



ORIGINAL ARTICLE

Septoplasty: Comparison of adrenaline with normal saline as submucoperichondrial infiltration solution.

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ABSTRACT... Objective: To see the effects of submucoperichondrial infiltration of different solutions in terms of mucoperichondrial injuries on flap elevation, convenience of finding the correct surgical plane and duration of surgery. **Study Design:** Cross Sectional study. **Setting:** Faisalabad Medical University and Affiliated Institutions. **Period:** February 2020 to August 2020. **Material & Methods:** Sixty patients in total were selected by Random sampling. To assess difference in terms of mucoperichondrial injuries on flap elevation, convenience of finding the correct surgical plane and duration of surgery after institution of submucoperichondrial infiltration of 1:80000 adrenaline in one group of patients and normal saline in other group of patients. **Results:** Patients results showed statistical significant difference in the two groups in terms of duration of surgery and convenience of finding the correct surgical plane. **Conclusion:** Adrenaline alone in concentration of 1:80000 is far more superior then 0.9% normal saline as submucoperichondrial infiltration option.

Key words: Adrenaline, Mucoperichondrial Injury, Normal Saline, Septoplasty, Submucoperichondrial Infiltration.

INTRODUCTION

Nasal obstruction is one of the most common^{1,2} complaints in ENT clinic and DNS (deviated nasal septum) is usually the cause. Symptomatic DNS usually require surgery in the form of septoplasty.³ Other common symptoms associated with DNS are headache, postnasal drip and purulent nasal discharge. Septoplasty is among the commonly performed ENT surgeries in public sector hospitals of Pakistan. Different surgeons prefer different solutions for submucoperichondrial infiltration to achieve bloodless surgical field⁴ and hydrodissection⁵ so that mucoperichondrial injury can be avoided and submucoperichondrial plane can be located easily thus ultimately shortening the duration of surgery. Some of the most common solutions used to achieve these goals are submucoperichondrial infiltration of 2% lignocaine with adrenaline^{6,7}, adrenaline alone in different concentrations⁸, 2% tetracaine⁹, 4% articaine with adrenaline⁹ and even normal saline.⁶ There is no consensus⁴ on any single solution for

infiltration. This study aims to evaluate subjectively (mucoperichondrial injury and convenience of finding the surgical plane) as well as objectively (duration of surgery) some of the variables in this context. Aim/Objective/Purpose: To see the effects of submucoperichondrial infiltration of different solutions in terms of mucoperichondrial injuries on flap elevation, convenience of finding the correct surgical plane and duration of surgery. Rationale: To see whether one infiltration method has any additional advantage over the other or not.

MATERIAL & METHODS

A cross sectional study of six months February 2020 to August 2020 was conducted at Department of Otorhinolaryngology, Faisalabad Medical University, Faisalabad and its affiliated hospitals. Sixty patients belonging mostly to lower class and lower middle class between 15-55 years of age both males and females having history of deviated nasal septum were included

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in the study. All the patients were interviewed in detail and ENT examination including nasal telescropy with 0 and 30 degree telescopes was done. Inclusion criteria was clinically confirmed deviated nasal septum having double deformity of nasal septum in the form of C or S shaped deformity, anterior septal dislocation or spurs of chondrovomerine, chondroethmoidal and chondromaxillary junction or combination of any of the two. Exclusion criteria was history of nasal trauma, multiple septal deformity, deviated nasal septum associated with external nasal framework deformity, previous nasal surgery, nasal allergies along with deviated nasal septum, complex septal deformities and congenital nasal and maxillofacial deformities.

The intervention technique and study variables are such that no special informed consent was needed. Sixty patients were randomized into two groups depending upon the day of admission (Monday or Thursday). Both surgeon and the patient were unaware of the solution given for submucoperichondrial infiltration. All septoplasties were done by Consultants. In Group I 1:80000 adrenaline was given for infiltration and in Group II only 0.9% normal saline was given. The Mucoperichondrial injury was rated by the surgeon. Mucoperichondrial injury was rated on three point scale i.e 0, 1 and 2 where 0 means no tear, 1 means single tear of upto 1cm (simple mucoperichondrial injury) and 2 means single tear of more than 1cm or multiple tears (severe mucoperichondrial injury). Convenience of finding the correct surgical plane was also determined by the surgeon using 3-point scale. 1 means easy, 2 means difficult 3 means extremely difficult. Duration of surgery was calculated from the point in time when mucoperichondrial incision was given and finally closure of incision was done with vicryl. The article was duly reviewed and approved by Ethical Review Committee of PHRC (Pakistan Health Research Council) (48.ERC/FMU/2021-22/249).

OPERATIVE PROCEDURE

Classical septoplasty with Freer incision on the side of concavity at mucocutaneous junction was employed in each case. Mucoperichondrial

flap was raised on the side of concavity but mucoperiosteal flap was raised bilaterally in each case after appropriate infiltration with 1:80000 adrenaline or 0.9% normal saline and waiting for 10 minutes. Scoring, cross hatching, wedge resection and/or shaving was used to straighten the septum. Anterior collumellar pocket was created in case of anterior septal dislocations. Spurs were removed wherever present.

STATISTICAL ANALYSIS

Data analysis was performed using a commercial statistics program (Statistical Package for Social Sciences) computer program (SPSS, Version 26, Chicago IL).

RESULTS

Sixty patients fulfilling the above criteria were operated for DNS from February to July 2020. Twenty two out of sixty (41.6 %) were females and the rest (58.3 %) were males. All of them were between 15-55 years of age. Mean age of presentation was 28.5 years. All of them belonged to lower and lower middle class socioeconomic status. 62% belonged to lower class and 38% belonged to lower middle class. 80% had nasal obstruction, 46.6 % had headache, 25 % had postnasal drip and 8.33 % had purulent nasal discharge. Mean duration of their presenting complaint was seven years. On full ENT examination 17% had C-shaped deformity with chondromaxillary spur, 20% had S-shaped deformity with chondroethmoidal and chondromaxillary spurs, 25% had anterior septal dislocation with chondromaxillary spur and 38% had C-shaped deformity with chondromaxillary, chondrovomerine and chondroethmoidal spurs.

Patients were randomized into two groups depending upon the day of admission (Monday or Thursday). Both surgeon and the patient were unaware of the solution given for submucoperichondrial infiltration. In Group I 1:80000 adrenaline was given for infiltration and in Group II only 0.9% normal saline was given. Results for Mucoperichondrial injury, Convenience of finding the correct surgical plane and duration of surgery were recorded on the day of surgery. Correct surgical plane was easily accessed in

86.66% in Group I but in Group II it was difficult to extremely difficult to find correct surgical plane in almost 83.33% cases. Mucoperichondrial injury of simple to severe nature was present in 63.32% in Group I and 69.99 in Group II. Mean duration of surgery in Group I was 9.2 minutes and 25.3 in Group II. A significant difference ($P < 0.05$) was thus observed between the two groups in terms of Convenience of finding the correct surgical plane ($P < .00001$) and Duration of surgery ($P < .00001$) but the difference was not significant ($P > 0.05$) in terms of Mucoperichondrial injury (P is .07771).

Mucoperichondrial Injuries Scale	Adrenaline Group Group I (n=30) n (%)	Saline Group Group II (n=30) n (%)
Simple (n= 25)	5 (16.6)	20 (66.6)
Severe (n= 15)	14 (46.6)	01 (3.3)
No injury (n= 20)	11 (36.6)	09 (30)
Total injury (n= 40)	19 (63.2)	21 (69.9)

Table-I. Mucoperichondrial injury status in the two groups

Convenience of Finding Correct Surgical Plane Scale	Adrenaline Group Group I (n=30) n (%)	Saline Group Group II (n=30) n (%)
Easy	26 (86.6)	05 (16.6)
Difficult	03 (10)	15 (50)
Extremely difficult	01 (3.3)	10 (33.3)
Total of difficulty	04 (13.3)	25 (83.3)

Table-II. Convenience of finding the correct surgical plane

	Operation time(min)	
	Mean	Std. Deviation
Epinephrine group (Group I)	9.2	0.9285
Saline group (Group II)	25.3	3.9085

Table-III. Operation time Mean and standard deviation

DISCUSSION

Evolution of septoplasty dates back 3500 B.C.¹⁰ It has been mentioned in ancient Egyptian literature. Septal surgeries are also described in western literature as early as 1757.¹¹ Adams in 1875¹², Ingals¹³ in 1882 and Asch¹⁴ in 1899 proposed and described modifications of septal surgery. 20th century saw the modifications of Gustav Killian of Germany and Otto Tiger Freer of USA who emphasized the importance of mucosal preservation and integrity of L-shaped dorsal and

caudal strut respectively.¹⁵⁻¹⁹ Metzenbaum, Peer and Galloway addressed caudal septal deviations in 1929, 1937 and 1946 respectively.²⁰ Cottle in 1946 pointed out the importance of dealing with nose as a functional unit rather than addressing the septum only. Modern day septoplasty owes much to Cottle and Loring.^{21,22} Extracorporeal septoplasty was made popular by King and Ashley in 1952.²³ 21st century saw the advent of telescopes by Lanza et al and Stammberger allowing target removal of spurs.^{24,25}

Septoplasty, however, continues to remain a challenging procedure for an ENT surgeon. No single technique suits all patients. Despite several modifications in surgical technique of septoplasty nobody ever studied conclusively the effect of different submucoperichondrial infiltration solutions in terms of mucoperichondrial injury, convenience of finding the surgical plane and duration of surgery not only in Pakistan but also in this region.

In this study an attempt has been made to at least conclusively decide between adrenaline and normal saline that which one is better so that further/more solutions can then be compared with the one that proves to be better in this study and ultimately come to a consensus solution for submucoperichondrial infiltration. Septoplasty now a day is usually performed under general anesthesia so the use of local anesthetic in the form of lignocaine, tetracaine, articaine and benzocaine is not justified. Moreover they have many local as well as systemic side effects which can prove fatal. Locally they have no effect on bleeding tendency. Their effect last from thirty minutes to three hours according to literature so their use as effective pain control measure in post septoplasty period is also not logically correct. Although adrenaline is usually added to local anesthetic to impede its absorption even then their systemic side effects can occur.

Rationale behind using adrenaline and normal saline in this study is that they are easily available, cost effective and already being used in most hospitals all over the world⁴⁻⁶ but in various combinations. Variables used to assess

the efficacy of submucoperichondrial infiltration solutions are both subjective as well as objective which can gauge the effectiveness of these solutions accurately. 1:80000 concentration of adrenaline is used to minimize its side effects and get its maximum efficacy. 0.9% normal saline is used as it is the most commonly available concentration with minimal delayed local side effects. It is used as Control.

To avoid selection bias patients were randomized into two groups on the basis of admission days. To avoid observer bias both surgeon and anesthetist were not aware of the infiltration solution. Our study showed a significant difference ($P < .00001$) in terms of convenience of finding the correct surgical plane. In Group I there was very little bleed so surgical plane was readily accessed but Group II Patients experienced frequent surgical field flooding which made surgical access difficult and time taking. This finding was totally in contrast to some of the previous studies^{4,6} which showed that there is no significant difference between adrenaline and normal saline. But in these studies by Mahilravi Thevasagayam et al and Volkan Gungor et al the concentration of adrenaline used was different and more so it was used in combination with lignocaine. Duration of surgery was also significantly ($P < .00001$) reduced in Group I because of the ease of finding the surgical plane which once again is well against the previous studies.⁶ Overall Mucoperichondrial injury rate however showed no significant difference (P is .07771) in two groups but to my surprise severe mucoperichondrial injuries were significantly (P is .03885) more in Group I which had also been documented earlier by Volkan Gungor et al.⁶ Above findings are perhaps due to more careful inclusion criteria which left out congenital maxillofacial defects and trauma cases in addition to other exclusions. It can also be due to difference in infiltration sites as well as infiltration concentration in addition to operator expertise. So I can safely conclude that the use of 1: 80000 adrenaline is far superior than normal saline in terms of above variables measured but it has no significant effect on mucoperichondrial injury rate. Further studies with larger sample size and same materials and methods may refine the

results further.

CONCLUSION

Adrenaline alone in concentration of 1:80000 is far more superior than 0.9% normal saline as submucoperichondrial infiltration option. Further studies with different concentrations of adrenaline should be carried out to look for better submucoperichondrial infiltration option to further ease the septoplasty procedure.


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AUTHORSHIP AND CONTRIBUTION DECLARATION

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