

## Effectiveness of Routinely Use of Throat Packs and its Role in Managing Post-Operative Nausea and Vomiting (PONV)

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### Abstract:

**Purpose:** The present study evaluated the amount of blood soaked by the throat packs in accordance to the medications given for preventing post-operative nausea and vomiting in patients during oral and maxillofacial surgical procedures under general anesthesia.

**Patients and Methods:** The investigators designed and implemented a prospective study. 300 patients were selected and were divided into two groups in accordance to the amount of blood soaked by the throat pack during surgery.

Group 1 - Consisted of patients in whom throat pack was incompletely soaked with blood and Group 2 - Consisted of patients in whom throat pack was completely soaked with blood.

**Results:** Of the 300 patients, only 21 % patients had episodes of PONV. A significant difference between the frequency of PONV and the various surgical procedures was seen in the present study (p value -0.043). A comparative evaluation revealed a significant difference between the type of surgery and duration of surgery (p value - 0.005). A significant difference between the two groups with greater PONV in patients with completely soaked throat pack than incompletely soaked throat pack (p value -0.01).

### Conclusion:

Throat pack can be a good indicator for assessing the patients needing prophylactic anti-emetic for post-operative nausea and vomiting and especially with procedures involving longer duration.

**Keywords:** Antiemetic , Post-operative nausea and vomiting , PONV , Throat Pack

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### I. Introduction

Oral and maxillofacial surgical procedures under general anesthesia have a relatively common complication of postoperative nausea and vomiting (PONV). Postoperative nausea and vomiting (PONV) is defined as any nausea or vomiting occurring during the first 24–48 hours after surgery. PONV is one of the most common causes of patient's discomfort and dissatisfaction post anesthesia. The incidence of PONV is reported to be 30% in all post-surgical patients and up to 80% in high-risk patients<sup>2</sup>. Patients undergoing oral and maxillofacial surgery under general anesthesia are at a moderate to high risk for PONV as most of these surgeries have a long duration with oral/nasal oozing leading to ingestion of blood. Such a scenario makes postoperative prophylactic antiemetic treatment an attractive option<sup>3</sup>. Throat packs are used in some surgical procedures to prevent saliva, blood or other surgical debris from trickling down into the pharynx, esophagus, and the respiratory tract during ear, nose, dental and oral surgical procedures<sup>4</sup>. Throat packing has been performed from time immemorial for soaking blood and secretions during surgery as well as for minimizing leakage of air around tracheal tubes<sup>5</sup>. During oral or nasal surgery, non-aspirated blood may flow through nasopharynx and oropharynx and may also drain into the stomach or leak past the tracheal tube cuff into the airway<sup>6</sup>. As blood is a potent emetic, any significant postoperative nausea and vomiting (PONV) in the immediate postoperative period may result in aspiration of gastric contents<sup>7</sup>. It is commonly believed that pharyngeal packing will absorb most of the blood loss and will also provide a physical barrier to the leakage of blood into the aero digestive passages. However, it has also been shown that pharyngeal packing does not offer 100% protection as slight leak around the pack especially when it is completely soaked is always a possibility<sup>8,9</sup>.

The present study evaluated the efficacy of throat packs by determining the quality of seal provided by throat pack, and by the amount of blood soaked by the throat packs in accordance to the medications given for preventing PONV in patients during oral and maxillofacial surgical procedures under general anesthesia.

## **II. Materials and Methods**

### **Ethical Clearance:**

Ethical clearance to conduct the study was taken from the Institutional Ethics Committee of Hitkarini dental College and Hospital, Jabalpur (India). Written informed consent was obtained from the patients prior to the start of the study.

**Study Design:** A prospective study was conducted at Hitkarini dental College and Hospital, Jabalpur from October 2015 to December 2017.

### **Sample Size Estimation:**

Sample size estimation was done using G power software and a total of 300 patients were included in the present study.

### **Allocation:**

300 patients were selected and were divided into two groups in accordance to the amount of blood soaked by the throat pack during surgery. Patients were also asked to provide details of smoking habits as part of their pre-operative assessment including previous medical history, history of nausea and vomiting and whether the patients had a known history of either motion sickness or post-operative nausea and vomiting. Group 1 consisted of patients in whom throat pack was incompletely soaked with blood. Group 2 consisted of patients in whom throat pack was completely soaked with blood.

### **Inclusion Criteria:**

Individuals between the age of 18 to 60 years, weighing > 40 kg, having American Society of Anesthesiologists (ASA) I-II category, and scheduled for oral and maxillofacial surgery under general anesthesia were included.

### **Exclusion Criteria:**

Patients unable or unwilling to provide consent, medically compromised, patients with postoperative intubation or tracheostomy, Patients with difficult intubations and multiple intubation attempts, Pre-operative nasal bleeding, Patients with postoperative nasal bleed, Patient with postnasal drip of blood, Documented hypersensitivity to any of the study drugs, history of neurological disease, and those who were not considered fit for surgery under general anesthesia were excluded from the present study.

### **Surgical Protocol:**

In our present study all surgeries were performed by only one surgeon and one anesthetist who made the subjective evaluation of the blood soaked throat pack.

A standardized general anesthetic protocol with endotracheal intubation was followed which consisted of:

- Standard anesthetic drugs and neuromuscular blocker
- Placement of a cuffed naso-tracheal tube
- Placement of throat pack with McGill's forceps under direct vision by the anesthetist
- Removal of throat pack with McGill's forceps under direct vision by the anesthetist

In the present study Pre-operative analgesia was not prescribed. Anesthesia was induced using fentanyl (1–2 lg.kg) and propofol (2–3 mg.kg). Muscle relaxation was facilitated using atracurium (0.6 mg.kg), succinyl choline was given (2mg.kg) and granisetron (1mg) given, following tracheal tube placement and confirmation of correct position, and anesthesia was maintained using nitrous oxide in oxygen and isoflurane. In both groups, patients had the standard pharyngeal pack placed under direct vision; throat pack used was 16-ply thread gauze, 10×10cm in size, soaked in normal saline solution which was placed into the pharyngeal space in the patients. At the end of surgery, neostigmine 2.5 mg and glycopyrrolate 500 mg were administered to reverse neuromuscular blockade. The pharyngeal pack was gently removed prior to extubation. All patients were extubated awake. After removal, the patients were allocated into the two groups i.e completely blood soaked throat pack and incompletely blood soaked throat pack. Postoperatively, all patients were assessed in the recovery room and department wards for episodes of nausea, vomiting, and the need for rescue antiemetic (Ondansetron 4mg). In the recovery room, episodes of PONV were identified by spontaneous complaints from patients or by direct questioning. The patients were observed for 24 hours postoperatively for incidence of complete response and adverse effects. All medications administered were recorded. The patients were transferred to the oral and maxillofacial surgery ward after the normal recovery period. In the ward, all patients were checked for episodes of vomiting at 3, 6, 12, 24 hour post operatively by nursing staff, who were unaware of the group allocation of the patients postoperative assessments were done on a standardized form.

**Statistical Analysis**

The data collected was entered in Microsoft Excel and subjected to statistical analysis using Statistical Package for Social Sciences (SPSS, IBM version 20.0). The level of significance was fixed at 5% and  $p \leq 0.05$  was considered statistically significant. Kolmogorov- Smirnov test and Shapiro-Wilks test were employed to test the normality of data.

**III. Results**

300 patients, undergoing oral and maxillofacial surgical procedures under general anesthesia were included in the present study. Out of 300 patients, 147 patients were under group 1 (Throat pack incompletely soaked with blood) and 153 patients under group 2 (Throat pack completely soaked with blood). Only 6 cases were presented with episodes of PONV in group 1 and 57 cases were presented with episodes of PONV in group 2. Out of 300 only 21 % patients had episodes of PONV. Of the 300 patients, 165 patients were male and 135 were female. Out of 63 patients 38 were females and 25 were males who presented with episodes of PONV. Out of 63 patients; 48 patients were presented with one episode of vomiting, 14 patients with two episodes of vomiting and 1 patient with 3 episodes of vomiting.

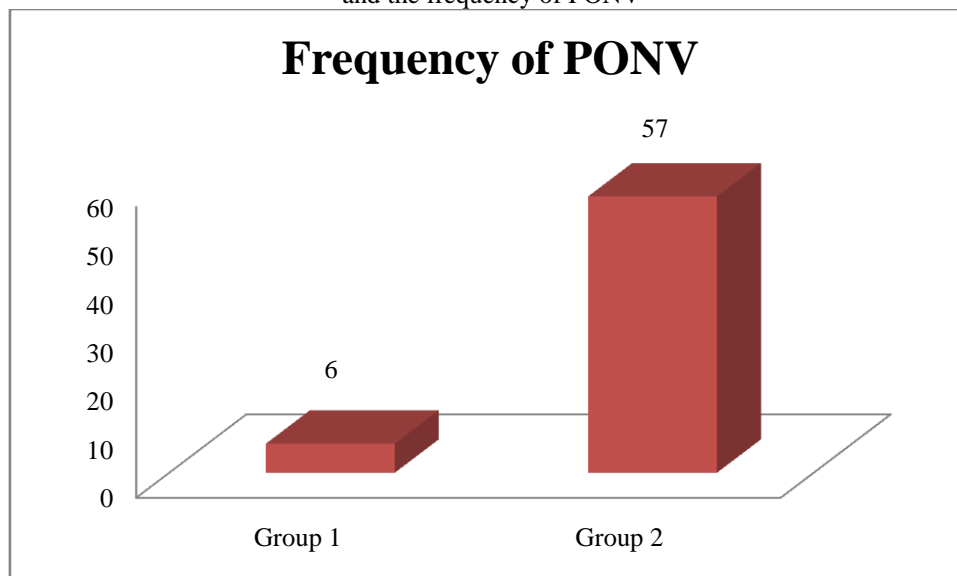
**Table 1** -The frequency of PONV in various surgical procedures. A significant difference ( $p \leq 0.05$ ) between the frequency of PONV and the various surgical procedures was seen in the present study.

**Table – 1**Frequency of PONV in various surgical procedures

Type of Surgery	PONV		p-value
	Yes	No	
Trauma	19	91	<b>0.043 (S)*</b>
Tumors / cysts	8	55	
Oncology	12	27	
TMJ	9	24	
Orthognathic	13	25	
Miscellaneous	2	15	
Total	63	237	

Test applied: Chi square test; \* $p \leq 0.05$  (Significant)

**Graph 1:** Relationship between incompletely (GROUP 1) or completely (GROUP 2) blood soaked throat pack and the frequency of PONV



**Table 2-** An evaluation of the duration of surgery and PONV revealed PONV in majority of patients with duration of surgery more than 2 hours.

**Table 2-**Relationship between the duration of surgery and PONV.

Duration of Surgery	No.of Patients	PONV	%
LESS THAN 1 HOUR	72	8	11.11 %
B/W 1 HOUR – 2 HOUR	105	19	18.09 %
MORE THAN 2 HOUR	123	36	29.26 %

**Table 3-** A comparative evaluation revealed a significant difference between the type of surgery and duration.

**Table 3:** Relationship between types of surgery and duration

SURGERY	DURATION			p-value
	LESS THAN 1HR (%)	ONE TO TWO HR (%)	MORE THAN 2HR (%)	
TRAUMA	30	38.2	31.8	
TUMOUR	22.2	44.4	33.4	
ONCOLOGY	15.4	20.5	64.1	
TMJ	21.2	24.2	54.6	0.005*
ORTHOGNATHIC	15.8	28.9	55.5	
MISC	35.3	47.1	17.6	

**Table 4-** An evaluation of the relationship between completely or incompletely blood soaked throat pack and PONV revealed a significant difference between the two groups with greater PONV in patients who were having blood soaked throat pack.

**Table 4:** Relationship between antiemetic prescription and the frequency of PONV

Groups	Frequency of PONV	p value
Group 1 N=147	6	<b>.01*</b> <b>(S)</b>
Group 2 N= 153	57	

#### IV. Discussion

During oral surgery procedures, throat packs are frequently placed following tracheal intubation to abate blood ingestion or tracheal contamination. This is performed owing to the theoretical advantage of reducing the incidence of PONV and the likelihood of aspiration of blood and secretions<sup>10</sup>. There are a multitude of reasons for the causation of PONV during oral and maxillofacial surgery though it is believed that a chief contributor is the presence of blood in the stomach. Any increase in PONV will be of significance as 30% of admissions to hospital following all types of surgery are due to vomiting<sup>11</sup>. A throat pack should absorb blood and provide a physical barrier to its ingestion and its presence should reduce the incidence of PONV; however, this is unproven. The use of pharyngeal gauze in surgery carried out under general anesthesia, with a high risk of blood, other fluid or particle aspiration, is routine in some medical centers. Traditionally, woven gauze has been used, although today polyurethane foam is also employed in such procedures. Taking into account risks such as airway obstruction due to leaving the pack inadvertently in place, certain protocols have been designed to ensure the complete removal of surgical gauzes at the end of the operation<sup>12, 13</sup>. There is an ongoing debate as to whether surgeons or anesthesiologists have overall responsibility for the removal of any packing used during surgery<sup>14</sup>. Blood ingestion is also a strong emetic factor<sup>15</sup>. In research carried out prior to 2009, Basha ET al<sup>8</sup> concluded that pharyngeal packing is associated with a more severe sore throat and a higher incidence of PONV after surgery. The influence of mean duration of surgery and PONV has been well documented, with an each 30 minutes increase in the duration of surgery raising the risk of PONV prolonged duration exposing the patient to the influence of anesthetic agents<sup>16</sup>. The quality of seal of throat packs is really the main indication for their use in maxillofacial and oral surgery. In this study, blood was found to be present on the distal tips of packs in completely soaked throat pack patients. Clinically it was found that throat pack created an effective clinical seal. There were no clinical blood clots noted beyond the tips of throat pack. We conducted this study to examine the efficacy of the throat pack during routine oral and maxillofacial surgery using a standard anaesthetic technique and standard postoperative pain and PONV management protocols. There were some variables which may have had an influence different types of oral and maxillofacial surgery procedures, of different duration and blood loss; The variable amount of blood loss which is ingested during the surgical procedure was measured while removing throat pack which was either soaked with blood till the distal tip or throat pack incompletely soaked

with blood and accordingly prescribed medication for it after watching the throat pack. To examine the effect of the presence of a throat pack in a normal and varied oral and maxillofacial surgery practice. The most significant variable remained the throat pack either completely soaked with blood or incompletely soaked with blood. In our study the incidence of PONV was higher when the throat pack was completely soaked with blood and antiemetic was not prescribed post operatively for it. Our results concur, as there was a statistically significant relationship between PONV and the duration of the surgery. <sup>Table 2&3</sup> indicates that the chances of developing PONV are higher in those patients whose surgery lasted for more than 2 hours 29.26 % as opposed to the other groups. An important stimulus for PONV in patients undergoing oral and maxillofacial surgery is the effect of swallowed blood in the stomach. It has been hypothesized that the resultant negative nitrogen balance after the breakdown of swallowed blood products in the stomach appeared to be one of the causes of postoperative emesis<sup>17</sup>. A standardized general prevention of PONV was identified as not being cost-effective and not to be required as a routine intervention in all surgical patients<sup>18</sup>. Furthermore it was noted that there was a significant improvement in post-operative Nausea and vomiting in both the study groups from 2 hours to 24 hours post-operatively and also improvement with use of antiemetic in patients with blood soaked throat pack after giving medications. In this study we conclude that as a maxillofacial region is a highly vascular area, resulting with high chances of blood soaked throat pack. Also longer duration surgical procedures show a high incidence of post-operative nausea and vomiting. In this study the use of throat pack was successfully assessed showing that it acts as a good barrier which prevents trickling of blood and fluids from oropharynx to stomach. When soaked it may result in some blood reaching the stomach. PONV has been one of the major postoperative discomforts faced in maxillofacial procedures along with pain. In our study, patients with blood soaked throat packs have shown a higher incidence of PONV when compared to patients with incompletely soaked throat pack. Also, use of prophylactic antiemetic after episodes of vomiting in patients with blood soaked throat packs have shown to have a significant comfortable post-operative period, less discomfort. Hence, throat pack can be a good indicator for assessing the patients needing prophylactic anti-emetic for PONV. Also, prophylactic use of anti-emetics is a successful way of managing PONV especially with procedures involving longer duration

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