

The Effect of Injection of Saline Adrenaline (1/100000) 15ml versus 5ml on the Intraoperative Skin Edema and Thickness during Rhinoplasty

Original
Article

*Amr Nabil Rabie, Marwa Mohamed Abdelazeem Elbegermy, Marwa Saeed Yassin,
Mohammed Aleem*

*Department of Otorhinolaryngology, Faculty of Medicine, Ain Shams University, Cairo,
Egypt.*

ABSTRACT

Background: Nasal skin edema is a common result of soft and bony tissue trauma during rhinoplasty. In a cosmetic surgery like rhinoplasty, skin edema can fade the cosmetic results and can lead to dissatisfaction for both the surgeon and the patient. Local saline /adrenaline injection is claimed to reduce the nasal skin edema intraoperative.

Objective: To assess effect of injection of saline adrenaline (1/100000) 15ml versus 5ml on the skin oedema and thickness during rhinoplasty through thesis study.

Patients and Methods: In this study 60 cases of rhinoplasty will be operated, 30 cases will be injected by saline adrenaline (1/100000) of 5ml and the others 30 cases will be injected by saline adrenaline (1/100000) of 15 ml, then measuring the skin oedema after 10 minutes of saline adrenaline (1/100000) injection, after 30 minutes and after 60 minutes of the injection at three sites; the dorsum, supratip and the tip of the nose by Seal Gouge Caliper (surgical caliber).

Results: The intraoperative skin edema was significantly decreased with local injection of large amount (15ml) of saline /adrenaline 1/100000 than the usual injected amount (5ml) saline /adrenaline 1/100000 specially at the tip and the supratip of the nose and specially at 30 min and 60 min after injection, but statistically significance difference only at 60min at the dorsum.

Conclusion: That the skin oedema much less with injection of 15ml of saline adrenaline (1/100000) in comparison to injection of 5ml of saline adrenaline (1/100000).

Key Words: Adrenaline, edema, rhinoplasty, skin thickness.

Received: 13 February 2022, **Accepted:** 7 March 2022

Corresponding Author: Mohammed Aleem, MD, Department of Otorhinolaryngology, Faculty of Medicine, Ain Shams, Cairo, Egypt, **Tel.:** (+2) 01225779797, **E-mail:** drmaleem2010@gmail.com

ISSN: 2090-0740, 2022

INTRODUCTION

With increasing demands for plastic surgery in recent years, the number of rhinoplasties has also shown an upward trend. The anatomy of the nose, with its vascular structure and limited area for maneuvering, restricts the surgeon's access and visibility during a rhinoplasty. Therefore, most surgeons have been using saline/adrenaline with local anesthetics as a way to prepare the region for operation. Indeed, this method has become a standard procedure and current practice for most plastic surgeons^[1].

Infiltration of solutions with adrenaline concentration of 1:100,000–1:200,000 are commonly used while solutions with the concentration of 1:10,000 are commonly used just for topical applications^[2, 3]. Also, infiltration of those agents provide mucoperichondrial flap elevation through hydrodissection in the septorhinoplasty surgery.

This study was designed to compare between the effect of injection 15ml of saline /adrenaline (1/100000) with the effect of injection of 5ml of saline /adrenaline (1/100000) on the nasal skin edema intraoperatively in rhinoplasty.

Objective:

To assess effect of injection of saline adrenaline (1/100000) 15ml versus 5ml on the skin oedema and thickness during rhinoplasty through thesis study.

PATIENTS AND METHODS:

A prospective double arm clinical trial study was carried at operating theatre of ENT department Ain Shams University Hospitals, starting from June 2018 till June 2019, 60 patients were included in our study.

Inclusion criteria:

- Patients presented to ENT clinic in Ain Shams university hospitals with deformed nose candidates for rhinoplasty.
- No sex predilection.
- Age group: ranges from 20 to 40 years.

Exclusion criteria:

- Revision rhinoplasty.
- Patient with skin diseases.
- Collagen disease.
- Patient with any contraindication for adrenaline injection.

Study tools and procedures:

1. Detailed explanation of the procedure and taking an informed consent from the patients.

2. All patients subjected to detailed history taking prior to the surgery.

3. Sixty cases of rhinoplasty patients operated by the same surgical team. 30 cases have been injected by saline adrenaline (1/100000) of 5ml and the other 30 cases have been injected by saline adrenaline (1/100000) of 15 ml using a 22gauge needle. The injection was done in two components: a picture frame block to reduce the regional blood supply and then the specific areas of surgery.

4. Assessment of the skin oedema was done after 10 minutes of saline adrenaline injection, then 30 minutes and lastly, after 60 minutes of the injection using surgical caliber.

5. This measurement has been done after marking six dots at three sites; the dorsum, supratip and the tip of the nose. After that the skin fold in these areas was measured using Seal Gouge Caliper (Figure 1).



Fig. 1: Measurement of the skin fold at the dorsum, supratip and the tip of the nose respectively.

Statistical Analysis:

Data were collected, revised, coded and entered to the Statistical Package for Social Science (IBM SPSS) version 23. The quantitative data were presented as mean, standard deviations and ranges when their distribution found parametric. Also, qualitative variables were presented as number and percentages. The comparison between groups regarding qualitative data was done by using *Chi-square test*.

RESULTS:

Sixty patients were included in this study. Patients ranged in age from 21:39 years (mean: 29.87 years), 56.7% were females and the rest were males (43.3%).

There was no significant statistical difference in the skin oedema at the dorsum of the nose between the two groups after 10 min and 30 min (*P value 0.639, 0.100* respectively).

There was significant statistical difference in the skin oedema at the dorsum of the nose between the two groups after 60 min (*P value: 0.011*).

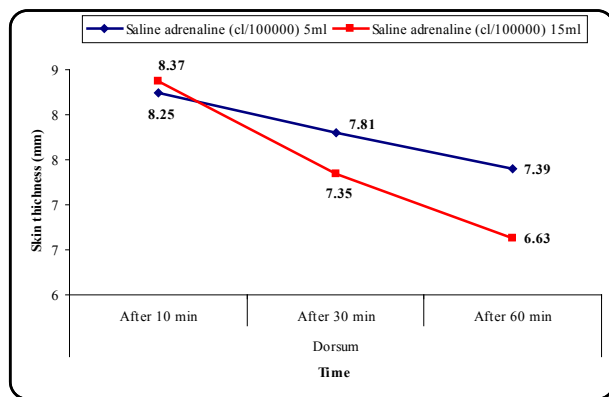


Fig. 2: The effect of injection of Saline adrenaline (1/100000) 5ml versus 15 ml on the dorsum.

There was no significant statistical difference in the skin oedema at the supratip of the nose between the two groups after 10 min (P value 0.82). But there was highly significant statistical difference in the skin oedema at the supratip of the nose between the two groups after 30 and 60 min (P value: 0.06 and 0.001 respectively).

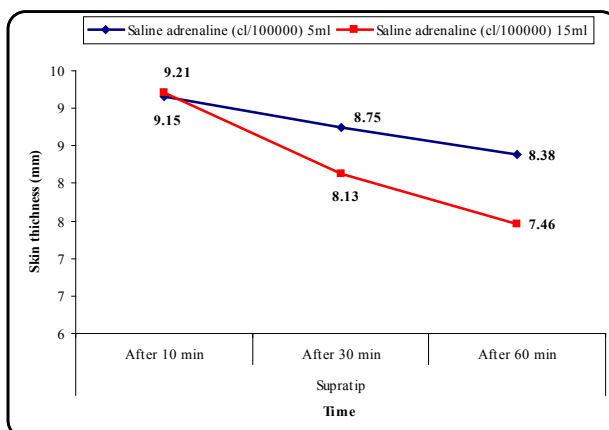


Fig. 3: The effect of injection of Saline adrenaline (1/100000) 5ml versus 15 ml on the supratip

There was no significant statistical difference in the skin oedema at the tip of the nose between the two groups after 10 min (P value 0.36). There was highly significant statistical difference in the skin oedema at the tip of the nose between the two groups after 30 and 60 min (P value: less than 0.001).

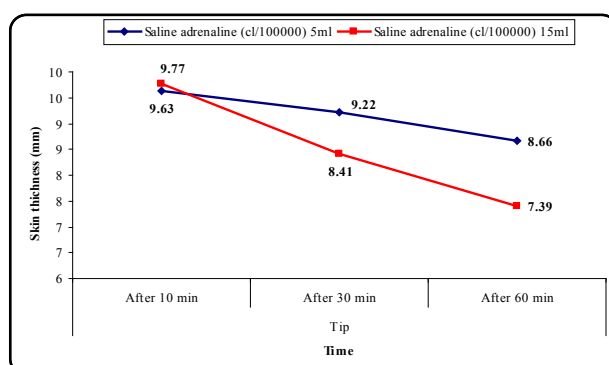


Fig. 4: The effect of injection of Saline adrenaline (1/100000) 5ml versus 15 ml on the tip.

DISCUSSION

In a cosmetic surgery like rhinoplasty, nasal skin edema can fade the cosmetic results and can lead to dissatisfaction for both the surgeon and the patient. Many attempts have been undertaken to minimize these morbidities^[4].

Nasal skin edema is a common result of soft and bony tissue trauma during rhinoplasty. The nasal vascular structures include a subdermal vascular plexus, lymphatic vessels, veins and arteries. Histopathological studies have revealed that the nose has two dissection planes: a subcutaneous plane and a deep areolar tissue plane. After surgical disruption of the venous and lymphatic vasculature, edema develops because levels of interstitial fluid and bleeding in soft tissues exceed the capacity of drainage to lymphatic and venous systems^[5]. Notably, dissection performed under the musculoaponeurotic plane reduces the severity of vascular injury^[6].

Local saline adrenaline is advised for easy dissection, reduction in the degree of edema, and clear dissection under both local and general anesthesia^[7].

The authors observed that Local saline adrenaline infiltration provides easier and cleaner dissection at the tip of the nose. All the operations were conducted under general anesthesia.

Adrenaline has two opposite effects on the vessels. It acts directly on α and β adrenergic receptors. Stimulation of α adrenergic receptors located in blood vessels causes vasoconstriction, whereas stimulation of β -adrenergic receptors causes vasodilation. Responses to adrenaline are both site/receptor and concentration dependent.

Whilst adrenaline leads to vasodilation at low doses, it causes vasoconstriction at high doses^[8].

Adrenaline is really a sympathomimetic amine with each α as well as β -adrenergic receptor agonist effects. Skin, mucosa, as well as kidney arterioles display vasoconstriction on account of α -receptor predominant activation. Low concentrations of adrenaline lead to preferential β 2 receptor activation leading to vasodilatation in bronchiolar smooth muscle while increased ranges activate α -receptor-mediated vasoconstriction in vascular smooth muscle^[9].

Our results show that intraoperative skin edema was significantly decreased with local injection of large amount (15ml) of saline /adrenaline 1/100000 than the usual injected amount (5ml) saline /adrenaline 1/100000 specially at the tip and the supratip of the

nose and specially at 30 min and 60 min after injection, this potentially improves the surgical outcome and give better correction of nasal deformities.

In GUN's study in Turkey on 48 patients, they investigated the effects of lidocaine/adrenaline combination injection on postoperative edema/ecchymosis in rhinoplasty. 2 ml of 2% lidocaine with 1:100,000 adrenaline solution was applied at a random side of the nose prior to the lateral osteotomy. The opposite side was used as a control. Lidocaine /adrenaline was infiltrated to lateral osteotomy site and was applied to the tip and the columellar regions. The relationship between edema/ecchymosis and the degree of lidocaine/adrenaline combination on the injected and uninjected sides was evaluated on the first, third and seventh day postoperatively^[10].

All patients experienced some degree of periorbital edema and ecchymosis. Edema and ecchymosis decreased daily in the majority of patients. Edema and ecchymosis were not observed on the seventh day. Grade IV (massive edema with the eyelid swollen shut) edema and ecchymosis were not seen in any patient, there were no significant differences between the lidocaine/adrenaline combination in injected and uninjected sides with regard to edema and ecchymosis on the first, third or seventh days^[10].

In a randomized control pilot study. Kalantar-Hormozis, *et al.*, (2011) aimed at showing that epinephrine can be avoided in local anesthetic solution used for rhinoplasty. Patients were randomized to either the intervention group (N = 39) which received (only lidocaine injection) or the control group (N = 74) which received (lidocaine with epinephrine). They reported that elimination of epinephrine for a few patients in the intervention group reduced the number of anticipated cardiac-related complications. Furthermore, elimination of epinephrine did not add any additional risk of bleeding assessed intraoperatively by sponge count and total aspirate. And also showed that elimination of epinephrine reduced the length of surgery in the intervention group, which could be partly due to the 5-10 min saved by not having to inject the lidocaine/epinephrine. These findings raise the possibility that elimination of epinephrine during the rhinoplasty could be an alternative procedure that may in fact lead to the same surgery outcome if not a better one^[11].

Matoušeks' study results show that: the topical administration of adrenalin on nasal mucosa in 1:10,000 dilution resulted in a systemic absorption. The amount of adrenalin, which was absorbed, was relatively low, the adrenalin levels in blood reached two-fold higher levels than the basal concentration. No changes were observed in blood pressure^[12].

In this study we demonstrated the effect of adrenaline injection on the skin of the nose, which reduces swelling during the rhinoplasty, which leads to good judgment on the shape of the nose during the operation. There is no study was found reporting the effect of the amount of local saline /adrenaline on the nasal skin oedema intraoperative and how to reduce nasal skin oedema of the nose during rhinoplasty. Most studies discuss the postoperative edema.

Our study was limited by small sample size. Studies with a larger sample size can help further substantiate these findings.

Other methods described by different authors to decrease the perioperative edema and ecchymosis as using intraoperative systemic steroid^[13], Also, Compression of the nasal dorsum with ice cooled, wet swabs^[14].

CONCLUSION

The available data shows that the intraoperative skin oedema in rhinoplasty operation much less with injection of 15ml of saline adrenaline (1/100000) in comparison to injection of 5ml of saline adrenaline (1/100000), Studies with a larger sample size can help further and substantiate these findings.

ACKNOWLEDGMENTS

The authors are grateful to Dr. Enrico Robotti as the idea of this study was acquired from his technique in rhinoplasty.

ETHICAL

Ethical approval of the Scientific and Ethical Committee of Ain-Shams University was obtained.

CONFLICT OF INTEREST

There are no conflicts of interest.

REFERENCES

1. Koeppel T, Constantinescu MA, Schneider J, Gubisch W (2005): Current trends in local anesthesia in cosmetic plastic surgery of the head and neck: results of a German national survey and observations on the use of ropivacaine. *Plast Reconstr Surg* 115(6):1723-1730.
2. McClymont LG, Crowther JA (1988): Local anaesthesia with vasoconstrictor combinations in septal surgery. *J Laryngol Otol* 102:793-795.

3. Matousek P, Kominek P, Garcia A (2011): Errors associated with the concentration of epinephrine in endonasal surgery. *Eur Arch Otorhinolaryngol* 268:1009–1011.
4. Ong AA, Farhood Z, Kyle AR, *et al.* (2016): Interventions to decrease postoperative edema and ecchymosis after rhinoplasty: a systematic review of the literature. *Plast Reconstr Surg* 137:1448–1462.
5. Ryan TJ (1989): Structure and functions of lymphatics. *J Invest Dermatol* 1989: 93: 18-24.
6. Rodrich RJ, Adams WP, Gunter JP (2002): Advanced rhinoplasty anatomy. In: Gunter JP, Rodrich RJ, Adams WP, eds: -Dallas Rhinoplasty. St. Louis, MO: Quality Medical Publishing: 5-41.
7. Erisir F, Tahamiler R. (2008): Lateral osteotomies in rhinoplasty: a safer and less traumatic method. *Aesthet Surg J*:28: 518–520.
8. Jastak JT, Yagiela JA, Donaldson D (1995): Pharmacology of vasoconstrictors In Local Anesthesia of the Oral Cavity. Philadelphia: Saunders: 61–85.
9. Ghali S, Knox KR, Verbese J, Scarpidis U, Izadi K, Ganchi PA. (2008): Effects of lidocaine and epinephrine on cutaneous blood flow. *J Plast Reconstr Aesthet Surg*: 61: 1226–1231.
10. Gun R, Yorgancılar E, Yıldırım M, Bakır S, Topcu I & Akkus Z (2011): Effects of lidocaine and adrenaline combination on postoperative edema and ecchymosis in rhinoplasty. *International journal of oral and maxillofacial surgery*, 40(7), 722-729.
11. Kalantar-Hormozi A, Fadaee-Naeni A, Solaimanpour S, Mozaffari N. (2011): Can Elimination of Epinephrine in Rhinoplasty Reduce the Side Effects: Introduction of a New Technique. *Aesthetic plastic surgery*; 35(4):582-7.
12. Matoušek P, Komínek P, Chalupa J. *et al.* (2007): Systemic absorption of adrenalin after topical administration on nasal mucosa, *Otorinolaryngologie a Foniatrie*, 56(2),P.67-72.
13. Koc S, Gürbüzler L, Yaman H, Eyibilen A, Süren M, Kaya Z, Yelken K, Aladağ I (2011): The effectiveness of steroids for edema, ecchymosis, and intraoperative bleeding in rhinoplasty. *Am J Rhinol Allergy* 25(2): 95-8.
14. Hettige R, Mansell N (2014): Limiting oedema, ecchymosis and haemorrhage in septorhinoplasty with ice cooled swabs. *Ann R Coll Surg Engl* 96(5):395-6.