

Combined Nasociliary and Infraorbital Nerve Block: An Effective Regional Anesthesia Technique in Managing Nasal Bone Fractures

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ABSTRACT

Background: Closed reduction of the fractured and displaced nasal bones results in nasal bleeding at the site of fracture which needs judicious management. Usually general anesthesia is used with orotracheal intubation, whereas managing these cases with combined nasociliary and infraorbital blocks needs a better understanding of the surface landmark and foramina anatomy.

Materials and methods: We report a randomized study of 2 groups of 25 patients each, with fractures of the nasal bones in our institution over 12 months. Group I included 25 patients with nasal bone fracture reduction done under general anesthesia, and group II included 25 patients in whom regional block anesthesia was given. Most of the patients in the study were in the ASA grade I and II and all had obvious nasal deformity observed and recorded with a history of trauma and injury.

Results: The time for full sensory loss in group A was 45 minutes and 21 minutes in group B. The procedure time of 12 minutes was the same in both the groups, while an added imaging time of 15 minutes resulted in an overall procedure time of 27 minutes. Splints were used for septal support as well as externally, which needed an extra 20 minutes for the gypsum salt or the thermoplast to settle. The time of recovery was immediate in group B, while 20 minutes of recovery was seen in group A. Most of the patients in group A commented a painless recovery, while most patients of group B commented an experience of discomfort during the procedure.

Conclusion: Unilateral fractures were reduced under regional block anesthesia. Comorbidities should outweigh compliance while preferring regional anesthesia, as the risks involved in general anesthesia have been reduced to the minimum possible extent. The regional block has reduced the operative costs but the complications of the procedure are nearly equal in both types of anesthesia.

Keywords: Computerized tomography (CT) scan, Infraorbital nerve block, Nasal bone fractures, Nasociliary nerve block.

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INTRODUCTION

Closed reduction of the fractured and displaced nasal bones gives rise to intranasal bleeding from the injured sites.¹⁻³ The general anesthesia is used under orotracheal intubation, whereas managing these cases with nasociliary and infraorbital blocks needs a better understanding of the surface landmark and foramina anatomy.¹⁻³ Nasal bones are the most common sites of injuries in the facial skeleton and adequate treatment of the same gives the best appearance in the long run.¹⁻³ Most of the fractures are lesser disfiguring if treated earlier under adequate mobilization.¹⁻³ The initial assessment and classification was done with axial sections of the fracture using CT-scan coronal views. All cases in the study were done under the standard operating protocol of closed reduction using intraoperative imaging. The results were documented and analyzed for symmetry of the external nose by a surgeon and his team and an independent unbiased assessment was made by an anesthesiologist.

MATERIALS AND METHODS

We report a randomized study of 2 groups of 25 patients each, with fractures of the nasal bones in our institution over 12 months. Group I included 25 patients with nasal bone fracture reduction done under general anesthesia, and group II included 25 patients in whom regional block anesthesia was given. Most of the patients in the study were in the ASA grade I and II and all had obvious nasal deformity observed and recorded with a history of trauma and injury. The patients were randomly allotted to two groups with

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the random allocation table, and the procedures were performed by the same team in both groups. An informed written consent about the procedure was obtained from all patients and all cases were evaluated for the displacement of the nasal bones and the concerned deformity, using CT scan axial films (Fig. 1).

Four parameters were assessed in group A and group B: (a) time to full sensory loss from infiltration in group B and from induction of general anesthesia till the start of the surgery in group A, (b) subjective patients' postoperative analysis score, (c) objective assessment of intraoperative hemorrhage, (d) surgeon's operative comfort. Regional nerve block was performed by infiltrating at the infraorbital nerve bilaterally and nasal branches of the nasociliary nerve bilaterally in group B patients

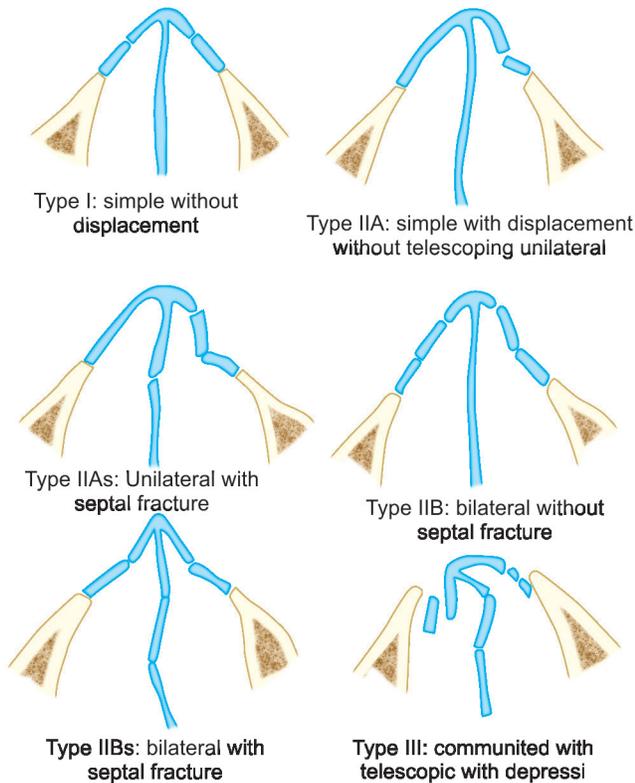


Fig. 1: Working classification of nasal bone fractures

and general anesthesia in group A. All the patients in the study aged between 15 and 52 years and the average age was 41.2 years. An estimated 19 males and 6 females were seen in group A, while 21 males and 4 females were seen in group B. Average age of males were 45.6 years (group A) and 43.2 years (group B); average age of females were 43.6 years (group A) and 4.8 years (group B). ASA grade I was seen in 13 patients in group A and 14 in group B, while grade II in 12 in group A and 11 in group B. A eutectic mixture of a local anesthetic application with occlusive dressing was applied liberally to the dorsum of the nose an hour before surgery in all cases. Nasal packing was done in all cases using 4% lidocaine, with minimal possible discomfort to the patient. This nasal packing varied in the groups: for general anesthesia, the decongestant packs were done after oral intubation, while for regional block, the packing was done before the infiltration to have a better endoscopic picture.

RESULTS

The time for full sensory loss in group A was 45 minutes, while it was 21 minutes in group B. The procedure time of 12 minutes was the same in both the groups, while an added imaging time of 15 minutes resulted in an overall procedure time of 27 minutes. Splints were used for septal support as well as externally, which needed an extra 20 minutes for the gypsum salt or the thermoplast to settle. The time of recovery was immediate in group B, while 20 minutes of recovery was seen in group A. Most of the patients in group A commented a painless recovery, while most patients of group B commented an experience of discomfort during the procedure. Combined nasociliary with 3 mL of 0.25% bupivacaine and 1% lignocaine and infraorbital blocks with 3 mL of 0.25% bupivacaine and 1% lignocaine with adrenaline 1:40,000 was used. Optimal doses of

local anesthesia were used and no complications were reported. No infiltration on the dorsum was done as the swelling can camouflage the success of reduction. Compound fractures of the nasal bones were excluded from the study; however, the intraoperative blood loss was minimal. The quantity of 2% lidocaine used was 4 mL overall and 1 mL each in all the nerve blocks; therefore, the complications were minimal. The after-reduction results were analyzed by the surgeon and his team and an independent assessment for linearity was done by the anesthesiologist. The comfort for the patients was better with general anesthesia and intubation, while mild sedation with midazolam was needed in cases with regional block in nearly half of the cases. The patients remembered the procedure in the block group but not in the general anesthesia group.

DISCUSSION

The fractures of nasal bones are common in middle age groups and heal comparatively slower than do younger age groups.⁴⁻⁷ Trauma being the commonest cause of fractures and also the added comorbidities in these patient makes fracture reduction with regional block more difficult.^{7,8} The use of general anesthesia was preferred as the airway was shared by both surgeons and anesthesiologists.^{7,8} Cases with extensive trauma to the maxilla and dentition, CSF rhinorrhea, bleeding disorders, and cerebrovascular accidents were excluded from the study.

Stranc’s classification system, based on clinical and axial CT scan images, classified nasal bone fractures as frontal impact type I, II, III, lateral impact 1, 2, 3, and communitated fractures.⁵ They advised all the communitated fractures managed by closed reduction using radiographic assistance, while the rest managed by open reduction under endonasal incision and radiographic guidance.⁵ Murray classified fractures according to the pathological criteria, where type I is injury restricted to soft tissue, type IIa being simple unilateral nondisplaced fracture, and type IIb being simple bilateral nondisplaced fracture.^{2,9,10}

Type III is simple displaced, type IV is closed communitated, while the open communitated fractures and complicated ones belong to the type V group.^{2,9,10} Our study was based on a computerized tomography scan classification of the fractures—the widely used method for classifying nasal bone fractures. The method included type I being simple without displacement, type II being simple with displacement and without telescoping, type IIa being unilateral type IIa being an unilateral with septal fracture and type IIb bilateral, while type IIBs being bilateral with septal fracture and type III being communitated with telescoping or depression.^{11,12} These nasal branches have sensory afferents to the mucous membranes of sphenoidal ethmoidal and frontal sinuses also.¹³⁻¹⁵ The nasociliary nerve has sensory afferents to the mucous membrane of the sphenoidal, ethmoidal, and frontal sinuses.¹³⁻¹⁵ The nasal branches have sensory afferents to the mucous membrane of the anterior septum, the lateral wall, and the skin of the ala and apex of the nose by the internal and external branches.¹³⁻¹⁵

The nasociliary nerve (Fig. 2) and its branches are blocked at the anterior ethmoidal foramen, which is 1 cm superior and 1.5 cm posterolateral to the medial canthal ligament of the eye while 1 cm deeper in the same posterior direction is the posterior ethmoidal foramen.^{16,17} Infraorbital nerve is a cutaneous branch of the maxillary nerve emerging through the infraorbital foramen (Fig. 3) and supplies the skin of the nose and the septum mobile nasi, the upper lip and its mucosa, and the lower eyelid and its conjunctiva.^{16,17} The nerve is blocked by palpating the depression



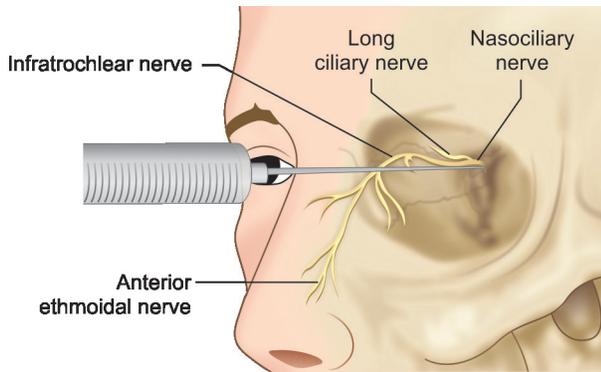


Fig. 2: Point of nasociliary nerve block

at the infraorbital foramen at 2.5 cm from midline on an imaginary line passing from the supraorbital notch, the pupil of the eye, and the second bicuspid tooth.^{18,19} 3 mL of 0.25% bupivacaine and 1% lignocaine with adrenaline 1:400000 (1.5 mL either side) was used to block the infraorbital nerve at the opening without entering the foramen. While no adrenaline was used at the nasociliary nerve facing retinal artery spasm. Decongestion in the cavities was done with 4% lidocaine 15 mL in 2 mL of adrenaline with cotton packs, which provide topical anesthesia to the turbinates and the posterior part of the nasal septum is supplied by the sensory branches of the pterygopalatine nerves.^{18,19}

CONCLUSION

Unilateral fractures (i.e., early type fractures) were reduced under regional block anesthesia. Comorbidities should outweigh compliance while preferring regional anesthesia, as the risks involved in general anesthesia have been reduced to the minimum possible extent. The regional block has reduced the operative costs but the complications of the procedure are nearly equal in both types of anesthesia.

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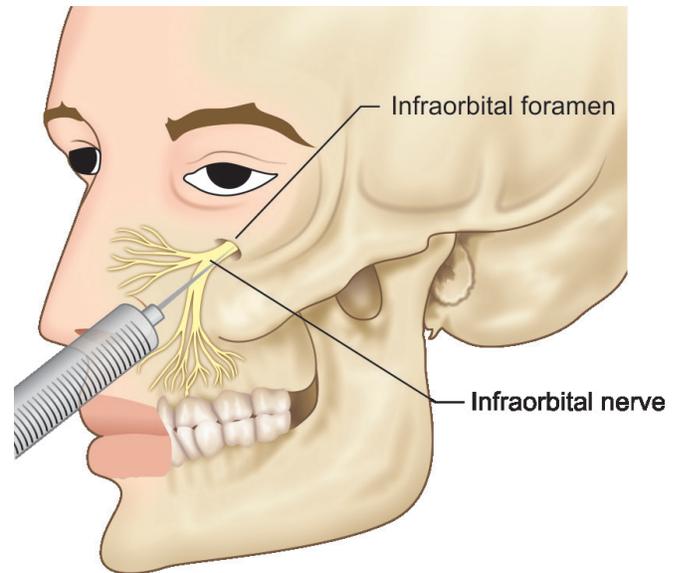


Fig. 3: Point of infraorbital nerve block

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