



Comparative study of subhypnotic dose of propofol alone and combined with dexamethasone for control of emetic episodes under spinal anaesthesia for caesarean section delivery

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Abstract

Introduction: Nausea, retching and vomiting are common and distressing for parturient undergoing cesarean delivery performed under regional anaesthesia. In recent years, various anti-emetic agents have been used for treatment of intraoperative and post-operative nausea and vomiting. None of the currently available antiemetic regimens are entirely effective and many are associated themselves with unpleasant side effects.

Material and Methods: This Randomized prospective study was conducted on 60 cases. Female patients ranging 20-45yrs (ASA I or II) at term undergoing cesarean section with spinal anaesthesia were included in this study.

Patients were randomly allocated into three groups (N= 20 each) to receive:

1. Group I: Infusion of inj. Propofol 1mg/kg/hr
2. Group II: Inj. Dexamethasone 8mg with infusion of injpropofol 1mg/kg/hr
3. Group III: Infusion of normal saline 1mg/kg/hr

Results: No statistically significant differences were found in pre-anaesthetic check-up parameters among the three groups. 35% patients in propofol group, 10% in Group II and 85% in control group show intraoperative symptoms ($p < 0.001$). 85% patients in control group, 10% in propofol group and 5% in Group II had postoperative symptoms ($p < 0.001$). The difference was found insignificant ($p > 0.05$). Sedation seen in one patient in propofol group and one patient in propofol+dexona group. No other adverse effects were found in any group.

Conclusion: We conclude that propofol given at subhypnotic dose infusion with dexamethasone is safe and more effective in controlling perioperative emetic symptoms compared to propofol or control group without increase in significant side effects in patient undergoing cesarean section under spinal anaesthesia.

Keywords: Dexamethasone, Propofol, Dexamethasone, Subhypnotic.

Introduction

Nausea, retching and vomiting are common and distressing for parturient undergoing cesarean delivery performed under regional anaesthesia. It is also a major factor, which determine post-operative recovery period. Prevention of nausea and vomiting associated with caesarean delivery under spinal anaesthesia has been a continual challenge for anaesthesiologist.

Caesarean delivery performed under regional anaesthesia is associated with a relatively high incidence (50%-80%) of intra-operative, post-delivery nausea and vomiting when no prophylactic antiemetic was provided^{1,2}.

The abrupt diaphragmatic contractions present in emesis are uncomfortable to the patient. It can lead to various surgical and non-surgical complications like wound disruption, oesophageal tear, gastric herniation, muscular fatigue, dehydration and electrolyte imbalance. These conditions may increase the risk of pulmonary aspiration of gastric content.

Intra operative nausea and vomiting (IONV) is a complex multifactorial problem arising from anaesthetic and non-anaesthetic causes.³

The risk factor involved in post-operative nausea and vomiting (PONV) may be age, gender, smoking habit, pain, operative procedure and anaesthetic technique. A surgical stimulus that is responsible for nausea and vomiting include exteriorization of the uterus, intra-abdominal manipulation and peritoneal traction during closure.^{4,5,6}

Anaesthesia related factors are pre-anaesthetic medication and anaesthetic technique. Premedication with opioids (morphine, fentanyl) increase the incidence of emetic symptoms by stimulating central nervous system opioids receptors. With the increase in the duration of surgery and anaesthesia, the risk of PONV increases possibly because of greater use of emetogenic anaesthetic agents. Anaesthetic, opioids and humoral factors released during surgery, activities the CTZ that affects labyrinths

and gastrointestinal tract resulting from surgical manipulation.⁷

Various pharmacological approaches has been used to reduce the incidence of nausea and vomiting in patients undergoing spinal anaesthesia for caesarean section but undesirable side effect of these drugs discourage the use as prophylactic agent to prevent intraoperative nausea and vomiting. Continued research for newer drugs and approaches to treat emesis indicate the magnitude of the problem and lack of satisfactory result.

In recent years, various anti-emetic agents have been used for treatment of IONV & PONV. Various groups of drugs include Anti-histaminics (promethazine, prochlorperazine, cyclizineetc), Anticholenergics agent including atropine and hyoscine, Major tranquilizers i.e. droperidol, Metoclopramide, Propofol, Dexamethasone.

None of the currently available antiemetic regimes are entirely effective and many are associated themselves with unpleasant side effects like sedation, dry mouth, dysphoria, restlessness and extra-pyramidal reaction.

Aim of the study was to see the incidence of nausea and vomiting and to compare the antiemetic efficiency of subhypnotic dose of propofol alone and combined with dexamethasone in patients undergoing cesarean section under spinal anaesthesia.

Material and Methods

This Randomized prospective study was conducted on 60 cases. Female patients ranging 20-45yrs (belonging to ASA physical status I or II) at term undergoing cesarean section with spinal anaesthesia were included in this study.

Patient with contraindications for regional anaesthesia like with a history of sensitivity to drug used in the study, patients with gastrointestinal diseases, liver diseases, hyperlipidemia, hyperemesis gravidarum, and those who have received drug with anti-emetic properties within 24 hrs before surgery were not included in study. Pre anaesthetic checkup carried out before surgery.

Patients were randomly allocated into three groups (N= 20 each) to receive:

1. Group I: Infusion of inj. Propofol 1mg/kg/hr
2. Group II: Inj. Dexamethasone 8mg with infusion of injpropofol 1mg/kg/hr
3. Group III: Infusion of normal saline 1mg/kg/hr

After baseline blood pressure, heart rate, and pulse oximetry values were recorded, Dural puncture was performed at the L3-L4 inter space with 23 or 25 gauge number puncture needle in right lateral decubitus position. After the free flow of cerebrospinal fluid, 2.5ml of 0.5% hyperbaric bupivacaine (12.5mg) were injected intrathecally. Following confirmation of sensory block by loss of sensation to cold and pinprick to T4-T5 level, surgical incision was given.

Spo2, pulse rate, respiratory rate and arterial blood pressure were monitored and recorded every 5 min interval for first 30 min after spinal anaesthesia, then every 15 min during surgery. The study agent was infused by using a programmable syringe pump and was started immediately after clamping of the umbilical cord. Intraoperative and post-delivery emetic episodes (nausea, retching, vomiting) experienced by the patients were recorded. Episodes were identified by direct questioning or by spontaneous complaint by the patient. If two or more episode of emesis occurred 4 mg of inj. Ondansetron was intravenously administrated.

Postoperatively each patient was followed and observed in the post anaesthesia care unit for vital signs and adverse events like nausea, severity and number of emetic episode. Blood pressure, heart rate, respiratory rate were monitored and

incidence of emetic episodes recorded at 1hr, 4 hr, 12 hrs and 24 hrs postoperatively.

In this study the severity of nausea and vomiting is assessed by VAS (visual analogue scoring) system.

Results

Table 1 shows the distribution of patients according to age along with the mean age of all the three groups in years. No statistically significant differences were found in pre-anaesthetic check-up parameters among the three groups. 35% patients in propofol group, 10% in propofol+dexona group and 85% in control group show intraoperative symptoms (Table 3). Statistically highly significant differences were found between propofol versus control and propofol+dexona vs control groups (p<0.001).

85% patients in control group, 10% in propofol group and 5% in propofol+dexona group had postoperative symptoms (Table 4). Statistically highly significant differences were found between propofol versus control and propofol+dexona versus control groups (p<0.001).

Table 5 shows distribution of cases according to the perioperative complications. 5% cases both in propofol and propofol+dexona group and 10% cases in control group suffered from bradycardia whereas 25%, 20% and 15% cases suffered from hypertension respectively. The difference was found insignificant (p>0.05). Sedation seen in one patient in propofol group and one patient in propofol+dexona group (Table 6). No other adverse effect like extrapyramidal side effects, allergic reaction, dystonic reaction, seizures and pain on injection were found in any group.

Table 1 Distribution of patients according to Age Group (years) in all three groups

Age Group (years)	Groups					
	Propofol		Propofol + Dexona		Control	
	No.	%	No.	%	No.	%
<20	4	20.0	1	5.0	1	5
21-30	14	70.0	18	90.0	16	80.0
>30	2	10.0	1	5.0	3	15.0
Mean	24.95		24.90		25.26	
SD	4.73		2.90		4.21	

Table 2 Statistical analysis of different parameters in Pre-anaesthetic check up

Characteristics	Propofol		Propofol + Dexona		Control		P
	Mean	SD	Mean	SD	Mean	SD	
Pulse (/min)	91.60	11.79	89.70	11.13	88.65	4.48	0.625
Systolic BP (mmHg)	129.10	12.46	127.40	9.32	128.30	7.95	0.868
Diastolic BP (mmHg)	84.70	8.27	81.10	6.03	81.80	5.02	0.195
Sebrasez Test (sec.)	22.60	0.82	23.00	0.97	23.00	0.97	0.295
Hemoglobin (gm%)	9.30	1.11	9.60	0.98	9.25	0.89	0.484
BT (min)	2.06	0.19	2.21	0.19	2.24	0.44	0.130
CT (min)	3.44	0.29	3.38	0.33	3.28	0.46	0.391
RBS (mg/dl)	87.50	16.28	94.90	7.93	88.60	9.24	0.108

Table 3 Intraoperative symptoms among different groups

Symptoms	Propofol		Propofol + Dexona		Control	
	No.	%	No.	%	No.	%
Nausea	3	15.0	1	5.0	6	30.0
Retching	1	5.0	0	-	5	25.0
Vomiting	3	15.0	1	5.0	6	30.0
Severe Vomiting	0	-	0	-	0	-
Total	7	35.0	2	10.0	17	85.0
	X ²				P	
Propofol vs Control	10.4167				<0.001	
Propofol + Dexona vs Control	22.5564				<0.001	

Table 4 Postoperative symptoms in all three groups

Symptoms	Propofol		Propofol + Dexona		Control	
	No.	%	No.	%	No.	%
Nausea	1	5.0	0	-	6	30.0
Retching	0	-	1	5.0	5	25.0
Vomiting	1	5.0	0	-	6	30.0
Severe Vomiting	0	-	0	-	0	-
Total						
	X ²				P	
Propofol vs Control	22.5564				<0.001	
Propofol + Dexona vs Control	25.8586				<0.001	

Table 5 Distribution of patients according to the perioperative complications

Symptoms	Propofol		Propofol + Dexona		Control		X ²	P
	No.	%	No.	%	No.	%		
Bradycardia	1	5.0	1	5.0	2	10.0	0.536	0.765
Hypertension	5	25.0	4	20.0	3	15.0	0.625	0.732

Table 6 Distribution of cases according to adverse effects

Adverse Effects	Propofol		Propofol + Dexona		Control	
	No.	%	No.	%	No.	%
Sedation	1	5.0	1	5.0	0	-
Extrapyramidal side effects	0	-	0	-	0	-
Allergic Reaction	0	-	0	-	0	-
Dystonic Reaction	0	-	0	-	0	-
Seizures	0	-	0	-	0	-
Pain on Injection	0	-	0	-	0	-
Others	0	-	0	-	0	-

Discussion

The etiology of nausea, retching and vomiting in parturient undergoing spinal anaesthesia for

cesarean delivery is complex and dependent on multiple factors including anaesthetic like hypotension, increased vagal activity, drugs etc.

as well as nonanaesthetic like surgical stimuli, uterotonic agents etc. Post-operative recovery and hospital stay increased if patient develop post-operative nausea and vomiting. Prolonged vomiting may give rise to electrolyte imbalances, dehydration and other surgical complications. The currently used antiemetics are also not free of various side effects.⁸

Propofol is having some anti-emetic action which can be useful to decrease the incidence of post-operative nausea and vomiting when used as subhypnotic dose. Dexamethasone also shown to have anti emetic properties in various surgical procedures.⁹

In this study, we had compared efficacy and safety of propofol alone at subhypnotic doses and propofol combined with dexamethasone to reduce emesis in parturient undergoing caesarian section under subarachnoid block.

All the three group are comparable in demographic profile of patients. Maximum patients belongs to age group 21-30 and no difference in mean age group in groups. In our study all, the three groups are comparable with respect to age, weight and pre anaesthetic factors.

Bradycardia and hypotension were not statistically significant in these groups. Studies like Rudra et al and Halder et al¹⁰ have shown the use of subhypnotic dose of propofol decreases incidence of emesis without increasing its unwanted cardiovascular side effects. Bianchin et al¹¹ also showed that use of single dose dexamethasone decreases emesis without increasing side effects like bradycardia and hypotension. Our study also showed similar results.

Incidence of intraoperative nausea retching and vomiting were 85%, 35% and 10% in control group, propofol group and propofol with dexona group respectively which was statistically significant in our study. In study by Yoshitaka F. and Numazaki et al they have shown statistically significant lower incidence of intraoperative emetic symptoms in-group receiving propofol with dexona (5%) compared to group received only propofol (20%).⁸

In our study 5%, 10% and 85% had postoperative emetic symptoms in propofol with dexona group, propofol group and control group respectively. These are statistically significant when compared between propofol vs control and propofol with dexona vs control group ($p < 0.001$).

Rudra A and Halder R et al¹⁰ showed use of subhypnotic dose of propofol found to have lower incidence of emesis post-operative emesis compared to control group (86% vs 40%). Another study by Yoshitaka F and Numazaki M et al showed use of sub hypnotic propofol along with dexamethasone were significantly more effective in reducing emetic symptoms after spinal anaesthesia in cesarean section compared to propofol alone group (5% vs 20%).⁸

Jaafarpour M. et al¹² compared groups receiving dexamethasone and placebo therapy, showed statistically lower incidence of nausea, and vomiting in dexamethasone group. Fujii Y. Nakayama M.¹³ also showed low dose propofol combined with dexamethasone are more effective in reducing postoperative nausea and vomiting compared to propofol alone. Our study showed similar results as in other studies and support the evidence that subhypnotic propofol along with dexamethasone had better outcome in reducing post-operative nausea and vomiting.

In our study, sedation was found in only two patients 1 each in propofol and propofol with dexona group, which was not significant. Other side effects like extrapyramidal side effects, allergic reaction, seizures and pain on injection etc. were not found in any groups of our study.

Various other studies like Yoshitaka Fuji and Mitsuko Numazaki et al^{8,14} and Rudra A et al¹⁰ showed no significant side effects in propofol with dexona group compared to other groups.

Conclusion

We conclude that propofol given at subhypnotic dose infusion with dexamethasone is safe and more effective in controlling perioperative emetic symptoms compared to propofol or control group without increase in significant side effects in

patient undergoing cesarean section under spinal anaesthesia.

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