Effect of Administration of Crystalloid I.V Fluids Preoperatively on Postoperative Nausea and Vomiting

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Abstract:

Background: postoperative nausea and vomiting are the most common complications of surgery and recent studies suggest that dehydration may be a precipitating factor in the occurrence of postoperative nausea and vomiting.

Objective: to test the hypothesis that large volume preoperative IV fluid therapy attenuates postoperative nausea and vomiting.

Methods: using nausea and vomiting scale. The nausea and vomiting were measured in 120 postoperative patients who were undergone different major surgeries and either received large volume preoperative IV fluid therapy or did not receive IV fluid therapy in the Medical City, Al-Yarmouk, and Al-Karama Teaching Hospitals, in Baghdad.

Results: the overall incidence of postoperative nausea and vomiting in the 1st five hours was not significantly p(>0.05) reduced in patients who received preoperative IV fluids when compared with those who did not.

Conclusion: postoperative nausea and vomiting are not affected by administration of large volume preoperative IV fluid therapy to surgical patients.

Keywords: Intravenous fluids, postoperative nausea and vomiting.

Introduction:

Postoperative nausea &vomiting (PONV) are distressing &common occurrences after operative procedures requiring general anesthesia [1]. They are the most common complication of anesthesia with an approximate prevalence of 30% up to 70% in high risk patients [1].

Postoperative nausea &vomiting may prolong recovery time, increase postoperative morbidity, delay the discharge of the patient &increase hospital cost [2].

Many factors have been associated with PONV, including anesthetic techniques, anesthetic agents, narcotics, pain, types of surgical procedures, anxiety, sex, obesity &prior history of PONV &motion sickness [3].

Recent studies suggests that the dehydration may be precipitating factor in the occurrence of PONV[4,5], studies have shown that the functional extracellular fluid volume is reduced in both minor &major surgeries, preoperative fasting can leave a large fluid deficit in the surgical patients[3].

The risk of dehydration is greater in patients who receive preoperative bowel preps, the elderly, children, female gender, patients with history of motion sickness patients with ascites, burns, trauma, bowel obstruction or peritonitis &those who undergo surgery later in the day[3,6],PONV was reduced when the fluid deficit was replaced preoperatively [5].

It has been demonstrated that the preoperative administration of IV fluid to patients who were fasting from fluids, decreased the overall incidence &severity of PONV, &decreased the need for rescue antiemetic therapy over the first 72hr. postoperatively [7].

Patients who received higher amounts of preoperative fluid, tended to have less PONV [1]. Because of this effect of IV fluid therapy on PONV and being as a cost effective &harmless method in surgery, its use has been recommended [3].

The present study was designed to evaluate the possibility of reducing (PONV) by preoperative administration of large volume of I.V fluids (2ml/Kg/hr).

Methods:

A cross-sectional multicenter study was carried out in Baghdad teaching hospital, Al-Yarmouk teaching hospital, and Al-Karama teaching hospital from the 12th of May till the 17th of June 2009.

The total number of patients induced were 120 (35 males and 85 females) with their age ranged between 10-90 years.

The patients were selected on a basis of not receiving preoperative IV fluids (2ml/Kg/hr) group A (65 patients) 17 male and 48 female with age range between 10- 80 years , the second group (B) received I.V fluids (2ml\kg\hr) preoperatively (55patients) 18male and 37 female with age range between 10 -90 years .

Every patient was interrogated to specify the degree of postoperative nausea and vomiting according to the scale used.

Postoperative Nausea and vomiting were measured within 5 and 24 hr after the patient was fully awake from anesthesia and according to a scale designed by the researchers to simplify grading of nausea and vomiting and to facilitate calculations, (table 1).

Table 1: scale of postoperative nausea and vomiting used in the current study.

0	No nausea or vomiting
1	Nausea without vomiting
2	< 3 vomiting daily
3	>3 vomiting \day

Results were collected and tabulated.

In both groups most of the patients were non-smoker (84%) females (70%) and underwent long surgeries lasting more than one hr.

Statistical analysis was performed using standard statistical program (SPSS Inc, version 15).

Demographic data were analyzed by using paired X^2 test.

p value < 0.05 was considered significant.

Results

64% of the patients in group A have no associated disease, and the rest (36%) with associated disease mainly hypertension alone (56%) and other have hypertension and ischemic heart disease, hypertension and diabetes mellitus, diabetes mellitus alone or asthma.

Whereas 65% of the patients in group B have no associated disease, and the rest (35%) with associated disease mainly hypertension alone (52%) and other have hypertension and diabetes mellitus, diabetes mellitus, anemia or asthma.

Only 30% of patients in group A have a history of nausea and vomiting, whereas 10% of patients in group B have a history of nausea and vomiting.

58% of patients in group A received postoperative opiod analgesics while the rest have postoperative non-steroidal anti-inflammatory drugs (NSAID) to relieve postoperative pain, while in group B 54% of patients used postoperative opiod analgesics.

61% of patients in group A and 76% in group B underwent long surgeries (lasting >1hr).

Table 2 shows that 29.2% of patients in group A underwent appendicectomy, 16.9% underwent

Cholecystectomy and 23% underwent caesarian section.

Table 2: types of surgery among patients in group A (who did not receive preoperative IV fluids)

Type of surgery	No.of patients
Colectomy	1
Appendectomy	19
Cholecystectomy	11
Ovarian cystectomy	1
Hysterectomy	4
Perforated duodenal ulcer	1
Splenectomy	2
Smaller Intestinal obstruction	3
Hernia repair	5
Caesarian section	15
Pyeloplasty	1
Perforated colostomy	1
Hydatid cystectomy	1

Table 3 shows that 18.8% of patients in group B underwent cholecystectomy, 27.2% were having intestinal obstruction, and another 27.2% underwent caesarian section.

Table 3: types of surgery among patients in group B (who received preoperative IV fluids)

Type of surgery	No.of patients
Colostomy	1
Ovarian cystectomy	1
Cholecystectomy	10
Intestinal obstruction	15
Curitage	1
Removal of anus	1
Peritoneal wash	1
Gastrectomy	2
Hernia	2
Caesarian section	15
Closure jejunectomy	1
Hysterectomy	2
Hydatid cyst	1
Abdominal trauma	1

Table 4 showes the overall incidence of PONV in the 1st 5 hours which was not a significant reduction (P<0.05) in patients who take preoperative I V fluids when compared with those who did not take preoperative I V fluids.

Table 4: Effect of preoperative I V fluids administration on postoperative nausea and vomiting scale in surgical ward within the 1st 5 hours after surgery

	Group A		Group B	
NV scale	**No.**	**%**	**No.**	**%**
0	19	29.3	24	43.6
1	13	20.0	10	18.2
2	21	32.3	12	21.8
3	12	18.4	9	16.3
total	65	100	55	100

$\mathbf{X^2}$ =0.8704

P value equals 0.4481 by conventional criteria; this difference is considered to be not statistically significant.

Table 5 shows that the overall incidence of nausea and vomiting after 24 hours of surgery was not significantly (P>0.05) reduced among patients in group A when compared with patients in group B

Table 5: Effect of preoperative I V fluids administration on postoperative nausea and vomiting scale in surgical ward after 24 hours after surgery

	Group A		groupB	
NV scale	**No.**	**%**	**No.**	**%**
0	39	60	38	69.0
1	18	27.6	12	21.8
2	5	7.0	1	1.8
3	3	4.6	4	7.2
total	65	100	55	100

$\mathbf{X^2}$= 1.6082

Pvalue =0.2062 by conventional criteria, this difference is considered to be statistically insignificant.

Table 6 clearly shows that the use of preoperative IV fluids was not significantly (p>0.05) reduced the need for postoperative antiemetic therapy.

Table 6: Use of postoperative antiemetic therapy

	A (n=65)		B (n=55)	
Need for an antiemetic	**No.**	**%**	**No.**	**%**
No postoperative antiemetic therapy	53	81.6	42	76.4
antiemetic therapy	12	18.4	13	23.6

Discussion

PONV continues to be a common and distressing complication of surgery. In high risk patients, the incidence of PONV can be > 80% [8, 9], while in our study the incidence was 70% in group A within the 1st 5 hours of surgery. Large volume preoperative IV rehydration has been proposed as a method of reducing PONV [10-16]. However our study have drawn conflicting conclusion and the overall incidence of PONV in the 1st 5 hr was not significantly (p>0.05) reduced in patients who take large volumes(2ml\kg\hr) of preoperative I V fluids when compared with those who did not take IV fluids.

This result was identical to the results of a study done by Mc Caul et al[14] who were unable to demonstrate a decrease in postoperative nausea and vomiting after the administration of compound sodium lactate (CSL) $105ml.kg^{-1}.h^{-1}$ of fasting, with and without added dextrose g kg^{-1}, in patients undergoing diagnostic gynecologic laparoscopy. Cook et al. [11] also found no decrease in PONV in patients undergoing gynecologic laparoscopy given 20 ml\kg CSL. Conversely, Ali et al.[16] demonstrated that preoperative administration of 15 ml\kg CSL decreased the incidence of PONV in patients undergoing a combination of laparoscopic gynecological procedures or open abdominal surgery. Moreover Yogendran et al., demonstrated that 20ml\kg of an isotonic electrolyte solution decreased the incidence of several adverse symptoms, in a diverse population of males and female ambulatory surgical patients undergoing gynecologic, orthopedic, and general surgical procedures. But the study failed to convincingly demonstrate the potential for preoperative large volume IV fluids therapy to attenuate postoperative nausea and vomiting [10]. Although they did not report a trend to a reduced incidence of nausea at all time points in their study, this difference was not significantly different, with the exception of the final time point studied, i.e., at 24hr [10]

Another study found a difference in the rate of PONV between patients who were administered a fluid bolus preoperatively &those who were not, the difference exist regardless the use of antiemetic [1].

These differences in the effectiveness of IV fluids given preoperatively to reduce postoperative nausea and vomiting may result from the methodological differences in these studies.

The sources of potential bias existed, such as failure to eliminate important potential confounders, including gender [10,13], type of surgery[10,13], differences in anesthetic technique[10] and differences in the amount of intraoperative fluid administration[16], in addition, the criteria for the diagnosis of postoperative nausea and vomiting in several studies were relatively insensitive [10-13, 15, 16], and postoperative follow-up times were generally limited [10-16].

In addition, most of our patients (70%) were female who don't smoke (85%), since a study done by Tong J Gaan in 2006 shows that nicotine decreases the incidence of postoperative nausea and vomiting [6]. In addition to that, postoperative nausea and vomiting increases in female gender post puberty [6].

61% of patients in group A and 76% in group B underwent long surgeries (lasting >1hr), which also enhances postoperative nausea and vomiting [6], 56% of our patients received opiod analgesic for postoperative pain and the postoperative opiod therapy is a known risk factor for postoperative nausea and vomiting , as recognized by Apfel et al.'s criteria[8].

A study done by Alla Ali (2008) demonstrated that antiemetic drugs were more effective than IV crystalloid in preventing postoperative nausea and vomiting but the possibility of adverse drug interaction increase with the use of these drugs[19].

In our study patients were by malpractice which was against the will of the researchers receiving large volumes (2ml\kg\hr) of preoperative IV fluids and in fact recent consensus guidelines regarding the management of postoperative nausea and vomiting do not recommend large volume preoperative IV fluids to reduce the risk of postoperative nausea and vomiting[17], in addition to that aggressive fluid administrating may not be entirely devoid of side effects [18] and also associated with cost implications.

We extended our data collection up to 24hour postoperative, given that the only significant reduction in nausea in the study by Yogendran et al[10] occurred at the final time point studied i.e., at 24 hour postoperatively. In conclusion large volume preoperative IV fluids have no effect on incidence of postoperative nausea and vomiting in Iraqi surgical patients.

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