

The Effects of Single Dose Dexamethasone on Periorbital Oedema and Ecchymosis after Rhinoplasty

SAADALLAH M. ALZACKO, F.R.C.S.*; ALI A. MUTTALIB, F.I.B.M.S.*;
NASHAT AL-KHAYAT, D.L.O.** and FAEIZ S. ALTAKAI, D.L.O.**

The Departments of Surgery, Mosul Medical College and E.N.T. Surgeon, Al-Jumhuri Teaching Hospital**, Iraq.*

ABSTRACT

A double blind randomized study was designed to determine the effect of a single dose of dexamethasone on periorbital oedema and ecchymosis after rhinoplasty operation. The study was carried out at Al-Jumhuri Teaching Hospital/Mosul-IRAQ, for the period from April 2007 to June 2008. Eighty patients who had undergone hump reduction and lateral osteotomies with or without septoplasty operation were included in this study. These patients were arbitrarily divided into two groups; group I (n=40 patients), were given a single dose of 8mg intravenous dexamethasone preoperatively and compared with the corresponding results of group II (n=40 patients), who received placebo as a control group. These patients were evaluated on the second postoperative day for postoperative periorbital oedema and ecchymosis. A scale of 0-4 points was used for oedema and 0-4 points for ecchymosis. The dexamethasone group (group I) included 22 males (55%) and 18 females (45%) with a ratio of 1.2:1. Their age ranged from 14-37 years with a mean of 22.9 years. The control group (group II) consisted of 26 males (65%) and 14 females (35%) with a ratio of 1.8:1. Their age ranged from 15-55 years with a mean of 25.2 years. None of our patients developed any complication related to the use of dexamethasone. Both periorbital oedema and ecchymosis were significantly lower in the dexamethasone group in comparison to the control group. It can be concluded that dexamethasone has significant effect in decreasing postoperative periorbital oedema and ecchymosis after rhinoplasty operation.

INTRODUCTION

During rhinoplasty, postoperative swelling and ecchymosis can influence the cosmetic results, causing dissatisfaction for both the surgeon and the patient. Osteotomies in rhinoplasty account for a notable proportion of this periorbital swelling and ecchymosis because of the injury in angular vessels crossing the osteotomy sites and fractured nasal bone [1].

Traditionally, steroids have been used to decrease ecchymosis and swelling in these patients. A number of randomized controlled trials have demonstrated the benefit of steroids in rhinoplasty. Dexamethasone was the most common steroid used

in the UK being administered as a single intravenous dose of 8mg in the majority of cases [2].

Schaberg et al. [3], Beirne & Hollander [4], Habal [5] and Mico-Liorens et al. [6] demonstrated statistically significant reduction in postoperative oedema after steroid administration following different surgical procedures.

The aim of the present study is to evaluate the effect of a single dose of dexamethasone on postoperative periorbital oedema and ecchymosis after rhinoplasty.

PATIENTS AND METHODS

This study presents a randomized, prospective double blind study concerned with 80 patients who had undergone rhinoplasty at Al-Jumhuri Teaching Hospital for the period from April 2007 to June 2008. Patients with history of peptic ulceration, diabetes mellitus, psychiatric problems and allergy to steroids were excluded from the study. These patients were arbitrarily divided into two groups; group I (n=40), were given a single dose of 8mg IV dexamethasone preoperatively and compared with the corresponding results of group II (n=40 patients) who received 5ml of normal saline placebo IV as a control group. Moreover, an official permission was taken from the patients in both study groups. Both patients and surgeons were blinded until the end of the study.

The operations were performed under general endotracheal anaesthesia. In addition, local anaesthesia of 1% lidocaine with 1:100 000 epinephrine was infiltrated to the osteotomy sites using dental syringe. All patients had dorsal hump removal and lateral osteotomies with or without septoplasty with the same surgical instruments. Nasal packing was used routinely postoperatively. All patients

underwent an operation using the same technique and received similar postoperative care.

Digital photographs were obtained on the second postoperative day which were reviewed by three panelists who were blinded to the nature of treatment. Moreover, the severity of periorbital oedema and ecchymosis were rated separately. The severity of periorbital oedema was rated on a 0-4 scale [7] and the extent of ecchymosis on a 0-4 scale [8] (Table 1 & Fig. 1).

Table (1): Scoring system of postoperative periorbital oedema and ecchymosis after rhinoplasty [7,8].

Rating	Ecchymosis	Oedema
0	No ecchymosis	No oedema
1	Medial one third of upper and/or lower eyelids	Mild oedema
2	Medial half of upper and/or lower eyelids	Moderate oedema
3	Entire upper and/or lower eyelids	Severe oedema
4	Entire upper and/or lower eyelids and/or conjunctiva	Complete (Massive) oedema

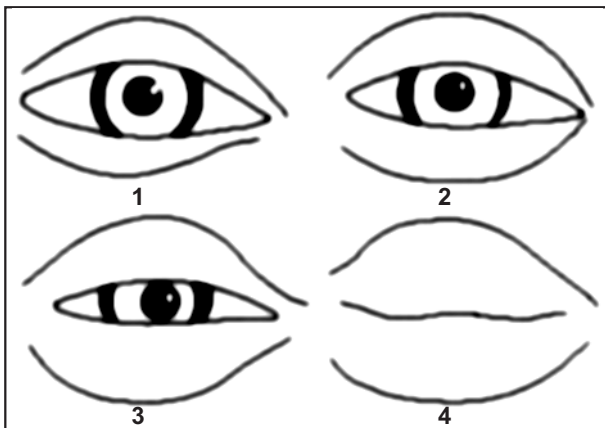


Fig. (1): Method of evaluating eyelid edema. 0 indicates none; 1+, minimal; 2+ moderate; 3+, severe; 4+ complete (massive edema). (From Erisir F., Oktem F. and Inci E. Effect of steroids on oedema and ecchymosis in rhinoplasty [7]).

The average extent of the severity of periorbital oedema and the extent of ecchymosis among the two groups were compared using analysis of variance. A *p*-value less than 0.05 was considered significant.

RESULTS

The mean age of the patients in the dexamethasone group (group I) was 22.9 years with a range

of 14-37 years. The peak age incidence was in the third decade of life (Fig. 2). The group included 22 male patients (55%) and 18 females (45%) with a ratio of 1.2:1.

In comparison, 25.2 years was the mean age of the patients in the control group (group II), with a range of 15-55 years. Similarly, the peak age incidence was in the third decade of life (Fig. 3). There was 25 males (62.5%) and 15 females (37.5%) with a ratio of 1.6:1.

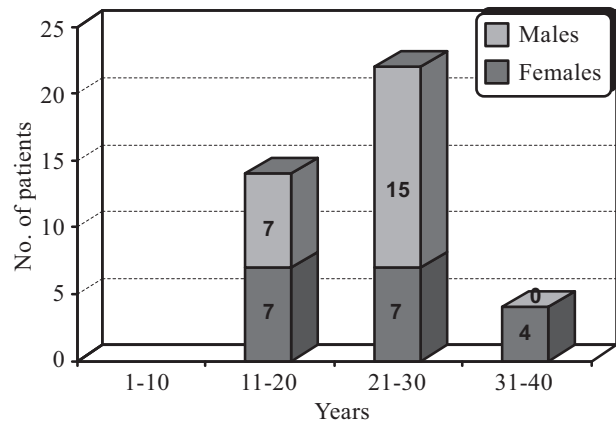


Fig. (2): Age and sex distribution of patients in the dexamethasone group.

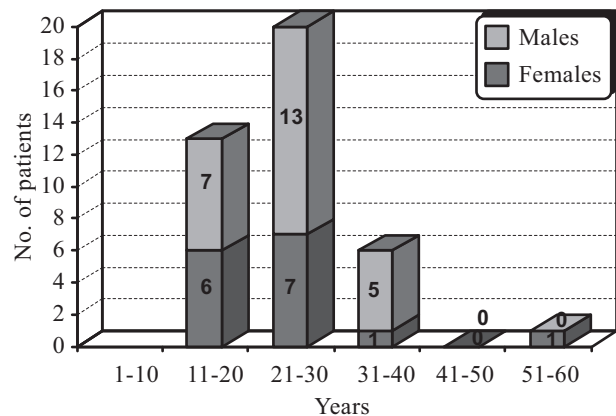


Fig. (3): Age and sex distribution of patients in the control group.

Table (2) shows the proportion of patients who developed postoperative periorbital oedema among both study groups. An evident decrease in the fraction of patients who developed postoperative oedema grade 2 and 3 among the dexamethasone group was noted. On the contrary, the control group showed an inverse finding. The proportion of patients with grade 1 oedema is significantly higher (*p*=0.002) than the control group (57.6% versus 22.5%). Overall, the mean grade of oedema among the dexamethasone group was 1.6±0.78 which is significantly lower (Figs. 4,5) than that of the control group 2.13±0.76 (*p*=0.003).

Table (2): Postoperative periorbital oedema among the study groups.

Oedema Grade	Dexamethasone group		Control group		p-value
	No.	%	No.	%	
0	—	—	—	—	—
1	23	57.5	9	22.5	0.002
2	10	25	17	42.5	0.102
3	7	17.5	14	35	0.79
4	0	0	0	0	0
Total	40	100	40	100	
Mean	1.6±0.78		2.13±0.76		0.003

Table (3) provides data on postoperative periorbital ecchymosis among the study groups. A similar trend to that of postoperative oedema was observed. Among grade 1 a significantly higher proportion of patients ($p=0.003$) appeared in the dexamethasone group than the control group. The reverse is true for grade 3 group. The mean postoperative ecchymosis grade among the dexamethasone group is 1.53 ± 1.15 compared to 2.58 ± 1.08 of the control group, a difference of highly significant value ($p=0.000$) (Figs. 4,5).



Fig. (4): Oedema and ecchymosis 48 hours postoperatively of the steroid group.



Fig. (5): Oedema and ecchymosis 48 hours postoperatively of the placebo group.

Table (3): Postoperative periorbital ecchymosis among the study groups.

Ecchymosis Grade	Dexamethasone group		Control group		p-value
	No.	%	No.	%	
0	7	17.5	2	5	0.81
1	16	40	4	10	0.003
2	9	22.5	11	27.5	0.607
3	5	12.5	15	37.5	0.012
4	3	7.5	8	20	0.19
Total	40	100	40	100	
Mean	1.53±1.15		2.58±1.08		0.000

DISCUSSION

Periorbital swelling and ecchymosis after rhinoplasty is distressing for the patient who may have difficulty in seeing 24 hours postoperatively and is quite conscious of this battered appearance. In the standard rhinoplasty operation, the osteotomies are responsible for a significant amount of this periorbital swelling and ecchymosis due to the injury to the angular vessels crossing the osteotomy sites. Several approaches have been advocated to decrease oedema and ecchymosis occurring postoperatively including technical refinements by using micro-osteotomies and preservation of periosteal attachment. Steroid administration is another way of minimizing oedema and ecchymosis, which were widely practiced in maxillofacial and plastic surgery [7]. Although some studies reported that steroids are of no benefit, other studies have found them useful [1]. Despite the evidence supporting the use of steroids to reduce postoperative sequelae following rhinoplasty, only a minority of consultants in the UK appear to use them as part of their practice [2].

Steroids are known as gene-active hormones. Their mechanism of action is by binding with chromatin in a cell nucleus, which then regulates a specific gene sequence to produce enzymes and proteins. These enzymes and proteins act on a target cell to minimize the inflammatory process by stabilizing cell membranes, inhibiting certain cell mediators, and inhibiting fibroplasia of the reparative process. Steroids produce an effect after a characteristic period of 30 minutes to several hours. The effect (beneficial or toxic) may persist from a few hours to several days, and does not correlate directly with plasma levels [7]. Dexamethasone is one of the most potent anti-inflammatory steroids, the effect of which is moderately long

lasting, with a biologic half-life of 36-54 hours [9]. Hence, with a single dose of dexamethasone, there was a significant effect within 48 hours as shown in our study.

We found that peroperative dexamethasone has significant effect in decreasing postoperative periorbital oedema and ecchymosis after rhinoplasty operation, (Figs. 4,5). Habal [5] used 1gm methylprednisolone in 158 patients undergoing various plastic surgery operations and followed the patient for five days, reporting that steroid used decreased facial oedema. Kargi et al. [1] examined the effects of the number of dexamethasone injections administered at different times (1 hour preoperatively, at the beginning of the surgery, and postoperatively) on ecchymosis and edema after rhinoplasty. They concluded that a triple-dose steroid application, with the first dose administered before surgery, is the most efficacious in decreasing postoperative ecchymosis and edema. Similarly, Griffies et al. [10] found that preoperative intravenous dexamethasone was more efficacious than placebo in reducing edema and ecchymosis 24 hours after rhinoplasty. All these goes with our study.

In a study by Kara and Gokalan [11], the effect of single dose of 10mg dexamethasone intravenously on postoperative oedema, ecchymosis in rhinoplasty was investigated. They found that there was significant difference between the steroid and control groups in decreasing upper and lower eyelid oedema and upper eyelid ecchymosis during the first 2 days. No significant effect was observed on ecchymosis of the lower eyelid.

Steroid use is associated with more complications especially in long term administration. In healthy patients there are nearly no important side effects [9]. In the current study there was no complications associated with the administration of dexamethasone.

Erisir et al. [7] showed a statistically significant benefit of steroids when compared to placebo in decreasing edema and ecchymosis in rhinoplasty. No complications were attributed to the administration of dexamethasone. However, the effect of dexamethasone has disappeared after the first two days, and its use did not shorten the recovery. That is why we assessed the oedema and ecchymosis on the second postoperative day.

Similarly, Ozdel et al. [12] showed that administration of single dose of dexamethasone 10mg caused neither euphoria nor depression. With single-dose dexamethasone, periorbital edema was significantly

reduced on the first 2 postoperative days, and upper eyelid ecchymosis was significantly decreased only on the first postoperative day. However, preoperative steroid administration had no influence on ecchymosis of the lower eyelid.

On the contrary, Totonchi and Guyuron [8] found that corticosteroids reduced edema, but not ecchymosis, to a greater extent compared with controls, at least during the early postoperative period. Moreover, Berinstein et al. [13] reported that contrary to our expectations, preoperative intravenous dexamethasone increased the edema in rhinoplasty patients when a preoperative magnetic resonance imaging scan was compared with a scan taken within 48 hours after surgery. This is the first objective, double-blind study that shows an increase in postoperative edema after rhinoplasty with a single preoperative dose of dexamethasone.

Conclusion:

Dexamethasone has significant effect in decreasing postoperative periorbital oedema and ecchymosis after rhinoplasty operation.

REFERENCES

- 1- Kargi E., Hosnuter M., Babuccu O., Altunkaya H. and Altinyazar C.: Effect of steroids on oedema, ecchymosis and intraoperative bleeding in rhinoplasty. *Annals of Plastic Surgery*, 51 (6): 570-574, 2003.
- 2- Ofo E., Singh A. and Marais J.: Steroids in rhinoplasty: A survey of current UK otolaryngologists practice. *The Journal of Laryngology and Otology*, 120 (2): 108-112, 2006.
- 3- Schaberg S.J., Stuller C.B. and Edwards S.M.: Effect of methylprednisolone on swelling after orthognathic surgery. *J. Oral Maxillofac Surgery*, 42: 356-361, 1984.
- 4- Beirne O.R. and Hollander B.: The effect of methylprednisolone on pain, trismus and swelling after removal of third molars. *Oral Surg. Oral Med. Oral Pathol.*, 61: 134-138, 1986.
- 5- Habal M.B.: Prevention of postoperative facial oedema with steroids after facial surgery. *Aesthetic Plast. Surg.*, 9: 69-71, 1985.
- 6- Micó-Liorens J.M., Satorres-Nieto M., Gargallo-Albiol J., Arnabat-Domínguez J., Berini-Aytés L. and Gay-Escod C.: Efficacy of methylprednisolone in controlling complications after impacted lower third molar surgical extraction. *European Journal of Clinical Pharmacology*, 62 (9): 693-698, 2006.
- 7- Erisir F., Oktem F. and Inci E.: Effect of steroids on oedema and ecchymosis in rhinoplasty. *Turk Arch. ORL.*, 39 (3): 171-175, 2001.
- 8- Totonchi A. and Guyuron B.: A randomized controlled comparison between arnica and steroids in the management of postrhinoplasty ecchymosis and oedema. *Plastic and*

- Reconstructive Surgery Journal, July, 271-274, 2007.
www.PRSJournal.com.
- 9- Gilman A.F., Rall T.W., Nies A.S., et al., eds: Goodman and Gilman's The Pharmacological Basis of Therapeutics. 8th ed. New York: Pergamon Press, 1442-1454, 1990.
 - 10- Griffies W.S., Kennedy K., Gasser C., Fankhauser C. and Taylor R.: Steroids in rhinoplasty. Laryngoscope, Nov., 99 (11): 1161-1164, 1989.
 - 11- Kara C.O. and Gokalan I.: Effect of single-dose steroid usage on oedema, ecchymosis intraoperative bleeding in rhinoplasty. Plast. Reconstr. Surg., 104 (7): 2213-2218, 1999.
 - 12- Ozdel O., Kara C.O., Kara I.G., Sevinc D., Oguzhanoglu N.K. and Topuz B.: Does corticosteroid usage in rhinoplasty cause mood changes. Adv. Ther., 23 (5): 809-16, 2006.
 - 13- Berinstein T.H., Bane S.M., Cupp C.L., Demarco J.K. and Hunsaker D.H.: Steroid use in rhinoplasty: An objective assessment of postoperative edema. Ear, Nose & Throat Journal., 77 (1): 40-43, 1998.