have to consider the use of specialized instruments designed for his purpose called Walsham's forceps and Asch's forceps.¹⁰⁻¹³ Walsham's forceps are used for reducing the nasal bone fractures, while Asch's forceps are primarily used in reducing the deviated nasal septum. However, both these instruments should be used with caution, as its inadvertent use can result in irreversible damage to the nasal mucosa. It is also safe, efficient, and also avoids the risks associated with GA.¹⁴⁻¹⁶ This correlates with our study in which there was no difference in clinical outcomes for cases done under LA with cases done under GA.

Manipulation under LA was also quicker to perform and did not require hospitalization resulting in freeing up of resources and theatre time.^{17,18} The fractured nasal bones have a tendency to move after repositioning due to minor trauma or drift back to their pre-reduction position. Hence, it is important to review the patients and keep them on regular follow-up following nasal fracture reduction.^{19,20} Patients in this study were followed up on a regular basis for a duration of 6 months.

As trauma is the most common aetiology, it can result in severe disruption of the nasal bones and cartilages resulting in significant external deformity and airway obstruction. The type and severity of nasal fracture is dependent on the force, direction and mechanism of injury.¹⁴⁻¹⁸ Lateral nasal trauma is most common and may result in the fracture of one or both nasal bones and sometimes dislocation of the nasal septum off the maxillary crest. Septal dislocation usually causes airway obstruction. Direct frontal trauma to the nose often results in the depression and widening of the nasal dorsum with associated nasal obstruction. More severe injuries may result in comminution of the entire nasal pyramid. If these fractures are not properly diagnosed and corrected, the patient will have a poor cosmetic and functional outcome.¹⁵⁻²⁰

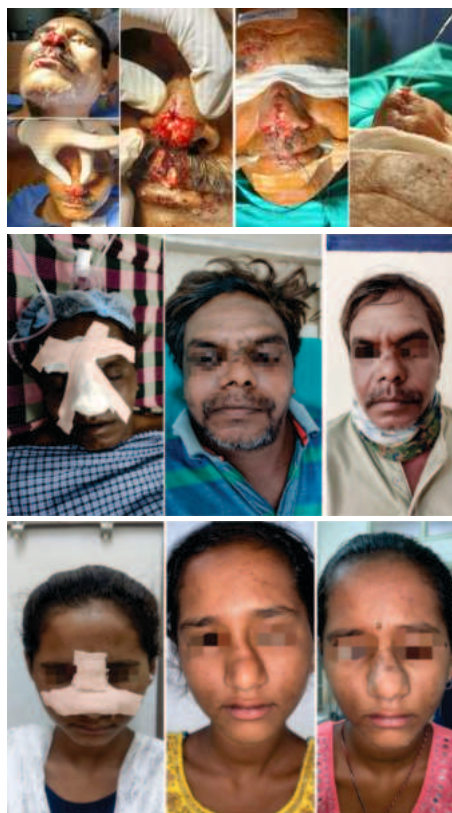
The advantages of reduction and splinting under local anaesthesia over general anaesthesia include (1) shortened hospital stay, (2) ability of the patient to see cosmetic appearance after manipulation while still under anaesthesia allowing further adjustment, (3) minimal delay between diagnosis and treatment, (4) reduction in operative costs, (5) elimination of general anaesthesia risks, (6) option of general anaesthesia available if local fails.²⁰⁻²⁵

CONCLUSION

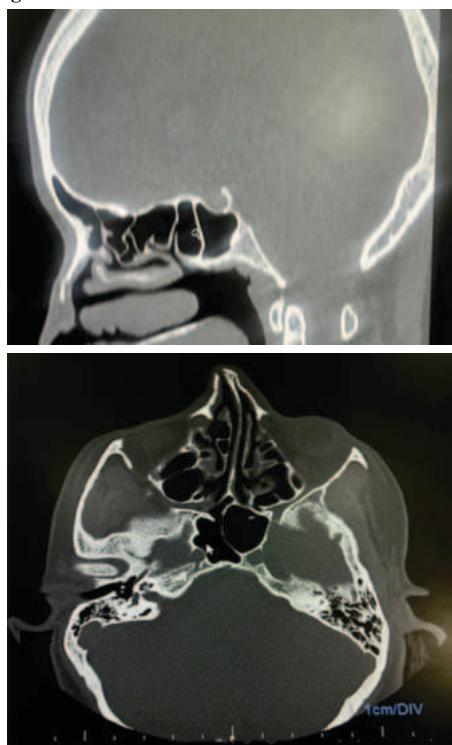
Closed reduction is an easy and sufficient treatment for nasal fractures, especially for mild nasal fractures and its early intervention raises the patient satisfaction rate. So, this method is relatively technique-sensitive, and therefore, it is recommended that every patient suffering from nasal bone fractures must be evaluated individually by thorough clinical and radiographic examination and by taking appropriate CT scan and/or radiographs, if needed, before attempting closed reduction techniques.

Reduction and splinting of nasal bone fractures under local anaesthesia is a safe and effective alternate to general anaesthesia. Nasal patency and cosmetic results are equally good as with procedure under general anaesthesia. External rhinoplasties were splinted with POP and internal rhinoplasties by aluminium splints.

However, further studies with larger sample size in different clinical situations should be considered to authenticate the efficacy of the same.



Radiological Pictures



Tables

VARIABLE	NUMBER (N=40)	PERCENTAGE (%)	PAIRED t-test
Functional Satisfaction:			
Happy (9-10)	24	60	p=0.001
Satisfied (5-8)	14	35	p=0.025

Unsatisfied (<5)	2	5	p=0.003
Aesthetic Satisfaction:			
Happy (9-10)	24	60	p=0.001
Satisfied (5-8)	14	35	p=0.025
Unsatisfied (<5)	2	5	p=0.003

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