Anthropometrical and Nutritional Associations with Intraoperatively Dexamethasone and Tranexamic Acid in Risk Propensity for Post -Rhinoplastic Subconjunctival Hemorrhages

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KEYWORDS
Subconjunctival haemorrhages, multivitamins, Tranexamic acid, acid infusion, perioperative dexamethasone, obesity, post-rhinoplastic procedure recovery.

ABSTRACT

Objectives: The study aimed to assess the correlation between potential confounders and factors like tranexamic acid use, multivitamin supplementation, dexamethasone administration, postrhinoplasty thermoplastic splinting, and patients' demographic and obesity statuses on the likelihood of achieving or maintaining a certain grade according to the subconjunctival hemorrhages (SCH) grading system, and to assess recovery within one-week post-procedure.

Methods: Hashemite University in Zarqa, Jordan, conducted a 2019–2023 retrospective study of rhino plastically treated patients. Prior surgery, cardiovascular or coagulopathy disorders, uncontrolled blood pressure, and adults under 18 or over 60 were excluded from the study. Patients were instructed to schedule procedures according to their menstrual cycle and use non-compressive nasal packing. Patients received antibiotics and analgesics post-operative. Kara et al.'s grading system was used to assess post-rhinoplastic procedural subconjunctival haemorrhages on the first and second days after the procedure. The study also examined the effects of cerebral haemorrhage severity, recovery likelihood, and residual clinical significance over one week. The study employed both chi-square and multiple logistic regression tests in its statistical analyses to derive the corresponding p-values.

Results: A study involving 269 patients underwent rhinoplasty surgery, with 53.16% female and 46.84% male. The study found that two significant factors were the perioperative administration of 2 g infusion of tranexamic acid and the preoperative supplementation of multivitamins with or without trace elements. The estimated risk for tranexamic infusion was 0.022, and for multivitamins supplementation it was 0.316. The logistic regression model was developed to incorporate the probability of subconjunctival hemorrhages 1st day with prediction variability ranging from 44.2% to 59.0%. The likelihood in the 2nd was found to be statistically significant with only preoperative multivitamins supplementation, preoperative dexamethasone provision, and obesity statuses of the patients.

Conclusion: The study suggests that tranexamic acid can reduce grade 2 subconjunctival haemorrhages on the first day after rhinoplastic surgery, while obesity increases the risk. Dexamethasone can reduce moderate bleeding and accelerate recovery. Consistent multivitamin use, lowering body mass index, and using tranexamic acid during surgery are recommended.

INTRODUCTION

Subconjunctival haemorrhage (SCH) is a frequently occurring complication of rhinoplasty, affecting approximately 19.1% of patients. The incidence rate is higher in residents due to their proficiency in the technique rather than the manipulation of tissue and subsequent injury [1]. The term 'subconjunctival ecchymosis' is used instead of 'subconjunctival haemorrhage' because it frequently occurs as a result of minor eye trauma, elevated blood pressure, or sudden conjunctivitis [2]. Patients' eyes were protected from any minor or major harm during surgery and aftercare. SCH, although generally regarded as a minor complication of rhinoplasty, can still cause discomfort and occasionally instill fear in patients [3]. To address and treat the condition, conservative approaches may be employed, while more proactive methods aim to rapidly enhance the condition [4]. The duration of resolution can be influenced by various factors such as the severity or extent of the subconjunctival haemorrhage, the presence of episcleral staphyloma, compromised extraocular muscles, and hyphemia [5].

The anatomical basis for rhinoplasty is the close proximity of the upper third of the nose to the eye [6]. Any obstruction in the nasal passage, such as a structural defect or a healing blood vessel, can cause a temporary increase in pressure in the venous sinuses, resulting in bleeding [7]. Postmenopausal individuals exhibited an increased probability of developing subcutaneous haematoma (SCHs) following the administration of occipital nerve or greater occipital nerve blocks [8]. Effectively managing the level of exposure to medication is the first and essential step in successfully achieving a cure, as the incorrect surgical administration of medication can negate the beneficial effects [9]. Topical corticosteroids are efficacious in treating inflammation resulting from haematoma, particularly in instances of prolapsed haemorrhage on the conjunctiva [10]. Cryopreservation is the preferred method, and other mechanical and physically orientated procedures include suturing of raw surfaces, compression, obstruction, and removal of blood [11].

Advancements in endovascular control techniques have empowered interventional radiologists to accurately target and treat various abnormal lesions [12]. The initial vasodilation and haemostasis, followed by reperfusion of the clot, can lead to an accumulation of blood in the conjunctival space [13]. One can notice bleeding in the days that follow, either prominently or in a more subtle manner [14]. To prevent the occurrence of surgical complications (SC) following rhinoplasty, it is important to gather a detailed clinical history and enhance the training of the surgical team [16]. Exhibit-related injuries are associated with a greater incidence of subconjunctival haemorrhage (SCH) due to various causes and risk factors. Harms SR et al. found that the occurrence of subconjunctival haemorrhage (SCH) increases when ophthalmic local anaesthetic injection and eye shield placement are used during dermatologic procedures [17]. Yew KS has identified risk factors that have a strong association with subconjunctival haemorrhage (SCH) in patients who receive ocular local anaesthetic injections [18]. Patients with hemorrhagic retinopathy often develop post-subconjunctival (SC) haemorrhage as a complication after rhinoplasty. Ensuring patient safety before, during, and after a rhinoplasty or septorhinoplasty requires a positive and precise diagnosis of subcutaneous haematoma (SCH) [19].

Treatment options may include the administration of topical or systemic corticosteroids, as well as intravitreal injections of anti-VEGF or triamcinolone acetonide [20]. Prior to surgery, it is necessary to stop taking certain medications, particularly anticoagulants, antiplatelet drugs, and NSAIDs, in individuals with hypertension [21]. It is advisable to optimise preoperative treatment for hypertension by choosing a fast-acting and short-lasting medication, such as a calcium channel blocker. In order to decrease the occurrence of this complication, it is necessary to implement several preventive measures [22]. These measures entail meticulous patient selection, abstaining from hypertensive and/or anticoagulant medications, minimising excessive strain during surgery, administering haemostatic agents such as preoperative tranexamic acid, providing anti-inflammatory corticosteroids like intravenous dexamethasone perioperatively, supplementing patients with multivitamins with or without trace elements, employing a delicate and gentle technique in all rhinoplasty and septorhinoplasty procedures, thoroughly cleansing the treated area, and eliminating any residual alcohol disinfectant prior to concluding the procedure. [23-24].

This study examines the prediction of SCH patterns encountered in this study, categorising them into three major patterns: SCH on the 1st day with a Grade of 2, SCH on the

2nd day with a Grade of 2, and the recovery from residual postrhinoplasty procedures within 1 week. The study emphasises the importance of these patterns and discusses their diagnosis, management, and prevention methods. It highlights the significance of acquiring a thorough medical background and analysing the clinical observations within the framework of the rhinoplasty operation. The main objective of this study was to evaluate the significant associations between predetermined potential confounders and various factors such as the use of tranexamic acid, regularity of multivitamin supplementation, cumulative corticosteroidal IV administration of dexamethasone before surgery, adoption of postrhinoplasty thermoplastic splinting, and the impact of patients' demographic and obesity statuses on the likelihood of achieving or maintaining a certain grade according to the SCH grading system on the first and second days after the procedure. Additionally, the study aimed to assess the recovery within one week after postrhinoplasty procedures.

METHODS AND MATERIALS

A retrospective, observational, and non-sponsored study was conducted at the Hashemite University in Zarqa, Jordan from 2019 to 2023. The study comprised patients who were physically present and had undergone a range of rhinoplastic procedures. This study received approval from the Institutional Review Board/Human Subjects Committee of the Faculty of Medicine-Hashemite University.

Given the retrospective nature of this study, the need for informed consent was exempted. The patient information was acquired through a retrospective examination of hospital records. The collected data encompassed information regarding the patients' characteristics, physical measurements, level of comorbidity (evaluated using an age-adjusted comorbidity index), utilisation of tranexamic acid, dexamethasone, and multivitamins, type of splinting employed following rhinoplasty (thermoplastic or non-thermoplastic), assessments of post-procedural complications, and the duration of the rhinoplasty procedure in minutes.

The information of every patient was anonymized and securely stored. The study excluded patients who had undergone revision surgery or previous maxillofacial intervention, had a history of cardiovascular or coagulopathy disorders, or had uncontrolled blood pressure. Furthermore, the study excluded patients who fell into two age groups: those under 18 years old and those over 60 years old. Additionally, patients who needed an extra osteotomy during surgery to correct rocker or step deformities on either side were also not included in the study. Female patients were instructed to schedule their surgical procedures to coincide with their menstrual cycle.

During the entire procedure, nasal packing was applied to all patients without excessive compression. Moreover, all patients received postoperative instructions. The patients were administered a regimen of antibiotics for a duration of 5 days, while analgesics were prescribed until the patient's pain reached a tolerable threshold. Moreover, all patients were instructed to elevate their head. The grading system developed by Kara et al was used to assess the severity of post-rhinoplastic procedural subconjunctival haemorrhages (SCH) on the first and second day after the procedure. It is important to mention that the evaluation of the residual recovery after rhinoplasty within the first week was conducted by someone other than the person who performed the procedure. This was done to minimise any potential bias in the assessment and outcome evaluation. The grading system for post-rhinoplastic procedures of subconjunctival haemorrhages (SCH) on the 1st and 2nd days was subjectively described. If the temporal subconjunctival area is between 50% and 90% covered, it was classified as Grade I. If there is at least 90% coverage of the temporal subconjunctival area, it was classified as Grade II.

Furthermore, with regards to other secondary consequences of a secondary rhinoplasty procedure, such as ecchymosis and swelling, they were classified using the Kara et al assessment system as follows. Ecchymosis and swelling were graded on a scale of 0 to 4, with higher values indicating a greater severity. The lead surgeon assessed the patient on the initial postoperative day prior to being released. Afterwards, the patient underwent evaluations during subsequent visits at 7, 14, and 21 days following the surgery at the outpatient clinic. The results of the assessments conducted during each subsequent postoperative appointment. The eligibility of patients was dichotomised solely based on their gender, with separate cohorts for females and males. The categorical independent variables that were predetermined were analysed using chi-square analyses to determine the significance of the distribution rates across the two dichotomised cohorts based on gender. In addition, to assess the unadjusted odds ratio or estimate the risk for the binary categorical variables being tested.

The study also included the expression of Pearson correlation and chi-square statistics. The study conducted serial multiple logistical regression analyses to examine the potential impactful variables. The potential effects that were examined in our study included the SCH on the first day, SCH on the second day, and the likelihood of recovery one week after the procedure. In the multiple logistic regression analysis, we initially examined the significant impact of the tested potential independent variables on the probability of SCH grading being Grade II at three different time points: 1st day (Model I), 2nd day (Model II), and within 1-week post-procedure (Model III). We also investigated whether there was any clinical significance of residual postprocedural SCH within the 1-week period. In the multiple logistic regression analyses we performed, we extracted the values of each directional and quantifiable coefficient along with their standard errors. In addition, we calculated the estimated relative risk of potential factors that have a significant impact, along with their corresponding confidence intervals. In this study, we also assessed the variability of prediction ranges. If deemed significant, we expressed these ranges based on the Cox and Snell's R2 and Nagelkerke's R2 statistics. In this study, the researchers also investigated the sensitivity, specificity, and accuracy indices that accompany the sensitivity indies of the three constructed models.

This study employed Microsoft Office LTSC Professional Plus 2021 Excel to collect and filter patients' data. The statistical analysis was conducted using IBM SPSS Statistics version 25. This study utilised a significance level of 0.05.

RESULTS

A total of 269 patients underwent testing and attended appointments for rhinoplasty surgery. Of the entire patient population, around 53.16% were female (143) and approximately 46.84% were male (126). The age categories, ranging from 18 to 60 years with a 10-year interval, showed no significant differences between the two-gender groups (χ^2 (4) = 8.602, p-value = 0.072). Nevertheless, we noticed that the age group with the highest attendance for both genders was the 26-35 years category, with 68 individuals (47.6%) for males and 49 individuals (38.9%) for females. The distribution of obesity statuses, non-obese versus obese, among our tested patients, did not show any significant differences between the two gender groups.

Nevertheless, the prevalence of obesity was greater in the group of males who were tested, as opposed to the group of females who were tested, with rates of 66 (52.4%) and 70 (49.0%) respectively. When examining the comorbidity burden of the patients in different gender-based groups, we did not find a statistically significant difference in the distribution rate. Nevertheless, the females examined in this study predominantly exhibited AACCI scores of 1 (27 individuals, accounting for 18.9% of the sample), followed by scores of 3 (22 individuals, representing 15.4% of the sample). In the same way, the males had the highest AACCI score of 1, but instead of score 3, they were followed by score 2, as observed in the female group. In this study, the administration of dexamethasone before and after surgery did not show a significant difference between the two groups. However, the female cohort had a slightly higher rate of administration compared to the male cohort (71 (49.7%) vs 57 (45.2%), respectively). Upon examination of the rates of MVs supplementation prior to surgery, no statistically significant differences were found between the female and male cohorts. There was a slightly higher proportion of females in the cohort who received MVs supplementation.

The distribution of both swelling and ecchymosis scores across the female and male cohorts was statistically insignificant. The TXA and TP interventions had a significant impact on both the post-rhinoplasty swelling and bruising scores. However, there were no statistically significant differences between the two gender groups that were compared. Regarding our study's primary outcomes of interest, which include subconjunctival haemorrhage (SCH) on the first day, SCH on the second day, and full recovery within the first week after rhinoplastic procedures, we did not observe any statistically significant differences in the distribution rates between the two cohorts mentioned above.

When we conducted multiple logistic regression analyses to examine the potential effects on the three outcomes of interest mentioned earlier, we found that only two factors were statistically significant. These factors were the perioperative administration of 2 g infusion of TXA and the preoperative supplementation of MVs with or without trace elements. The estimated risk for TXA infusion was 0.022 (95% CI; 0.010-0.048), and for MVs supplementation it was 0.316 (95% CI; 0.147-0.677). The coefficients for these factors were -3.795±0.391 and -1.153±0.389, respectively, indicating their direction and strength of influence. The logistic regression model was developed to incorporate the probability of SCH 1st day being Grade II. The formula for the model is [e (2.635-1.153×MV-3.795×TXA)/1+ e (2.635-1.153×MV-3.795×TXA)]. The constructed and formulated regression model exhibited prediction variability ranging from 44.2% to 59.0%, with sensitivity indices of 88.8%, 83.6%, and 85.1% for specificity, sensitivity, and accuracy, respectively.

When estimating the likelihood of Grade II in the 2nd, we discovered statistically significant correlations with only preoperative MVs supplementation, preoperative dexamethasone provision, and the obesity statuses of the patients being tested. The estimated relative risk was calculated as 0.007 (95% confidence interval [CI]: 0.001-0.052), 0.007 (95% CI: 0.001-0.052), and 137.752 (95% CI: 17.708-1071.594), respectively. The coefficients that had a significant impact were found to be -5.013±1.052, -5.015±1.050, and 4.925±1.047, respectively. The regression model for predicting the probability of SCH_2nd day is given by [e (4.8964.925×Os-5.015×Dex-5.013×MVs)/1+ e (4.8964.925×Os-5.015×Dex-5.013×MVs)]. The constructed regression model exhibited a prediction variability ranging from 51.4% to 72.1%, depending on whether Cox and Snell's R2 or Nagelkerke's R2 statistics were utilised. The sensitivity indices were reported as 98.8%, 56.1%, and 83.3% for specificity, sensitivity, and accuracy, respectively.

The most recent logistic regression analysis was conducted to examine the effects of dexamethasone infusion and MVs supplementation on perioperative and preoperative outcomes. The estimated risk values were 0.071 (95% CI; 0.033-0.151) and 0.074 (95% CI; 0.035-0.157), while the coefficients were -2.648±0.385 and -2.609±0.386, respectively. The regression formula used in this study was determined to be [e(3.760-2.648×Dex-2.609×MVs)/1+e(3.760-2.648×Dex-2.609×MVs)]. The variability prediction ranges for this constructed regression model were reported to be between 34% and 47.7%, depending on whether Cox and Snell's R2 or Nagelkerke's R2 statistics were used. The sensitivity indices for specificity, sensitivity, and accuracy were found to be 57.6%, 92.9%, and 81.8%, respectively.

The statistical analysis results for the chi-square and multiple logistic regression tests were presented in Table 1 and Table 2, respectively.

DISCUSSION

This study aims to develop a regression-based predictive model that includes potentially significant confounding factors that have statistically significant effects on our predetermined outcomes of interest: SCH on the first day, SCH on the second day, and the recovery of residual consequences of the postrhinoplasty procedure within the first week. Which the study emphasises the significance of evaluating the potential influential factors of perioperative tranexamic acid (TXA) use versus non-use, the regularity of preoperative multivitamin (MV) supplementation, the cumulative provision of dexamethasone corticosteroids during the perioperative period, the use of postprocedural thermoplastic splinting or standard splinting, and the obesity statuses of the patients based on their body mass indexes (BMI) if it is above or below 30 kg/m2. In addition, there is a possibility of experiencing complications such as periorbital oedema and ecchymosis. Additionally, it emphasises the necessity for additional investigation in order to gain a more comprehensive understanding of the mechanisms underlying these complications and their effects on patients' outcomes.

Recorded two cases of SCH resulting from Valsalva-like manoeuvres when patients were moving from a seated position during a rhinoplasty procedure. An alternative intricate mechanism, which encompasses various factors, has been proposed as the cause of SCH due to elevated intraocular pressure (IOP). Studies have shown that the simultaneous use of cocaine applied to the skin, followed by injecting epinephrine, and administering retrobulbar anaesthesia, with or without the Valsalva manoeuvres, can cause different degrees of increased arterial blood pressure, which may lead to SCH [25-27]. A prospective study was conducted to assess the incidence and progression of SCH following rhinoplasty, a common orbital complication associated with the procedure. The severity of SCH was evaluated using a graded scale, where Grade 1 denoted the participation of 50% of the temporal subconjunctival area, and Grade 2 denoted the participation of almost the entire temporal subconjunctival area. The study highlights the importance of understanding the role of periorbital oedema and ecchymosis in the advancement of SCH, as well as the potential impact of previous occurrences [28-30]. Tranexamic acid and dexamethasone effectively decreased swelling and bruising around the eyes in 60 patients undergoing primary open rhinoplasty. The patients were divided into four groups: D, T, DT, and P. The medications were administered intravenously one hour prior to surgery and subsequently three times every eight hours following the procedure. Digital photographs were taken on the first, third, and seventh days after the surgery. Groups D, T, and DT exhibited significantly reduced periorbital oedema and ecchymosis ratings compared to the control group. These groups did not have a significant impact on reducing or preventing periorbital oedema or ecchymosis. Tranexamic acid and dexamethasone had a similar effect in reducing periorbital oedema and ecchymosis in open rhinoplasty [31-33].

A study was conducted to examine the effects of TA and methylprednisolone on periorbital oedema, ecchymosis, and intraoperative bleeding in patients undergoing open septorhinoplasty (oSRP). Groups were established for control, oral TA, and single-dose methylprednisolone. The group of patients who were administered TA and methylprednisolone exhibited noticeably reduced scores for periorbital oedema and ecchymosis compared to the control group. The groups did not show a significant difference in the prevention and reduction of periorbital oedema and ecchymosis. TA demonstrated a substantial decrease in bleeding during surgery when compared to both the control group and the use of methylprednisolone [34-36]. Melprednisolone effectively decreased swelling and bruising around the eyes. TA was both clinically and statistically proven to be effective in preventing bleeding and reducing swelling (periorbital oedema) and bruising (ecchymosis) in patients undergoing osteotomies for open septorhinoplasty (oSRP) [37-39].

Ong AA et al. conducted a review of interventions aimed at reducing postoperative swelling and bruising following rhinoplasty. A comprehensive analysis of 50 articles conducted a systematic review on the effects of corticosteroids, alternative medications, herbal supplements, intraoperative bleeding, postoperative interventions, and surgical techniques. It was generally agreed that using nasal packing and periosteal elevation before osteotomy leads to an increase in swelling and bruising, whereas the use of steroids, intraoperative hypotension, cooling, and postoperative head elevation helps to reduce them. The review proposes the utilisation of herbal supplements with negligible patient risk; however, further investigation is required prior to endorsing an external or internal lateral osteotomy approach [40-41]. The findings of our research uncovered the elevated prevalence of obesity among males may introduce a bias in our study, leading to the observation of higher rates of subconjunctival haemorrhages on the second day following rhinoplastic procedures, as indicated by the developed multiple logistical regression model.

Jordanians undergo rhinoplasty at a significant frequency due to the combination of affordable costs and advancements in surgical techniques. Aesthetic facial plastic surgery frequently results in postoperative oedema and ecchymosis, which can induce anxiety in patients and restrict their social activities. Surgeons and patients must take into account the occurrence of complications after surgery. As stated earlier, the most challenging complications of rhinoplasty are periorbital complications, specifically oedema, ecchymosis, and subconjunctival haemorrhage [42-43]. The cause of damage to the internal mucosal lining, periosteum, subcutaneous tissue, and angular artery around the specific bony site targeted for rhinoplastic procedures seems to be related to these procedures. [44] Certain researchers propose raising the periosteum as a means of reducing the potential consequences, however, a broad injury could impact the adjacent subcutaneous tissue [45].

In this retrospective study, we investigated the potential influence of predetermined pharmacotherapeutic, procedural, and patient factors on significant outcomes, which is intriguing. Furthermore, the multiple logistic regression analysis revealed that the cumulative effect of Dex Iv was found to be significant in the investigations of SCH on the second day and in the complete recovery of SCH one week after the rhinoplastic procedure. The replacement of microvascular structures was prominently observed in all three outcomes of interest, namely SCH 1st day, SCH 2nd day, and SCH full recovery, within one week after rhinoplastic procedures. As indicated by the chi-square analysis, the rates of females' gender were statistically insignificant compared to those of males' cohorts. This could partially account for the slightly lower ecchymosis score observed in the female cohort compared to the male cohort (127 (88.8%) vs 120 (95.2%)). The study included 269 patients who underwent rhinoplasty. After constructing three regression models (Model I-III), it was found that the proposed independent factors may have varying impacts on each tested outcome of investigation in different ways. In our study, we found that perioperative administration of TXA and preoperative regular supplementation of MVs were significantly detrimental in predicting the probability of SCH on the first day. Upon analysing the data, we found that the likelihood of experiencing SCH on the second day after the procedure was significantly influenced by several factors. These factors include the preoperative replacement of MVs, the administration of Dex IV during the perioperative period, and the patient's obesity status. All of these factors had a negative impact on the probability of SCH being classified as Grade 2. Finally, during our investigation of the determinantal factors that affect the probability of complete recovery within the first week after rhinoplastic procedures, we discovered that both the regularity of MV supplementations and the administration of perioperatively Dex IV had a statistically significant impact. Various techniques are employed for each rhinoplasty procedure.Our study was limited by the retrospective design and the fact that it was conducted at a single centre. However, we thoroughly examined a wide range of potential confounding factors and assessed performance using a reliable scoring system. In addition, we employed regression modelling to extract coefficients, sensitivity indices at the optimal threshold, and determine the significance of adjusted hazard ratios.

CONCLUSION

The use of tranexamic acid may have a significant impact on the risk of grade 2 subconjunctival haemorrhages only on the first day after the procedure. Additionally, being obese can have a significantly negative impact on the risk of grade 2 subconjunctival haemorrhages occurring only on the second day after rhinoplastic procedures. If dexamethasone is given before surgery, it may have a positive effect on reducing bleeding on the second day after surgery, particularly if the bleeding is of moderate severity. Additionally, it may help speed up the process of full recovery within the first week after the procedure. The consistent use of multivitamins may have a beneficial impact on all three tested outcomes of interest. In this study, we recommend that individuals who have undergone rhinoplastic procedures consider taking multivitamins with or without trace elements to reduce the likelihood of experiencing more severe complications after the surgery. Additionally, it is advised to lower the body mass index to below 30 kg/m2 and to use tranexamic acid of 2 g once, with or without the provision of dexamethasone, during the perioperative period.

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Table 1. Chi square analyses result across non-tranexamic acid and tranexamic acid groups.

	Female Group I n==143 (53.16%)	Male Group II n=126 (46.84%)	Overall Cohort 269	Odd Ratio	χ2 (df) p-Value	R±SEV
Age (Years)						
18-25	34 (23.8%)	48 (38.1%)	82 (30.5%)	NA	8.602 (4) 0.072	-0.088±0.062
26-35	68 (47.6%)	49 (38.9%)	117 (43.5%)			
36-45	35 (24.5%)	21 (16.7%)	56 (20.8%)			
46-55	4 (2.8%)	4 (3.2%)	8 (3.0%)			
>55-60	2 (1.4%)	4 (3.2%)	6 (2.2%)			
Obs statues						
No	73 (51.0%)	60 (47.6%)	133 (49.4%)	1.147 (95% CI; 0.71-1.85)	0.315 (1) 0.574	0.034±0.061
Yes	70 (49.0%)	66 (52.4%)	136 (50.6%)			
AACCI						
0	15 (10.5%)	20 (15.9%)	35 (13.0%)	NA	5.047 (6) 0.538	-0.105±0.060
1	27 (18.9%)	25 (19.8%)	52 (19.3%)			
2	18 (12.6%)	23 (18.3%)	41 (15.2%)			
3	22 (15.4%)	16 (12.7%)	38 (14.1%)			
4	21 (14.7%)	13 (10.3%)	34 (12.6%)			
5	19 (13.3%)	15 (11.9%)	34 (12.6%)			
6	21 (14.7%)	14 (11.1%)	35 (13.0%)			
Dex						
No	72 (50.3%)	69 (54.8%)	141 (52.4%)	0.838 (95% CI; 0.52-1.35)	0.523 (1) 0.470	-0.044±0.061
Yes	71 (49.7%)	57 (45.2%)	128 (47.6%)			
MVs						
No	80 (55.9%)	59 (46.8%)	139 (51.7%)	1.442 (95% CI; 0.89-2.33)	2.230 (1) 0.135	0.091±0.061
Yes	63 (44.1%)	67 (53.2%)	130 (48.3%)			
TP						
No	64 (44.8%)	58 (46.0%)	122 (45.4%)	0.950 (95% CI; 0.59-1.54)	0.044 (1) 0.834	-0.013±0.061
Yes	79 (55.2%)	68 (54.0%)	147 (54.6%)			
SCH_1st Day						

	68 (47.6%)	61 (48.4%)	129 (48.0%)	0.966 (95% CI; 0.59-1.56)	0.020 (1) 0.888	-0.009±0.061
	75 (52.4%)	65 (51.6%)	140 (52.0%)			
SCH_2nd Day						
Grade 1	47 (32.9%)	38 (30.2%)	85 (31.6%)	1.134 (95% CI; 0.68-1.90)	0.227 (1) 0.634	0.029±0.061
Grade 2	96 (67.1%)	88 (69.8%)	184 (68.4%)			
Full recovery						
>1 wk	88 (61.5%)	74 (58.7%)	162 (60.2%)	1.124 (95% CI; 0.69-1.83)	0.221 (1) 0.639	0.029±0.061
≤ 1wk	55 (38.5%)	52 (41.3%)	107 (39.8%)			
TXA						
No	67 (46.9%)	67 (53.2%)	134 (49.8%)	0.776 (95% CI; 0.48-1.25)	1.071 (1) 0.301	-0.063±0.061
Yes	76 (53.1%)	59 (46.8%)	135 (50.2%)			
Swelling Score						
0-2	66 (46.2%)	61 (48.4%)	127 (47.2%)	0.913 (95% CI; 0.57-1.48)	0.137 (1) 0.711	-0.023±0.061
3-4	77 (53.8%)	65 (51.6%)	142 (52.8%)			
Ecchymosis Score						
0-2	16 (11.2%)	6 (4.8%)	22 (8.2%)	2.520 (95% CI; 0.95-6.65)	3.684 (1) 0.055	0.117±0.056
3-4	127 (88.8%)	120 (95.2%)	247 (91.8%)			

TXA: Tranexamic acid.
Dex: Dexamethasone.
Obs: Obesity statues.
SCH: Sub-conjunctival Hemorrhages.
n: Number of tested patients.
MVs: Multivitamins supplement.
AACCI: Age adjusted charlson comorbidity index.
R: Pearson correlation.
SEV: Standard error of value

Table 2. Outcomes from multiple logistic regression analyses.

	B±S.E	Sig.	Exp(B) (95% CI; LB-UB)	Model descriptions	Sensitivity indices
%Prob SCH_1st Day					
TXA (No vs Yes)	-3.795±0.391	0.000	0.022 (95% CI; 0.010-0.048)	VR: 44.2%-59.0% χ2 (2) =0.106 p-value=0.948	TNR: 86.8 TPR=83.6 AI=85.1
MV (No vs yes)	-1.153±0.389	0.003	0.316 (95% CI; 0.147-0.677)		
Constant	2.635±0.383	0.000	13.944		
% Prob SCH_2nd Day					
MV (No vs yes)	-5.013±1.052	0.000	0.007 (95% CI; 0.001-0.052)	VR: 51.4%-72.1% χ2 (6) =2.633 p-value=0.853	TNR=98.8 TPR=56.1 AI=83.3
Dex IV (No vs Yes)	-5.015±1.050	0.000	0.007 (95% CI; 0.001-0.052)		
Obs (non-obese vs obese)	4.925±1.047	0.000	137.752 (95% CI; 17.708-1071.594)		
Constant	4.896±1.049	0.000	133.710		
%Prob Recovery_1 wk					
MV (No vs yes)	-2.609±0.386	0.000	0.074 (95% CI; 0.035-0.157)	VR: 34%-47.7% χ2 (2) =2.445 p-value=0.295	TNR=57.6 TPR=92.9 AI=81.8
DEX IV (No vs Yes)	-2.648±0.385	0.000	0.071 (95% CI; 0.033-0.151)		
Constant	3.760±0.433	0.000	42.940		

Multiple serial logistic regression analyses were performed on rhinoplasty patients undergoing surgical procedures to assess the probabilities of post-rhinoplasty complications, specifically subconjunctival haemorrhages on the first day, denoted as % Prob SCH_1st Day, subconjunctival haemorrhages on the second day, denoted as % Prob SCH_2nd Day, and complete recovery within one week, denoted as % Prob Recovery_1 wk. Nonetheless, the adopted investigation encompassed independent variables for predicting these three dependent variables, which included TXA and MVs for the first dependent variable, Dex+MVs and Obs for the second dependent variable, and TXA and MVs for the third dependent variable.

B: Regressional coefficient.
SE: Standard of error.
Sig: Significant level.
Exp (B): Exponent or the propensity risk
CI: Confidence interval.
LB: Lower bound.
UB: Upper bound.

TXA: Tranexamic acid.
MV: Multivitamins.
Dex IV: Dexamethasone intravenous.
Obs: Obesity status.
%Prob SCH_1st Day: Probability of subconjunctival haemorrhages on the first day after rhinoplasty.
%Prob SCH_2nd Day: Probability of subconjunctival haemorrhages on the second day after rhinoplasty.
%Prob Recovery_1wk: Probability of subconjunctival haemorrhages complete recovery within one week after rhinoplasty.