The Effects of Anesthesia Method on Throat Pain after Elective Rhinoplasty

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ABSTRACT

Objectives: Throat pain is a common postoperative complaint. In this study, we aimed to determine its incidence of throat pain after rhinoplasty by general anesthesia (GA) or conscious sedation (CS).

Methods: We evaluated throat pain in postanesthesia care unit, 4, 12 and 24 hours after surgery using a numerical rating scale (NRS) in a clinical trial. A total number of 252 consecutive females aging over 18 years undergoing GA or CS for elective rhinoplasty entered the study after implementing inclusion and exclusion criteria. A logistic regression model was used to predict having throat pain.

Results: The incidence of throat pain after CS and GA in postanesthesia care unit, 4, 12 and 24 hours after rhinoplasty were 34.9% vs. 34.9% (P = 0.99), 27.0% vs. 33.3% (P = 0.27), 14.3% vs. 22.2% (P = 0.10), 10.3% vs. 15.9% (P = 0.19), respectively. The odds ratio for throat pain was statistically significant for nausea/vomiting in postanesthesia care unit (OR = 11.1, 95% CI: 5.7-21.8; P < 0.0001).

Conclusions: Method of anesthesia had no independent role in predicting throat pain. Although larynx of subjects undergoing general anesthesia is manipulated by tracheal intubation, sedation has its specific risks for promoting throat pain after surgery. Therefore, neither CS nor GA is superior in terms of throat pain.

Keywords: Conscious sedation, General anesthesia, Sore throat, Incidence.

INTRODUCTION

Throat pain is a very common postoperative complaint in a number of surgical procedures. It results in considerable economic and health problems due to the lost days of postoperative activity and patient discomfort. The incidence of throat pain varies from 14.4% to 50% after tracheal intubation¹ and from 5.8% to 34% after laryngeal mask insertion.² We could not find any reports about the incidence of throat pain after conscious sedation (CS) in PubMed and Embase bibliographic databases till preparing this manuscript.

Conscious sedation is a minimally decreased level of consciousness in which the patient still maintains his/her upper airway protection and the related reflexes. The airways are continuously patent, and the patient has the ability to show appropriate responses to any physical stimulus or any verbal command.³,⁴

This method has been utilized for some types of surgeries such as biopsies, endoscopic procedures, dilation and curettage, cataract surgery, orthopedic closed reduction, myringotomy and septorhinoplasty.

Postoperative incisional pain, nausea/vomiting and throat pain are some of the most important factors influencing patient satisfaction; however, there is no published comparison of postoperative complications of conscious sedation and general anesthesia (GA) for elective rhinoplasty surgery.

In this study, the primary aim was to compare the incidence of throat pain after elective rhinoplasty, using either conscious sedation or general anesthesia.
METHODS

The proposal of the study was confirmed by Ethics Committee and Institutional Review Board at Department of Anesthesiology and Critical Care, School of Medicine, Shahid Beheshti University of Medicine, Tehran, Iran. A total number of 252 females aging over 18 years, candidate for elective rhinoplasty surgery with ASA class I and II were randomly selected from all the subjects referring to two private surgical centers for elective rhinoplasty. Patients with a history of throat pain prior to the surgery, smoking, head and neck trauma or surgery, cardiac, respiratory, airway, gastrointestinal or endocrine disorders, any history of sensitivity to sedative or anesthetic agents, as well as those with Mallampati grade 3 or 4 and laryngospasm during anesthesia were all excluded.

Patients' age, type of anesthesia (GA or CS), and the duration and presence of nausea/vomiting after the completion of anesthesia (i.e. from the entrance of each patient into the recovery room) were recorded in pre-specified datasheets by an anesthesiologist. All anesthesia, either GA or CS, was performed by the same anesthesiologist in both centers but surgical operations were done by various surgeons. We administered 0.2 mg of clonidine half an hour before anesthesia regardless of anesthetic method.

In the GA group, after each patient was in supine position in the operation room, standard monitoring including oxygen saturation levels, pulse rate, and constant monitoring of respiratory status was performed. Non-invasive blood pressure (NIBP) monitoring and 3 lead electrocardiogram monitoring were also established. Then fentanyl (1 µg/kg), midazolam (30 µg/kg) and lidocaine (1 mg/kg) were injected intravenously as premedication drugs. Finally, GA was applied by intravenous administration of incremental doses of thiopental (4 mg/kg) and atracurium (0.5 mg/kg).

The trachea was intubated using a Rosch® low pressure high volume tube (size 7-7.5 according to the size of the glottis) by direct laryngoscopy. The tracheal tube cuff was filled by air to 15-20 cm H₂O pressure until minimal leak occurred. A wet pharyngeal pack was fixed using laryngoscope 85 blade and McGill forceps. The anesthesia was maintained by repeated doses of atracurium and minimum alveolar concentration isoflurane (0.8-1 MAC). The systolic blood pressure was adjusted between 80-100 mmHg using intravenous nitroglycerine and propranolol in titrated fashion as required. The residual of muscle relaxant was reversed by atropine (0.02 mg/kg) and neostigmine (0.04 mg/kg) after detection of minimal muscle contractions at the end of the procedure. The subjects were extubated following removing the pharyngeal pack in fully awake condition.

In the CS group, after establishing the standard monitoring mentioned above, subjects were sedated by titrated fentanyl (4 µg/kg) and midazolam (30 µg/kg) and maintained in the 2nd or 3rd level of Ramsay Sedation Scale (conscious sedation) (Table 1). Continuous administration of oxygen (1-2 l/min) was established via an oral catheter (number 14) during the surgery. The anesthesiologist communicated with the patients throughout the procedure and the patients obeyed the anesthesiologist’s and the surgeon’s commands. For all the subjects, either GA or CS, 500-1000 ml of intravenous lactated Ringer’s solution was administered as a continuous infusion, according to the length of surgery. Furthermore, intravenous dexamethasone (8 mg) and metoclopramide (10 mg) were administered slowly during the procedure. For all the subjects, taking oral acetaminophen 325 mg every 4 hours began 3 hours after the end of the surgery. Intravenous methadone (5 mg, slow infusion) was administered to the patients who had pain scores more than 3 out of 10.

The overall incidences of throat pain, its severity and its presence or absence were assessed at four different time intervals: in the postanesthesia care unit (PACU) and 4, 12, and 24 hours after the termination of the surgery. The assessment was performed using a Numerical Rating Scale (NRS) ranging from 1 to 10 recorded by direct questioning of the patients. NRS = 0 and NRS > 0 were considered as painless and painful throat, respectively. All the patients were trained preoperatively how to answer the NRS.

| Level | Characteristics                           |
|-------|------------------------------------------|
| 1     | Anxious, agitated, restless              |
| 2     | Cooperative, oriented, or tranquil       |
| 3     | Drowsy, but responding to commands       |
| 4     | Asleep but exhibiting a brisk response to stimuli |
| 5     | Asleep and exhibiting a sluggish response to stimuli |
| 6     | Asleep with no response to stimuli       |
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Figure 1. Incidence of throat pain after rhinoplasty among subjects receiving general anesthesia or conscious sedation in postanesthesia care unit (PACU), 4, 12 and 24 hours after surgery.

All continuous data with normal distribution are expressed as means ± SD. Categorical variables are expressed as percentages. The continuous and dichotomized variables were compared using the student’s t-test.

Multiple regression analysis was used to estimate the adjusted odds ratios of having throat pain in PACU, 4, 12 and 24 hours after surgery separately as dependent variables in forward conditional method. Type of anesthesia (GA vs. CS), duration of anesthesia (minutes), age (years) and nausea/vomiting (positive vs. negative) were considered as independent variables. All statistical analyses were performed by SPSS11.5 (SPSS Inc., Chicago, IL). Differences with probability values less than 0.05 were considered statistically significant.

RESULTS

A total number of 126 patients candidate for elective rhinoplasty were studied in each group (GA vs. CS). The patients were aged 18 to 60 (28.2 ± 7.9) years. Duration of anesthesia was in the range of 45 to 340 (171 ± 48) minutes while it was shorter in the GA group than in the CS group (162 ± 43 vs. 182 ± 50 minutes, respectively; P = 0.001). Among all, 25.5% (n = 64) had nausea/vomiting after surgery, the incidence of which was significantly higher in the GA group than the CS group (P = 0.02).

The relative frequency of throat pain (numeric rating of pain score > 0) decreased by passing time. Although the incidence of throat pain 4 hours after surgery was lower in the CS group than the GA group, the differences were not significant afterwards (Figure 1 and Table 2).

In the multiple regression analysis, the multivariate adjusted odds ratios for presence of throat pain were significant for nausea/vomiting (OR = 11.1, 95% CI: 5.7-21.8; P < 0.0001) in PACU. None of the other variables had a significant role in predicting throat pain in the assessed periods (Table 3).

DISCUSSION

The results of this study showed that the incidence of throat pain after elective rhinoplasty, using either CS or GA, was not significantly different. Though CS method resulted in less postoperative nausea and vomiting.

Table 2. Score of throat pain by NRS* according to type of anesthesia after elective closed rhinoplasty surgery.

|                  | Mean | Maximum | Median | Percentile 75th |
|------------------|------|---------|--------|-----------------|
|                  | GA†  | CS‡     | GA     | CS             | GA   | CS   | GA   | CS   |
| PACU§            | 1    | 0       | 9      | 8              | 0    | 0    | 2    | 2    |
| 4 h after surgery| 1    | 0       | 7      | 9              | 0    | 0    | 3    |
| 12h after surgery| 1    | 0       | 9      | 6              | 0    | 0    | 0    |
| 24h after surgery| 1    | 0       | 9      | 8              | 0    | 0    | 0    |

* NRS: Numeric rating scale; † GA: General Anesthesia; ‡ CS: Conscious Sedation; § PACU: Post Anesthesia Care Unit
Table 3. Multivariate logistic regression for predicting throat pain after elective closed rhinoplasty surgery

| Variable                      | Painful (n = 88) | Painless (n = 164) | Adjusted odds ratio (95% CI)* | P   |
|-------------------------------|------------------|--------------------|------------------------------|-----|
| PACU†                         |                  |                    |                              |     |
| Age (year)                    | 27.8 ± 7.2       | 28.4 ± 8.3         | 0.98 (0.94-1.02)             | 0.43|
| Duration of anesthesia (minute)| 176 ± 42        | 170 ± 51           | 1 (0.99-1.01)                | 0.13|
| Type of anesthesia            |                  |                    |                              |     |
| CS†                           | 44 (50.0)        | 82 (50.0)          | 1                            |     |
| GA§                           | 44 (50.0)        | 82 (50.0)          | 0.97 (0.52-1.9)              | 0.91|
| Nausea/vomiting               |                  |                    |                              |     |
| Negative                      | 40 (45.5)        | 147 (89.6)         | 1                            |     |
| Positive                      | 48 (54.5)        | 17 (10.4)          | 11.1 (5.7-21.8)              | <0.0001|
| 4 hours after surgery         | (n = 76)         | (n = 176)          |                              |     |
| Age (year)                    | 27.6 ± 7.5       | 28.4 ± 8.1         | 0.99 (0.95-1.02)             | 0.42|
| Duration of anesthesia (minute)| 177 ± 48        | 170 ± 48           | 1 (0.99-1.01)                | 0.47|
| Type of anesthesia            |                  |                    |                              |     |
| CS                            | 42 (55.3)        | 108 (52.4)         | 1                            |     |
| GA                            | 34 (44.7)        | 98 (47.6)          | 1.5 (0.85-2.65)              | 0.16|
| Nausea/vomiting               |                  |                    |                              |     |
| Negative                      | 54 (71.1)        | 134 (76.1)         | 1                            |     |
| Positive                      | 22 (28.9)        | 42 (23.9)          | 1.4 (0.74-2.6)               | 0.31|
| 12 hours after surgery        | (n = 46)         | (n = 206)          |                              |     |
| Age (year)                    | 27.1 ± 8.3       | 28.4 ± 7.9         | 0.98 (0.93-1.02)             | 0.31|
| Duration of anesthesia (minute)| 178 ± 46        | 170 ± 48           | 1 (0.99-1.01)                | 0.19|
| Type of anesthesia            |                  |                    |                              |     |
| CS                            | 18 (39.1)        | 108 (52.4)         | 1                            |     |
| GA                            | 28 (60.9)        | 98 (47.6)          | 1.9 (0.96-3.73)              | 0.07|
| Nausea/vomiting               |                  |                    |                              |     |
| Negative                      | 31 (67.4)        | 165 (76.1)         | 1                            |     |
| Positive                      | 15 (32.6)        | 49 (23.9)          | 1.5 (0.76-3.12)              | 0.24|
| 24 hours after surgery        | (n = 33)         | (n = 219)          |                              |     |
| Age (year)                    | 26.9 ± 9.3       | 28.4 ± 7.7         | 0.97 (0.92-1.02)             | 0.28|
| Duration of anesthesia (minute)| 165 ± 48        | 173 ± 48           | 1 (0.99-1.01)                | 0.42|
| Type of anesthesia            |                  |                    |                              |     |
| CS                            | 13 (39.4)        | 113 (48.4)         | 1                            |     |
| GA                            | 20 (60.6)        | 106 (51.6)         | 1.6 (0.46-2.45)              | 0.25|
| Nausea/vomiting               |                  |                    |                              |     |
| Negative                      | 24 (72.7)        | 163 (74.8)         | 1                            |     |
| Positive                      | 9 (27.3)         | 55 (25.2)          | 1.1 (0.46-2.45)              | 0.88|

Values are numbers (percentages) and continuous data are presented as mean ± SD.

† PACU: Post Anesthesia Care Unit; * CI: Confidence Interval; ‡ CS: Conscious Sedation; § GA: General Anesthesia

Therefore, generally speaking, the two methods mentioned in this study had nearly no role in predicting the occurrence of throat pain after elective closed rhinoplasty surgery. According to the Ramsay Sedation Scale, any patient being from level 2 (i.e. cooperative, oriented, or tranquil) up to level 5 (i.e. asleep and exhibiting a sluggish response to stimuli) will be considered in an appropriate depth of sedation for surgical procedures. Therefore, it seems that CS is not superior to GA regarding throat pain. Moreover, the incidence of throat pain at PACU among subjects who underwent GA and CS was in concordance with other similar studies.

Our study had some potential limitations. The most important limitation was small sample size. Therefore, further studies are suggested to precisely elucidate the role of more various risk factors. In addition, we found no report about the incidence of throat pain after CS in PubMed and Embase bibliographic databases by the time this manuscript was prepared. However, the wide variation in these figures is presumably due to different skills and techniques among anesthetists and to differences between individual anesthetists and patients in the definition of sore throat.

The size of the tracheal tube in GA patients was 7-7.5 and cuff pressure was controlled during the anesthesia. In CS subjects, the two additional risk factors for throat pain were dry oxygen supplementation and intermittent oropharyngeal suction during the operation. Considering all this information, the high incidence of throat pain in our study seems sound.
The incidence of throat pain was higher after GA, immediately after surgery which can be explained in different ways. However, there are a number of limitations for this finding. First, we used direct rather than indirect questioning. It is well recognized that assessing incidence of pain by direct question will result in significantly higher values. Second, all of the study subjects had some known risk factors for throat pain such as female gender, relatively young age, and closed rhinoplasty surgery as a kind of head and neck surgery. Furthermore, although GA subjects had pharyngeal pack which would be able to minimize the risk of blood aspiration, in the CS group it was not possible to insert pharyngeal pack and some blood and secretions were swallowed by patients. However, this study demonstrated less postoperative nausea and vomiting in the CS group, an advantage that could be a great factor affecting the postoperative patient satisfaction.

CONCLUSION

Throat pain is a common minor complication of anesthesia. The findings of this study suggest that CS is not accompanied by less incidence of throat pain. Thus, it seems that for elective rhinoplasty surgery CS cannot guarantee complete removal of postoperative throat pain compared with GA.

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