

Manipulation under anaesthetic of fractured nasal bones – a ten-year retrospective study

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Abstract

Background: Nasal bone fractures are treated by manipulation (MUA) under general (GA) or local anaesthetic (LA). Data on long-term benefits of LA MUA is limited. We aimed to quantify the proportion of patients requiring septoplasty or septorhinoplasty after GA and LA MUA.

Methods: Anonymised data was collected from electronic records for all patients undergoing MUA at our centre over a ten-year period, including demographics, timing of MUA and need for further surgery.

Results: We identified 625 GA and 52 LA MUAs. LA MUAs were performed earlier (LA: 9 days, GA: 15 days, $p < 0.05$) and were more likely to achieve manipulation (LA: 83%, GA: 76%, $p < 0.05$). There was no difference in the percentage of patients requiring further surgery between techniques.

Conclusion: We describe a large cohort of MUAs over a 10-year period. LA MUAs are increasing since COVID-19 and results are comparable to GA with reduced delays between injury and manipulation.

Keywords

Nasal bone;; Facial Injuries; Nasal Surgical Procedures

Introduction

Nasal bone fractures are a common emergency presentation seen in Otorhinolaryngology departments and account for up to 50% of facial fractures. These fractures are traditionally managed with closed manipulation (MUA) under general anaesthetic (GA) within two weeks of injury, with the aim of restoring nasal anatomy prior to the formation of fracture callus^{1,2}. Nasal deformities associated with poor cosmesis or nasal obstruction can be assessed following injury for the need for septoplasty or septorhinoplasty¹. Outcomes to assess the success of MUA include patient satisfaction and the need for future surgery^{3,4}. Previous studies have shown persistent nasal deformities in 14-50% of patients following MUA with 3% requiring further surgery⁵.

In recent years, MUAs have also been performed in an outpatient clinic setting using local anaesthetic (LA) techniques such as the nasociliary nerve block². This involves infiltration of local anaesthetic bilaterally, between the medial canthus and glabella, down to periosteum. Some providers also administer topical anaesthetic to each nostril². The COVID-19 pandemic has forced surgical departments across the country to reduce the number of surgeries performed to minimise hospital contact, and to reconsider which emergency procedures can be done in an outpatient clinic setting⁶. This has led to the shift to performing MUAs under LA to reduce the demand on elective operating theatres and limit the number of hospital interactions. This change was most pronounced at the height of the COVID-19 pandemic in the UK in March 2020⁷. At our centre, MUAs under LA have remained the preferred technique following emergence from the COVID-19 pandemic.

Besides reducing costs and operating theatre burden, other benefits of LA include a shorter waiting time between injury and MUA, which potentially increases the chance of a successful MUA. Additionally, as patients are awake during the procedure, they can give immediate feedback as to whether they are satisfied with the appearance of their nose. Despite the increasing popularity of performing MUA under LA, data on the long-term benefits of MUA under LA is limited. Therefore, we aimed to quantify the proportion of patients requiring further surgery after undergoing MUA under GA or LA at our centre.

Materials and Methods

All patients who underwent MUA under either GA or LA for confirmed or suspected nasal bone fracture within the Otorhinolaryngology department at Norfolk and Norwich University Hospital (NNUH) were included in the study. Patients who underwent simultaneous septoplasty and MUA were excluded. Patients were referred from local Urgent Care centres or the Emergency Department, following clinical examination or Computed Tomography scan for head injury identifying a nasal bone fracture. The department aims to see all referrals within 5-14 days following nasal bone injury if possible.

Data for MUAs under GA was collected over ten years from 01/01/2012 to 31/12/2021 and was identified by obtaining case lists from the electronic ORSOS theatre management system using the procedure code 'V09.2 Reduction Nasal Bones Closed'.

At NNUH, MUAs under LA are performed in clinic on the day of first presentation to the Otorhinolaryngology department. The preferred technique for local anaesthetic administration

is nasociliary nerve block using external infiltration of 1-5mls of 2% lidocaine-hydrochloride with 1:80,000 adrenaline. Patients are selected for MUA under local or general anaesthetic based on a combination of patient choice, age, and practitioner skill level. At the time of writing almost all Otorhinolaryngology clinicians at NNUH were comfortable performing manipulation under LA. Follow up is not routinely scheduled following MUA unless specific concerns arise.

Procedures performed in the Otorhinolaryngology clinic are recorded in a monthly logbook entitled 'Local Safety Standards for Invasive Procedures' (LocSSIP). The first recorded MUA under local anaesthetic at NNUH was performed in December 2018. Data for MUAs under LA was collected over three years from 01/12/2018 to 31/12/2021 and compared with GA data over the same time period.

Anonymised data was collected from patients' electronic clinic letters and operation notes for:

- patient age and gender
- date of injury and date of MUA
- type of nasal deformity and success of MUA determined by the clinician on the day of procedure
- use of additional instruments (i.e. Asch or Walsham's forceps)
- need and indication for septoplasty or septorhinoplasty
- complications or revision procedures
- duration from MUA to revision surgery

Nominal variables were analysed using the chi-squared test and continuous variables using the two-tailed Mann–Whitney U test.

Results and Analysis

A total of 625 GA MUAs were included in the 10-year analysis of our centre from 2012-2021. From 2019-2021, 80 GA MUAs and 52 LA MUAs were recorded. The GA MUA group comprised a larger proportion of male patients and patients aged <18 years. Full demographic characteristics are detailed in Table 1. The number of MUAs performed under LA increased between 2019-2021 with an associated decrease in MUAs under GA. 9.1% of MUAs were performed under LA in 2019 compared to 79.6% in 2021 (Figure 1). Two patients undergoing MUA under LA subsequently underwent GA. Of the patients requiring GA, 58 (9.3%) required the use of additional instruments such as Walsham’s forceps. Full operation notes were not available for 17 patients (21%) undergoing MUA under GA between 2019-2021.

There was no statistically significant difference in the type of nasal bone injury between GA and LA patients. Across all patients, 615 (90.8%) had a deviated nasal bone fracture, 44 (6.5%) had a depressed fracture and 18 patients (2.7%) had a previously fractured nasal bone (Figure 2).

MUAs under LA were performed earlier than GA MUAs over the same time period (LA: 9 days [95% CI 7.91 - 10.1], GA: 15 days [95% CI 14.1 - 15.9]) (Figure 3). There was no statistically significant difference in the percentage of patients requiring further surgery when

the MUA was performed under LA or GA (Figure 4). In total, 4 patients (0.6%) required septoplasty and 29 patients (4.3%) required septorhinoplasty. The median time from MUA to septoplasty or septorhinoplasty was 5 months for LA and 15 months for GA over the same time period (range 10-28 months). Nasal obstruction was cited as a cause for surgery in 23 cases (74.2%) following GA MUA whilst poor cosmesis was cited for 24 cases (77.4%). Three patients developed wound infections following septorhinoplasty and two patients required revision surgery.

MUAs performed under LA were more likely to achieve manipulation (as reported by the surgeon on the day of procedure) than under GA over the same time period (LA: 83%, GA: 76%, $p < 0.05$) (Figure 5.).

Discussion

This study identifies the increasing trend towards LA MUA at our centre in the wake of the COVID-19 pandemic. The LA approach enables manipulation to be performed 6 days earlier on average compared to GA. There was no difference in future septoplasty or septorhinoplasty rates between either technique. MUAs performed under LA were more likely to achieve manipulation as reported by the surgeon on the day of the procedure compared to GA.

The COVID-19 pandemic has placed significant demands on clinicians to reduce hospital interactions, and has resulted in a corresponding increase in MUAs performed under LA. This technique offers a safe and effective alternative to GA. Patients can undergo MUA under LA

on the day of their clinic appointment. Our study demonstrates that this is more likely to be within the two-week window following injury during which nasal bones are most mobile and easily reduced¹.

We describe a large cohort of patients compared to other studies of MUAs under LA following the COVID-19 pandemic⁷⁻⁹. We also present a long review period of up to 10 years for our GA cohort. However, results are limited by the available data. Operation notes were not available for some cases performed under GA, and MUAs performed under LA may not have been recorded in our analysis if the clinician did not notify the clinic nurse or complete the LocSSIP log. No data was available for LA MUAs prior to December 2018, although this is likely due to a limited number of LA MUAs being performed prior to this. Additionally, patients may have moved out of area prior to seeking follow up or sought treatment through the private sector, so some septorhinoplasties may not be included in our analysis.

The LA and GA groups were not matched for age and sex which may influence results, as children are less likely to undergo septorhinoplasty until their nasal bone has fully matured. We identified fewer children in the LA group, which is expected since young children are less likely to tolerate LA and are at risk of harm if they move during the procedure. This study did not compare outcomes such as pain scores, nasal airway patency and patient satisfaction with the procedure or with cosmesis. These outcomes have been shown in previous studies to be similar amongst GA and LA MUAs^{7,10}, including a systematic review by Chadha et al¹¹.

Rates for future septoplasty or septorhinoplasty in our study are lower compared to previous retrospective studies of LA MUAs^{12,13}. Pinto et al demonstrated an increase in septorhinoplasty rates following the adoption of the LA technique at their centre in Manchester, UK, with 5.4% of 37 patients requiring further surgery over nine months in 2017⁹. Narang et al. identify a cohort of 10 LA MUAs in Scotland over three months in 2020, of which two subsequently required septorhinoplasty⁸. Reduced rates of future surgery in our more recent study may have been due to increasing familiarity with the LA technique as it has gained popularity nationwide.

This study demonstrates that LA is an effective alternative to GA at our centre, with no difference in long term outcomes. Future prospective multicentre studies are required to compare GA and LA techniques. Further work could investigate the success of MUA under LA by duration from injury to MUA and also by type of nasal bone injury (such as depressed, deviated, comminuted or recurrent nasal bone fractures). This study demonstrates a clear need to account for variation in age and sex between groups when comparing GA and LA in the future, due to inherent differences in demographic characteristics for patients choosing to undergo LA.

Conclusion

This study describes a large cohort of MUA patients and includes a long review period of up to 10 years for MUAs under GA. We identify that the use of MUAs under LA is increasing following the COVID-19 pandemic at our centre. Results with LA are comparable to GA with the benefit of reduced delays between injury and manipulation. Future prospective multicentre

studies could further investigate the success of MUAs under LA by type of nasal bone injury and duration from injury to MUA.

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Competing Interests

None declared.

Ethical Approval

This project was a local service evaluation and did not require ethical approval, following completion of the NHS Research Ethics Committee Tool, provided by the Medical Research Council. The project was reviewed by the local information governance team and Caldicott Guardian and was deemed to comply with national data protection principles.

Bullet Point Summary

- Benefits of nasal bone fracture manipulation (MUA) under local anaesthetic (LA) include immediate patient feedback, reduced procedure costs and reduced time to treatment compared to general anaesthetic (GA)
- LA MUA is becoming increasingly prevalent following the COVID-19 pandemic to reduce hospital interactions but the long-term benefits are unclear
- This study demonstrates no difference in local rates for septoplasty and septorhinoplasty at 6-36 months following MUA under LA compared to GA
- Patients undergoing LA MUA in this study cohort received treatment on average 6 days earlier than GA
- LA MUA is a safe and effective alternative to GA MUA for nasal bone fractures

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Tables and Charts

Table 1
Demographic comparison of MUAs under general and local anaesthetic

	GA MUAs 2012-2021	GA MUAs 2019-2021	LA MUAs 2019-2021	p value GA vs LA 2019-2021
Demographics				
N	625	80	52	
Age [mean years (SD)]	26 (14)	27 (15)	29 (13)	0.060
Age <18 (%)	171 (27)	26 (33)	8 (15)	0.028
Male (%)	455 (73)	64 (80)	33 (63)	0.035

Figure 1: Number of MUAs performed by year

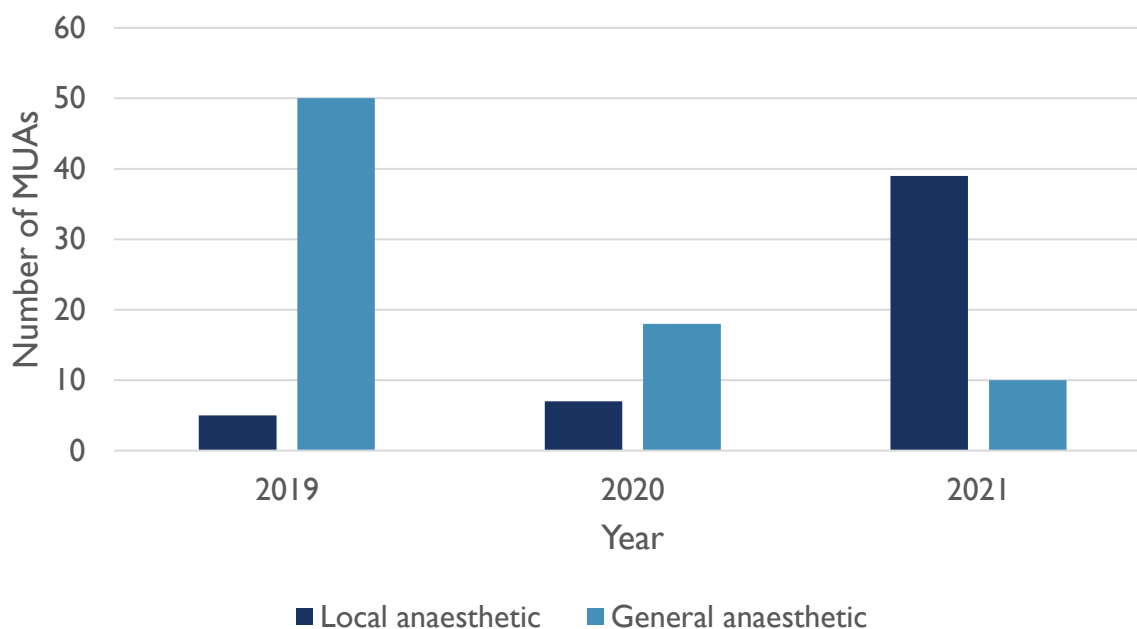


Figure 2: Type of nasal bone injury

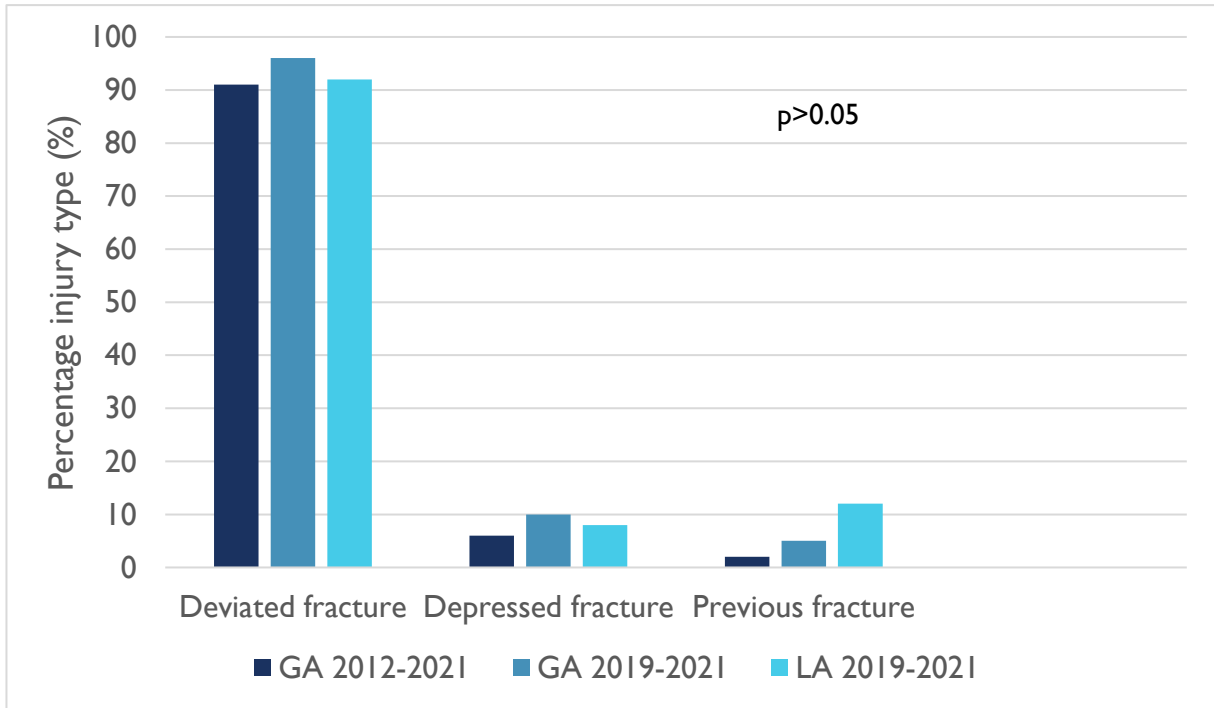


Figure 3: Time from injury to MUA

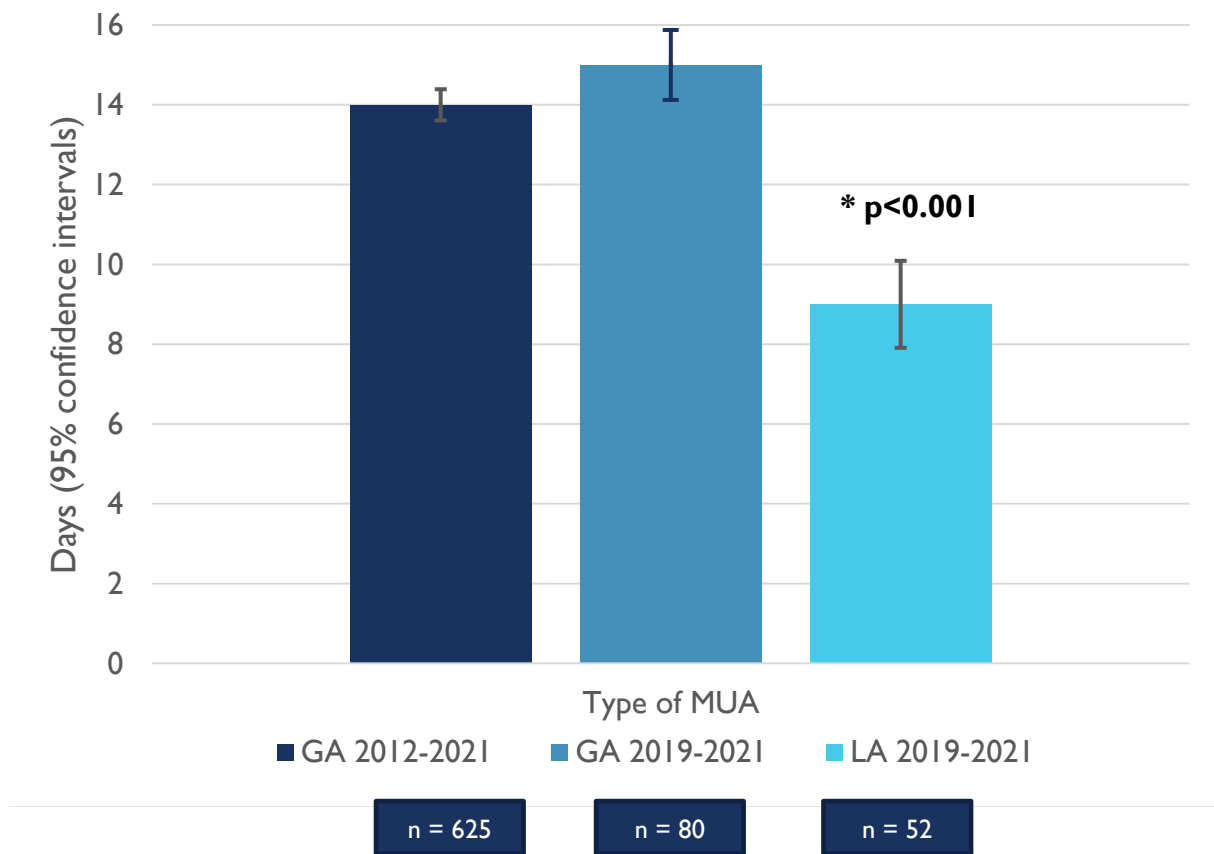


Figure 4: Proportion of patients requiring surgery after MUA

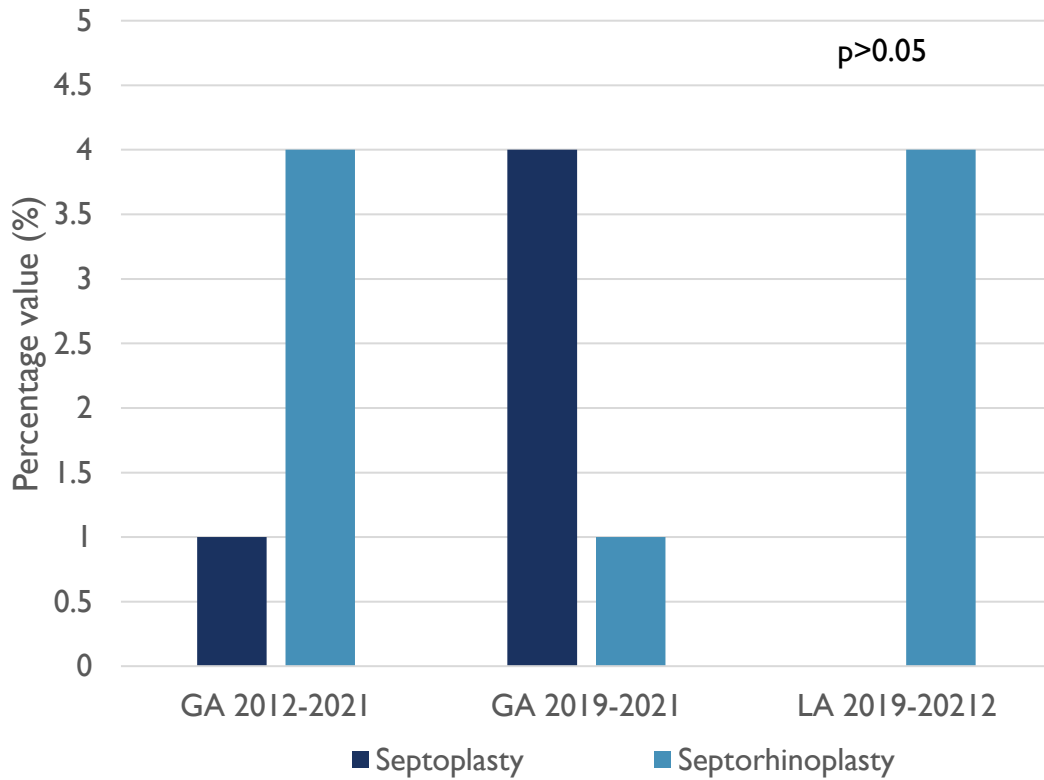


Figure 5: Proportion of MUAs achieving manipulation

