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Incidence of Post Discharge Nausea/Vomiting after Ambulatory Anesthesia in Oral Surgery

Archana Viswanath, Sepideh Sabooree, Mina Boulos, Alireza Ashrafi and Constantinos Laskarides*

Department of Oral and Maxillofacial Surgery, Tufts University School of Dental Medicine, USA

Abstract

Purpose: The purpose of this study was to quantify the incidence of post discharge nausea and vomiting (PDNV) in patients undergoing general anesthesia for third molar extraction and also identify any risk factors associated with PDNV.

Methods: 70 patients were enrolled for this prospective clinical study. The primary endpoint was the incidence of nausea and/or vomiting after discharge from the clinic up to 7 postoperative days. Logistic regression analysis was applied to identify and quantify the impact of relevant risk factors.

Results: A total of 42 patients completed the study. The overall incidence of nausea for the study was 56.1% and vomiting was 14.8%. The incidence of nausea on Day 1 was 48.8%. The incidence of nausea decreased to 14.6% on the next day after surgery and 4.8% on Day 7. Females had higher incidence of nausea compared to males but the results were not statistically significant. There was no association between anesthetic medications, history of motion sickness, opioid consumption, antibiotic usage and smoking status and nausea.

Conclusion: Post discharge nausea affects a significant number of patients after general anesthesia for third molar extractions. Further studies with larger study populations are needed to identify potential risk factors for post discharge nausea.

Keywords: Post discharge nausea; Ambulatory anesthesia; Third molar extraction

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Correspondence:
Archana Viswanath, Department of Oral and Maxillofacial Surgery, Tufts University School of Dental Medicine, Boston, USA, Tel: 6176363578; Fax: 6176366809;
E-mail: Archana.Viswanath@tufts.edu

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Introduction

One of the most common surgical procedures done in oral surgery is extraction of impacted third molars. Approximately 10 million wisdom teeth are extracted by oral surgeons annually in the United States [1].

Although removal of impacted third molars is acceptable for patients under local anesthesia or conscious sedation a significant number of third molar extractions are done under general anesthesia. One of the goals of ambulatory general anesthesia is to have patients experience minimal nausea and vomiting after surgery. The incidence of nausea and vomiting following discharge after ambulatory general anesthesia is approximately 35% to 50% [2-4]. Postoperative and post discharge nausea and vomiting (PONV/PDNV) is one of the most commonly occurring postoperative complications and is one of most distracting side effects after surgery/anesthesia [5]. Studies have shown that avoiding nausea and vomiting is a top priority for the patients and more than post-operative pain [6-8]. Reports show that patients who have experienced nausea and vomiting after surgery were willing to pay $75-$100 in out of pocket expenses for a preventive anti-emetic drug [9].

In an attempt to identify what causes post-operative nausea and vomiting (PONV) and how to prevent it, Apfel designed a model that associated potential risk factors in patients with the chance of their developing PONV [5]. This model allows physicians to identify high-risk patients and administer medications accordingly. A multimodal approach on administering antiemetic to patients has shown a great improvement in prevention of PONV [6]. Therefore, finding the incidence of PDNV after third molar extraction and developing a risk-factor model for this complication would not only allow oral surgeons to understand how to plan individualized treatment for patients, but would also allow the patient to experience a more pleasant and quick recovery.

Post operative complications following extraction of impacted third molars has been reported extensively but there is very little literature about the post-discharge nausea and vomiting following third molar extraction. Since majority of the patients are discharged within two hours of completion

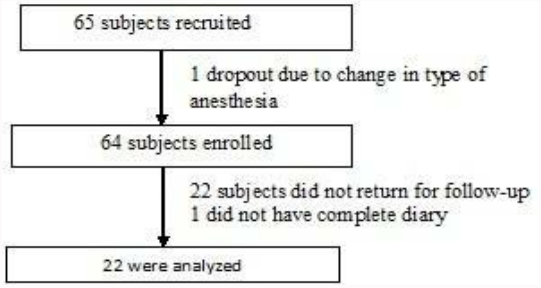

Figure 1: Consort diagram.

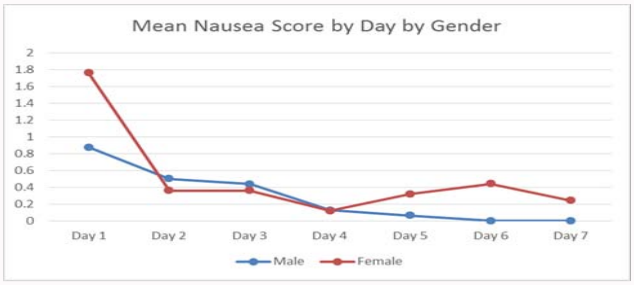

Figure 2: Shows the mean nausea score by gender.

of the procedure for purposes of this study we recorded post discharge nausea and vomiting (PNDV).

The purpose of this study was to 1) Identify the incidence of Post discharge nausea and vomiting (PDNV) for 7 days in patients undergoing third molar extractions under ambulatory general anesthesia. 2) Identify potential risk factors associated with increased incidence of nausea and vomiting.

Once incidence and risk factors of PDNV in patients undergoing ambulatory surgeries for third molar removal has been found, prophylactic medications can be prescribed for high-risk patients. Postoperative nausea and vomiting (PONV) and post discharge nausea and vomiting (PDNV) are some of the complications commonly seen in ambulatory surgeries.

Materials and Methods

This prospective clinical study took place in the Department of Oral Surgery at Tufts University School of Dental Medicine. The Institutional Review Board at Tufts University approved all procedures and protocols. Informed consent was obtained by all participants. Consecutive patients who were at least 15 years old and for whom a decision had already been made to extract impacted third molars under general anesthesia were enrolled in this study. Subjects were not excluded on the basis of sex or race. Subjects were excluded from the study if they were unable to speak English, currently pregnant, have had recent surgical procedures under anesthesia (<3 months), currently using opioids, currently using anti-emetics, suffering from pro-emetic diseases such as Meniere's disease, currently suffering from nausea. Eligible participants were recruited on the day of surgery prior to start of any surgical procedures by one of the co-investigators. All third molar extractions were performed by performed by oral and maxillofacial surgery faculty and residents at Tufts University School of Dental Medicine. At the time of consent, patients were informed about the "Patient Diary". They were also instructed to bring the patient diary back when they came for the seven day post-operative follow-up visit. All the patients who returned the diary were compensated with a $10 gift card. All the surgical procedures were routine standard of care and there was no change in the dosage of anesthetic medications or surgical techniques for purposes of the study. For the purposes of the study PDNV is defined as Post-discharge nausea and vomiting from the time the patient was dismissed from our dental clinic.

Study Variables and Measurements

Potential pre-, intra- and post-operative risk factors known to contribute to post discharge nausea and vomiting (PDNV) were obtained from patient's medical records. Preoperative data included demographic and health history variables; intra-operative data included duration of surgery, dosage of anesthetic medications; post-discharge data included dosage and type of post-operative medications.

Table 1 displays a more complete list of variables collected. All subjects completed questionnaires pertaining to demographics, medical and surgical history. Intra-operative data such as duration of procedure, dosage of anesthetic medications such as midazolam, fentanyl and propofol were obtained from anesthesia records. Incidence and severity of nausea and vomiting were recorded for seven days following the procedure. Additional data captured on the diary included the number of prescription medications taken, number of over the counter medications taken, and antibiotic usage. The subjects were asked to record in the diary the number of times they had nausea. The incidence of PDNV was measured as any number greater than 0 on the pain diary. Severity of nausea, vomiting and retching was measured using a 5 point numerical rating scale, where 0 represented "no nausea" and 5 represented "worst nausea imaginable."

All the patients received a self-report patient diary at the time of discharge which included questions about nausea and vomiting for seven days. All the PDNV data was collected from the patient's diary.

Results

Incidence

A total of 70 (55.7% Female, 44.3% Male) patients participated in the study (Figure 1). 28 patients did not return the pain diary and one patient did not complete the study. Data from a total on 41 patients were included in this analysis the mean age of the participants was 24.01 (SD=5.16). The mean length of the procedure was 36.8 min. The overall incidence of nausea for the study was 56.1% and vomiting was 14.8%. The peak incidence of nausea on Day 1 with 48.8% (Figure

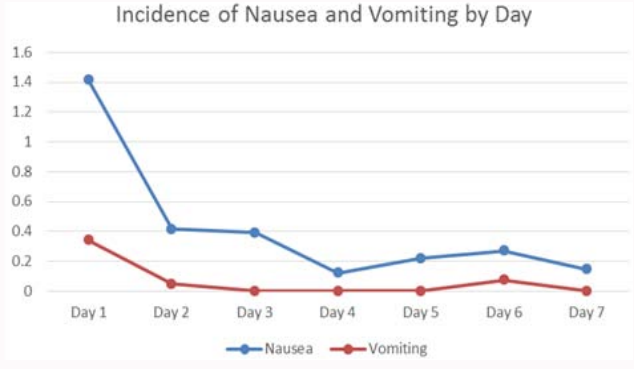

Figure 3: shows the mean nausea and vomiting score by day.

Table 1: Potential pre-operative, intra-operative and post-operative risk factors for PDNV.

Preoperative characteristics	Intraoperative characteristics	Postoperative characteristics
Age	Duration of surgical procedure	Number of post-operative narcotics
Gender	Dosage of Midazolam	Number of antibiotics
Race	Dosage of Fentanyl	Number of over the counter medications
History of Motion Sickness	Dosage of Propofol	
Use of recreational drugs	Dosage of Ketamine	
History of migranes		
History of anemia or other bleeding disorders		

2). The incidence of nausea decreased to 14.6% on the next day after surgery and 4.8% on Day 7. The incidence of nausea was higher among females than males but the difference was not statistically significant.

Severity of nausea

Moderate-severe nausea (>2 on scale of 0-5) affected 37.6% (Figure 3) of patients on the day of surgery but the severity reduced to 14.6% on the next day. On Day 7 post-operative period only 1 subject continued to have severe nausea.

Differences in demographic and clinical characteristics

Demographic and clinical characteristics of patients who experienced nausea. The mean dose of Midazolam used was 5.25 mg, Fentanyl 76.68 mg, Propofol 128.53 mg, Ketamine 17.79 mg. The average length of procedure was 36.79 min. Although the incidence and severity of nausea was higher in females than males the difference was not statistically significant. Age, race, history of motion sickness, history of previous exposure to general anesthesia, history of drug abuse, duration of the procedure, number of postoperative narcotics taken, number of over the counter medications taken did not have any effect on the incidence of PDNV in our study population.

Discussion

The purpose of this study was to examine the incidence of PDNV following third molar extraction under general anesthesia and also identify any risk factors associated with PDNV. The overall incidence of nausea for the study was 56.1% and vomiting was 14.8%. Nausea is at the top end of reported PDNV range of 30% to 56%. Studies have shown that surgeries that have a direct relationship on increased incidence of PONV include eye, oral, plastic, ear, nose and throat, head and neck, gynecological, obstetric, laparoscopic and abdominal procedures [10-12]. Very few studies have focused on the incidence and risk factors associated with PONV following oral surgical procedures. O'Donovan et al reported in 1984 that the incidence of PONV in patients undergoing general anesthesia for third molar extraction is 19% to 44% when no prophylactic antiemetic is given [13-15]. Although medical and pharmaceutical advancements have been achieved over the past few decades's results from our study show that the incidence of post discharge nausea and vomiting (PDNV) has increased over years. Carroll et al. [14] reported that patients with post-discharge nausea and vomiting require a longer time to resume normal daily activities. They also reported that nausea and vomiting in the immediate postoperative period may not accurately predict the incidence of nausea and vomiting after discharge from the hospital. Several risk scores have been developed to predict PONV. Apfel et al. [15] developed a simplified risk score bases on the number of the four risk factors (female gender, history of motion sickness or PONV, non smoking status, expected need for post operative opioids). Presence of the increased number of risk factors increases the risk of PONV. For purposes of this study we included all the risk factors. Most investigations have reported a significantly lower incidence of post discharge nausea and vomiting in men [16,17]. In this study we found that the incidence of PONV in females is relatively higher (73.5%) but the results were not statistically significant. History of motion sickness or prior PONV are considered independent predictors for PONV because the patient has already established a reflex arc for vomiting [18,19]. Studies have shown that there is a threefold increase in the incidence of PONV in patients who have a history of PONV or motion sickness.

Conclusion

The incidence and severity of PDNV following third molar removal under general anesthesia appears to have been greatly underestimated and it affects a significant number of patients after general anesthesia for third molar extractions. Because of our sample size we could not identify any risk factors associated with PDNV, future multicenter trials are needed.

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