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Is Cold Water Gargling Effective in Treating Postoperative Nausea and Vomiting?

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Abstract

Purpose: Recently, a multimodal strategy using various medications and non-pharmacological methods has been recommended for treating Postoperative Nausea and Vomiting (PONV). Cold water gargling may be helpful as one of the non-pharmacological methods.

Methods: A total of 49 patients were randomly divided into a control group (Group C, n = 25) and a gargling group (Group G, n = 24). When postoperative patients experienced nausea after awaking from the anesthesia, anti emetics were administered to Group C, while Group G patients gargled 2-3 times with 50cc cold water (2-8℃). The extent of nausea in the two groups was measured straight after the treatment and in 30/60 minutes and 24 hours later using the Visual Analogue Scale (VAS)

Findings: Immediately after the treatment, the degree of nausea in Group G was lower than in Group C (P = 0.002). However by 30/60 minutes and 24 hours after the treatment, there was no significant difference between the two groups. The number of anti emetics administered after discharge from the PACU was significantly greater in Group C than in Group G.

Conclusions: Cold water gargling is helpful in reducing postoperative nausea.

Keywords: Anti emetics; Cold Water Gargling; Postdischarge Nausea and Vomiting; Postoperative Nausea and Vomiting

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Introduction

Post-Operative Nausea and Vomiting (PONV) is one of the most common postoperative complications. According to one study, its incidence is 30% in patients after normal operating procedures and 70-80% in the high risk group without prophylaxis [1]. PONV can cause dehydration and electrolyte disturbance, fear of surgery, longer stay in hospital and even fatal complications such as aspiration pneumonia and wound disruption. It can also lead to unexpected hospitalization after discharge. So, it is very important to control this unpleasant phenomenon since that reduces postoperative discomfort, prevents complications and accelerates the attainment of mental balance and physiological recovery.

Diverse anti emetics have been developed and administered in clinical trials for preventative or treatment purposes, but a treatment that is one hundred percent effective is not yet available. Pharmacological treatments, in addition, carry a risk of side effects and unnecessary medical expense. Therefore, there have been many studies of non-pharmacological methods aimed at reducing side effects such as nausea and vomiting [2-9]. Recently, a multimodal strategy employing a variety of medications and non-pharmacological methods has been recommended [2, 10, 11].

In this study we compared the degree of nausea and vomiting in a group of patients receiving anti emetics with a group employing cold water gargling after general anesthesia.

Materials and Methods

Study Population

After obtaining approval from the Hospital Ethics Committee, we explained the purpose and methodology of our study on the eve of their surgery to patients scheduled to have laproscopic cholecystectomy and laproscopic right hemicolectomy under general anesthesia. This study was then carried out on those patients who gave their approval. Inclusion criteria were

i) American Society of Anesthesiologist (ASA) class is I or II patients, ii) having taken no anti emetics within 24 hours before surgery, iii) aged 18-75 and capable of expressing their thoughts, iv) surgery for 1-4 hours under inhalation anesthesia. A total of 50 patients were randomly divided into a control group (Group C, n = 25) and a gargling group (Group G, n = 24).

During the 8 h before the operation, all patients fasted and did not take any premedications. When the patients entered operating room, their noninvasive blood pressure, ECG, SpO_2 were observed. After patient monitoring, they were oxygenated with 100% oxygen. Then, anesthesia was induced by using 1% lidocaine 0.5 – 1 mg/kg, propofol 1 – 1.5 mg/kg, rocuronium 0.6 mg/kg, remifentanil 0.05 – 0.15 μg/kg/min and maintained anesthesia using desflurance and 50% oxygen. 30 minutes before the end of surgery, muscle relaxation reversal agents (pyridostigmine and glycopyrolate) were administered to each patient. After surgery, patients were moved to recovery rooms and monitored for symptoms of nausea and vomiting. If patients wanted to control pain using intravenous patient controlled analgesia (i.v. PCA), Anaplus® patient-controlled analgesia pump (Ewha Medical, Seoul, Korea) was used as PCA devices. Total volume was 100 ml, maintenance dose was 1 ml per hour, demand dose was 1 ml, and lockout interval was 15 minutes for both groups. For i.v. PCA, total volum was 100 ml, fentanyl 20 μg/kg, ketorolac 2 mg/kg, ondansetron 8 mg mixed with normal saline. Fentanyl 2 μg/kg, ketorolac 0.5 mg/kg were administered as initial bolus dose.

When patients experienced nausea after awaking from the anesthesia, anti emetics were administered to Group C whereas Group G patients gargled 2-3 times with 50cc water (2-8℃). Then, the extent of nausea was compared in the two groups immediately after the treatment and 30/60 minutes and 24 hours later using the Visual Analogue Scale (VAS). Vomiting frequency was measured for 24 hours. When patients requested to control pain, additional analgesics were administered. Also, when nausea and vomiting worsened, anti emetics were administered for treatment.

As potential PONV-causing factors, the following were measured; gender, smoking, history of nausea, anesthesia time, previous postoperative nausea & vomiting, use of Patient-Controlled Analgesia (PCA) and use of narcotic analgesics during postoperative recovery.

Statistical Analyses

Assuming an average difference of VAS of 2 between the two groups at least 23 patients were needed in each group to achieve a 0.05 significance level and 90% power. Taking into account dropouts, 25 patients were thought to be needed in each group. SPSS WIN version 18.0 was used for statistical analysis, and all data were recorded as mean ± standard deviation or numbers. To test for homogeneity of the factors causing nausea and vomiting causing factors and the degree of nausea as reported in the two groups, we used the χ^2-test and t - test. P values of less than 0.05 were considered statistically significant.

Results

One individual in the gargling group was excluded from the study because of re-operation. As a result, 49 patients (24: gargling group, 25: control group) were analyzed. There were no statistically significant differences between the demographic data and PONV-causing risk factors in the two groups (Table 1). There was no significant difference when both groups were compared of the number of opioids administered (P = 0.355, Table 1).

Table 1: Patients Characteristics and Demographic Data

	Gargling group (n = 24)	Control group (n = 25)	P value
Gender			
Male / Female	9 / 15	7 / 18	0.478
Age (yr)	46.1 ± 15.1	45.5 ± 14.9	0.881
Height (cm)	164.1 ± 8.1	160.7 ± 10.3	0.199
Weight (Kg)	59.8 ± 9.7	62.9 ± 10.8	0.287
Anesthesia time (min)	140.6 ± 66.6	163.8 ± 58.6	0.202
Risk factors			
Smoker	3	4	0.726
Motion sickness	13	9	0.201
PONV history	4/19	1/14	0.124
PCA	9	12	0.458
Additional opioid administration	20	23	0.355

Data are presented as number of patients or mean ± SD.

There were no significant differences between the two groups.

The VAS scores on nausea just before treatment were 6.3 ± 2.4 and 7.3 ± 2.2 in Group G and Group C, respectively, (P = 0.133) (Table 2). Just after treatment, nausea in Group G was less than in Group C (P = 0.002), but 30/60 minutes and 24 hours later there was no significant difference between the two groups (Table 2).

Table 2: Extent of Nausea Measured by VAS

	Gargling group (n = 24)	Control group (n = 25)	P value
Before treatment	6.29 ± 2.368	7.28 ± 2.15	0.133
After treatment	3.29 ± 2.458*	5.48 ± 2.220	0.002
After 30 min	2.42 ± 2.302	3.04 ± 2.441	0.363
After 6 min	1.50 ± 1.842	2.48 ± 2.632	0.139
After 24 hr	0.67 ± 1.810	0.56 ± 1.294	0.813

Data are presented as mean ± SD.

*P < 0.05 compared with Control group.

In the PACU (Post-Anesthesia Care Unit), 3 patients from Group G and 5 from Group C experienced vomiting and only one patient in Group G vomited in the 24 hours after discharge from the PACU (Table 3). An analysis showed that more anti emetics were administered to Group C than to group G after discharge from the PACU (P = 0.046, Table 4).

Table 3: Number of vomiting episodes

	Gargling group (n = 24)	Control group (n = 25)	P value
Vomiting			
PACU	3	5	0.702
24 hrs Post PACU	1	0	0.327

Data are presented as number of patients.

There were no significant differences between the two groups.

Table 4: Anti emetics Administration after PACU

	Gargling group (n = 24)	Control group (n = 25)	P value
Anti emetics	5	12	0.046

Data are presented as number of patients.

There was no significant difference between the two groups.

Discussion

In this study we focused on patients who experienced nausea after general anesthesia and compared the degree of nausea and vomiting in a group of patients receiving anti emetics (Group C) with those in another group gargling with cold water (Group G). The decrease in the extent of nausea after treatment was greater in Group G than in Group C. In other words, it appears that cold water gargling is temporarily effective in easing nausea. No significant difference in nausea was observed between the two groups 30, 60 minutes and 24 hours later. According to an analysis of the use of anti emetics after patients returned to their ward, use of anti emetics by Group C was greater than by Group G (P = 0.046). This difference may have been due to the effect of cold water gargling, but most of the patients also received narcotic analgesics. In this study, however, we only noted whether or not a medicine was used without checking what kind of medicine it was or how often it was administered. Hence, it is hard to tell if gargling had any effect. Because there was no difference by the time the patients were in the PACU (30 minutes after treatment), it is unlikely that the effects of gargling lasted. In case of vomiting, it hardly occurred in both groups so that it was pretty unnecessary to examine if the results were statistically significant or not.

As described in the Introduction, PONV is common (70-80% frequency) in the high risk group [1]. In terms of Post-Discharge Nausea and Vomiting (PDNV), in particular, it appears that there were some omissions in reporting. Therefore, it is likely that PDNV would occur more than expected. According to some studies, even though a multimodal antiemetic drug was administered for preventive purposes to patients in a high-risk group, PDNV was still found in many patients after ambulatory surgery [12-14].

Since the frequency of ambulatory surgery has been on the rise, there has been a strong demand for continuous prevention or treatment of PDNV. Even though pharmacological treatment is effective, it also has some side effects such as headache, constipation and a temporary increase in the Aspartate Transaminase (AST) / Alanine Transaminase (ALT) ratio. Therefore, it would be desirable to maximize the effects of minimal doses. At the same time, there has been a lot of interest in alternative or adjuvant therapies such as acupressure, acupuncture

acustimulation [4-6], aromatherapy [9]. Despite some disagreement over the effects, cannabinoids and oxygen therapy are reported to be effective in cancer patients on chemotherapy [3, 5-7].

Our study does not throw any light on how cold water gargling might work; we suggested that it is effective straight after treatment because the vagus or glossopharyngeal nerve (both of which are involved in nausea and vomiting) are suppressed by vasoconstriction by the cold water. However, the definite mechanism of cold water gargling on PONV has not known. Therefore, further studies are needed to find the exact mechanism. Second, it may reduce the severe thirst and oral discomfort caused by long fasting, intubation, anesthesia, and anticholinergics administered for reverse muscle relaxation and intraoperative bleeding.

There are limitations in this study. First of all, cold water gargling was not performed at specific time intervals or when patients were in great discomfort once they had returned to the ward. If it had been, more definite results might have been obtained. A second shortcoming was that a single instance of cold water gargling in the PACU was not sufficient to generate clear results. Lastly, it would have been helpful to have had a group of patients who did not receive anti emetics even though they experienced nausea. In addition, more patients would be needed to detect effects on vomiting.

In conclusion, cold water gargling was helpful in reducing postoperative nausea. Also it is a simple, non-invasive treatment that evokes little resistance. To observe the ongoing effects of cold water gargling, one would need to examine the effects of cold water gargling carried out several times at regular time intervals.

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