

Nasal fracture manipulation: a comparative study of general and local anaesthesia techniques

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Nasal injuries are common conditions treated in either Otolaryngology or Plastic Surgical departments. Manipulation for deformity can be conducted in various ways. The aim of this study is to determine if the anaesthetic technique used for manipulation influences outcomes. Five hundred and fifty-five patients had either local anaesthetic (LA) or general anaesthetic (GA) nasal fracture manipulations in our departments over a 6-year period. Three hundred and twenty-four of these could be contacted and questioned as to subsequent surgical treatments received. Rhinoplasty, septorhinoplasty or septoplasty had been subsequently performed in 3.2% of the GA group and in 17.2% of the LA group ($P < 0.0001$). We recommend considering this result when treating nasal fractures in conjunction with other important issues of patient preference, financial costs, associated risks, morbidity and facilities available.

Keywords *nasal fracture anaesthesia surgical technique operative*

Nasal fractures are the most common type of facial fractures, comprising of approximately half of all facial fractures.¹ The central position and anterior projection on the face predisposes the nose to traumatic injury. However, nasal fractures are often unrecognized and inadequately treated at the time of injury, resulting in chronic functional or aesthetic problems. Research has shown that most nasal fractures involve the septum, which can provide an obstacle to successful reduction and account for the high rate of septoplasty procedures performed later for nasal obstruction.²

Fractures can be classified as open or closed, depending upon the integrity of the skin or mucosa, and can be subclassified into fractures, dislocations or mixed injuries, affecting either the cartilage or bone or both the components of the nasal framework. Co-existent injuries and complications of nasal trauma must be examined for.

Nasal fractures are managed in different ways depending on surgeon preference, hospital protocols, surgical speciality and region of practice. Differences in practice occur with regard to

anaesthetic technique, location of treatment, timing of treatment and method of reduction. Reduction can be closed such as with external pressure only or in combination with instrumentation (Ashe, Walsham, Hills, Boies) or open including acute septoplasty and the use of external or internal splints.^{2–4} The goals of treatment are to restore a satisfactory appearance, restore nasal airway patency, reduce the septum to the midline, preserve the nasal valve integrity and prevent stenosis, septal perforation, columellar retraction and saddle deformity.²

Anaesthesia for nasal fracture reduction can be categorized as: (1) local anaesthesia (LA), a technique which may include a sedative, (2) general anaesthesia (GA) or (3) without anaesthesia as revealed in a recent survey of ENT consultants.⁵ The importance of the initial manipulation on subsequent functional or aesthetic outcome has been of interest to us. The initial manipulation may be influenced by the anaesthesia technique used. We aim to study this issue comparing the two methods of anaesthesia used in our region.

Method

A retrospective study was performed, with the study population defined as those patients having had fractured nose

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manipulations carried out over a 6-year period between January 1, 1995 and December 31, 2000. A list of patient attendance at fractured nose clinics was generated from the hospital database systems at two hospitals in the region, Hutt Hospital Plastic Surgery Department and Wellington Hospital Otolaryngology, Head and Neck Surgery Department. The hospital notes were reviewed for patients on the generated list. Criteria for exclusion were age under 14 years at presentation, nasal fracture manipulation not performed, any other associated facial fractures and less than a minimum period of 6 months follow-up since manipulation.

The technique of nasal fracture manipulation performed at Hutt Hospital was GA with digital external manipulation or use of Asch, Walsham and Hill's instrumentation. External Plaster of Paris splints were used in all the patients, and nasal packing was used in some patients. The technique of fracture reduction performed at Wellington Hospital was predominantly local anaesthesia (LA), consisting of intranasal Copheylcaine forte spray (5% lignocaine HCl, 0.5% phenylephrine HCl and 0.1 mg/mL of benzalkonium chloride; Paedopharm Pty Ltd, Perth, Australia), cocaine paste (10% cocaine with 0.06% adrenaline) and 2% lignocaine with 1:80 000 adrenaline interalar injection with external digital manipulation and, if deemed required, internal out-fracturing with Aschs, Walsham and Hill's instruments. No external splints or intranasal packing were used. Both hospitals conducted the nasal fracture reductions on the day of initial assessment.

The hospital records of the study group were reviewed with age, sex, time elapsed to manipulation, previous nasal fractures and any subsequent treatment for the nose recorded on a coding sheet. The patient was then individually telephoned and asked what, if any, subsequent treatment had occurred to the nose since the initial fracture manipulation, a time period between 6 months and 6 years, in particular, if any operations (septoplasty, septorhinoplasty and rhinoplasty) had been performed. Telephone numbers were generated from the hospital database by using the most recent contact with the patient and, if required, a family/friend contact number given at the time was used. If no contact was made with the patient in this way, the patient's national hospital number was used to search the New Zealand national database for the most recent phone number. If this again was unsuccessful, an Internet phone directory, <http://www.whitepages.co.nz>, was used to try and generate a match by searching.

Groups were compared with Fisher's exact test for proportions and unpaired *t*-tests for age and days to present the latter using logs to approximate a bell-shaped distribution.

Results

A total number of 555 nasal fracture manipulations had been performed in both departments over the 6 years. Three hundred and twenty-four patients could be contacted (a response

rate of 58.4%). A total number of 338 patients were identified as having GA manipulations during the study period, all but several performed at Hutt Hospital, of which five died, one declined to participate and 142 could not be contacted. The remaining 190 were followed-up (a 55.2% follow-up rate). A total number of 217 patients were identified as having LA manipulations during the study period, all performed at Wellington Hospital, of which 83 could not be contacted. The remaining 134 patients were followed-up (a 61.8% follow-up rate; Table 1). The demographic profile was similar for contacted and non-contacted groups.

Of the groups contacted and included in the study, GA (190) and LA groups (134), the demographic profile was similar for each variable, age and sex ratio, but different for time-to-fracture manipulation (Table 2).

From the GA group of 190 patients, there were four who subsequently had a septoplasty and two who had a rhinoplasty, giving an intervention rate of 3.2%. There were five (2.6%) who re-fractured their nose in the intervening period. From the LA group of 134 patients, there were 13 who subsequently had a septoplasty, nine who had a septorhinoplasty and one who had a rhinoplasty, giving an intervention rate of 17.2%. There were seven (5.2%) who re-fractured their nose in the intervening period (Table 3). The subsequent comparative surgery rate was significantly different between the LA and GA groups ($P < 0.0001$). Within the operated groups of GA and LA patients, the ratio of the various operations performed (septoplasty, septorhinoplasty and rhinoplasty) was significantly different ($P = 0.049$). The re-fracture incidence was similar between the groups ($P = 0.25$).

Table 1. Proportions of contacted and non-contacted patients having nasal manipulations

	Contacted (<i>n</i> = 324)	Non-contacted (<i>n</i> = 231)	<i>P</i> -value (Fisher's exact test)
GA manipulations (<i>n</i> = 338)	190 (55.2%)	148	0.22
LA manipulations (<i>n</i> = 217)	134 (61.8%)	83	0.22
Male	266	191	1.00
Female	58	40	1.00
M/F ratio	0.22	0.22	1.00
Age, mean (SD)	26.6 (12.7)	25.2 (9.6)	0.13

Table 2. Breakdown of contacted patients in the study

Contacted	GA manipula- tion (<i>n</i> = 190)	LA manipu- lation (<i>n</i> = 134)	<i>P</i> -value (Fisher's exact test)
Male (%)	158 (83.2)	108 (80.6)	0.56
Female (%)	32 (16.8)	26 (19.4)	0.56
M/F ratio	0.20	0.24	0.56
Age, mean (SD)	26.7 (13.4)	26.4 (11.7)	0.80
Days to presenta- tion (SD)	5.2 (3.1)	9.3 (3.7)	<0.0001

Table 3. The numbers of patients in each group who proceeded to subsequent surgery

	GA manipulation (n = 190)	LA manipulation (n = 134)	P-value (Fisher's exact test)
Total operations (%)	6 (3.2)	23 (17.2)	<0.0001
Septoplasty	4	13	0.049
Septorhinoplasty	0	9	0.049
Rhinoplasty	2	1	0.049
Re-fractured	5	7	0.25

A previous study (unpublished) found no difference in satisfaction with both function and aesthetics of the nose between the two techniques of anaesthesia (Table 4). The breakdown of patients in this study showed that the two groups were comparable for age, sex, time to manipulation, inciting injury and recurrent fracture rate. This study found a preference for GA reduction if they were to re-fracture their nose, but this did not reach significance ($P=0.11$).

Discussion

The importance of the anaesthetic technique on subsequent function or aesthetic appearance of the nose has been addressed by a small number of studies.⁶⁻¹¹ Of these seven studies, three addressed the issue of manipulation under GA versus LA, with all reaching the conclusion that no difference exists in outcomes. These prospective studies followed patients for only 4,⁶ 12⁷ and 8 weeks,⁸ which could be considered a short time interval, especially when assessing nasal function. Study size was small in these, with 29 (17 LA and 12 GA),⁶ 100 (50 LA and 50 GA)⁷ and 50 (25 LA and 25 GA) patients.⁸ The assessment of result was based predominantly on subjective measures of outcome and, in one

case, rhinomanometry. One study reported similar subsequent surgery rates for both GA and LA reductions.

Results from our previous study (unpublished) compared satisfaction with both function and aesthetics following manipulation and found no statistical difference between the GA and LA techniques. This result was similar to other studies that looked at satisfaction, which was between 70% and 90%, with closed manipulation of nasal fractures.^{12,13} Studies have attempted to quantify nasal function objectively and aesthetics following closed manipulation, a good result is reported to be achieved in 50-70%.^{14,15} The opposite of this is the failure rate, reported as ranging between 9% and 48%, with subsequent surgery often performed, more frequently, septal surgery rather than rhinoplasty.^{7,12,14,15} It would seem that patients have a higher satisfaction with the achieved results of manipulation than the doctors have. This study uses an outcome variable i.e. subsequent surgery rate to compare the anaesthesia techniques. The patient's and surgeon's decision to have subsequent surgery is a reflection of an unsatisfactory result from the initial manipulation. We found a very significant difference in the subsequent rate of surgery performed between the two groups of patients contacted from the study population of 324 nasal manipulations. It is the authors' opinion that this result may reflect the reluctance of surgical staff rigorously to manipulate a nose and/or use instrumentation in the LA group for several reasons: the patient may be experiencing pain, instrumentation can be seen as barbaric, and the clinical environment where manipulation is conducted being an outpatient clinic versus operating-theatre environment, where factors such as assisting staff numbers, patient position and privacy may be of influence.

We acknowledge the limitations of our study in terms of retrospective design - a follow-up rate of 58.4% because of this transient/mobile group of patients. However, this is similar to one other telephone follow-up study of nasal fractures.¹² The use of two departments may lead to bias

Table 4. Satisfaction with function, aesthetics and anaesthesia technique (unpublished)

		GA manipulation (n = 65) (%)	LA manipulation (n = 59) (%)	P-value
Satisfaction with appearance of nose	Better than before	9	3	0.19
	Same as before	37	37	0.97
	Worse but is acceptable	43	37	0.52
	Worse - wants further treatment	11	22	0.09
Satisfaction with function of the nose	Better than before	3	2	0.62
	Same as before	65	56	0.32
	Worse but is acceptable	18	27	0.23
	Worse - wants further treatment	14	15	0.82
Patients' overall satisfaction with the nose	Never any problems	52	53	0.85
	Occasional problems	37	32	0.58
	Frequent problems	12	15	0.64
Patients' satisfaction with anaesthesia	Prefer same treatment	82	69	0.11
	Prefer alternative treatment	18	31	-

with different surgical staff, although predominantly advanced trainee registrars using similar techniques, performing the manipulations. The strengths of this study are in the method: using telephone contact with each patient to ask about subsequent treatments rather than to rely on hospital records and patient notes, as subsequent surgery could have been conducted in a number of hospitals located in the region or elsewhere in the country. The study population was 324, larger than that in previous studies in the literature, and the time from manipulation to follow-up was 3 years on average, ranging from 6 months to 6 years.

We conclude from this study that evidence exists that general anaesthetic nasal fracture reduction is a more effective treatment for displaced nasal fractures than local anaesthetic nasal fracture reduction in that less subsequent corrective surgery is required. Other factors not taken into account in this study are costs, associated risks, morbidity and facilities available, all of which are important considerations when treating nasal fractures.

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