

## ORIGINAL ARTICLE

## USE OF STEROIDS IN RHINOPLASTY WITH LATERAL OSTEOTOMIES FOR REDUCING POST OPERATIVE OEDEMA

Aamna Sanober, Mamoon Rashid, Mohammad Ibrahim Khan, Saad Ur Rehman, Shumaila Yousaf, Ishtiaq Ur Rehman Orakzai, Samia Fatima, Farhan Ahmed Eitezaz, Adeela Hussain

Department of Plastic Surgery, Shifa International Hospital Islamabad-Pakistan

**Background:** Postoperative periorbital oedema is a commonly encountered side effect of rhinoplasties in which lateral osteotomies have been incorporated. It dissatisfies the surgeon as well as the patient. Osteotomies are done at the end of all soft tissue manipulation to reduce the development of oedema. The aim of this study was to determine the efficacy of intravenous dexamethasone in reducing oedema in patients who undergo rhinoplasty with lateral osteotomies. **Methods:** A Prospective randomized controlled trial was done at department of plastic and reconstructive surgery, Shifa International Hospital Islamabad. Sixty patients age between 16–55 requiring open rhinoplasty were taken for this study and divided in two groups. One group received dexamethasone 8mg intravenously preoperatively and second dose 4 hours postoperatively. The second group did not receive anything. Both groups were assessed on first post-operative day and 7<sup>th</sup> day for periorbital oedema. **Result:** The overall decrease in oedema in patients who received steroid was by 50% while in control group was 33.3%. By the 7<sup>th</sup> day control group 13.3% patients had grade III oedema as compared to 3.33% in steroid group. Chi test was applied and *p*-value of 0.0289 was obtained which was found to be statistically very significant. **Conclusion:** Dexamethasone used in minimal dosage showed significant advantage in reducing periorbital oedema after rhinoplasty with no evidence of any side effects secondary to steroid administration.

**Keywords:** Rhinoplasty; Lateral osteotomy; Steroid

**Citation:** Sanober A, Rashid M, Khan MI, Rehman S, Yousaf S, Orakzai IR, Fatima S, Eitezaz FA, Hussain A. Use of steroids in rhinoplasty with lateral osteotomies for reducing post-operative oedema. J Ayub Med Coll Abbottabad 2018;30(1):45–8.

### INTRODUCTION

Rhinoplasty like all surgeries causes tissue trauma which leads to an inflammatory response and results in postoperative periorbital swelling with discoloration which can mask the aesthetic outcomes and annoy the patient as well as the surgeon.<sup>1</sup> Lateral osteotomies are considered in aesthetic rhinoplasty as a final step.<sup>2</sup> They are done to correct the asymmetries of the bony skeleton<sup>3</sup> it is considered at the completion of all tissue manipulation to reduce the chances of bleeding and postoperative ecchymosis and periorbital oedema.

There are several approaches for performing osteotomies, i.e., vestibular, percutaneous and intraoral approach.<sup>4</sup> A significant improvement could be achieved in usual postoperative course and appearance if this oedema is kept to minimal. To prevent or minimize oedema and ecchymosis, one of the methods is to administer steroids which are being commonly practiced in most of the plastic and maxillofacial surgical procedures.<sup>5</sup> Steroid use has been reported to reduce postoperative swelling and recovery time.<sup>6</sup> Glucocorticoid inhibit the initial process of inflammation that includes oedema, fibrin deposition, capillary dilatation, migration of lymphocytes and phagocytic activity, render decreased permeability of vessels and resultant lesser degree of exudation and oedema.<sup>6</sup> Dexamethasone is considered to have the

highest anti-inflammatory properties, early onset of action and the half-life of 36–54 hours.<sup>8</sup> Glucocorticoid usage in rhinoplasty has been done with variable and diverse dosing regimens. Hoffman *et al.* used intraoperative and for succeeding 5 days postoperatively and reported decrease in ecchymosis and swelling in first 7 days postoperatively.<sup>7</sup> Griffies *et al.* preferred a stat dose of preoperative steroid and observed a decline in oedema and ecchymosis on first postoperative day.<sup>9</sup> Given this information, we performed a prospective randomized control trial to compare the impact of use of dexamethasone, given preoperative and post operatively to patients following rhinoplasty, in decreasing the periorbital oedema.

### MATERIAL AND METHODS

After approval of the ethical review committee at Shifa International Hospital, Islamabad, a total number of 60 patients aged between 16–55 requiring open rhinoplasty were included in this study and divided in two groups. Patients having history of peptic ulcers, diabetes mellitus, glaucoma, coagulation disorders, psychiatric problems and known drug allergy to steroids were excluded. All surgeries were done by standard rhinoplasty technique and lateral osteotomies via vestibular or gingival approach. After taking informed consent, including the information that they will be a part of this research,

patients were divided into groups alternatively. One group received intravenous dexamethasone 8 mg preoperatively and second dose 4 hours postoperatively. The second group did not receive steroid. No other attempts were done to control the oedema postoperatively with pressure or ice packs. All patients received similar postoperative care. Patient were assessed in terms of grade of periorbital oedema on first post-operative day and frontal view pictures were taken and compared on follow up on the 7<sup>th</sup> day. Patients got discharged on 1<sup>st</sup> or 2<sup>nd</sup> postoperative day and called for follow-up on 7<sup>th</sup> postoperative day. Data collected through Performa was analysed through SPSS software 22. Variables like age and periorbital oedema score were measured as mean±SD. Percentages and frequencies were measured for qualitative variables like gender. Chi-Square test was applied to compare difference in the resolution of oedema between the two groups. Effect modifiers like age and gender were controlled using stratification. A *p*-value ≤0.05 was considered significant.

## RESULT

A total number of 60 patients who underwent rhinoplasty with lateral osteotomies were studied. Forty-

six (76.6%) were female and 14 (23.3%) were males. Mean age was 26.48 years (SD 6.07). No patient had any adverse reaction to given drug in group I. In group-I, 21 patients were females and 9 were males. Eleven patients had grade I, 16 had grade II and 3 patients had grade III oedema on 1<sup>st</sup> postoperative day. On 7<sup>th</sup> postoperative day, 21 patients had grade I, 8 had grade II whereas only one patient had grade III oedema. In group II 25 patients were females and 5 were males. On 1<sup>st</sup> postoperative day, 13 patients had grade I, 15 had grade II and 2 patients had grade III oedema. 14 patients had grade I, 12 had grade II and 4 patients had grade III oedema on 7<sup>th</sup> postoperative day. In one patient, unilateral grade III oedema was noted in group I on 1<sup>st</sup> postoperative day. The overall decrease in oedema in patients who received steroid was by 50% while in control group was 33.3%. By the 7<sup>th</sup> day control group 13.3% patients had grade III oedema as compared to 3.33% in steroid group. Chi test was applied and *p*-value of 0.0289 was obtained which was found to be statistically very significant.

There were no side effects observed due to administration of steroids in any patients.



**Group I: (A) preoperatively, (B) 1<sup>st</sup> postoperative day - grade III periorbital oedema on right side and grade II on left side, (C) 7<sup>th</sup> postoperative day - grade I periorbital oedema bilaterally.**



**Group-II: (A) preoperatively, (B) 1<sup>st</sup> postoperative day – grade III oedema bilaterally, (C) 7<sup>th</sup> postoperative day - grade II oedema bilaterally.**

**Table-1: Degree of periorbital oedema on day 1 and 7**

Periorbital oedema	Number on day 1	Number on day 7
<b>GROUP I</b>	30	30
Grade I	11 36.6%	21 70%
Grade II	16 53.3%	08 26.6%
Grade III	03 10.0%	01 3.33%
<b>GROUP II</b>	30	30
Grade I	13 43.3%	14 46.6%
Grade II	15 50.0%	12 40.0%
Grade III	02 6.66%	04 13.3%
	60	60

**DISCUSSION**

Periorbital swelling as well as ecchymosis after rhinoplasty is upsetting for the patient who may have trouble in vision during the first 24 hours postoperatively. The implication of osteotomies, in a standard rhinoplasty procedure, is mostly responsible for a considerable number of postoperative stigmata of periorbital swelling along with ecchymosis secondary to angular vascular trauma that are traversing the site of osteotomy. Administration of steroids is being extensively used in maxillofacial and plastic surgical procedures to prevent the development of post-operative oedema and modify the postoperative outcomes and patient satisfaction.<sup>5</sup> Steroids are given perioperatively in various facial and orthognathic procedures, as described by several clinical studies, but the results have been conflicting.<sup>10,11</sup>

Steroids are gene-active hormones that act by binding, in cell nucleus, with chromatin, which in turn produce enzymes and proteins regulated by a specific gene sequence. Target cells are acted upon by these enzymes and proteins, stabilizing cell membranes, inhibiting various cell mediators and fibroplasias secondary to reparative procedures, thus reducing the inflammatory processes.<sup>12,13</sup> The effect of steroids starts after 30 minutes to a number of hours. For few hours to several days, the effect may persist and have no direct correlation to the plasma levels.<sup>15</sup> Dexamethasone was found to be most appropriate among various corticosteroids that have been used in previously in multiple studies due to its relative early onset of action with maximum anti-inflammatory effect and a longest available, protracted biological half-life of 36–54 hours.<sup>8,12</sup> As mineralocorticoid activity of the steroids is responsible for most of the undesirable effects thus low dose and short term usage of dexamethasone dose not imperil patient safety.<sup>14</sup>

Erisir *et al*<sup>15</sup> showed in comparison to placebo, a statistically significant advantage of steroids in lessening oedema and ecchymosis postoperatively in rhinoplasty. There were no complications endorsed to dexamethasone administration. Totonchi and Guyuron found that

corticosteroids decreased oedema, but not ecchymosis, to an extent greater than in comparison to controls, at least through the early postoperative phase.<sup>16</sup>

In our study, we found single dose to be very effective, causing a significant difference in post-surgical oedema in group I patient administered at the time of surgery and 4 hours post operatively. The grade II oedema got converted to grade I on 7<sup>th</sup> post-operative day whereas in no steroid group there was significant oedema seen on follow up on after 7 days.

Based on our observation in this study the use of long acting steroids with multiple large doses can be investigated in healthy individuals undergoing routine procedures, no immediate side effects of steroids were seen in our study however they should be kept in mind and patient be educated about them.

**CONCLUSION**

Postoperative periorbital swelling and discoloration can affect the outcome in rhinoplasty both the surgeon and patients look forward to a non-depressive and an even course of recovery. Our study showed a statistically significant improvement with administration of steroid in decreasing oedema and ecchymosis however double blinded large group randomized trials are needed to further assess the long-term effect of steroids.

**AUTHORS' CONTRIBUTION**

AS: Conception and design of the work. AS, SY, IUR, SF, FAE, AH: Data collection. AS: Data analysis and interpretation. AS: Drafting of the article. MR, MIK, SUR: Critical revision of the article. MR: Final approval.

**REFERENCES**

1. Stucker FJ. Prevention of post-rhinoplasty oedema. *Laryngoscope* 1974;84(4):536–41.
2. Lee HM, Kang HJ, Choi JH, Chae SW, Lee SH, Hwang SJ. Rationale for osteotome selection in rhinoplasty. *J Laryngol Otol* 2002;116(12):1005–8.
3. Sinha V, Gupta D, More Y, Prajapati B, Kedia BK, Singh SN. External vs. internal osteotomy in rhinoplasty. *Indian J Otolaryngol Head Neck Surg* 2007;59(1):9–12.
4. Beck DO, Kenkel JM. Evidence-based medicine: Rhinoplasty. *Plast Reconstr Surg* 2014;134(6):1356–71.
5. Kara CO, Gökalan I. Effects of single-dose steroid usage on oedema, ecchymosis, and intraoperative bleeding in rhinoplasty. *Plast Reconstr Surg* 1999;104(7):2213–8.
6. Ghazipour A, Alani N, Lahiji SG, Dilmaghani NA. Buccal sulcus versus intranasal approach for postoperative periorbital oedema and ecchymosis in lateral nasal osteotomy. *J Craniomaxillofac Surg* 2014;42(7):1456–9.
7. Pulikottil BJ, Dauwe P, Daniali L, Rohrich RJ. Corticosteroid use in cosmetic plastic surgery. *Plast Reconstr Surg* 2013;132(3):352e–60.
8. Tuncel U, Turan A, Bayraktar MA, Erkorkmaz U, Kostakoglu N. Efficacy of dexamethasone with controlled

- hypotension on intraoperative bleeding, postoperative oedema and ecchymosis in rhinoplasty. J Craniomaxillofac Surg 2013;41(2):124–8.
9. Gutierrez S, Wuesthoff C. Testing the effects of long acting steroids in oedema and ecchymosis after closed rhinoplasty. Plast Surg 2014;22(2):83–87.
  10. Schaberg SJ, Stuller CB, Edwards SM. Effects of methyl prednisolone in swelling after orthognathic surgery. J Oral Maxillofac Surg 1984;42(6):356–61.
  11. Echavez MI, Mangat DS. Effects of steroids on mood, oedema and ecchymosis in facial plastic surgery. Arch Otolaryngol Head Neck Surg 1994;120(10):1137–41.
  12. Goodman LS, Gilman A, editors. The Pharmacological basis of therapeutics. 5th ed. New York: Macmillan; 1975. p.1704.
  13. Haynes RC, Murad F. Adrenocorticotrophic hormone; adrenocortical steroids and their synthetic analogs; inhibitors of adrenocortical steroids biosynthesis. in: Goodman Gilman A, Goodman LS, editor. The Pharmacological Basis of Therapeutics. New York, MacMillan, 1980. p1466–96.
  14. Novak E, Stubbs SS, Seckman CE, Hearron MS. Effects of a single large intravenous dose of methylprednisolone sodium succinate. Clin Pharmacol Ther 1970;11(5):711–7.
  15. Erisir F, Oktem F, Inci E. Effect of steroids on edema and ecchymosis in rhinoplasty. Turk Arch 2001;39(3):171–5.
  16. Totonchi A, Guyuron B. A randomized controlled comparison between arnica and steroids in the management of postrhinoplasty ecchymosis and edema. Plast Reconstr Surg J 2007;120(1):271–4.

<i>Received: 6 January, 2017</i>	<i>Revised: 3 October, 2017</i>	<i>Accepted: 1 November, 2017</i>
----------------------------------	---------------------------------	-----------------------------------

**Address for Correspondence:**

**Aamna Sanober**, A/20 Journalist Colony, Hyderabad-Pakistan

**Cell:** +92 332 264 2266

**Email:** amu\_honey@live.com