Original Article

Comparison of the Effect of Injectable Tranexamic Acid and Inhaled Desmopressin in Controlling Bleeding and Ecchymosis in Open Rhinoplasty

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ABSTRACT

Background: Bleeding during rhinoplasty surgery has a negative effect on the quality of surgery; so, it is important to reduce bleeding during rhinoplasty. We aimed to evaluate the effect of injectable tranexamic acid (TXA) and nasal spray of desmopressin (DDAVP) on reduction in intraoperative bleeding and ecchymosis after open rhinoplasty.

Methods: In a Randomized Clinical Trial (RCT) prepared since 2020 to 2021 in Razi Hospital and Imam Khomeini Hospital, Tehran, Iran on 42 patients who underwent open rhinoplasty were divided into three groups. In the first group, TXA was injected one hour before surgery at a dose of 10 mg / kg with a placebo inhalation spray. In the second group, DDAVP was administered as a nasal spray at a dose of 40 mcg with a placebo injection. The third group received a placebo spray and placebo injection. All required data were gathered and analyzed.

Results: In TXA group and DDAVP groups, the volume of bleeding during surgery significantly (P=0.022) decreased compared to placebo group, also, the quality of the surgical field and the surgeon's satisfaction significantly (P=0.007) improved compared to the placebo group but not with each other. Unlike placebo group, there were no reports of postoperative bleeding in the TXA and DDAVP groups. Duration of surgery, ecchymosis on the day after surgery and coagulation tests before and after surgery were not significantly different in three groups.

Conclusion: Use of DDAVP and TXA can both reduce the amount of bleeding during surgery and postoperative bleeding in rhinoplasty and improve the quality of the surgical field and the surgeon 's satisfaction during surgery.

Keywords: Tranexamic Acid; Inhaled Desmopressin; Rhinoplasty; Ecchymosis

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INTRODUCTION

Rhinoplasty is a facial plastic surgery performed to improve the beauty of the nose and the function of the airways [1]. Rhinoplasty has become very popular around the world over the past decades. Evidence suggests that rhinoplasty surgery is more common among Asians [2]. Apart from possible postoperative deformities, there are many other risks and complications [3]. The most common complications of rhinoplasty are

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bleeding, eyelid edema, and eye lid ecchymosis. Osteotomies are responsible for a significant amount of intraoperative and postoperative complications, including bleeding, eyelid edema, and pericardial ecchymosis [1]. Trauma to angular arteries during osteotomy and inadequate local homeostasis may lead to excessive bleeding during surgery, increased surgical time, risk of morbidity, and postoperative recovery. It also affects patient dissatisfaction and poor aesthetic results [4-6]. Excessive bleeding during surgery also, reduces the surgeon's vision and therefore have to control it by using drugs such as corticosteroids, desmopressin and tranexamic acid, etc. [7-9]. Tranexamic acid is an anti-fibrinolytic agent and is a safe drug and has no major side effects including thromboembolic events reported in previous studies [10]. Desmopressin is a synthetic anti-diuretic hormone analogue that is useful in the treatment of a wide range of pathologies, including von Willebrand disease and type A hemophilia [11].

While tranexamic acid and desmopressin are widely available, and some studies have shown the role of tranexamic acid and desmopressin in controlling intraoperative bleeding as well as edema and ecchymosis after rhinoplasty, but comparative studies of these two drugs on rhinoplasty was limited. Since comparative investigations are basically necessary to have best choice of treatment, so in this study the comparative effect of tranexamic acid (TXA) with desmopressin (DDAVP) in bleeding during and after rhinoplasty and ecchymosis after rhinoplasty was assessed.

MATERIALS AND METHODS

The present study is a prospective randomized double-blinded clinical trial performed in 2020 and 2021 on volunteer primary rhinoplasty patients referred to Imam Khomeini Hospital Complex (IKHC) and Razi Hospital in Tehran, Iran.

Ethical Approval

This article is based on a thesis accepted by Ethic Committee with code: IR.TUMS.IKHS.REC.1399.322. All participating clients signed informed consent.

Inclusion criteria were 1) primary rhinoplasty, 2) no coagulation disorders, 3) age 18 to 50 years and 4) ASA-1. The exclusion criteria were: 1) Contraindications to tranexamic acid and desmopressin (coagulation disorders and diseases due to increased coagulation such as stroke, coronary artery disease, DVT, pulmonary embolism and peripheral vascular disorders), 2) allergy to tranexamic acid and desmopressin, 3) hypertension, 4) dissatisfaction to participate in research and 5) the use of drugs that affect the coagulation system.

Due to the effect of Covid 19 disease in limiting cosmetic surgeries, we had 42 patients undergoing primary rhinoplasty in our study, these 42 patients were divided into three groups (each group 14 patients) according to standard block style categorization methods: in first group TXA was injected one hour before surgery at a dose of 10 mg/kg with a placebo inhalation spray, in the second group, DDAVP was administered as a nasal spray at a dose of 40mcg (2 puff of 0.1 mg / mL spray each nostril) with a placebo injection. The third group received a placebo spray and placebo injection. The information collected before, during and after surgery included: duration of surgery, volume of bleeding during surgery (suctioned blood volume without using gauze), postoperative bleeding, quality of the surgical field (Boezaart Score) [11], surgeon satisfaction (Likert scale) [11], ecchymosis the day after surgery (Gurlek Score) [12] and coagulation factors (CT, BT, INR, PTT, PT and Platelet) before and after surgery.

All patients underwent surgery by the same surgical team. Blood pressure control was done in similar anesthetic drugs unless TNG or labetalol added in some specific cases to maintain blood pressure in suitable condition.

Data analysis was performed using SPSS software version 22 (IBM Corp., Armonk, NY, USA). Quantitative and qualitative gathered data were analyzed accordingly to demonstrate separate evaluation.

RESULTS

Overall, 42 patients (8 men and 34 women, 18 to 49 years, mean age 30.67 ± 8.27 years) participated who were equally and randomly divided into three groups. The Suction volume was measured without using irrigation and gauze to assess the bleeding. Nasal bleeding in placebo group was significantly higher than TXA group and DDAVP group (36.07 cc vs. 22.50 cc and 21.43 cc, P = 0.022) but not significantly different between TXA group and

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DDAVP group. Postoperative bleeding was reported in 2 patients (14.3%) in the placebo group, while none of the patients in the TXA and DDAVP groups had postoperative bleeding.

Boezaart score (Quality of Surgery Field) and Likert score (surgeon's satisfaction) were assessed every 30 min. In three groups showed that the mean score of Boezaart decreases over time of surgery. Boezaart score in TXA group and DDAVP group was significantly better than in placebo group at both 30, 60 min time (P= 0.011 and P = 0.007) but not significantly different between TXA group and DDAVP group (Figure 1).

In three groups showed that the mean score of Likert increased over time of surgery. Likert score in TXA group and DDAVP group was significantly better than Placebo group at both 30, 60 min time (P = 0.001 and P = 0.002) but not significantly different between TXA group and DDAVP group (Figure 2).

There was no statistically significant difference in eye lid ecchymosis the day after surgery between three groups. The results showed that coagulation tests including PT, PTT, INR, BT, CT and Platelet before and after surgery did not differ significantly between groups.

DISCUSSION

One of the necessities of rhinoplasty surgery is good vision of the surgeon. The nasal cavity is small corridor with lots of poorly accessible blood vessels, it is difficult to control bleeding using routine homeostatic procedures [9]. Postoperative edema and ecchymosis are annoying for rhinoplasty patients [10]. There are various preventive and therapeutic measures to manage and improve rhinoplasty surgical conditions. In our study, the hemostatic effect of tranexamic acid and desmopressin on

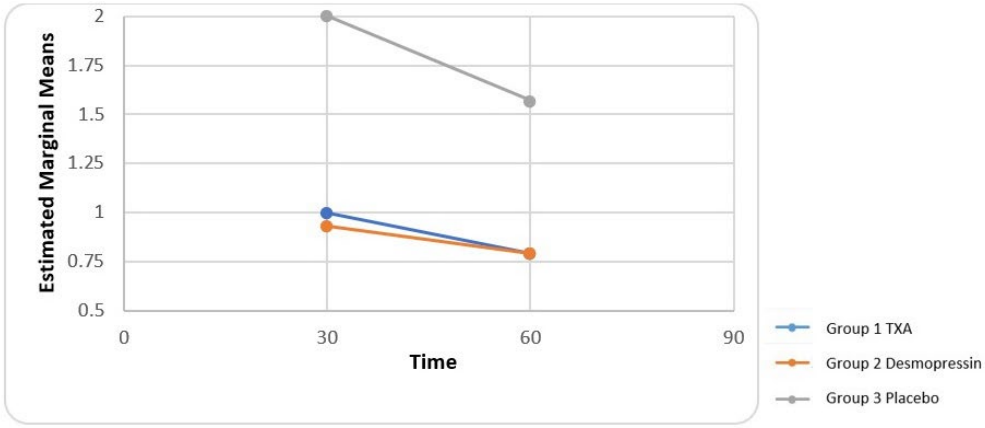


Figure 1: The trend of changes in Boezaart score during the operation in three groups

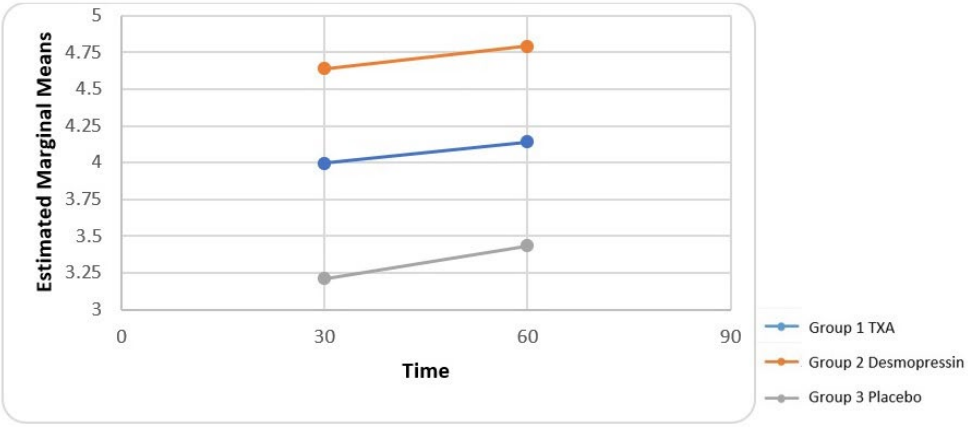


Figure 2: The trend of changes in Likert score during the operation in three groups

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reducing bleeding and improving ecchymosis in rhinoplasty was investigated. Our study showed that TXA and DDAVP were both able to reduce effectively intraoperative and postoperative bleeding compared to Placebo group. On the other hand, the reduction of bleeding during surgery was observed on a significant improvement in the quality of surgery and the surgeon's satisfaction and achievement of ideal conditions [11]. Although no similar article was found comparing the effect of DDAVP and TXA on blood volume lost during rhinoplasty surgery, other researchers also found the effect of DDAVP [12] and TXA [7]. Another factor that affects patient satisfaction after rhinoplasty is postoperative ecchymosis. The results of our study showed that TXA and DDAVP had no effect on ecchymosis on the day after surgery.

The present study also had some limitations. Because our study was prospective and the prevalence of coronavirus increased during our study and many surgeries, including rhinoplasty, were canceled due to the peak of the disease, so the sample size decreased. It is clear that if more rhinoplasty volunteers were included in the study, the accuracy and reliability of the results would also increase.

CONCLUSION

In patients with rhinoplasty, pretreatment with TXA one hour before surgery at a dose of 10 mg / kg or DDAVP at a dose of 0.1 mg / mL according to the surgeon's diagnosis by reducing blood volume and improving the surgical field and surgeon satisfaction leads to homeostasis is satisfactory.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interests.

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