Does Type of Pharyngeal Packing during Sinonasal Surgery Have an Effect on PONV and Throat Pain?

Basak Ceyda Meco, MD, DESA1, Menekse Ozcelik, MD1, Cigdem Yildirim Guclu, MD1, Suha Beton, MD, FEBORL-HNS2, Yuce Islamoglu, MD, FEBORL-HNS2, Aysegul Turgay, MD1, Cem Meco, MD, FEBORL-HNS2,3, and Yesim Batislam, MD1

Abstract

Objective. Postoperative nausea and vomiting (PONV) is a common problem that affects up to 30% of all surgical patients after general anaesthesia, which increases in sinonasal surgery due to the very potent emetic effect of ingested blood that is swallowed during the procedures. Therefore, a hypo/oropharyngeal packing is commonly placed in an effort to prevent blood ingestion. The primary aim of this study was to compare the efficacy of 3 packing types in preventing PONV and to compare the results with patients who received no packing. The secondary aim was to compare the postoperative throat pain in all 4 groups.

Study Design. A prospective double-blind randomized controlled study.

Setting. A university hospital.

Subjects and Methods. After Institutional Review Board approval and informed consent, 201 adult patients scheduled for sinonasal surgery were randomized to 4 groups to have dry packing (n = 52), packing soaked with water (n = 48), packing soaked with chlorhexidine gluconate and benzydamine hydrochloride (n = 51), or no packing (n = 50). Postoperative PONV and throat pain were assessed.

Results. Demographic data, procedural characteristics, and PONV risk scores were similar among groups. The PONV incidences, throat pain scores, and analgesic use were comparable in all 4 groups.

Conclusion. Despite commonly used practices, usage of different types of pharyngeal packing did not affect incidence of PONV and throat pain, nor did usage of no packing.

Keywords

pharyngeal packing, sinonasal surgery, postoperative nausea and vomiting, throat pain

P ostoperative nausea and vomiting (PONV) is a common and disturbing problem that affects 20% to 30% of all surgical patients after general anaesthesia.1 This incidence increases to 4 to 6 times in nasal and endoscopic sinus operations.2 It is well known that PONV is multifactorial, involving anesthetic, surgical, and individual risk factors.3

As the nose and paranasal sinuses are highly vascularized structures, operations of this region may present considerable bleeding, and the blood swallowed during the procedure may increase the occurrence of PONV, as ingested blood is a very potent emetic.2,4

Contrary to popular belief, the endotracheal tube’s cuff is not 100% effective in preventing aspiration of hypopharyngeal blood.5 Therefore, pharyngeal packing is commonly placed by the anesthetists following intubation, in an effort to prevent PONV related to blood ingestion. However, pharyngeal packing is not devoid of its own associated problems, such as postoperative throat pain.6 This converse effect might be due to the irritating characteristics of the packing (eg, softness) on pharyngeal mucosa but also its status of being dry or wet.

Apart from the status of the packing being dry or wet, to date, no study has considered the effect of a throat pack soaked with chlorhexidine gluconate 0.2% solution and benzydamine hydrochloride 0.15% solution (CGBH) on PONV and throat pain, which is prescribed for sore throat as a mouthwash. Chlorhexidine gluconate is an antimicrobial agent that eliminates or stops replication of microbes and

1Department of Anesthesiology and ICM, Ankara University Faculty of Medicine, Ankara, Turkey
2Department of Otorhinolaryngology-Head and Neck Surgery, Ankara University Faculty of Medicine, Ankara, Turkey
3Department of Otorhinolaryngology-Head and Neck Surgery, Salzburg Paracelsus Medical University, Salzburg, Austria

Corresponding Author:
Basak Ceyda Meco, MD, DESA, Department of Anesthesiology and ICM, Ankara University Faculty of Medicine, Mesa Koza Plaza Blok 2 No 15 GOP, Ankara, Turkey.
Email: basakceyda@hotmail.com
that achieves a topical antiseptic effect, and benzydamine hydrochloride is a nonsteroidal anti-inflammatory agent that is used for the treatment of pain and inflammation as well as for achieving local anesthesia on the surface for which it is topically used. These medications are commonly prescribed in Europe, Middle East, and India for relieving pain and inflammation associated with a sore throat or mouth sores, especially caused by radiation therapy. They generally delay the progression of radiation-induced mucositis but also reduce the intensity of pain.

The primary aim of this study was to compare the efficacy of CGHB-soaked, water-soaked, and dry packing in preventing PONV and to compare the results with patients who received no packing. The secondary aim was to evaluate and compare the postoperative throat pain in all 4 groups.

Material and Methods

Power Analysis

Before the initiation of the study, a power analysis was performed to detect an estimated reduction of 20% in the incidence of PONV. The incidence of PONV was reported as approximately 30% in a very similar study setting. An α error of 0.05 and a β error of 0.20 (power of the study 80%) were considered statistical threshold points. According to the criteria mentioned above, a group of 48 patients was calculated to have statistically adequate power to demonstrate a clinically significant 20% reduction in the incidence of PONV following nasal surgery.

Inclusion Criteria

After Institutional Review Board approval (Ankara University Faculty of Medicine Ethical Committee, 01-49-14) and written informed consent were obtained, 230 adult patients aged 18 to 60 years who were scheduled for nasal and endoscopic para nasal surgery under general anesthesia were screened for this randomized prospective double-blind study. The study was registered to Clinicaltrials.gov (NCT 01945502).

Exclusion Criteria

Exclusion criteria were patient refusal, allergy to agents used, history of difficult intubation, and body mass index >35 kg/m². Also, patients having another intervention at the same time (adenoidectomy, tonsillectomy, etc) were excluded from the study. A total of 29 patients had exclusion criteria; therefore, from 230 patients, 201 were enrolled and included in the study (Figure 1).

Measurements

All patients were randomized to 1 of 4 groups to have dry pharyngeal packing (group 1, n = 52), packing soaked with water (group 2, n = 48), packing soaked with CGBH (group 3, n = 51), or no packing (group 4, n = 50) during surgery after endotracheal intubation. Random Allocation Software (http://random-allocation-software.software.informer.com) was used for randomization.

The study protocol was explained to all patients, and they were educated regarding the follow-up of postoperative throat pain. Also, the risk stratification for all patients was done with the Apfel score.7

In the operating room, all patients were premedicated with 0.03 mg/kg of midazolam intravenously following routine American Society of Anesthesiologists monitoring. They received the same anesthesia induction (lidocaine, 40 mg; propofol, 3 mg/kg; remifentanil, 1 mcg/kg; muscle relaxant facilitated with rocuronium, 0.6 mg/kg) and were intubated by the same physician. In the first 3 groups, extra soft cotton pharyngeal packs—dry, soaked with water, or soaked with CGBH—were smoothly placed under direct vision. During this placement, delicate movements and maneuvers were carefully practiced to not injure or bruise the pharyngeal mucosa. Group 4 did not receive any packing.

The anesthesia was maintained with nitrous oxide in oxygen and sevoflurane. At the end of the surgery, a performed nasal pack was inserted in the nasal cavities of all patients in all groups. Then the neuromuscular blockade was reversed, and the pharyngeal packing was gently removed prior to extubation to avoid mucosal rasp. All patients received methylprednisolone (1 mg/kg) for its anti-inflammatory effect and dexketoprofen (50 mg) + tramadol (100 mg) intravenously for postoperative analgesia.

At the end of the surgery, surgeon satisfaction (1, very bad; 2, bad; 3, moderate; 4, good; 5, very good) and the quantity of bleeding (1, excessive bleeding; 2, a lot of bleeding; 3, moderate bleeding; 4, minimal bleeding; 5, no bleeding) assessed by the surgeon were asked.

In the recovery room after the surgery, the nursing staff, which was unaware of the group allocation, recorded the incidence and score of PONV and throat pain on admission and minutes 5, 10, and 30 in the postanesthesia care unit. All patients were then transferred to the ward, and PONV and throat pain incidences and scores were assessed and noted at 2, 4, 6, and 24 hours postoperatively by an anesthesiology resident also blinded to the study group allocation. PONV scored as follows: 0, no PONV; 1, mild nausea; 2, moderate nausea; 3, frequent vomiting; 4, severe, continuous vomiting.8

Patients received antiemetic (intravenous metoclopramide, 10 mg) when they had a minimum of 3 episodes of nausea and/or vomiting during a period of 15 minutes, and its frequency was also recorded. Throat pain was assessed with a visual analog scale by the same investigator, and a rescue analgesic (intramuscular tramadol, 100 mg) was given when visual analog scale was >4.

Statistical Analysis

To describe the variables, frequency (percentage) for categorical variables, mean ± standard deviation, or median (minimum-maximum) for metric variables was given. For the comparison of >2 independent groups in terms of metric variables, 1-way analysis of variance or Kruskal-Wallis variance analysis was performed; for that of categorical variables, a chi-square test.
was performed. $P < .05$ was considered as statistically significant.

**Results**

**Demographic Data and Baseline Characteristics**

A total of 201 patients were included in the study (Figure 1). Demographic data, baseline characteristics, and intubation parameters were similar among groups (age, body mass index, sex, American Society of Anesthesiologists classification, performed procedure, PONV risk score, number of intubation attempt, Cormack-Lehane score; Table 1).

The operations carried out were as follows: 85 septoplasty, 18 septorhinoplasty, 45 septoplasty and functional endoscopic sinus, and 53 functional endoscopic sinus. The distribution of the patients according to the type of surgery was similar among groups. Additionally, in all 4 groups, anesthesia and surgery times were similar (Table 2). The surgeon’s satisfaction score and bleeding quantity were comparable in all groups (Table 2).

**PONV and Throat Pain**

PONV incidences were similar in all 4 groups at any time postoperatively. The PONV incidences and the need of antiemetic for all patients in 4 groups are presented in Table 3. Also, throat pain scores and analgesic use were similar among groups at the postanesthesia care unit and during the postoperative period (Table 4). In addition, no patients developed any postoperative complications related to the packing.

**Discussion**

Pharyngeal packing is a frequently used practice, especially in Europe, to minimize the risk of blood aspiration despite intubation cuff, as well as blood ingestion, which could be a cause of PONV due to the potent emetic characteristics of blood in the gastrointestinal system. This practice is even more strongly utilized during sinonasal operations. These rhinologic operations could occasionally cause extensive bleeding. However, a pharyngeal packing starting from the level of oropharynx and extending to the level of hypopharynx around the endotracheal tube could establish a physical barrier to prevent blood from sneaking into the trachea and esophagus. Although this practice is traditionally believed to prevent or reduce blood ingestion and consequent PONV, up to now there is no sound scientific evidence upon its efficacy, and there are reports that this practice could cause postoperative throat pain itself. Some of the few randomized controlled studies had a lack of evidence due to the missing power analysis for PONV. Among them, the study by Fennessy et al compared 3 groups with dry, wet, and absent packing and found no difference between PONV and sore throat. The study by Basha et al compared 2 groups with saline-soaked packing and absent packing and concluded that despite no difference in PONV, the pharyngeal packing group had an higher incidence of throat pain. However, only 2 randomized controlled trials with adequate power analysis compared 2 groups with and without packing and showed no significant difference between groups for PONV.
Table 1. Demographic Data and Baseline Characteristics of the Patients and Intubation Parameters.a

<table>
<thead>
<tr>
<th></th>
<th>Group 1 (n = 52)</th>
<th>Group 2 (n = 48)</th>
<th>Group 3 (n = 51)</th>
<th>Group 4 (n = 50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, y, mean ± SD</td>
<td>38 ± 11</td>
<td>38 ± 12</td>
<td>42 ± 15</td>
<td>37 ± 13</td>
</tr>
<tr>
<td>Sex, female:male, n</td>
<td>20:32</td>
<td>22:26</td>
<td>17:34</td>
<td>18:32</td>
</tr>
<tr>
<td>ASA</td>
<td>1 (1-2)</td>
<td>1 (1-2)</td>
<td>1 (1-2)</td>
<td>1 (1-2)</td>
</tr>
<tr>
<td>Diagnosis, n</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Septoplasty</td>
<td>22</td>
<td>19</td>
<td>18</td>
<td>26</td>
</tr>
<tr>
<td>Septoplasty + FESS</td>
<td>10</td>
<td>10</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>Septorhinoplasty</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>FESS</td>
<td>16</td>
<td>10</td>
<td>19</td>
<td>8</td>
</tr>
<tr>
<td>PONV risk score</td>
<td>1 (0-3)</td>
<td>1 (0-3)</td>
<td>1 (0-3)</td>
<td>1 (0-3)</td>
</tr>
<tr>
<td>No. of intubation attempts</td>
<td>1 (1-3)</td>
<td>1 (1-3)</td>
<td>1 (1-2)</td>
<td>1 (1-3)</td>
</tr>
<tr>
<td>Cormack-Lehane score</td>
<td>1 (1-4)</td>
<td>1 (1-4)</td>
<td>1 (1-4)</td>
<td>1 (1-4)</td>
</tr>
</tbody>
</table>

Abbreviations: ASA, American Society of Anesthesiologists physical status classification; FESS, functional endoscopic sinus surgery; PONV, postoperative nausea and vomiting.
*aAll P values, nonsignificant. Values in median (minimum-maximum) unless noted otherwise. Group 1, dry packing; group 2, packing soaked with water; group 3, packing soaked with chlorhexidine gluconate 0.2% solution and benzydamine hydrochloride 0.15% solution; group 4, no packing.

Table 2. Surgical Data, Surgeon Satisfaction, and Bleeding Quantity.a

<table>
<thead>
<tr>
<th></th>
<th>Group 1 (n = 52)</th>
<th>Group 2 (n = 48)</th>
<th>Group 3 (n = 51)</th>
<th>Group 4 (n = 50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anesthesia time, min</td>
<td>105 ± 52</td>
<td>123 ± 57</td>
<td>130 ± 57</td>
<td>116 ± 58</td>
</tr>
<tr>
<td>Surgery time, min</td>
<td>85 ± 50</td>
<td>107 ± 59</td>
<td>111 ± 55</td>
<td>95 ± 54</td>
</tr>
<tr>
<td>Surgeon satisfaction scoreb</td>
<td>4 (0-5)</td>
<td>4.5 (0-5)</td>
<td>4 (2-5)</td>
<td>4 (2-5)</td>
</tr>
<tr>
<td>Bleeding quantityb</td>
<td>4 (0-5)</td>
<td>4 (0-5)</td>
<td>4 (2-5)</td>
<td>4 (2-5)</td>
</tr>
</tbody>
</table>

*aAll P values, nonsignificant. Values in mean ± SD or median (minimum-maximum). Group 1, dry packing; group 2, packing soaked with water; group 3, packing soaked with chlorhexidine gluconate 0.2% solution and benzydamine hydrochloride 0.15% solution; group 4, no packing.
*bThese parameters are evaluated with a Likert scale: surgeon satisfaction (1, very bad; 2, bad; 3, moderate; 4, good; 5, very good); the quantity of bleeding (1, excessive bleeding; 2, a lot of bleeding; 3, moderate bleeding; 4, minimal bleeding; 5, no bleeding).

Table 3. Postoperative Nausea, Vomiting, and Antiemetic Use.

<table>
<thead>
<tr>
<th></th>
<th>Group 1 (n = 52)</th>
<th>Group 2 (n = 48)</th>
<th>Group 3 (n = 51)</th>
<th>Group 4 (n = 50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nausea At extubation</td>
<td>0 (0)</td>
<td>4 (8.3)</td>
<td>5 (9.8)</td>
<td>5 (10)</td>
</tr>
<tr>
<td>At PACU arrival</td>
<td>1 (1.9)</td>
<td>3 (6.3)</td>
<td>6 (11.8)</td>
<td>5 (10)</td>
</tr>
<tr>
<td>5 min</td>
<td>2 (3.9)</td>
<td>3 (6.3)</td>
<td>3 (6)</td>
<td>2 (4.1)</td>
</tr>
<tr>
<td>10 min</td>
<td>2 (3.9)</td>
<td>5 (10.4)</td>
<td>4 (8)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>30 min</td>
<td>2 (3.9)</td>
<td>5 (10.4)</td>
<td>3 (6)</td>
<td>3 (6.1)</td>
</tr>
<tr>
<td>Vomiting Exubation</td>
<td>0 (0)</td>
<td>1 (2.1)</td>
<td>3 (5.9)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>At PACU arrival</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>2 (3.9)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>5 min</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1 (2)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>10 min</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1 (2)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>30 min</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1 (2)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Total attack during 24 h</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nausea</td>
<td>0 (0-1)</td>
<td>0 (0-4)</td>
<td>0 (0-1)</td>
<td>0 (0-1)</td>
</tr>
<tr>
<td>Vomiting</td>
<td>0 (0-0)</td>
<td>0 (0-4)</td>
<td>0 (0-2)</td>
<td>0 (0-1)</td>
</tr>
<tr>
<td>Antiemetic use during 24 h, %</td>
<td>0</td>
<td>2.1</td>
<td>6</td>
<td>4.2</td>
</tr>
</tbody>
</table>

Abbreviation: PACU, postanesthesia care unit.
*aAll P values, nonsignificant. Values in n (%) or median (minimum-maximum) unless noted otherwise. Group 1, dry packing; group 2, packing soaked with water; group 3, packing soaked with chlorhexidine gluconate 0.2% solution and benzydamine hydrochloride 0.15% solution; group 4, no packing.
packing versus no packing and found no significant alteration between 2 groups regarding postoperative throat pain. In contrast, Korkut et al did not mention if the pharyngeal packing was wet or dry nor if the patients had postoperative throat pain. Nevertheless, in another work from the same study group, the authors assessed the incidence of postoperative sore throat and concluded that use of a pharyngeal pack poses a higher risk for developing aphthous stomatitis, thus causing postoperative pain.\(^{11}\)

In our prospective randomized controlled study, after ensuring power analysis, we have assessed not only POVN but also postoperative sore throat in 4 groups with either pharyngeal packs (dry, soaked with water, or soaked with CGBH) or no packing. Although there have been other earlier studies comparing dry or wet packing with no packing—with controversial results that need to be double-checked with other studies—there have been no published study looking at the effect of using packing soaked with CGBH for the same purpose. CGBH (chlorhexidine gluconate 0.2% and benzoylamine hydrochloride 0.15%) containing mouthwashes are commonly prescribed by otolaryngologists to relieve sore throat symptoms; they relieve symptoms by their anti-septic and anti-inflammatory effects. In our study, we had the assumption that if pharyngeal packing has a positive effect, packing soaked with water would be better than dry packing, as dryness of the packing could rasp or irritate pharyngeal mucosa; furthermore, packing soaked with CGBH would be better than packing soaked with water, as CGBH could have a positive effect on the pharyngeal mucosa through its medication effects on sore throat and pain. Nevertheless, our results did not support this hypothesis.

Although our groups were all well balanced regarding demographic data, baseline characteristic factors, surgical procedures, as well as intubation parameters, no significant difference was found among all groups on POVN results. Yet, it is worth mentioning that in all groups, the surgeon satisfaction score and bleeding quantity according to surgeons were evaluated as good and minimal bleeding, respectively. This could be why the results were not statistically significant, as the blood (the main cause of the symptoms) was produced inconsequentially.

However, in our case load in all groups, there were no significant differences among the postoperative throat pain scores. In all groups, including the one without packing, the median pain scores were nil. This could be interpreted as though pharyngeal packing does not add risk concerning postoperative pain.

**Conclusion**

In light of our results, we can conclude that usage of different types of pharyngeal packing or no packing does not significantly affect PONV incidences and throat pain, despite commonly used practices. Nevertheless, placing a pharyngeal pack does not increase postoperative throat pain, thus adversely affecting the patient. No significant advantage or disadvantage of using CDBH as a pain-relieving anti-inflammatory medication could be shown in this prospective double-blind randomized controlled study.

**Author Contributions**

Basak Ceyda Meco, designed and conducted the study, drafting, final approval, accountability for all aspects of the work; Menekse Ozcelik, designed and conducted the study, drafted the work, final approval, accountability for all aspects of the work; Cigdem Vildirim Guclu, collected data and analyzed data, revising the manuscript, final approval, accountability for all aspects of the work; Suha Beton, collected data, drafting, final approval, accountability for all aspects of the work; Yuce Islamoglu, collected data, drafting, final approval, accountability for all aspects of the work; Aysegul Turgay, collected data, drafting, final approval, accountability for all aspects of the work; Cem Meco, analyzed data, revising it critically, final approval, accountability for all aspects of the work; Yesim Batislam, designed the study, revised the manuscript, final approval, accountability for all aspects of the work.

**Disclosures**

**Competing interests:** None.

**Sponsorships:** None.

**Funding source:** None.

**References**


