

The Impact of Reverse Trendelenburg Versus Head-up Position on Intraoperative Bleeding of Elective Rhinoplasty

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Date of Submission: May 07, 2012

Date of Acceptance: Sep 13, 2012

How to cite this article: Nooraei N, Dabbagh A, Niazi F, Mohammadi S, Mohajerani SA, Radmand G, *et al.* The impact of reverse trendelenburg versus head-up position on intraoperative bleeding of elective rhinoplasty. *Int J Prev Med* 2013;4:1438-41.

ABSTRACT

Background: In spite of several efforts for decreasing blood loss, our experience sometimes shows that some patients bleed more profusely during rhinoplasty. Patient position could have deep impact on bleeding amount during surgical procedures.

Objective: In this study, we aimed to compare reverse trendelenburg position and head-up position on intra-operative bleeding of elective rhinoplasty. This was to check the effects of reverse trendelenburg position and head up position on the intraoperative bleeding of elective rhinoplasty.

Methods: In this study, 30 ASA I (American Society of Anesthesiology physical condition classification) patients between 18 and 40 years of age who were candidate to rhinoplasty operations for first time were included. Patients were randomly assigned to reverse trendelenburg or head-up position. Exclusion criteria was any history or lab indicating coagulation problems or using any drug. All gauzes used and the blood that accumulated in the aspirator throughout the operation were calculated.

Results: Our results showed that the mean amount of blood loss in reverse trendelenburg was lower (77.00 ± 13.20 ml) than head-up position (83.33 ± 21.18 ml), although, there was no statistical difference between two groups. However, there was no significant differences among two groups in different aspects of hemodynamic determinants and bleeding amount during and after rhinoplasty.

Conclusions: Our results showed that patient bleeding is not increased because of positioning *per se*. In conclusion, perhaps in the future reverse trendelenburg will be given more often during rhinoplasty.

Keywords: Intraoperative bleeding, reverse trendelenburg, rhinoplasty

INTRODUCTION

Background

The demand for cosmetic surgery has been increased significantly, with rhinoplasty being one of the most commonly

performed esthetic procedures. Bleeding is the most frequent complication in nasal surgery^[1,2] due to limited operating visual field and patient discomfort.^[3] Different ways have been tried to decrease intraoperative bleeding such as cold compressions, intraoperative controlled hypotension.^[4-7] Patients should be put into a slight reverse trendelenburg position to facilitate venous drainage.^[8] Reverse trendelenburg position is also used for neck and head surgery and gynecological procedures because it reduces the flow of blood to those areas. The reverse trendelenburg position is also used to improve surgical exposure of the prostate and minimally invasive upper abdominal procedures. The patient must be tilted in and out of the reverse trendelenburg position slowly to avoid sudden shifts in blood pressure and minimizing blood loss.^[9] Head-up position and use ice pack is advised for sleeping after rhinoplasty to reduce the swelling and bruising.^[10] It has been shown that head-up position is effective on decreasing nocturnal intraocular pressure and cardiac output in cardiac surgeries.^[11] We did not find any study to compare reverse trendelenburg and head-up position during rhinoplasty in decreasing intraoperative bleeding. Given that position have a tremendous effect on intraoperative bleeding, we aimed to compare reverse trendelenburg position and head-up position in decreasing blood loss. In this study, intraoperative bleeding rate of rhinoplasty was compared between patients who rest on reverse trendelenburg and head-up position.

METHODS

In this randomized clinical trial (RCT) held from 2010 to 2011, at least 60 ASA I (American Society of Anesthesiology physical condition classification) patients between 18 and 40 years of age who candidate to rhinoplasty operations for first time in Modarres hospital, will be included. Informed consent were obtained from all patients included in the study and study was approved by university ethics committee. Patients will be randomly assigned to groups as odds number to reverse trendelenburg position and even numbers to head-up position. Exclusion criteria were patients who have symptoms that made us think of coagulation problems after routine preoperative examinations and laboratory tests, and patients not using any drug affected blood pressure and coagulation. In the reverse

trendelenburg group, patients are placed in a supine position, which is inclined at 30 degree angle, so that the head is higher than the pelvis and the leg is lower than hip. In the head-up group, patients are laid down in a supine position, which is inclined at 30 degree angle, so the head and shoulder are higher than pelvis but legs are at same level of pelvis. The patients are all operated on under standard general anesthesia. Same drugs will be used in both groups, including remifentanyl, propofol, atracurium, midazolam and colonidin. The systolic arterial blood pressure should be between 80-90 mmHg during operation; otherwise, the patient will be excluded from study. Nasal packing to the nostrils and dorsal nasal splints were used in all patients at the end of the operation. CBC was done immediately before operation and 48 h after surgery. All gauzes used and the blood that accumulated in the suction bottle aspirator throughout the operation were calculated. Each used gauze was considered as 20 mL blood loss. Systolic, diastolic, mean arterial BP and heart rate were recorded at baseline and every 10 min intervals afterward and in recovery in first hour. Same anesthetic procedure was applied to both groups including induction by 1 to 3 mg/kg propofol, atracurium, and maintenance by TIVA propofol at maintenance dose. Premedication was used as midazolam 0.1 mg/kg and fentanyl 1 µg/kg. The amount of blood loss was estimate based on SF (the grading for endoscopic surgical view contaminated by intraoperative bleeding or blood clotting).

Statistical analysis

All numerical values are expressed as mean ± standard deviation (SD). Sample size were calculated by statistical software based on pilot studies. Chi-square test will be used for detecting significant differences of nominal variables between two groups. Student t-test was used for normally distributed parametric data and Mann-Whitney U test was employed to compare the means of continuous data with non-parametric distribution. *P* values below 0.05 will be considered significant.

RESULTS

Patients demographic findings did not show any significant differences among two groups. The age and weight of the patients (mean ± SD) are included in Table 1. Comparing post-operative hemodynamic

data in two patients group of trendelenburg position or head-tilt group [Table 2] also did not show any significant differences among two groups. We have used the same induction, maintenance and volume intake protocols between two groups. Even we used equal IV catheters for patients to adjust for any confounding in our study. The mean amount of blood loss in reverse trendelenburg was lower (77.00 ± 13.20 ml) than head-up position (83.33 ± 21.18 ml), although, there was no statistical difference between two groups. The volume received in each group was not significantly different. The differences of postop platelet amount and Hgb were statistically but not clinically significant between two groups. The duration of operation was not significantly different between Reverse trendelenburg (RT) group (1.35 ± 0.43 h) and heads-up group (1.28 ± 0.55 h). The RT group had significantly more grade I-II SF (19.3%) and grade III-IV (17.4%) than heads-up grade I-II (15.3%) and III-IV (11.7%).

DISCUSSION

Bleeding and throat pain are the most common pre and post-operative complaint after rhinoplasty.^[12] In order to control bleeding during rhinoplasty, the patients are put in a slightly head-up position to help reduce bleeding and improve surgical access. Whether the use of head-up instead of reverse trendelenburg technique actually decreases the amount of bleeding is questionable. Although, there is still an inherent belief that heads-up position is safer for anesthesiologist, the markedly increased rate of hypotension from head-up position make that view difficult to prove. In this study, intraoperative bleeding rate of rhinoplasty is compared between patients who rest on reverse trendelenburg and head-up position.

Our study did not showed any significant differences between these two groups. Considering that our groups were adjusted for volume intake, age and sex, and other demographic findings, our

Table 1: Comparing demographic data in two patients group of reverse trendelenburg position or head-tilt group

	Groups		Total (N=30)	P value
	Reverse trendelenburg (N=15)	Head-up (N=15)		
Age	26.73±8.40	27.27±2.96	27.00±6.19	0.161
Weight	63.36±10.06	62.87±9.81	63.10±9.76	0.895
Sex (%)				NS
Male	6 (40)	6 (40)	12 (40)	
Female	9 (60)	9 (60)	18 (60)	

Table 2: Comparing post-operative hemodynamic data in two patients group of trendelenburg position or head-tilt group

	Groups		Total (N=30)	P value
	Reverse trendelenburg (N=15)	Head-up (N=15)		
BPsys	114.60±15.44	114.80±10.45	114.70±12.95	0.567
BPdias	70.27±15.36	74.00±11.37	72.13±13.42	0.461
HR	79.80±7.22	78.00±11.84	78.90±9.68	0.250
Hb	13.57±1.66	11.94±0.82	12.78±1.54	0.004
Plat ($\times 10^3$)	198.47±49.69	162.00±43.20	180.86±49.45	0.020
WBC ($\times 10^3$)	11.52±18.29	6.63±0.68	9.07±12.94	0.839
PT*	13.20±2.24	12.79±0.58	13.00±1.65	0.813
INR	1.05±0.07	1.07±0.07	1.06±0.07	0.583
PTT	34.29±2.70	32.07±2.02	33.18±2.60	0.021
Mean BP systole	80.47±3.54	80.40±6.61	80.43±5.21	0.713
Mean BP diastole	43.80±3.89	46.67±5.36	45.07±4.74	0.183
Mean HR	85.00±18.11	78.33±4.40	81.67±13.39	0.345
Blood loss (ml)	77.00±13.20	83.33±21.18	80.17±17.64	0.233

HR=Heart rate, PTT=Partial thromboplastin time, WBC= White blood cell, INR= International normalized ratio, BP= Blood pressure

results showed that patient bleeding is not increased because of positioning *per se*. In fact, post-operative hemorrhage is the most commonly seen problem after rhinoplasty, however, previous reports has not commented on whether position have a major effect on this or not.^[13]

Reverse trndelenberg position during surgeries has become increasingly safer, especially because of the dramatically decreased incidence of severe bleeding intraoperative.

CONCLUSIONS

Perhaps in the future reverse trendelenburg will be given more often during rhinoplasry. Also, the ultimate impact of the position of patient on bleeding is not clear. Lastly, consistent with the practice of medicine overall, well designed protocols will increasingly be the basis upon which positioning patient is based.

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Source of Support: Nil, **Conflict of Interest:** None declared.