

The Comparison Effect of Dexamethasone Single vs. Triple-Doses in Rhinoplasty-Induced Complications

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ABSTRACT

Introduction: Postoperative edema and ecchymosis may affect the patient and surgeon's satisfaction from the result of cosmetic surgery. Corticosteroids have been used to reduce the rhinoplasty-induced complications. The aim of this study was to compare the efficacy of single versus three-doses of dexamethasone in postoperative complications following rhinoplasty.

Materials and methods: This clinical study was performed on 100 patients who referred for rhinoplasty to Mehregan Hospital in Babol (located in Northern Iran). The patients were randomly divided into two groups: The first group received single dose dexamethasone and the second group received the same dose of dexamethasone before operation and the second and third doses 16 hours after that. The efficacy in these two groups reducing edema, ecchymosis and intraoperative bleeding were compared.

Results: All patients (40% males, aged 23.95 ± 6.52 and 60% females, aged 25.26 ± 6.95) underwent open rhinoplasty with osteotomies. The degree of edema and ecchymosis observed were more than the group that received three doses of dexamethasone ($p < 0.001$).

Conclusions: Three-dose dexamethasone is more effective than single-dose dexamethasone administration in reducing edema, ecchymosis and intraoperative bleeding following rhinoplasty.

Keywords: Rhinoplasty; Edema; Ecchymosis; Dexamethasone

INTRODUCTION

Although, rhinoplasty (nose cosmetic surgery) is considered as the most attractive procedure for cosmetic purpose but it can be one of the most difficult surgery. In order to technical developments, many changes have been done within the last decades in surgery and management of post operation complications. The general principles of rhinoplasty are based on subtracting the soft and hard tissue of nose and the nasal respiratory function should not be impaired during the surgery [1]. Significant edema and ecchymosis are seen in periorbital area leading to the injury of the soft and hard tissues in rhinoplasty [2]. Most of the complications are produced by the lateral osteotomy during surgery [3]. The Anatomic proximity of the nose and orbit causes high vulnerability of orbit in rhinoplasty complications [4]. Edema in the first 24 hours after surgery may cause vision disorders [5]. Intraoperative bleeding,

postoperative edema and ecchymosis may cause some patient and surgeon dissatisfaction from the surgery results [2]. Several factors, such as corticosteroids, arnica, and melilotus extract are known to be effective in reducing the complications [5]. Also, the internal and external micro-osteotomy surgical procedures are performed to prevent the very same postoperative complications [5]. Research has shown that the use of corticosteroids is effective in reducing the inflammatory following rhinoplasty [6]. Also, in plastic and maxillofacial surgery, intraoperative and postoperative administration of corticosteroids such as dexamethasone single dose is widely used assuming that this treatment would reduce intraoperative bleeding, postoperative edema and ecchymosis, as well as shortening the time of surgery and the recovery period [2]. Recurrence of symptoms of rhinoplasty may be occurred following administration of a single dose of dexamethasone [2]. Considering the fact that following rhinoplasty the patients will

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Received date: June 23, 2020; **Accepted date:** July 08, 2020; **Published date:** July 15, 2020

Citation: Darzi A (2020) The Comparison Effect of Dexamethasone Single vs. Triple-Doses in Rhinoplasty-Induced Complications. J Surg Anesth 4:130.

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be monitored at the hospital for at least 24 hours, this study was designed to investigate the effect of three doses of intravenous dexamethasone on the postoperative complications of rhinoplasty surgery.

MATERIALS AND METHODS

In this clinical study 100 participants were selected for rhinoplasty procedure, that the subjects were randomly divided into two equal groups.

Informed consent was obtained from all patients and the study was approved by the Ethics Committee of Babol University of Medical Sciences. This clinical investigation was registered in Iranian Registry of Clinical Trials (IRCT) with number: 2014011316195N1. The patients' age range was 18 to 30 years old. No patient had any history of diseases such as hypertension, heart disease, diabetes, or any records of smoking or alcohol drinking. Also patients underwent different bone manipulation and used aspirin and ibuprofen and supplements prior to surgery were excluded.

The intervention of the prescribing was done, only the doctor was aware of the kind of treatment.

In both groups, the patients were given dexamethasone (8 mg Alborz Daru Co., Tehran, Iran). In the first group before surgery, a single-dose of dexamethasone (8 mg, i.v.) was injected. The second group received second dose 8 hours and the third dose was 16 hours after surgery. Dexamethasone was injected intravenously in all patients.

Open rhinoplasty with osteotomy was performed by the same surgeon, and all patients were under general anesthesia. All patients undergo the same degree of bone work. Lateral osteotomies and dorsal hump reduction were done for all patients. Dorsal hump reduction was performed using both of Rubin and rasp osteotomies. During the operation, the surgical time and bleeding amount and blood pressure were recorded for each patient. Blood loss as determined by gain in sponge's weight and gain in gauge weight represents the amount of blood loss. The blood measured in suction bottle is added to the increase in sponges and gauge weight to determine the total amount of blood loss during surgery. After the operation, no attempt was made to reduce the edema or the ecchymosis. Antibiotics were administered for 5 days to each groups of study. The nasal pack for all patients was inserted for 48 hours.

Nose splint was used for all patients for a week. Sutures were removed seven days after the surgery. The degree of eyelid edema and ecchymosis of the soft tissue around the eyes were recorded on the second day after surgery. In all patients, postoperative edema and ecchymosis was examined separately by one observer using a 0-4 scale [5] (Figure 1,2).

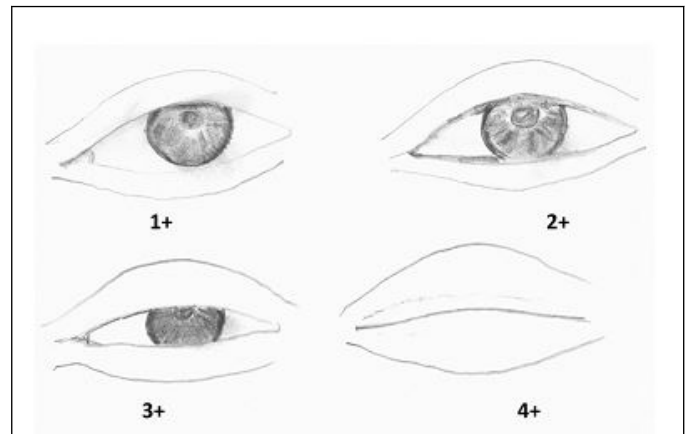


Figure 1: Level for the periorbital eyelid.

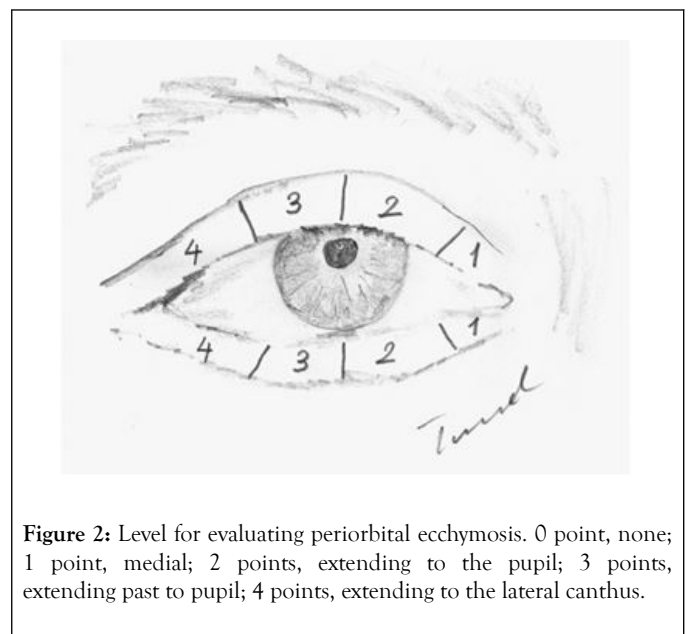


Figure 2: Level for evaluating periorbital ecchymosis. 0 point, none; 1 point, medial; 2 points, extending to the pupil; 3 points, extending past to pupil; 4 points, extending to the lateral canthus.

The data were analyzed using statistical software such as the SPSS V.20. Kolmogorov-Smirnov test was used to evaluate whether the distribution of variables were normal. Data were analyzed using chi-square and Mann-Whitney U-test. The difference between data was considered significant at $p < 0.05$.

RESULTS

One-hundred patients underwent open rhinoplasty with osteotomies in which 40 were males (40%) and 60 were females (60%). The average age by the separation of sex was 23.95 ± 6.52 in men and was 25.26 ± 6.95 in women ($P=0.26$). No statistically significant differences existed among the two groups in terms of sex ($p=0.99$). All the basic information is shown in Table 1.

Table 1: Mean \pm SD of the results of two different dexamethasone treatments following rhinoplasty. Fifty patients participated in each treatment group of the study.

| Variable | Group I (n=50) | Group II (n=50) | P-Value |
|--|----------------|-----------------|---------|
| Age (Year) | 25.88 ± 7.09 | 24.06 ± 3.82 | 0.36 |
| Operation time (min) | 103.75 ± 10.64 | 100.69 ± 7.28 | 0.3 |
| Systolic arterial pressure (mmHg) | 91.70 ± 8.12 | 90.30 ± 9.71 | 0.66 |
| Diastolic arterial pressure (mmHg) | 74.40 ± 7.60 | 72.40 ± 8.34 | 0.21 |
| Amount of intraoperative bleeding (ml) | 129.80 ± 68.40 | 94.20 ± 53.72 | 0.09 |

The group that received a single dose of dexamethasone before surgery, the degree of edema observed was more than the group that received three doses of dexamethasone (p<0.0001), Figure 3.

A single dose of dexamethasone was injected before surgery. The degree of ecchymosis was over in the group that received single doses of dexamethasone (p<0.0001), Figure 4.

Also, no patient in the two groups had any complications from the prescription of corticosteroids.

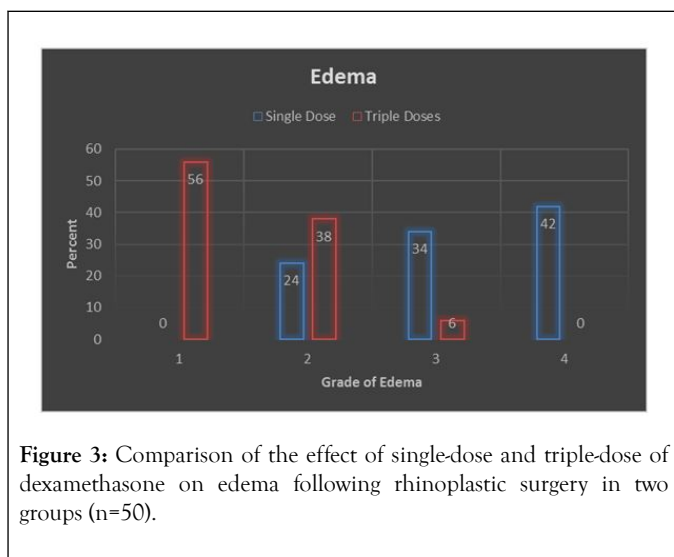


Figure 3: Comparison of the effect of single-dose and triple-dose of dexamethasone on edema following rhinoplastic surgery in two groups (n=50).

DISCUSSION

The previous studies study has that the numbers of cosmetic surgery applicants are increasing day by day [7]. Rhinoplasty is mainly based on reduce the tissue by removing and modifying the main anatomic components of nose in various degrees [7]. Edema, ecchymosis and intraoperative bleeding are the undesirable complications following the surgery.

Due to the destruction of the lymphatic system and nasal veins during surgery, the extent of edema and ecchymosis increase, which is mainly because the amount of interstitial fluid and hemorrhage in the soft tissue of the lymphatic which requires a proportionate increase in venous drainage capacity [3].

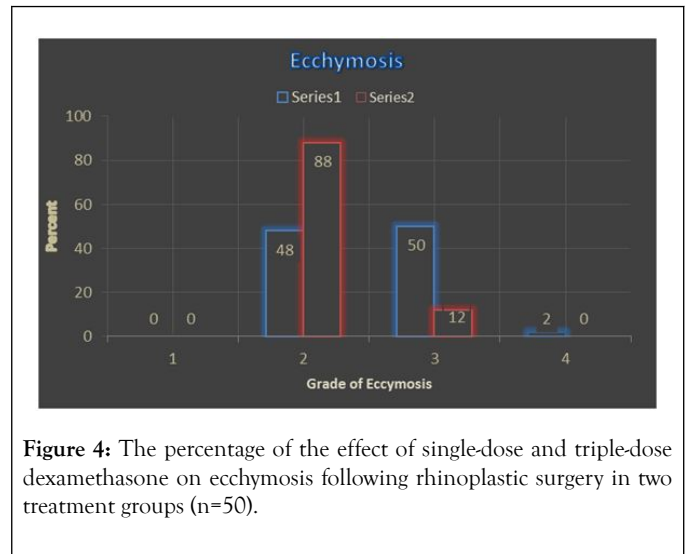


Figure 4: The percentage of the effect of single-dose and triple-dose dexamethasone on ecchymosis following rhinoplastic surgery in two treatment groups (n=50).

Since the nose is exposed as a beauty element of the face, negative appearance after surgery can cause fear or panic in many patients who need reconstructive surgery [8]. There are postoperative complications, including the type and thickness of the patient’s skin, surgeon’s experience, osteotomy, and the intraoperative blood pressure [9].

To reduce the side effects of rhinoplasty, corticosteroids may be used in different doses during surgery [10]. Since the single-dose of glucocorticoids may be used with no harmful effects, many physicians prefer to use a single dose of the drugs [6,11].

Dexamethasone is potent and long-acting anti-inflammatory steroid that has a relatively rapid onset of action and the half-life is 72 hours [11]. Other researchers have also described the effects of treatment with dexamethasone [11].

It has been reported that the using dexamethasone a before rhinoplasty is the most effective way to reduce postoperative edema and ecchymosis [12]. Our results are consistent with the results of their study in this part, but there was no significant difference in bleeding rates which is obviously consistent with the results obtained by our study.

Another study was done by Koc S et al. in 2011 on the amount of the intraoperative bleeding; and there was no significant difference between the three groups.

Gurlek A et al. in 2006 performed a study on the effect of corticosteroids on edema and ecchymosis resulting from rhinoplasty on 40 patients. The obtained results showed no significant difference between the effects of different corticosteroids, as compared with the non-corticosteroid control group. The corticosteroids significantly decrease edema and ecchymosis, which means the result is in contrast with our study, and is probably due to the use of a single dose of corticosteroids and its lower dose [13].

One study has shown that dexamethasone is the most corticosteroid [14].

It has been shown that combination of compression of wet gauze with normal cold saline during surgery and pretreatment dexamethasone (10 mg) significantly decreased edema,

ecchymosis and operation time [15].

Another study has shown that dexamethasone can reduce edema, ecchymosis and the intraoperative bleeding during operation time compared to the control group [5].

In the present study, using three doses of dexamethasone can significantly reduce edema and ecchymosis compared to the single dose dexamethasone treatment. But the systolic blood pressure during the operation time was not significantly lower than the first group that received a single dose of dexamethasone.

CONCLUSIONS

According the results, use of three doses of dexamethasone can reduce edema and ecchymosis after rhinoplasty more than the single dose treatment. Three doses of dexamethasone may increase the plasma levels as well as its pharmacologic effects. Based on the present study, using three doses treatment of dexamethasone is recommended in reducing inflammatory complications especially on edema and ecchymosis after rhinoplasty.

ACKNOWLEDGMENT

We are thankful to Mehregan Hospital personnel, the Clinical Research Development Center staff of Shahid Beheshti Hospital, Babol for their cooperation and to Dr. Evangeline Foronda for the English editing.

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