Preop Fluid Bolus Reduces Risk Of Post Op Nausea And Vomiting: A Pilot Study

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Abstract

Postoperative nausea and vomiting (PONV) are distressing and common occurrences after operative procedures requiring general anesthesia. The purpose of this study was to determine the effect of a preoperative one liter fluid bolus of normal saline on a patient's post operative nausea and vomiting.

This pilot study compared the incidence of nausea and vomiting between an experimental group who received a 1-liter fluid bolus pre-operatively, and a control group who were given the standard fluid requirements. Subjects consisted of 90 females who underwent gynecological laproscopic surgery.

The two groups were evenly divided, with 45 in each group. There was no difference in the mean age of the two groups. The average age in the control and the study groups was 33. The weight of the control group was significantly higher, 80 kg vs. 69 kg in the experimental group (p=.018). Thirty percent of the control group had nausea and five percent experienced vomiting. The experimental group had a twelve percent nausea rate and no vomiting. When episodes of nausea and vomiting were combined, there was a significant difference between the groups (p=.001). Fifty-one percent of the control group had an episode of nausea/vomiting while only seventeen percent of the experimental group experienced nausea or vomiting.

Our findings suggest that administering a liter of saline fluid bolus decreases the incidence of nausea and vomiting in this population. Further studies need to examine the use of hydration without the use of antiemetics and control for other factors that might affect nausea and vomiting.

INTRODUCTION

Postoperative nausea and vomiting (PONV) are distressing and common occurrences after operative procedures requiring general anesthesia. PONV may prolong recovery time, increase postoperative morbidity, delay patient discharge, and increase hospital costs ([1]). Many factors have been associated with PONV, including anesthetic techniques, anesthetic agents, narcotics, pain, types of surgical procedures, anxiety, sex, obesity, and prior history of PONV or motion sickness ([2,3,4,5]). The general view is that modern anesthetic drugs and techniques have reduced the incidence of PONV, but the data indicate that the incidence has changed little in the past 30 years and is still unacceptably high, ranging from 5-30% ([6,7,8,9,10]). Although some rank nausea and vomiting as a “minor” complication, in a survey of dissatisfied ambulatory surgery patients, PONV was cited by 71% as the reason for their poor rating of the postoperative experience. Many patients were more willing to accept pain than to suffer from nausea and vomiting (5).

Much has been written on the etiology, prevention and treatment of this complication. Several studies have examined nontraditional methods of preventing or treating nausea and vomiting, including the use of cannabinoids, propofol, and acupressure/acupuncture ([11,12]).

Recent research suggests that dehydration may be a precipitating factor in the occurrence of PONV ([13]). Studies have shown that the functional extracellular fluid volume is reduced in both minor and major surgery. Pre-op fasting can leave a large fluid deficit in the surgical patient. For example, 8 hours of fasting in a 70 kg. patient can cause at least a 1 liter fluid deficit. The risk of dehydration is greater in patients who receive pre-op bowel preps, the elderly, children, patients with acities, burns, trauma, bowel obstruction, or peritonitis and those who undergo surgery later in the day. During a surgical procedure there are many avenues of fluid loss. Unhumidified anesthetic gasses, perspiration, evaporation, blood loss, urine, and loss of other body fluids (acities, GI contents) are among the most common causes of loss. All of these contribute to

dehydration ([14]).

In 1995, Yogendran et al. investigated the impact of preoperative fluid status on clincial outcomes. 200 ASA Grade 1-3 ambulatory surgical patients who were randomized into two groups to receive high (20 cc/kg) or low (2 cc/kg) infusion of isotonic electrolytes preoperatively. Outcomes were assessed at 30 and 60 minutes after surgery, at discharge, and on the first preop day. The incidences of thirst, drowsiness, and dizziness were significantly lower in the high infusion group. However, the study was too small to allow broad generalizations (6).

In 1997 Elhakim et al reported the effect of intraoperative fluid load on post operative nausea and vomiting over 3 days after day-case termination of pregnancy. In a randomized study, 100 patients were allocated into one of two groups receiving 1000 cc of compound sodium lactate solution during surgery or no intraoperative fluid. The scores of nausea were significantly lower in the fluid groups compared with the control group ([15]).

Berry (1991), outlining the causes and treatment of postoperative nausea and vomiting, advocates delaying oral administration of fluids from 6 to 8 hours post-op. Berry suggests hydrating children up to age 3 the first hour with 25 cc/kg, with subsequent administration of 15 cc/kg hr. For older children he recommends 15 cc/kg for the first hour, then 10 cc/kg thereafter. He notes that incidence of nausea in this group is very low (1).

In a recent survey conducted in the Post Anesthesia Recovery Room (PACU) at a large teaching hospital, the nausea and vomiting rate for the general surgical population was 8% . For patients undergoing GYN laproscopic procedures, the rate increased to 11% ([16]). The PACU nurses noticed a decrease in the nausea and vomiting rate in those patients who had received an extra amount of IV fluid. This study was undertaken in order to further explore the relationship between the degree of hydration preoperatively and nausea and vomiting following surgery.

METHODOLOGY

This pilot study compared the incidence of nausea and vomiting between an experimental group who received a 1-liter fluid bolus pre-operatively, and a control group who were given the standard fluid requirements. After review and approval from the Institutional Review Board, the study was conducted in the Operating Room, Post Anesthesia Care Unit and the Ambulatory Surgical Unit (ASU) at a large teaching hospital in the Southeast. Subjects consisted of 90 females who underwent gynecological laproscopic surgery. Criteria used for inclusion in the study were age 18-55, non emergent, non pregnant, ambulatory admission status, no prior history of nausea or vomiting, and ASA Class 1 or 2. Class 1 patients have no organic, physiologic, biochemical or psychiatric disturbance. The pathologic process for which the operation is to be performed is localized and does not entail a systemic disturbance. Class 2 patients have mild to moderate system disturbances caused either by the condition to be treated or by other pathophysiologic processes (15).

The OR schedule was reviewed the day before surgery to identify potential subjects. After obtaining informed consent, subjects were randomly assigned to either the control or the experimental group, using a random distribution table. All patients underwent the usual preoperative anesthesia assessment. Those in the experimental group received 1000 cc of normal saline as a pre-op fluid bolus. Those in the control group received the usual IV fluid of Lactated Ringers in an amount decided by the anesthetist. The amount of fluid received was recorded. The anesthetics, drugs used and anesthesia techniques were decided by the attending anesthesiologist/anesthetist. Surgery proceeded as usual. During the stay in the PACU, patients were evaluated by the nurse for the presence or absence of nausea or vomiting. Nausea was defined as awareness of the tendency to vomit. Vomiting was the forceful expelling of gastric contents through the mouth. The PACU nurses were instructed not to make suggestions to the patients about the feeling of nausea. All episodes of nausea and vomiting were recorded on a data flow sheet. After discharge to the ASU, the subjects continued to be observed for any late signs of nausea and vomiting, and episodes were recorded on the flow sheet.

Demographic information was analyzed using descriptive statistics. Analysis of variance was conducted to test for differences between the mean frequencies of nausea and vomiting of the two groups. An alpha level of .05 was used to determine significance.

RESULTS

The two groups were evenly divided, with 45 in each group. There was no difference in the mean age of the two groups. The average age in the control and the study groups was 33. However, the weight of the control group was significantly higher. The control group was 80 kg vs. 69 kg in the experimental group (p=.018). Thirty percent of the subjects in the control group had nausea and five percent experienced

vomiting. The experimental group had a twelve percent nausea rate and no vomiting. When episodes of nausea and vomiting were combined, there was a significant difference between the groups (p=.001). Fifty-one percent of the subjects in the control group had an episode of nausea/vomiting while only seventeen percent of the experimental group experienced nausea or vomiting.

The use of antiemetics was recorded to see if their usage might have affected the incidence of nausea and vomiting. The antiemetics used were ondansetron, metoclopamide and droperidol. There was no significant difference between the groups in the use of antiemetics. Thirty-seven percent of the subjects in the control group received antiemetics and 33% of the study group received antiemetics. This fact is interesting in that despite the prophlactic use of antiemetics in both groups, the rate of nausea and vomiting was still high.

The volumes of fluid received by the two groups were also compared. The control group received a mean amount of 1803 cc while the experimental group received 1212 cc. There was a significant difference in this amount ($p<.05$).

DISCUSSION

This study found a difference in the rate of nausea and vomiting between patients who were administered a fluid bolus preoperatively and those who were not. This difference existed regardless of the use of antiemetics. This finding is consistant with Yogendran et al. (1995) and Elhakim et al. (1998), who concluded that patients who received higher amounts of fluid pre-operatively tended to have less post-operative nausea and vomiting (6, 13). The correlation between weight and vomiting and nausea was not studied. The control group was heavier and also had more nausea and vomiting which is similar to Watcha and White (1992) and Mannino (1990) and who found that there is a positive correlation between weight and nausea and vomiting ($5,_{17}$). It would be interesting to separate obese patients in both groups to examine their rate of nausea/vomiting.

Our findings suggest that administering a liter of saline fluid bolus decreases the incidence of nausea and vomiting in this population. However, the study was limited by its small sample and by the fact that only patients who were ASA Class 1 and 2 were included. Further, there was no control for the timing of surgery. Some cases started as the first case of the day, while others did not start until the afternoon, increasing the chances of dehydration in those subjects. A standard regime for fluid replacement was not followed. Instead, fluid replacement was left to the discretion of the anesthetist. What needs to be clarified in future studies is the timing of the fluid bolus and inclusion of a standardized fluid replacement formula. Further research is needed to identify how the different antiemetics affected nausea and vomiting in each group. Future studies need to examine the use of hydration without the use of antiemetics and control for other factors that might affect nausea and vomiting.

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