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Comparison of Incidence of Postoperative Nausea and Vomiting With Prophylactic Use of Oral Rehydration Solution Versus Water Following Caesarean Section Under Spinal Anaesthesia

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ABSTRACT
Despite advances in antiemetic therapy, occurrence of PONV is 20-30% and further rises to approximately 70% of the patients with certain risk factors. The determinants which increase the risk of PONV are opioids, inhalational anaesthetics, apprehension and adverse effects of drugs. The percentage in obstetrics and gynecology population vary between 40 to 80%. The study encompassed 200 patients scheduled for elective caesarean section who were given spinal anaesthesia. The study participants were sorted into two groups ORS group and water group. An informed written consent was taken from all participants in the study sample after explaining the procedure. A pre-anaesthetic checkup was done including detailed history, physical examination, baseline hemodynamic measurements and routine investigations. In the study, PONV was observed in 92 of 200 patients (46%) in 0-24 hrs post spinal anaesthesia. 22% had incidence of PONV in 0-4 hours, 13% in 4-12 hours, 2% in 12-24 hours respectively in the ORS group and 37% in 0-4 hours, 14% in 4-12 hours, 4% in 12-24 hours respectively in the water group. Hence PONV in the water group was higher in all 3 intervals when compared to ORS group.

INTRODUCTION

Postoperative nausea and vomiting (PONV) is typically used to describe nausea, retching or vomiting in the first two days following procedure in the PACU. It is the main reason for patient's distress post anaesthesia, with the occurrence of 30% in most of the patients post procedure and up to 80% in higher risk individuals[1]. Nausea and vomiting is considered major common reason of morbidity post anaesthesia[2]. Despite advances in antiemetic therapy, occurrence of PONV is 20-30% and further rises to approximately 70% of the patients with certain risk factors. The determinants which increase the risk of PONV are opioids, inhalational anaesthetics, apprehension and adverse effects of drugs. The percentage in obstetrics and gynecology population vary between 40 to 80%[3-5].

A few hypotheses have shown that fasting for long hours does not alter the gastric fluid volume, gastric pH and it will not contribute to the occurrence of nausea and vomiting. However, some studies have shown that it leads to dehydration and discomfort in patient. This is one of the triggering factors for nausea and vomiting post procedure. This led to the development of the concept of preoperative fluid therapy prior to the procedure. Enhanced recovery after surgery protocol or fast track plans try to curb physiological and psychological responses in major procedures. This has led to the immediate return of day to-day tasks, decrease in complications and duration of hospital stay. One of the main basis in enhanced recovery consists of avoidance of long hours of preoperative fasting and loading carbohydrate solution up to 2 hrs preoperatively[6].

Sufficient amounts of fluids will be given to the uncomplicated laboring patients orally. The uncomplicated patient scheduled for a surgery will be allowed clear fluids orally up to 2 hrs prior induction of anaesthesia. The target of fluid therapy preoperatively is to preserve circulation with sufficient fluid and electrolyte balance, thus resulting in beneficial outcome of the patient. Various interventions were tried to alleviate PONV. We tried to find out if giving water or ORS two hours prior to spinal anaesthesia had any effect on PONV, which was assessed by nausea scale.

MATERIALS AND METHODS

Study was carried out in pregnant women who were scheduled to undergo caesarean section under spinal anaesthesia.

Inclusion Criteria:

- Willing to participate in the study
- Pregnant ASA 2 patients
- Elective caesarean section under spinal subarachnoid blockade
- Aged 18 to 35 years

Exclusion Criteria:

- BMI 30
- Hyperemesis gravidarum
- Hypertension
- Diabetes mellitus

The study encompassed 200 patients scheduled for elective caesarean section who were given spinal anaesthesia. The study participants were sorted into two groups ORS group and water group. An informed written consent was taken from all participants in the study sample after explaining the procedure. A pre-anaesthetic checkup was done including detailed history, physical examination, baseline hemodynamic measurements and routine investigations. Patients were kept nil per oral for 8 hours before surgery for solids and water was allowed up to 2 hours before surgery as per NPO guidelines. They were asked to drink 200 ml of water or 200 ml of ORS 2 hrs prior to surgery in according to their groups.

18 G iv cannula was secured. Injection ranitidine 50 mg and injection metoclopramide 10 mg iv were given 30minutes prior to the surgery. Patient shifted to OT and standard monitors including pulse oximetry, NIBP and ECG were established. IV fluid ringer lactate was on flow. Patient was put in left lateral position. Under absolute aseptic precautions, spinal subarachnoid block was achieved at L3 - L4 space via 27G QBS needle with 2 ml of 0.5% heavy bupivacaine after free flow of CSF was confirmed. Then the patient was placed in supine position with a 150 wedge under right buttock for left uterine displacement. Surgery was started after adequate block height was achieved. 0nce the baby was extracted, 20 IU oxytocin added in 500 ml of RL was started intravenously. The flow rate was titrated to the uterine contractility. At the end of the surgery, after hemodynamic stability was confirmed, the patient was shifted to PACU. In both the groups in PACU, hemodynamic parameters like BP, pulse rate, oxygen saturation, PONV were measured in the intervals of 0-4 hrs, 4-12 hrs and 12-24hrs.

RESULTS AND DISCUSSIONS

The mean age and BMI in both the groups was nil significant. The mean systolic BP (in mmHg) in both the

Table 1: Comparison of Age in years and BMI between the groups

Group		N	Mean	Std. Deviation	t test p value	
Age	ORS	100	28.74	3.54	0.167	NS
	Water	100	35.14	45.84		
	Total	200	31.94	32.59		
BMI	ORS	100	23.84	19.12	0.202	NS
	Water	100	21.38	1.57		
	Total	200	22.61	13.59		

The mean age and BMI in both the groups was nil significant

Table 2: Systolic blood pressure measurements (in mmhg) (n= 200) between the groups

						95% Confidence Interval for Mean			
		Groups	N	Mean	S.D	Lower Bound	Upper Bound	t test p-value	
SBP	0-4 hrs	ORS	100	115.40	5.93	114.22	116.58	0.070	NS
		Water	100	116.95	6.11	115.74	118.16		
	4-12 hrs	ORS	100	117.70	5.15	116.68	118.72	0.786	NS
		Water	100	117.42	8.94	115.65	119.19		
	12-24 hrs	ORS	100	118.75	4.99	117.76	119.74	0.107	NS
		Water	100	117.40	6.68	116.07	118.73		

The mean systolic BP (in mmHg) in both the groups was nil significant

Table 3: Diastolic blood pressure measurements (in mmhg) (n=200)

						95% Confidence Interval for Mean			
		Groups	N	Mean	S.D	Lower Bound	Upper Bound	t test p-value	
DBP	0-4 hrs	ORS	100	72.05	7.72	70.52	73.58	0.001	HS
		WATER	100	75.80	8.28	74.16	77.44		
	4-12 hrs	ORS	100	74.40	7.53	72.91	75.89	0.677	NS
		WATER	100	73.85	10.84	71.70	76.00		
	12-24 hrs	ORS	100	75.95	5.76	74.81	77.09	0.361	NS
		WATER	100	75.10	7.28	73.66	76.54		

Table 4: PONV within the groups

		Group					
		ORS		WATER		Total	
		Count	Percentage	Count	Percentage	Count	Percentage
PONV	0-4 hrs	22	22.0	37	37.0	59	29.5
	4-12 hrs	13	13.0	14	14.0	27	13.5
	12-24 hrs	2	2.0	4	4.0	6	3.0
	N	63	63.0	45	45.0	108	54.0
Total		100	100.0	100	100.0	200	100.0

Fishers exact test p=.048, sig

groups was nil significant. The mean diastolic BP (in mmhg) in both the groups was decreased in 0-4 hrs. The mean diastolic BP (in mmhg) was 72.05±7.8 in ORS group and 75.80±8.3 in water group in 0-4 hrs which was highly significant with t test p value of 0.001. According to Fishers exact test PONV was lesser in the ORS group when compared to the water group. In the study, PONV was observed in 92 of 200 patients (46%) in 0-24 hrs post spinal anaesthesia. 22% had incidence of PONV in 0-4 hrs, 13% in 4-12 hrs, 2% in 12-24 hrs respectively in the ORS group and 37% in 0-4 hrs, 14% in 4-12 hrs, 4% in 12-24 hrs respectively in the water group. Hence PONV in the water group was higher in all 3 intervals when compared to ORS group.

The risk factors for nausea and vomiting related with spinal anaesthesia are block height of T5 or higher, motion sickness history and hypotension. The incidence of PONV was 10% if no risk factors, 21% for one, 39% for two, and 79% for four risk factors. A study by Jelting *et al*. stressed upon factors responsible for hypotension induced PONV. They concluded that few factors in caesarean section like regional anesthesia, increased vagal tone, heavy blood loss, manipulation of uterus and peritoneum led to hypotension and PONV. The study stressed upon hypotension induced PONV and stated that use of vasopressors and sufficient infusion of crystalloids had significant effect[7]. In our study, use of oral fluids until 2 hrs prior to surgery also had a beneficial effect on PONV. A study by Wilson *et al*. stated that there was no data to show that the risk of aspiration was more in patients who were provided with fluids orally 2 hrs preoperatively than the patients who were NBM from 12 at night. It also stated that risk of aspiration or airway obstruction could develop even after prolonged starvation[8]. In the present study, even if the patients were allowed clear fluids up to 2 hrs prior to surgery PONV was observed. In another study, Morino *et al*. observed that PONV lasted up to 48 hrs after general and regional anaesthesia but was relatively higher in 0-24 hrs. The incidence of nausea and vomiting in 0-24 hrs were 40% and 22% respectively whereas in 24-48 hrs were 10% and 3% respectively[9]. In our study, PONV was observed in 92 of 200 patients (46%) in 0-24 hrs post spinal anaesthesia. 22% had incidence of PONV in 0-4 hrs, 13% in 4-12 hrs, 2% in 12-24 hrs respectively in the ORS group and 37% in 0-4hrs, 14% in 4-12 hrs, 4% in 12-24hrs respectively in the water group.

A study by Hausel *et al*. showed the effects of ORS on PONV after laparoscopic cholecystectomy. A total of 86 patients received carbohydrate solution of 400 ml 2 hrs prior to surgery, 86 patients received 800ml of fluids on the evening before surgery and 400ml 2hrs prior to surgery. VAS scores and episodes of PONV were recorded up to 24 hrs after surgery. The study concluded that carbohydrate solution had reduced incidence of PONV in 12-24 hrs after surgery[10]. Our study showed that in spite of ORS administration 2 hrs prior to surgery PONV was observed at 0-4hrs and further decreased at 4-12 hrs and 12-24 hrs intervals.

In a previous study by McCraken *et al*. a total of 11,500 patients who were posted for surgery under general anaesthesia, regional anaesthesia or both were studied to assess the incidence of PONV. It showed that 5.2% had nausea and 2.8% had vomiting within 24 hrs postoperatively where 6 hrs fasting were followed. 3.8% had nausea and 2.2% had vomiting within 24 hrs postoperatively where patients had clear oral fluids 2 hrs prior to surgery. Hence authors concluded that consumption of clear fluids 2 hours prior to surgery reduced the occurrence of PONV[11]. Our study showed that 37% in water group and 22% in ORS group had PONV in 0-4 hrs post-surgery.

A study by Voldby *et al*. showed that carbohydrate containing fluid intake 2 hrs before surgery had postoperative insulin resistance and improved wellbeing. They also noted that hemodynamic parameters were not significant[12]. In our study, among the hemodynamic parameters the mean diastolic BP (mmHg) was 72.05±7.8 in ORS group and 75.80±8.3 in water group in 0-4 hrs which was highly significant with t test p value of 0.001. DBP was relatively lower in first 4 hours post spinal anaesthesia in both the groups. This might be due to spinal subarachnoid blockade in spite of good hydration. Our study also showed that patients had reduced dehydration and improved wellbeing. A study by Kulshrestha *et al*. showed that keeping patients short preoperative fast as compared to NBM from 12 o'clock at night did not have considerable impact on gastric fluid and pH. Hence, it does not enhance the risk of pulmonary aspiration. The study stated that the preoperative fasting period reduced to 2 hrs for clear fluids had decreased incidence of dehydration[13]. In our study, it showed that administration of oral fluids 2 hours prior to surgery had better hydration status which reduced the incidence of PONV.

A study by Itou *et al*. showed that none of the patients had a gastric volume >200 ml. The ORS group had maximum of 60 ml and fasting group had 155 ml. The gastric pH did not change in both the groups. Therefore ORS is beneficial with adequate safety margin up to 2 hrs prior to procedure. European Society of Anaesthesiology state that patients can receive glucose containing solution up to 2 hrs prior to surgery in their preoperative fasting guidelines in adults and children[14]. In our study, the incidence of PONV in ORS group was less when compared to the water group. In addition it was noted that patients receiving ORS were meagerly hungry and thirsty.

CONCLUSION

In conclusion the prophylactic use of oral rehydration solution 2 hrs prior to elective caesarean section following spinal anaesthesia has reduced incidence of PONV when compared to the use of water.

REFERENCES

1. Pierre, S. and R. Whelan, 2013. Nausea and vomiting after surgery. Contin. Educ. Anaesth. Crit. Care. Pain., 13: 28-32.
2. Eberhart, L.H.J., J. Högel, W. Seeling, A.M. Staack, G. Geldner and M. Georgieff, 2000. Evaluation of three risk scores to predict postoperative nausea and vomiting. Acta. Anaesthesiol. Scand., 44: 480-488.
3. Den Bosch, J.E.V., K.G. Moons, G.J. Bonsel and C.J. Kalkman, 2005. Does measurement of preoperative anxiety have added value for predicting postoperative nausea and vomiting. Anesth. Analg., 100: 1525-1532.
4. Mraovic, B., T. Šimurina, Z. Sonicki, N. Skitarelic and T.J. Gan, 2008. The dose-response of nitrous oxide in postoperative nausea in patients undergoing gynecologic laparoscopic surgery: A preliminary study. Anesth. Analg., 107: 818-823.
5. Harmon, D., M. Ryan, A. Kelly and M. Bowen, 2000. Acupressure and prevention of nausea and vomiting during and after spinal anaesthesia for caesarean section. Br. J. Anaesth., 84: 463-467.
6. Melnyk, M., R.G. Casey, P. Black and A.J. Koupparis, 2011. Enhanced recovery after surgery (eras) protocols: Time to change practice. Can. Urol. Assoc. J., 5: 342-348.
7. Jelting, Y., C. Klein, T. Harlander, L. Eberhart, N. Roewer and P. Kranke, 2017. Preventing nausea and vomiting in women undergoing regional anesthesia for cesarean section: Challenges and solutions. Local. Reg. Anesth., 10: 83-90.
8. Wilson, G.R. and K.L. Dorrington, 2017. Starvation before surgery: Is our practice based on evidence. BJA. Educ., 17: 275-282.
9. Morino, R., M. Ozaki, O. Nagata and M. Yokota, 2012. Incidence of and risk factors for postoperative nausea and vomiting at a Japanese cancer center: First large-scale study in Japan. J. Anesth., 27: 18-24.
10. Hausel, J., J. Nygren, A. Thorell, M. Lagerkranser and O. Ljungqvist, 2005. Randomized clinical trial of the effects of oral preoperative carbohydrates on postoperative nausea and vomiting after laparoscopic cholecystectomy. Br. J. Surg., 92: 415-421.
11. McCracken, G.C. and J. Montgomery, 2018. Postoperative nausea and vomiting after unrestricted clear fluids before day surgery. Eur. J. Anaesth., 35: 337-342.
12. Voldby, A.W. and B. Brandstrup, 2016. Fluid therapy in the perioperative setting-a clinical review. J. Intens. Care., Vol. 4. 10.1186/s40560-016-0154-3.

13. Mathews, J., M. Kulshrestha, M. Kapadia and S. Sanwatsarkar, 2013. Breaking the midnight fast: An observational cross-sectional audit of preoperative fasting policies and practices at a tertiary care hospital. Indian. J. Anaesth., 57: 414-417.
14. Itou, K., T. Fukuyama, Y. Sasabuchi, H. Yasuda and N. Suzuki et al., 2011. Safety and efficacy of oral rehydration therapy until 2 h before surgery: A multi center randomized controlled trial. J. Anesth., 26: 20-27.