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Prophylactic Pyridoxine for Postoperative Nausea and Vomiting

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Abstract: BACKGROUND: pyridoxine (vitamin B6) is a dietary supplement that is used effectively in the treatment of pregnancy-associated nausea and vomiting but its role in the management of postoperative nausea and vomiting is not clearly understood. METHODS: We conduct a randomized controlled prospective trial to measure the effect of intravenous pyridoxine on the incidence of postoperative nausea and vomiting in the early postoperative period (24 hours) in parturients undergoing elective caesarian section under general anesthesia. 85 pregnant women were enrolled in the study, after the application of exclusion criteria which were a previous history of postoperative nausea and vomiting, and a history of motion sickness; 70 women were included in the effective data analysis, 35 women received intraoperative pyridoxine (group P.) and the other 35 women received placebo intraoperatively (group C). RESULTS: we did not notice a difference in the incidence of postoperative nausea and vomiting between group P and group C. CONCLUSION: administration of intravenous pyridoxine has no effect on the incidence of nausea and vomiting in the early postoperative period of women undergoing elective caesarian section under general anesthesia.

Keywords: pyridoxine, postoperative nausea and vomiting, cesarean section, antiemetic prophylaxis.

INTRODUCTION

Nausea and vomiting may affect a large percentage (30-80%) of patients in the first 24 hours postoperatively leading to an increase in the postoperative morbidity and hospitalization period (Amirshahi, M. *et al*., 2020- Bayter, M.J.E. *et al*., 2016). The factors that may contribute to postoperative nausea and vomiting (PONV) can be classified as patient-related factors (age, sex, and body habitus), surgery-related factors (site and duration of surgery), and anesthesia-related factors (use of inhalational anesthetics, nitrous oxide, opioids and high dose of neostigmine) (Son, J. *et al*., 2010- Lerman, J, 1992). Many attempts to prevent PONV use different modalities of pharmacological and non-pharmacological methods with variable outcomes and adverse effects (Rüsch, D. *et al*., 2010).

Pyridoxine is a dietary supplement that has been used widely to treat nausea and vomiting during pregnancy. In one study, pyridoxine alone failed to prevent the PONV(Kernis, L. *et al*., 1950), while it shows positive results when combined with doxylamine (Brenda, K. *et al*., 2005). Pyridoxine is considered to be a safe drug for the mother and the baby (Dror, D.K. *et al*., 2012), this fact encourages us to reinvestigate the effect of pyridoxine alone in patients undergoing caesarian section under general anesthesia.

MATERIALS AND METHODS

We conduct a prospective study at Al-Zuhur Private Hospital in Baghdad from January 2016 to September 2016, the study aimed to assess the effect of intraoperative intravenous pyridoxine on the incidence of early postoperative nausea and vomiting in parturient patients undergoing caesarian section under general anesthesia.

In our study we select 85 parturient patients with physical status I and II according to the American Society of Anesthesiologists classification after the application of exclusion criteria, only 70 patients were enrolled in the study. Group P consists of 35 patients who received 100 mg intravenous pyridoxine intraoperatively, while Group C consists of 35 patients who received a placebo intraoperatively; in both groups, the patients were selected randomly.

Patients with a history of intractable postoperative nausea and vomiting, gastrointestinal disease, motion sickness, and drug hypersensitivity were excluded from the study.

Before starting anesthesia 18=20 G cannula was inserted and each patient was monitored with continuous ECG (electrocardiogram), non-invasive blood pressure, and pulse oximeter. After pre-oxygenation with 100% oxygen, anesthesia was started using thiopental sodium 5 mg/kg, ketamine 0.25 – 0.5 mg/kg, rocuronium bromide 0.6 mg/kg, after 1 min cuffed endotracheal tube was inserted and confirmation of placement through auscultation, maintenance with halothane 0.5-1% in 100% oxygen, intravenous prophylactic antimicrobial drug (usually ceftriaxone 1 gram unless the patient has a history of hypersensitivity to it) is started at the beginning of the operation by infusion, and after delivery of the fetus, intravenous oxytocin 20 i.u. is given to enhance uterine contraction, at this point group P received

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100 mg of intravenous pyridoxine in 2 ml while group C received 2 ml of normal saline.

At the end of the operation, the inhalational anesthetic agent is discontinued and muscle relaxant reversal (neostigmine 0.05 mg/kg + atropine 0.02 mg/kg) is given, after that, the patient is extubated and moved to the recovery room before being taken to the ward.

Regardless of the severity in either group, the patients are watched for the first 24 hours post-op for nausea and/or vomiting.

RESULTS

Out of 85 pregnant women enrolled, 70 were eligible after inclusion and exclusion criteria and randomized evenly into two groups based on receiving a single dose of intravenous pyridoxine intraoperatively (35 women received it and another 35 were not).

Concerning the demographic characteristics, both groups were found to have non-comparable char including; the age (29.54± 4.718 vs. 28.69± 2.784), and duration of cesarean section operation (27.40± 7.527 vs. 28.03± 13.152) for control and pyridoxine groups respectively (each *P* >0.05) (Table 1).

Table 1: Demographic characteristics of study groups

Characteristic (mean ± SD)	**Control-group (n=35)**	**Pyridoxine-group (n=35)**	***P*-value**	**95% CI**
Age	29.54± 4.718	28.69± 2.784	0.926* 0.359	-0.998–2.713
Cesarean section duration (Minutes)	27.40± 7.527	28.03± 13.152	0.245* 0.807	-5.740–4.483

* Values of independent t-test.

Similarly, those other characteristics related to women's history of abortion and hyperemesis gravidarum (HEG) were not statistically significant (each *P* >0.05) (Figure 1-2). Nevertheless, a significant difference was found between study groups regarding women's parity obviously among extremes of nullipara and multipara subcategories (x^2 = 6.762, df: 2, *P* <0.05) (Figure 3).

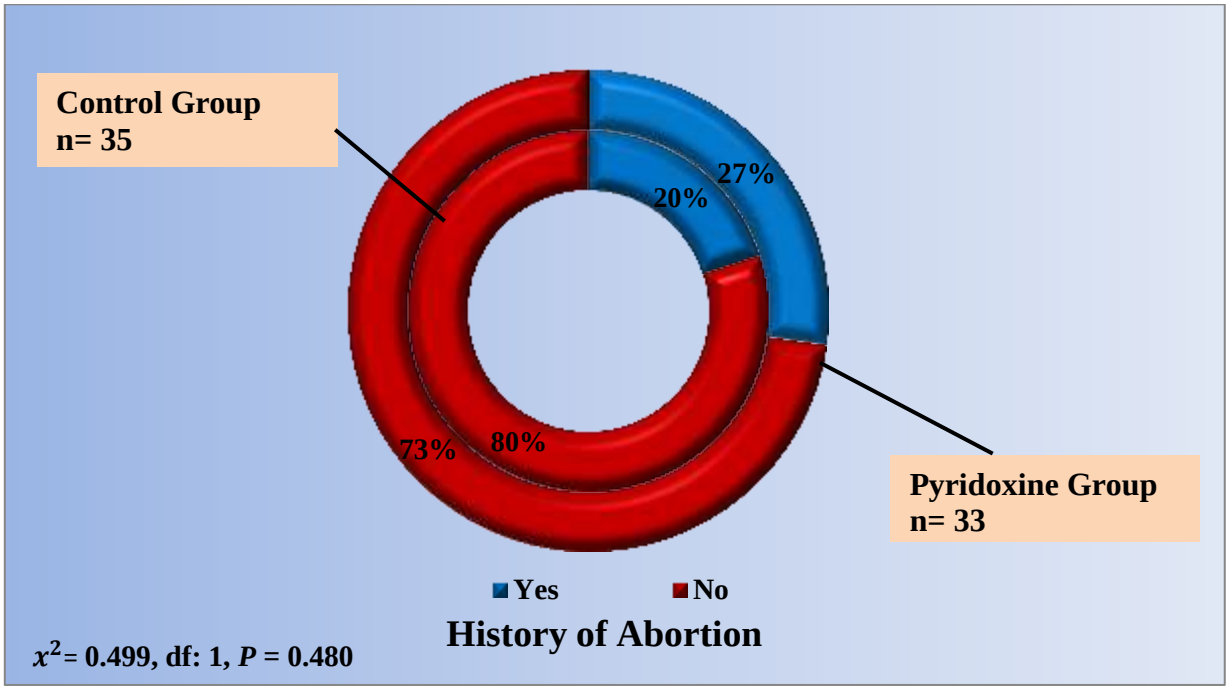

Figure 1: Distribution of maternal history of abortion among study's groups (n=68)

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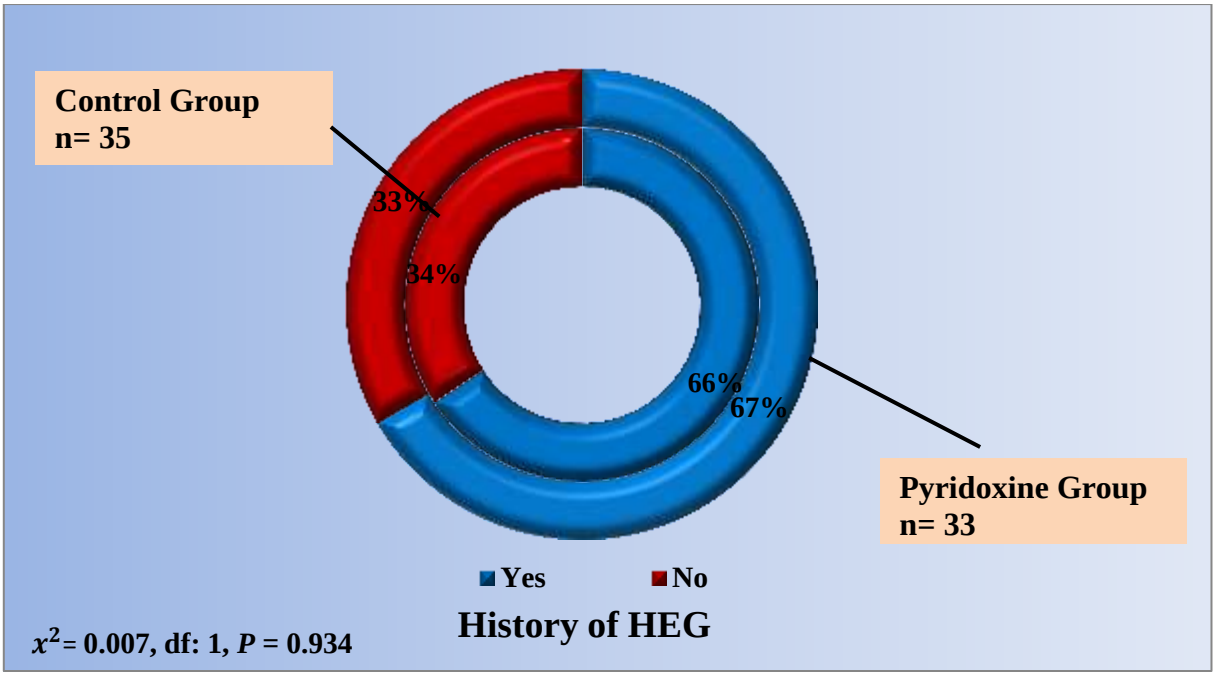

Figure 2: Distribution of maternal history of hyperemesis gravidarum among the study's groups (n=68)

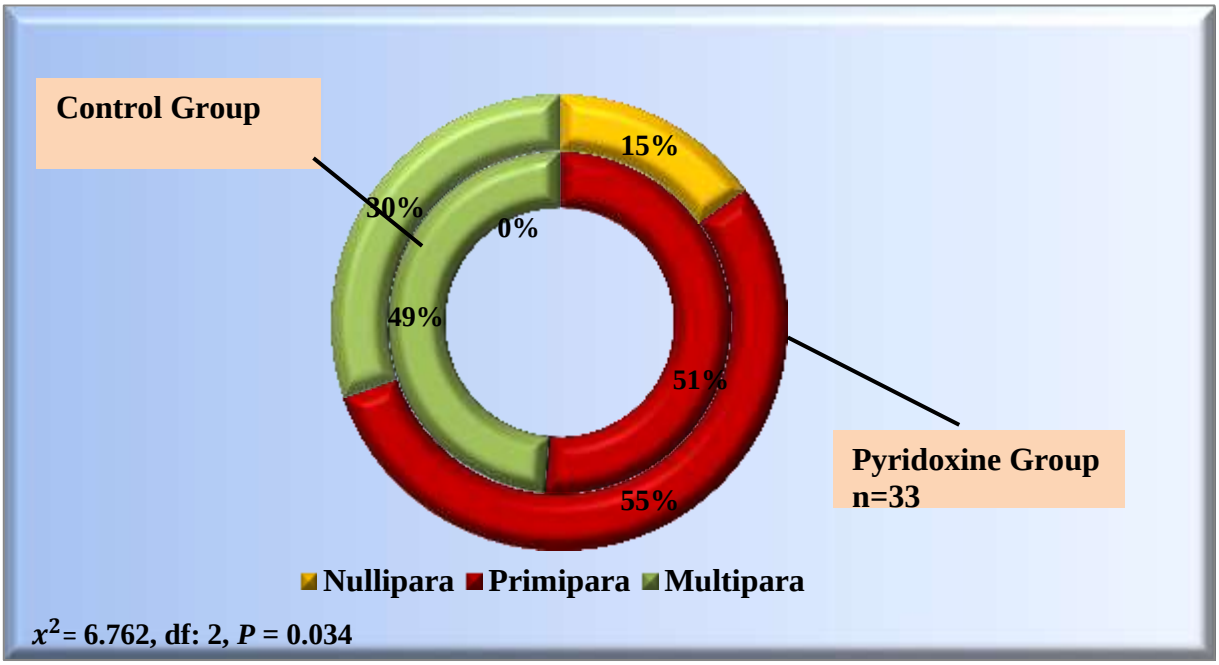

Figure 3: Distribution of maternal parity among the study's groups (n=68)

With respect to the post-cesarean incidence of early postoperative nausea and vomiting, no significant differences were found among study groups regarding such outcome (x^2 = 0.570, df: 1, P = 0.450) (Table 2).

Table 2: Post-caesarean incidences of nausea and vomiting among study groups

Post-caesarean Nausea and vomiting	Control-group (n=35)		Pyridoxine-group (n=35)		Total (n=70)	
	No.	%	No.	%	No.	%
Yes	3	8.6	5	14.3	8	11.4
No	32	91.4	30	85.7	62	88.6

Likelihood Ratio x^2 = 0.570, df: 1, P = 0.450

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DISCUSSION

Nausea and vomiting involve a complex mechanism that includes many centers in the body the central nervous system, autonomic nervous system, gastrointestinal system, and endocrine system, which results in a wide individual variability to neurogenic stimuli (Wiesmann, T. *et al*., 2015). Nausea and vomiting may be triggered by various stimuli including physiological, pathological, emotional, infectious, or pharmacological triggers (Zhong, W. *et al*., 2021), and this may explain the wide range of drugs that are used to treat PONV and the various outcome.

Many drugs are investigated in attempts to reduce postoperative nausea and vomiting as a single or combined drug with various outcomes. (Kaye, A.D. *et al*., 2017)

Although pyridoxine is considered to be a safe and low-cost drug, it has not been well investigated in the treatment of postoperative nausea and vomiting as a monotherapy despite showing good results in the treatment of pregnancy-induced nausea and vomiting (Jewell, D. *et al*., 2003)(Dr Gordon). Also when combined with doxylamine, pyridoxine showed good results in the treatment of nausea and vomiting associated with pregnancy or postoperative nausea and vomiting (Brenda, K. *et al*., 2005; Madjunkova, S. *et al*., 2014)

Few old studies were made to check the effectiveness of pyridoxine in reducing post-anesthetic nausea and vomiting, these studies failed to show positive results in preventing the symptoms (Kernis, L. *et al*., 1950; Bergmann, W, 1947), these results need to be reinvestigated especially with the change in the type of anesthetic drugs, anesthetic machines, and the surgical procedures.

In this study we tried to decrease the variables that affect the outcome, all the patients are female in gender, of young age group, undergoing caesarian section under general anesthesia, and the duration of the operation.

We found that the group which received intraoperative pyridoxine did not show improvement in the incidence of PONV in the early postoperative period (first 24 hours) when compared to the control group.

We faced two limitations in our study, the first limitation was the difficulty to contact the patients after discharge to inquire about the late incidence of PONV, and the second limitation was the variable postoperative treatment protocols (antibiotics and analgesics mainly) for the patient which may affect the PONV.

CONCLUSION

Despite the efforts to minimize the influencing variables (age, gender, type of operation, and the duration of surgery) pyridoxine did not show a positive effect in reducing the PONV. More efforts are needed to investigate pyridoxine effects in a larger sample size, different dosages, or type of surgery.

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