Original Article

Local versus General Anesthesia for the Manipulation of Nasal Bone Fracture

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Abstract

Background: *Nasal bone fractures are common injuries requiring manipulation, typically managed with local or general anesthesia. The choice between these anesthesia techniques remains a topic of debate due to differences in postoperative outcomes.*

Objective: *To evaluate the clinical outcomes of nasal bone fracture manipulation using local versus general anesthesia.*

Materials and Methods: *A total of 230 patients aged 18 years and older, presenting with nasal bone fractures, were enrolled in this prospective, observational study conducted from July 2021 to July 2023 at the Department of Otolaryngology & Head-Neck Surgery, Holy Family Red Crescent Medical College Hospital, and BSMMU. Participants were randomly assigned to two groups: local anesthesia (121 patients) and general anesthesia (109 patients). Key outcomes included treatment initiation time, operative duration, postoperative pain (measured using the Visual Analogue Scale), complication rates, and patient satisfaction.*

Results: *The mean age of patients in the local anesthesia and general anesthesia groups was 34.20 ± 11.765 years and 36.57 ± 11.080 years, respectively. A complete fracture reduction was achieved in 90.9% of the local anesthesia group and 96.3% of the general anesthesia group. The local anesthesia group had a significantly shorter hospital stay (mean 1.63 ± 0.87 days) compared to the general anesthesia group (mean 3.84 ± 0.81 days, $p < 0.05$). Postoperative complications were observed in 20.7% of the local anesthesia group and 24.8% of the general anesthesia group, with no significant difference ($p = 0.615$). Patient satisfaction with functional outcomes was higher in the local anesthesia group.*

Conclusion: *Both local and general anesthesia techniques are effective for the manipulation of nasal bone fractures, with local anesthesia offering benefits such as quicker treatment initiation, shorter surgeries, reduced hospital stays, and higher patient satisfaction. However, general anesthesia resulted in a higher success rate for complete fracture reduction and better control of postoperative pain. Local anesthesia may be preferred for its efficiency and patient comfort, especially in uncomplicated fractures.*

Keywords: *Nasal bone fracture, Nasal bone fracture manipulation, Local anesthesia, General anesthesia.*

Introduction

Nasal bone fractures (NBFs) are among the most common injuries in the maxillofacial region due to the relative fragility of the nasal bones and their prominent projection on the face. These fractures frequently occur alongside nasal septal fractures, with an incidence range of 42% to 96% in various studies, making them one of the most prevalent fracture types globally. Nasal bone fractures not only pose cosmetic challenges but also significantly affect nasal airway function. The primary goal of treatment is to restore the nose to its pre-fracture state, both in appearance and function[1,2].

Previous studies comparing local and general anesthesia for nasal bone fracture reduction have generally agreed that closed reduction performed under local anesthesia is a safe and effective procedure for most adult patients with isolated nasal fractures [3,4]. However, many of these studies had limitations such as small sample sizes, lack of randomization, and inadequate prospective data collection [5,6]. Despite these limitations, more recent randomized trials have supported the efficacy of local anesthesia as comparable to general anesthesia in managing nasal fractures, particularly when appropriate patient selection is applied[7,8].

Recent studies have highlighted the advantages of local anesthesia, particularly in specialized nasal fracture clinics, where reduction procedures under local anesthesia are faster and lead to high patient satisfaction and favorable functional and aesthetic outcomes [9,10]. These findings suggest potential benefits of local anesthesia, especially for mild unilateral or bilateral fractures, and may make it a viable alternative to general anesthesia in certain cases.

Despite this, controversy remains over which anesthesia technique is optimal. This study aims to compare the outcomes of nasal bone fracture manipulation under local versus general anesthesia, focusing on treatment initiation time, operative duration, postoperative complications, and patient satisfaction.

Objective: To compare the clinical outcomes of nasal bone fracture manipulation performed under local anesthesia versus general anesthesia.

Methodology

Study Design: This study was a prospective, observational cohort study conducted to compare the outcomes of nasal bone fracture manipulation under two different anesthetic techniques: local anesthesia (LA) and general anesthesia (GA).

Study Duration: The study was conducted over a period of two years, from July 2021 to July 2023, at the Department of Otolaryngology & Head-Neck Surgery.

Study Place: Holy Family Red Crescent Medical College Hospital and Bangabandhu Sheikh Mujib Medical University (BSMMU).

Study Population: A total of 230 patients aged 18 years or older who presented with nasal bone fractures were enrolled in this study. These patients underwent nasal bone fracture manipulation during the study period.

Sampling technique: Inclusion and exclusion criteria were used to screen the study population and select eligible participants. Then, they were randomly assigned to either of the two intervention arms.

Inclusion Criteria

- Adults aged 18–60 years
- Acute nasal bone fractures (types III and IV) with cosmetic or functional deformity, within 14 days post-trauma

Exclusion Criteria

- Patients with diabetes mellitus, hypertension, craniofacial deformities from previous nasal trauma
- Those with a history of adverse reactions to anesthetic agents or clinical instability
- Type V nasal fractures
- Patients refusing participation

Randomization

upon meeting the inclusion and exclusion criteria, patients were randomly assigned to one of two intervention groups:

- **Group A (Local Anesthesia):** 121 patients
- **Group B (General Anesthesia):** 109 patients
- **Patient satisfaction:** Assessed based on both functional and cosmetic outcomes following the procedure.

Demographic and Clinical Characteristics: Demographic data (age, sex, and weight) and clinical characteristics (etiology of fracture, admission examination findings, fracture classification) were recorded.

Statistical Analysis: The data were analyzed using appropriate statistical methods. Descriptive statistics were used for demographic and clinical characteristics. Categorical variables were compared using the chi-squared test, while continuous variables were analyzed using t-tests for significance. A p-value of <0.05 was considered statistically significant.

Results

A total of 10 patients were lost to follow-up in both groups. After randomization, 121 patients were assigned to the local anesthesia group (Group A) and 109 to the general anesthesia group (Group B), resulting in a final sample of 230 patients. These patients underwent nasal bone fracture manipulation, with 121 in the local anesthesia group and 109 in the general anesthesia group.

Table 1 shows the age distribution of the patients in both anesthesia groups. The mean age for the local anesthesia group was 34.20 years (SD = 11.765), while the mean age for the general anesthesia group was 36.57 years (SD = 11.080). No significant difference was observed between the two groups regarding age distribution (p = 0.118).

Table I: Age Distribution of Respondents

Age Range (Years)	Local Anesthesia (n=121)	General Anesthesia (n=109)	P-Value
Below 31	61 (50.4%)	37 (33.9%)	
31 -40	28 (23.1%)	36 (33.0%)	
41 -50	19 (15.7%)	24 (22.0%)	0.118
Above 50	13 (10.7%)	12 (11.0%)	
Mean ± SD	34.20 ± 11.765	36.57 ± 11.080	

Figure 1 illustrates the gender distribution in both groups. Males were predominant in both anesthesia groups, with 79.3% in the local anesthesia group and 82.6% in the general anesthesia group. No significant difference in gender distribution was found between the two groups (p = 0.615).

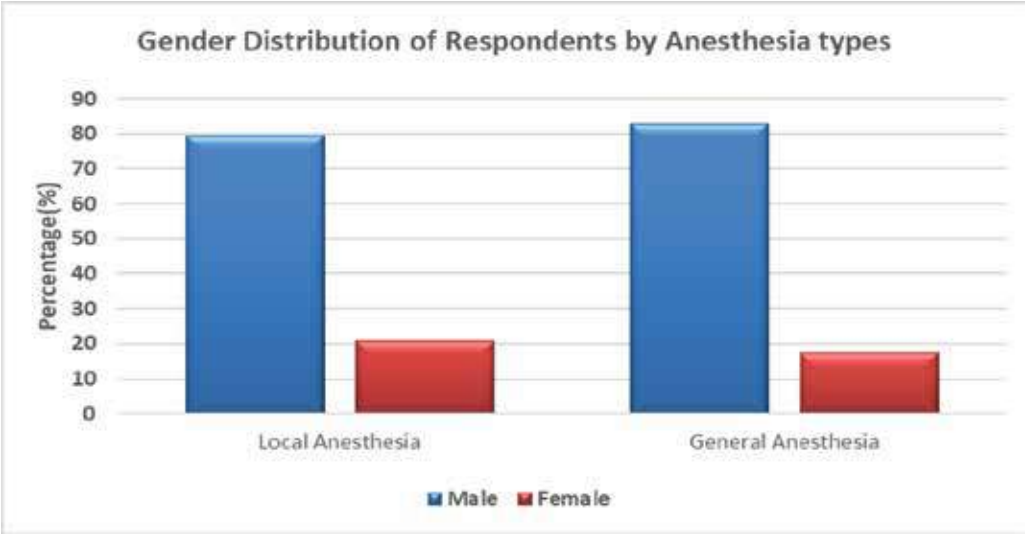

Figure 1: Gender Distribution of Respondents by Anesthesia types

Table II presents the weight distribution of patients in both groups. The mean weight for the local anesthesia group was 63.34 kg (SD = 7.495), and for the general anesthesia group, it was 63.58 kg (SD = 6.674). There was no statistically significant difference between the two groups in terms of weight distribution (p = 0.799).

Table II: Weight Distribution of Respondents

Weight (kg)	Local Anesthesia (n=121)	General Anesthesia (n=109)	P-Value
Below 51	8 (6.6%)	2 (1.8%)	
51 -60	36 (29.8%)	37 (33.9%)	
61 -70	62 (51.2%)	57 (52.3%)	0.799
Above 70	15 (12.4%)	13 (11.9%)	
Mean ± SD	63.34 ± 7.495	63.58 ± 6.674	

Figure 2 shows the primary causes of nasal bone fractures in both groups. Assault was the most common cause in both groups, with 47.1% of cases in the local anesthesia group and 54.1% in the general anesthesia group. There was no significant difference between the two groups regarding fracture etiology (p = 0.723).

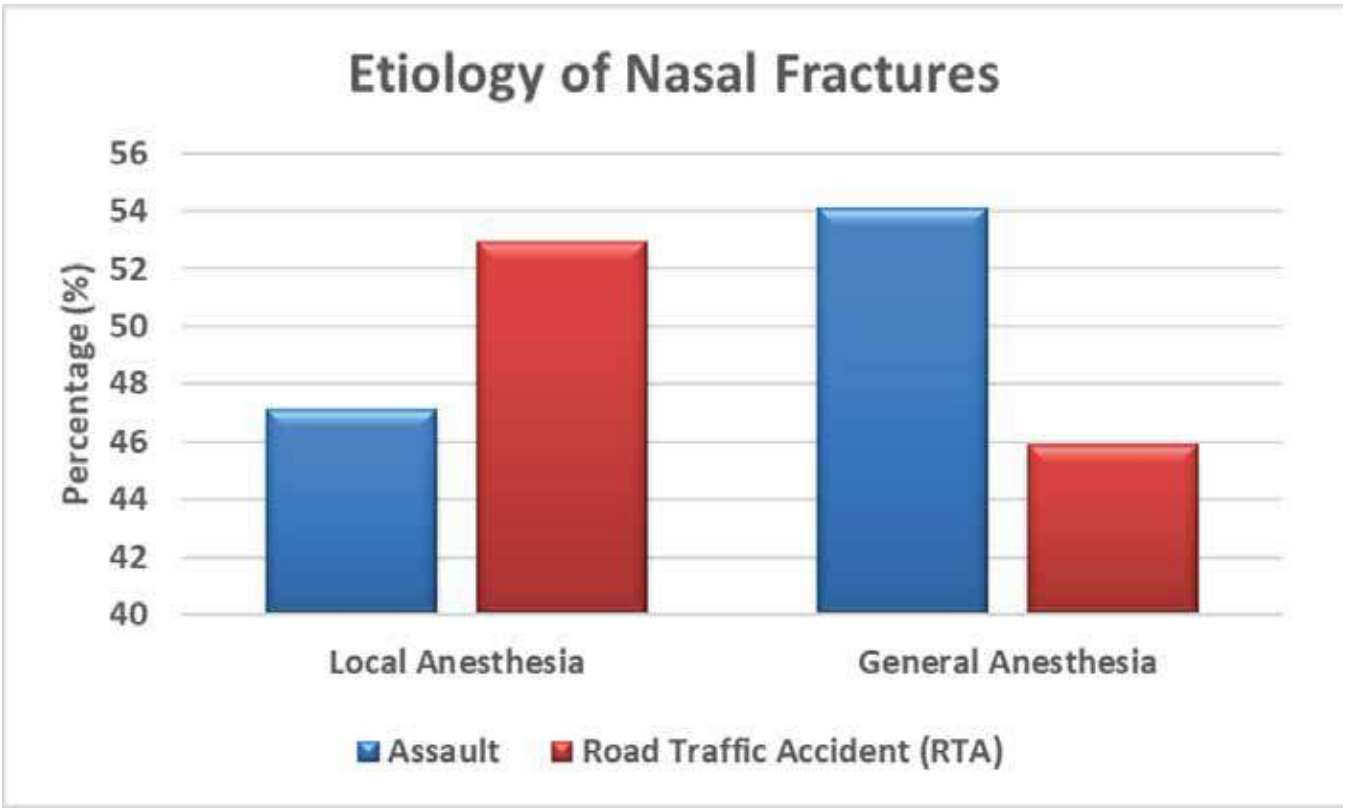

Figure 2: Etiology of Nasal Fractures

Table III shows the lengths of hospital stay in both anesthesia groups. Patients in the local anesthesia group had a significantly shorter hospital stay (mean = 1.63 days, SD = 0.87) compared to the general anesthesia group (mean = 3.84 days, SD = 0.81), with a p-value of <0.05, indicating statistical significance.

Table III: Length of Hospital Stay (Days)

Length of Hospital Stay (Days)	Local Anesthesia (n=121)	General Anesthesia (n=109)	P-Value
< 3 Days	103 (85.1%)	1 (0.9%)	0.000
3-5 Days	18 (14.9%)	107 (98.2%)	
> 5 Days	0 (0%)	1 (0.9%)	
Mean ± SD	1.63 ± 0.87	3.84 ± 0.81	

Figure 3 shows the incidence of postoperative complications in both anesthesia groups. The complication rate was 20.7% in the local anesthesia group and 24.8% in the general anesthesia group, with no significant difference observed (p = 0.615).

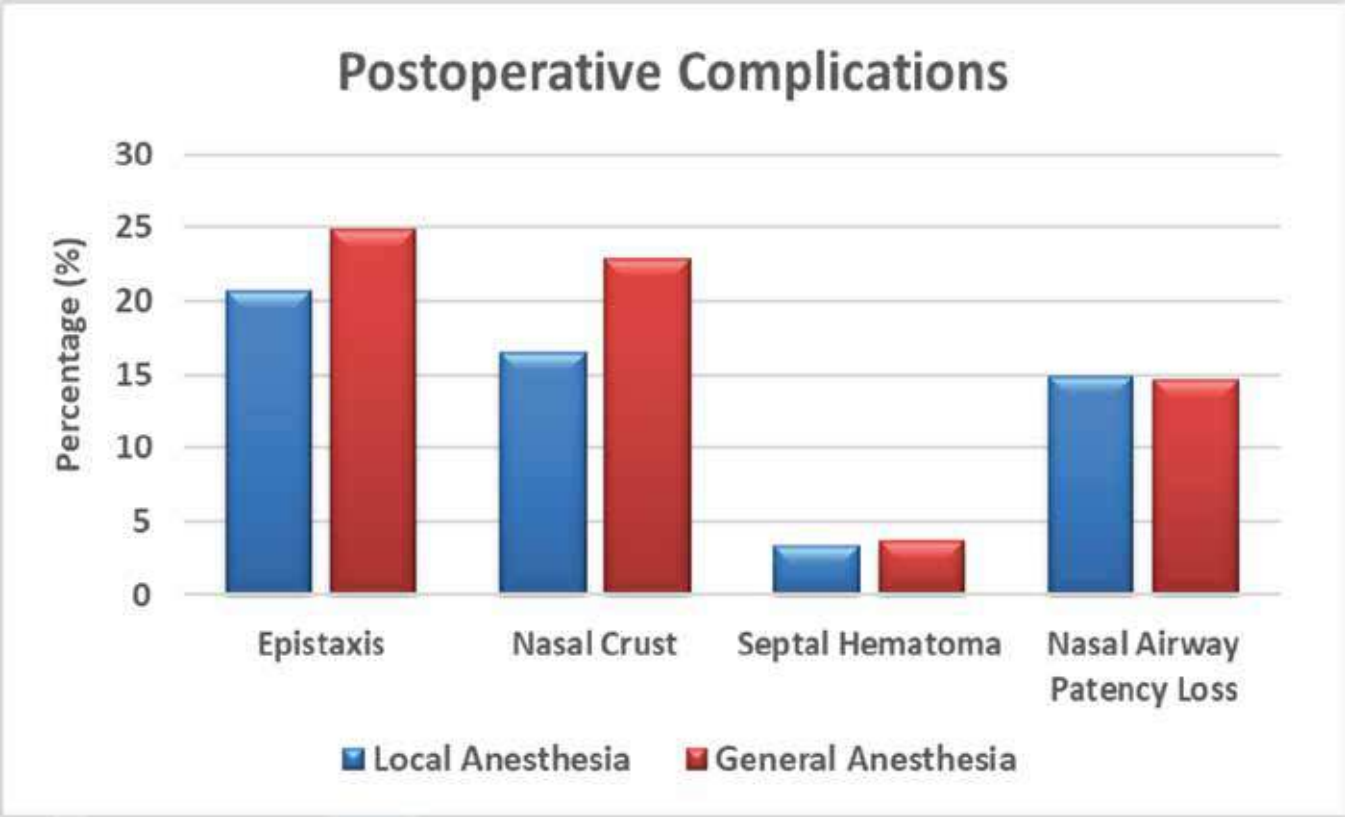

Figure 3: Postoperative Complications

Table IV outlines the postoperative complications for both groups over a 45-day period. The most common complications were epistaxis and nasal crust, which were more frequent in the general anesthesia group initially but resolved over time. Both groups experienced minimal complications after the 14th postoperative day, indicating effective management of postoperative care.

Table IV: Postoperative Complications by Postoperative Day (POD)

Complication	2nd Day (LA / GA)	7th Day (LA / GA)	14th Day (LA / GA)	30th Day (LA / GA)	45th Day (LA / GA)
Epistaxis	22 (18.2%) / 24 (22.0%)	13 (10.7%) / 19 (17.4%)	0 (0.0%) / 0 (0.0%)	0 (0.0%) / 0 (0.0%)	0 (0.0%) / 0 (0.0%)
Nasal Crust	20 (16.5%) / 25 (22.9%)	18 (14.9%) / 21 (19.3%)	6 (4.8%) / 19 (17.4%)	0 (0.0%) / 10 (9.0%)	0 (0.0%) / 0 (0.0%)
Septal Hematoma / Abscess	4 (3.3%) / 4 (3.7%)	3 (2.5%) / 4 (3.7%)	3 (2.5%) / 3 (2.5%)	4 (3.7%) / 3 (2.5%)	4 (3.7%) / 3 (2.5%)
Nasal Airway Patency Loss	18 (14.9%) / 16 (14.7%)	16 (13.2%) / 12 (11.0%)	1 (0.8%) / 7 (6.3%)	0 (0.0%) / 2 (1.8%)	0 (0.0%) / 2 (1.8%)

Discussion

The presented research study provides a thorough comparison between local anesthesia and general anesthesia in nasal bone fracture reduction. The findings reveal that both anesthesia methods can be effective in reducing nasal bone fractures, controlling pain, and managing complications. However, the study highlights some key differences in terms of surgical duration, recovery time, postoperative complications, and patient satisfaction. One of the most notable findings of this study is that the local anesthesia group had a significantly shorter procedure time compared to the general anesthesia group. This observation is consistent with Lee (2013), who found that local anesthesia allowed for quicker surgeries, likely due to its more targeted nature[11]. The mean time from fracture to surgery in the local anesthesia group was also notably shorter than in the general anesthesia group, indicating that local anesthesia may offer a faster and more efficient approach for nasal fracture reduction. Similarly, the shorter hospital stay for patients in the local anesthesia group supports findings from Jung (2019), which reported reduced recovery times for patients who received local anesthesia[12]. The results also indicated that local anesthesia was associated with higher patient satisfaction regarding functional outcomes. These results align with Das (2018), who reported high levels of patient satisfaction with local anesthesia in nasal fracture reductions, particularly regarding functional recovery[13.]. However, the study found that general anesthesia was associated with a higher rate of complete fracture reduction, a result consistent with findings from Holt (1978) and Abdul Aziz (2000), who also suggested that general anesthesia could provide a more thorough and complete fracture alignment, especially in more complicated fractures[14,15]. This aligns with the general assumption that general anesthesia offers deeper sedation and more precise control during surgical procedures. The study also assessed the impact of demographic factors such as age, gender, and weight on the results. The age distribution in both groups did not show significant differences, with the mean age in both the local anesthesia and general anesthesia groups being similar (34.20±11.765 years vs. 36.57±11.080 years, respectively). This consistency in age distribution ensures that the age of the patients did not skew the outcomes of the study, supporting the conclusions drawn by other studies who also found a similar age range (20-30 years) as the most common demographic for nasal fractures due to high activity levels in employment, sports, and vehicle operation[16,17]. The gender distribution revealed that males comprised the majority in both groups, which is consistent with previous studies[18,19]. The present study, 79.3% of the local anesthesia group and 82.6% of the general anesthesia group were male. These findings support the well-established observation that nasal

fractures occur more frequently in males, likely due to higher participation in physically demanding activities and contact sports. As noted males often sustain more injuries in such activities, which could explain the gender disparity in the study population[20,21]. In terms of pain management, the study found no significant differences in the pain scores between the two groups, with both local and general anesthesia proving effective in controlling discomfort during the fracture reduction. This result aligns with the study reported no significant difference in pain scores between patients receiving local or general anesthesia for similar procedures[22]. Both groups showed relatively high levels of pain control, with the mean pain scores being 8.60±1.314 for the local anesthesia group and 8.24±1.976 for the general anesthesia group, suggesting that both methods provide effective analgesia. Postoperative complications were also assessed, and both anesthesia groups experienced relatively low rates of complications. The most common complications were epistaxis and nasal crusting, both of which resolved over time. Interestingly, the general anesthesia group exhibited a slightly higher incidence of postoperative complications, which aligns with a study noted that patients receiving general anesthesia tended to experience more complications post-surgery[23]. This suggests that while general anesthesia may provide more complete fracture reductions, it might also come with a higher risk of postoperative issues, possibly due to the longer duration of anesthesia or the deeper sedation involved. The study also noted that while both anesthesia methods had similar rates of postoperative complications, local anesthesia resulted in fewer complications overall. This finding is consistent with previous studies, that local anesthesia was associated with fewer postoperative complications in nasal fracture reduction[24,25]. The reduced hospital stay for patients in the local anesthesia group also further supports these findings, as patients were able to recover more quickly and with fewer issues compared to those in the general anesthesia group. Finally, the study revealed that patient acceptance of the procedure was higher in the general anesthesia group (98.2%) compared to the local anesthesia group (87.6%), which indicates that patient preference for anesthesia choice plays a significant role in procedural satisfaction. The patients who received general anesthesia for nasal surgeries were generally more accepting of the treatment due to the less invasive nature of the anesthesia and the higher likelihood of complete fracture reduction [26,27]. This highlights the importance of considering patient preferences and perceptions when deciding on the type of anesthesia, as these factors can influence overall satisfaction with the treatment and recovery process.

Conclusion

The findings of this study indicate that both local and general anesthesia are effective methods for nasal bone fracture reduction, with each having its respective advantages. Local anesthesia offers the benefits of quicker procedures, faster recovery times, and fewer postoperative complications, making it an appealing choice for many patients, especially those with less complicated fractures. On the other hand, general anesthesia is more likely to provide a complete reduction, making it more suitable for patients with more complex fractures who require a more thorough approach. The study emphasizes the importance of considering both clinical and patient-specific factors, such as fracture complexity and patient preferences, when choosing the appropriate anesthesia method. Further research focusing on the long-term outcomes and cost-effectiveness of both anesthesia types would provide additional insights to guide clinical decision-making.

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