

«Original Article»

Comparison of hemodynamic stability, bleeding, and vomiting in propofol-remifentanil and isoflurane-remifentanil techniques in septorhinoplasty surgery

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Abstract

Background: Due to prevalence of septorhinoplasty surgery in Iran and in the world, and the importance of anesthetic technique in bleeding and conducting an accurate and uncomplicated surgery, we decided to compare the hemodynamic stability, bleeding and recovery time with the two techniques in the surgical anesthetic propofol and isoflurane in septorhinoplasty.

Material and methods: This is a prospective, double-blind, and randomized trial study in which enrolled 60 patients undergoing septorhinoplasty surgery in class ASA I and ASA II. The patients were divided into two groups of 30 anesthetized with propofol and isoflurane. Then hemodynamics changes, bleeding and surgeon satisfaction were evaluated and recorded for both groups during surgery and after (recovery). Data were analyzed using SPSS V18.

Results: Of 60 patients, 40 were females and 20 males, with a mean age of 25 ± 2.3 years old. The patients had no underlying disease, and their anesthesia and surgical characteristics were similar. Bleeding mean was 155 ± 14.3 ml in the propofol group, and 164.12 ± 18.24 ml in the isoflurane group, which was not significantly different in terms of bleeding. There was a significant difference between recovery time and incidence of nausea and vomiting between the two groups ($P < 0.05$), therefore the average recovery time was 20.23 ± 3.28 in the propofol group min and 25.13 ± 4.72 min in the isoflurane group. Intraoperative hemodynamics was not significantly different between the two study groups ($P > 0.05$). The average duration of surgery in both groups was 179 ± 21 min.

Conclusion: The findings of this study showed that there were no significant differences between bleeding and hemodynamic stability in the two methods, and anesthesia and induction in both techniques can be used in septorhinoplasty surgery. However, since the recovery time was short and incidence of nausea and vomiting in anesthesia with propofol was less than isoflurane, it seemed that the use of propofol was better than isoflurane.

Keywords: Hemodynamic stability, Bleeding, Recovery time, propofol, Isoflurane, Septorhinoplasty

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Introduction

Anesthesia technique plays an important role in accurate and non-complication surgery. Therefore, methods reducing bleeding and keeping hemodynamic stable are of significance. An ideal anesthetic technique for septorhinoplasty operations should have a rapid onset of intraoperative amnesia and analgesia while facilitating a short recovery period without any side effects (1). Rhinoplasty complications range from infection, bad reaction to anesthesia, excessive bleeding, and loss of sense of smell.

Epinephrine injection in a position of act and putting the patient upward to be able to reduce blood pressure slightly is one the techniques used in this type of surgery (2). Drugs like Propofol, Remifentanil, and Isoflurane are used in nose surgery because they decrease blood pressure and thus reduce bleeding (3-5). Propofol is a derivative of isopropyl phenol that is used in complete intravenous anesthesia. Due to its antiemetic effects and shorter recovery time and ability to decrease blood pressure, it is suitable in cataract surgery, rhinoplasty surgery and sinus surgery. (6) Remifentanil is a μ -receptor agonist and a short-acting opioid with an elimination half-life of less than ten minutes that causes a relative decrease in cerebral blood flow to maintain normal blood pressure (7, 8). Isoflurane is an inhalation anesthetic with a molecular weight of 184.5 and 1.15 MAC that getting fast anesthesia and faster onset after the induction of anesthesia also reduces hypotension dependent on dose volume (9). Several studies have investigated the effects of Remifentanil on hemodynamics status reporting it as an ideal drug for intravenous anesthesia (10). In one study, two techniques of anesthesia with Propofol and Isoflurane for endoscopic sinus surgery were compared (11). In another study, bleeding in rhinoplasty surgery was compared in Isoflurane and Propofol as two techniques of anesthesia (12), and more other applicable studies were

recommended. However, no complete and comprehensive study can be found to include all the factors affecting septorhinoplasty surgery such as comparison of hemodynamic stability, bleeding, nausea, and vomiting after surgery and the recovery period. Therefore, authors of the present study found it necessary to conduct a research on this issue.

This study compared hemodynamic stability, bleeding, nausea, and vomiting after surgery and during the recovery time between the two techniques in septorhinoplasty surgery: maintenance of anesthesia with Propofol-Remifentanil and Isoflurane-Remifentanil.

Material and methods

In this clinical trial, 60 patients undergoing septorhinoplasty of ASA I and ASA II classes enrolled. Inclusion criteria included insensitivity to anesthetic drugs, and lack of an underlying disease such as diabetes, hypertension, coagulation disorders, liver and kidney failure, vascular disease, etc. Exclusion criteria included lack of inclusion criteria and the refusal or withdrawal of patients from participating in the study. The study was initiated after being approved by the Ethics Committee of the surgery center. In preoperative anesthetic visits, informed consents were obtained from the patients and they were assigned in groups A and B, randomly. From the time of anesthetic up to leaving the recovery room, both groups were monitored and evaluated by ECG, BP, SpO₂, and End-Tidal CO₂.

Anesthetic process was similar in both groups and included injection of 0.03 micro g/kg midazolam, 2 mg/kg fentanyl, 1.5 mg/kg lidocaine, 2.5 mg/kg Propofol, and 0.5 mg/kg atracurium.

Mask ventilation and intubation were performed after 3 minutes and then intubation correct criteria including bilateral chest movements, End-Tidal CO₂-

O₂ saturation and checking the breath with stethoscope were conducted and confirmed.

Anesthetized in groups were as follows:

Group A applied 1.2 MAC Isoflurane with 0.25 mg/kg/min Remifentanyl and staggering amounts of atracurium.

Group B applied 100-150 mg/kg/min of Propofol and 0.25 mg/kg/min Remifentanyl and staggering amounts of atracurium.

Patients with a tidal volume of 9 ml/kg and 11 breaths per minute and equal volumes of oxygen and nitrogen monoxide (4 liters of oxygen and 4 liters nitrogen monoxide) were placed on mechanical ventilation with the anesthesia machine Penlon AV800 made in England. End-tidal CO₂ in all patients was kept in the range of 30-35 mmHg.

Bleeding in both groups were carefully calculated and recorded. The volume of blood in the suction after fractioning the volume of washing serum, volume of each gas and blood mesh, was assigned 15-20 ml and the field maunder was assigned 25 ml. Hemodynamic changes were recorded each 5 minutes and blood pressure was kept in the range of 105 to 90 mmHg. Heart rate of the patients was maintained between 90-50. The patients in both groups were similar in position. The top of the head to the body surface was 20 degrees. Surgeon satisfaction was rated using the following response options: no bleeding (3), less bleeding (2), and high bleeding (1). Closing time was when Propofol infusion and Isoflurane anesthesia gases dropped, and their nets were cast by surgery. Then, to eliminate flaccidity and vertices of neostigmine, 40 mg/kg of atropine 20 mg/kg was used, and finally, after evaluating airway reflexes, partial awakening intubation was removed to help patients respond to commands, and then they were transferred to the recovery room. Aldert criteria were used for

discharging them from the recovery room to the surgical ward (13).

Descriptive statistics were used to show frequency and mean. We used *t*-tests to compare the two groups. Data were analyzed by SPSS18 and p-values lower than 0.05 were considered significant ($P < 0.05$).

Results

Of the 60 patients, 20 (33.33%) were male and 40 (66.67%) were female. The average age of the patients in group A (Isoflurane anesthesia) was 23 ± 3.55 years old and it was 24 ± 2.71 in group B (Anesthesia with Propofol). No statistically significant differences were observed between the two groups.

One of the studied variables was hemodynamic changes and bleeding in the two groups, which are given in Table 1. This table shows that there is no statistically significant difference between the groups in terms of bleeding and hemodynamic changes.

Two other variables examined in both groups were nausea and vomiting during recovery. The results are given in Table 2 and as shown there is significant diffraction between the two groups due to the recovery period and the incidence of nausea and vomiting ($P < 0.05$). Nausea and vomiting during the recovery in group B (Anesthesia with Propofol) were less than in Group A (Anesthetized with Isoflurane, respectively).

The surgeon satisfaction of operating conditions in both groups is shown in Table 3. The results showed there is no statistically significant differences between the groups in terms of satisfaction with the surgeon of operating conditions. The mean duration of surgery in patients was 179 ± 21 minutes.

Table 1. The comparison of mean blood pressure and heart rate and bleeding data in the two groups

Variables	Groups		P-Value
	A (Mean \pm SD)	B (Mean \pm SD)	
Heartbeat	73 \pm 17	69 \pm 14	0.74
SBP(mmHg)	91.04 \pm 5.15	88/23 \pm 6.92	0.086
Diastolic blood pressure(mmHg)	57.51 \pm 6.36	63/12 \pm 7.38	0.13
Bleeding(ml)	164.12 \pm 18.24	155 \pm 14.3	0.43

Table 2. Comparing mean of recovery and duration of nausea and vomiting in the two groups

	Group A	Group B	P-Value
Nausea and vomiting	4 cases (13.33%)	0 cases (0 %)	0.03
Duration of recovery	Mean \pm Standard Deviation 26.13 \pm 5.72min	Mean \pm Standard Deviation 20.23 \pm 3.28min	0.017

Table 3. Comparing surgeon satisfaction in the two groups

Criteria	Rate	Group A	Group B	P-Value
Surgeon satisfaction of operation conditions	Clear operating position with no obvious bleeding (3)	25 (83.34%)	27 (90%)	0.21
	Clear operating position with less bleeding (2)	4 (13.33%)	3 (10%)	
	Not-Clear operating position with high bleeding (1)	1 (3.33%)	0 (0/0%)	

Discussion

The results of the study showed that there was no significant difference between the mean of blood in group A and B. The results were in agreements with that of Paolin and Hosni, where the rate of bleeding in endoscopic sinus surgery was compared by two anesthesia techniques with Propofol and Isoflurane. They found that no significant difference between the amount of bleeding and anesthesia existed (11, 14). However, the result of another study that compared the rate of bleeding in rhinoplasty surgery with Propofol and Isoflurane anesthesia technique showed there was a significant difference between the two methods of anesthetic technique, indicating bleeding mean in Propofol anesthetic was 55 ml less than in Isoflurane anesthetic (12). This was consistent with the results of our study.

Results of hemodynamic variables in our study showed there was no significant difference between the two groups and in similar studies conducted in endoscopic sinus surgery and rhinoplasty, no significant difference was observed between the two techniques of anesthesia with Propofol and Isoflurane on hemodynamic changes (11,12). Although, Godrati's study showed that some significant diffraction existed in few periods in rhinoplasty, the author considered them not clinically significant. (12) Other studies evaluating hemodynamic stability of Propofol, supported its stability (10,11,15). Some studies determined the hemodynamic stability of intravenous anesthesia more than gas inhalation anesthetic (16,17).

In the present study, the duration differences of nausea and vomiting during the recovery were significant in the two groups. The duration of recovery and postoperative nausea and vomiting in group B (Anesthesia with Propofol) was less than in group A (Anesthetized with Isoflurane). Several studies have proved anti-nausea and vomiting effect of Propofol. Khezri's study showed that injection of 0.5 mg/kg Propofol was more effective than metoclopramide in prevention of nausea and vomiting in early hours (18,20). Moreover, in Kevin's study, the duration of anesthesia and recovery from anesthesia with thiopental was less than Propofol (20). Other studies also proved the duration of recovery to be less in Propofol (21, 22).

Surgeon satisfaction of conditions in our study had no significant differences in the two groups in practice. Hosni's study of endoscopic sinus surgery and the surgeon's satisfaction showed there was no significant difference between the two techniques of anesthesia and Isoflurane Propofol (11). Nevertheless, some studies performed to study the surgeon satisfaction of condition, indicated that the surgeon

satisfaction in Propofol group was more than in Isoflurane group, which is consistent with the results of our study (12,22).

The number of studies in this area is few, and seems that more applied studies with larger sample size are required.

Conclusion

The findings of this study showed that there were no significant differences between the two methods of anesthesia, in bleeding and hemodynamic stability, and that induction of both techniques can be used on septorhinoplasty surgery. However, Due to the short recovery time and lower incidence of nausea and vomiting in anesthesia with Propofol and Isoflurane, using Propofol it seems better than Isoflurane.

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