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Original Research Article

Preventive Effects of Dexamethasone on Reducing Edema and Bleeding Rate after Rhinoplasty

Shabnam Noei Alamdary[1], Shahram Ghasembaglou[2] *

[1] Assistant Professor of Otorhinolaryngology, Head and Neck Surgery. Department of Otorhinolaryngology, School of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran

[2] Assistant Professor of Otorhinolaryngology, Head and Neck Surgery, Tuberculosis and Lung Disease Research Center, Department of Otorhinolaryngology, School of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran

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ABSTRACT

The anti-inflammatory effect of these drugs by interrupting the macrophage inhibitory factor phase and preventing the accumulation of macrophages, reducing the dilation and permeability of inflamed capillaries and adhesion of white blood cells to the capillary wall, and finally, causing edema and migration of white blood cells. it is possible. The aim of this study was to determine the effect of dexamethasone with two therapies in reducing edema and ecchymosis around the eye and intraoperative bleeding. This descriptive cross-sectional study was performed in parallel with the participation of 90 rhinoplasty patients at Tabriz University of Medical Sciences. Dexamethasone was injected intravenously for patients before surgery; For group B, dexamethasone was injected every eight hours after surgery, and for group A, it was injected only before surgery. Finally, the amount of ecchymosis and edema and the amount of bleeding between the study groups were compared with Chi-square, Mann-Whitney U and T-tests The degree of lower eyelid edema on the first day after surgery was significantly different in comparison with groups A and B and group C (P=0.001). On the second day after surgery, the degree of lower eyelid edema was higher in group C compared to groups A and B (P=0.001). The degree of upper eyelid ecchymosis was equal between groups A and B on the first day after surgery. And group C patients had significantly more upper eyelid ecchymosis (P=0.001). Use of a single dose of dexamethasone (8 mg) before rhinoplasty reduces edema and ecchymosis of the upper eyelid and edema of the lower eyelid in the first 48 hours after surgery and reduces ecchymosis of the lower eyelid in the first 24 hours after surgery. There is no improvement in reducing the volume of bleeding during the operation and the length of the period.

Keywords: Rhinoplasty, Dexamethasone, Edema, Bleeding

***Corresponding Author: ORCID: 0000-0001-7933-4238**
E-mail: shahramgasembaglou@yahoo.com

Introduction

Rhinoplasty is one of the most common plastic surgeries performed worldwide. At the same time, rhinoplasty is one of the most delicate, precise and difficult plastic surgeries. Edema and ecchymosis around the eye occur following soft tissue trauma, microvascular injury, and exudate and blood leaking from the vessel following osteotomy in rhinoplasty (1). Efforts have been made to eliminate and reduce this complication by assuming the effect of steroids in reducing vascular permeability and preventing exudate and blood from leaving the arteries, and studies have been performed in this field. Rhinoplasty, like any other surgery, is not without its complications. The difference between these patients and other patients who are candidates for surgery is that rhinoplasty is performed for cosmetic purposes and complications should be avoided as much as possible(2 , 3). Edema and ecchymosis follow rhinoplasty due to soft tissue manipulation and damage to small blood vessels and exudate and blood out of the vessel and is seen in almost all patients undergoing rhinoplasty(4). Several studies have been performed to prevent or reduce edema and ecchymosis, assuming the effect of corticosteroids (steroids). Glucocorticoids reduce or prevent tissue responses to inflammatory processes without addressing the underlying cause(5). The anti-inflammatory effect of these drugs by interrupting the macrophage inhibitory factor phase and preventing the accumulation of macrophages, reducing the dilation and permeability of inflamed capillaries and adhesion of white blood cells to the capillary wall, and finally, causing edema and migration of white blood cells(6). The aim of this study was to determine the effect of dexamethasone with two therapies in reducing edema and ecchymosis around the eye and intraoperative bleeding.

Material and Methods

Study design: The present study is an analytical study with a comparative method with a parallel design that has been done with three separate groups. The study population included 90 patients who underwent rhinoplasty from the beginning of 2018 to the end of 2019 in the ENT department of Shamam Reza Hospital (Tabriz Medical Sciences). Samples were selected sequentially from the study population.

Inclusion / Exclusion Criteria: Inclusion criteria included age over 18 years and rhinoplasty candidate. Patients with a history of gastric ulcer, diabetes, tuberculosis, corticosteroid allergy, a history of blind use of thicosteroids, and active infection were excluded from the study.

Methods

The samples were assigned to three groups A, B and C randomly. In this way, after assigning a unique row number to each patient admitted to the study, the first three people in each group were selected using a random number table and then the rest of the group were systematically assigned. Patients in group A included those who received 8 mg intravenous dexamethasone preoperatively and group B received 8 mg intraoperative dexamethasone and three intravenous doses of 8 mg every eight hours after surgery. Group C as group Controls were selected. A pre-determined questionnaire was used to record patients' information. All patients received written consent for rhinoplasty and inclusion in the study. Patients were placed under general anesthesia by a reputable anesthesiologist. During surgery, the volume of bleeding was calculated and recorded by the amount of blood collected in the suction cup and the number of blood-stained gases (each blood-stained gas was equivalent to 15 cc). In addition, according to the weight of blood-stained gases, each gram of weight gain was equivalent to one milliliter of bleeding. In all patients, rhinoplasty was performed by closed method and also Hump resection and osteotomy were performed by a surgeon for all patients. Patients in groups A and B were given an 8 mg dose of dexamethasone before the injection. At the end of the operation, postoperative instructions including head posture and diet were the same for patients in all three groups, except in group B, where three doses of eight mg of dexamethasone were injected every eight hours. To determine the degree of edema and ecchymosis around the eye, the point scoring system was used, in which the degree of ecchymosis is determined separately for each eyelid from the inner canthus to the outer canthus. On the first, second, fifth, seventh days, the degree of edema and ecchymosis of patients was determined by a person who did not know about the assignment of patients to the three groups and was recorded in a questionnaire. After discharge, all patients were given oral antibiotics (cephalexin capsules) for five days. The duration of recovery was determined in patients of all three groups.

Ethical considerations: This plan was implemented after the approval of the ethics committee of Tabriz University of Medical Sciences. The informed consent form was completed by all participants.

Statistical analysis: The collected data were entered into SPSS software (version 21). The available data were compared with Chi-square, Mann-Whitney U and T-tests.

Results

The present study was performed on 90 patients (20 males and 70 females) who underwent rhinoplasty in the ENT department of Imam Reza Hospital (Tabriz University of Medical Sciences). The mean age of the patients was 25.41 ± 3.58 years with a minimum of 17 years and a maximum of 39 years. The degree of upper eyelid edema after surgery was determined based on point scoring system in the first, second, fifth and seventh days after surgery. The degree of upper eyelid edema on the first, second and fifth days was not different between group A and B patients. But there was a significant difference between groups A and B with group C (P = 0.001). On the seventh day after surgery, the degree of upper eyelid edema was significantly different between groups A and B and group C (P = 0.007). The degree of lower eyelid edema on the first day after surgery was significantly different in comparison with groups A and B and group C (P = 0.001). On the second day after surgery, the degree of lower eyelid edema was higher in group C compared to groups A and B (P = 0.001). Lower eyelid edema on the fifth day was no different between patients in the three groups. In terms of the degree of edema of the lower eyelid on the seventh day after surgery, patients in groups A, B and C were the same. Patients in the three groups were evaluated for ecchymosis around the eye in the upper and lower eyelids based on the point scoring system in the first, second, fifth and seventh days after surgery. The degree of upper eyelid ecchymosis was equal between groups A and B on the first day after surgery. And group C patients had significantly more upper eyelid ecchymosis (P = 0.001). The second day after upper eyelid ecchymosis surgery, patients in groups A and B were not significantly different. But patients in group C were significantly different from groups A and B (P = 0.001). The degree of upper eyelid ecchymosis on the fifth day was not different between groups A and B, but the difference between group C and groups A and B was significant (P = 0.014). On the seventh day, upper eyelid ecchymosis was the same in the three

groups. The degree of lower eyelid ecchymosis was equal in groups A and B one day after surgery; But group C was significantly different from groups A and B (P = 0.001) and on the second day the degree of lower eyelid ecchymosis was not different between the three groups. The degree of lower eyelid ecchymosis on the fifth and seventh days was not significantly different between the groups. Bleeding volume during surgery was measured in three groups with a total mean of 114.85 ± 20.96 ml. The rate of bleeding was statistically significant in all three groups.

Discussion

In our study, patients were divided into three groups of 30. In group A, they received only one dose of 8 mg dexamethasone before surgery and group B received a dose of 8 mg before surgery and three doses after surgery every eight hours. And group C were selected as the control group. In the first two days, upper and lower eyelid edema in the two groups receiving steroids was significantly different from the control group, which is similar to the results of previous studies. Upper eyelid ecchymosis in the first two days and lower eyelid ecchymosis in the first day were significantly different from the control group, which is similar to the results of similar studies. In most studies, there was no significant difference in the reduction of edema and ecchymosis compared with the single-dose group and the three-dose group(7 , 8). Although upper eyelid edema on the first and second days, lower eyelid edema on the second and fifth days, and upper eyelid ecchymosis on the second and fifth days were lower in the three-dose group, no difference was seen on the seventh day (9). In all three groups, maximum ecchymosis was seen on the second and fifth days, which can be explained as follows. Ecchymosis is the result of damage to small arteries such as veins, venules, and arterioles. Its extent depends on the amount of blood drawn from the arteries. Due to the movement of ecchymosis from the depth of the tissue to the surface, ecchymosis may be mild or absent at first and appear within a few hours or days. An important factor during rhinoplasty is proper control of bleeding (10). Bleeding due to disruption of the operation area and problems in the surgeon's vision and prolongation of the operation time will have a definite negative effect on the operation process; Rarely, the bleeding may be so severe as to cause hemodynamic disturbances. Edema and ecchymosis around the eye is a complication of rhinoplasty that causes fear and panic in the patient. Severe eyelid edema can sometimes lead to eyelid closure during the first 24 hours after surgery and impair vision. On the

other hand, the created ecchymosis has a negative effect on the patient. In order to improve or reduce these side effects, several studies have been performed on the use of steroids. Dexamethasone is a steroid with strong anti-inflammatory properties that has a rapid onset of action (30 minutes) and a relatively long duration of action (36-50 hours). This drug reduces edema and exudate by reducing vascular permeability. A single dose of dexamethasone at the end of rhinoplasty has been recommended by several researchers. A study comparing different forms of degrametazone after rhinoplasty; In the steroid-receiving groups, reduction of upper eyelid edema and ecchymosis and lower eyelid edema was significant in the first two days after surgery, and steroids had no effect on intraoperative bleeding volume, lower eyelid ecchymosis, and length of recovery period. The recovery period was seven days. The results of these studies are in line with the results of our study and are in the same direction. Steroids, including dexamethasone, have potential side effects, the most important of which is pituitary-adrenal suppression. This complication occurs with the use of 20-30 mg of prednisone for five days, and if the dose is physiological, it takes a month for suppression to occur. In previous studies, single-dose or three short-term uses of dexamethasone has been uncomplicated. In this study, patients who complained of gastric ulcer, diabetes, history of tuberculosis, corticosteroids and steroid allergy were excluded from the study and no complication was observed in patients in the three groups.

Conclusion

Use of a single dose of dexamethasone (8 mg) before rhinoplasty reduces edema and ecchymosis of the upper eyelid and edema of the lower eyelid in the first 48 hours after surgery and reduces ecchymosis of the lower eyelid in the first 24 hours after surgery. There is no improvement in reducing the volume of bleeding during the operation and the length of the period.

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