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Original article

Effects of IV Ondansetron during spinal anaesthesia with Ropivacaine and Fentanyl

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Abstract

Background and aim: Intrathecal fentanyl improves quality of spinal anaesthesia and prevents emesis during caesarian section under spinal anaesthesia. The study was done to determine if ondansatron has any beneficial effect during caesarian section under spinal anaesthesia with isobaric ropivacaine and fentanyl. Methods: One hundred two patients undergoing elective caesarian section under spinal anaesthesia were enrolled for the randomized, prospective, double blind study. Fifty one patients of group O received ondansatron 4mg after delivery of baby and 51 patients of group C received normal saline as placebo. Results: A total of 95 eligible patients were included in the study. There were 47 patients in group O and 48 patients in group C. There were no statistically significant differences between the groups on the incidence of emesis (8.5% vs 12.5%) and total mephentermine requirement (8.06 ± 6.60 vs 7.12± 8.17) in mg. Conclusion: Administration of ondansetron after delivery of baby has no any beneficial effect on maintaining haemodynamic stabily and reducing incidence of emesis if intrathecal fentanyl is coadministered with local anaesthetics and emetic drugs are not used.

Introduction

Nausea, with reported incidence of 40 -81%, is a common side effect during caesarean section performed under regional anaesthesia.[1] Ondansetron has been used for preventing perioperative nausea and vomiting during caesarian section. It is reported that ondansetron has beneficial haemodynamic effects during spinal anaesthesia for caesarian section.[2,3] Intrathecal fentanyl prevent intraoperative nausea and vomiting during caesarian section under spinal anaesthesia.[4,5] The study was done to determine if ondansetron has any beneficial effects on maintaining haemodynamic stabily and reducing incidence of emesis with intrathecal ropivacaine and fentanyl for caesarian section .

Methods

The study was approved by hospital ethics committee. Informed written consent for the study was obtained from 100 patients of American society of anesthesiologists Grade 1 or 2, presenting for elective caesarian section. Exclusion criteria were: contraindication for regional anaesthesia, severe PIH, established gastrointestinal disease and antiemetic medication in the previous 24 hours. Patients were randomly divided into one of two equal groups to receive either ondansetron 4 mg or normal saline within 1 to 2 minutes of delivery of baby. All patients

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were infused with 500 ml of Ringer Lactate before performing sub arachnoid block. Patients were placed in lateral position on the horizontal operating table. Intrathecal injection of isobaric ropivacaine 0.75%, 2.3ml (17mg) and fentanyl 0.3 ml, 15 µg was done through Quinke needle 25 G. The level of analgesia was assessed by pinprick. Surgery was allowed to commence when adequate level of anaesthesia is obtained (sensory level at T_5 dermatome bilaterally). Patients were monitored with electrocardiogram (ECG), pulse oximetry and non invasive blood pressure (NIBP). Non-invasive BP was monitored at 3 minutes interval. Additional NIBP measurement was done if significant tachycardia was detected between two routine measurements of NIBP. Oxygen was administered if oxygen saturation fell below 95%. Hypotention (decrease in systolic blood pressure of 20% more from baseline values or absolute decrease to 100 mm Hg) was treated by increasing the rate of fluid administration, left lateral tilt and incremental doses of mephentermine. Oxytocin was administered at dose of 5 units of slow bolus following delivery of infant and infusion of 5 units in 500 ml of fluid. At the initiation of surgery, Ondansetron 4mg was diluted with normal saline to 5ml by a second anaesthetist at a separate room. The placebo was 5 ml of normal saline. The anaesthetist who was blinded to content of the syringe observed the patients. Intra-operaratively, haemodynamic parameters, emetic episodes, consumption of mephentermine, requirement of atropine and any other drugs were recorded.

Result

One hundred two patients were initially included in the study. Two patients of group O and one patient of group C were excluded from the study because of inadequate level of anaesthesia. Two patients of each group received ergometine or corboprost on surgeon request, and so excluded from study. The remaining 95 patients were of 47 patients in group O and 48 patients in group C. Extorization of uterus was done in most of the patients. There were no significant differences with respect to demographic parameters and duration of operation (Table 1). The baseline and intra-operative haemodynamic parameters were comparable between the two groups (Table 1 and 2). Four patients (8.5%) of group O and 6 patients (12.5%) of group C experienced nausea and vomiting, but the difference was statistically insignificant (P=0.74). The cumulative mephentermine requirements after delivery of baby were 8.06 ± 6.6 in group O and 7.12 ± 8.17 in group C. The difference was statistically insignificant. Patients were infused with 1.2-2 liters of fluid.

Five patients in group O was found to be drowsy with oxygen saturation transiently falling to 93 to 94%. The oxygen saturation was normal on arousing the patients.

Discussion

Pregnant women are predisposed to experience nausea and vomiting due to high level of progesterone. Three most common factors that can be attributed to intraoperative nausea and vomiting (IONV) are hypotension, visceral pain and intravenous emetic drugs. Emetic drugs that are commonly used during caesarian section are iv opioids, ergometrine and carbopost. Opioids and local anaesthetics coadministered intrathecally have potent synergistic analgesic effects. It was evident that adequate level of anaesthesia is achieved by adding fentanyl with lower doses of local anaesthetics.[4] Khaw and colleagues determined the ED50 of isobaric ropivacaine without additive for caesarean section to be 16.7 mg.[6] P. Gautier and

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colleagues reported that ropivacaine 12 mg (50% of ED 95) with sufentanyl 2.5 µg had a high failure rate.[7] We decided to use isobaric ropivacaine 17mg with fentanyl 15 µg for intrathecal administration. Ondansetron, a selective 5-hydroxytryptamine 3 (5 HT3) receptor antagonists is a potent antiemetic. The 5 HT3 receptors are located peripherally on the cardiac vagal afferent and centrally in the chemoreceptor trigger zone. The Bezold- Jarisch reflex causes cardiovascular depression through serotonin. Ondansetron, as a 5 HT3 receptor antagonist, suppresses the Bezold-Jarisch reflex[2, 3].

In our study the difference of rate of post delivery intraoperative nausea and vomiting were found to be insignificant (p=0.74). Manullang and colleague found that intrathecal fentanyl prevent intraoperative nausea and vomiting.[4] Manal and colleague reported that ondansetron significantly reduces the requirement of ephedrine.[2] In their study only bupivacaine was injected for subarachnoid block and ondansetron was injected before initiation of subarachnoid block. So, the result of our study may differs from that of Manal and colleague. However, three patients of group C, on contrary to none of group O, required more than three incremental doses of mephentermine.

The patients of our study are relatively small in stature and weight. The ED50 of ropivacaine for our parturients may be lower than 16.7 mg. In our study, no patient experienced high spinal anaesthesia or respiratory difficulty. Oxygen supplementation was required for none. We found inadequate level of anaesthesia for four patients. The intrathecal dose of ropivacaine even with fentanyl may be higher than 17 mg to decrease failure rate of spinal anaesthesia.

Conclusion

Administration of ondansetron after delivery of baby has no any beneficial effect on maintaining haemodynamic stabily and reducing incidence of emesis if intrathecal fentanyl is coadministered with local anaesthetics and emetic drugs are not used.

Table 1: Demographic parameters in the two groups

Variables	Group O	Group C	P value
Age (years)	23.6 8±5.51	25.23±2.36	0.07
Height (Inch)	61.36±1.42	60.7± 2.00	0.06
Weight (kg)	56.53±9.50	58.9±7.64	0.18
Duration of operation (min)	47.59 ± 7.65	45.45±6.65	0.14
Apgar score 1 min	8-9	8-9	-
Apgar score 5 min	9-10	9-10	-

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Table 2: Comparision of mean systolic blood pressure			
Time	Group O	Group C	P
Baseline	130.87 ± 12.68	132.02 ±13.56	0.6
3 min after block	125.65 ± 14.48	124.93 ± 17.67	0.8
6 min after block	111.50 ± 16.73	113.29 ± 16.45	0.6
3 min after delivery	115.87 ± 13.68	114.21 ± 15.57	0.5
6 min after delivery	118.49 ± 14.56	117.97 ± 13.57	0.6
15 min after delivery	111.43 ± 13.89	112.17 ± 18.58	0.8
24 min after delivery	113.43 ± 12.50	112.52 ± 10.46	0.7
30 min after delivery	110.96 ± 10.76	108.85 ± 10.95	0.3

Table 3: Comparision of mean heart rate			
Time	Group O	Group C	P
Baseline	92.97 ± 11.36	90.35 ± 8.37	0.2
3 min after block	98.76 ± 16.56	99.31 ± 20.87	0.8
6 min after block	97.04 ± 13.33	96.48 ± 19.21	0.8
3 min after delivery	92.20 ± 14.00	89.70 ± 13.43	0,3
6 min after delivery	92.11 ± 13.23	92.87 ± 10.36	0.9
15 min after delivery	92.97 ± 11.36	91.68 ± 10.09	0.5
24 min after delivery	94.95 ± 13.54	94.05 ± 12.27	0.4
30 min after delivery	95.87 ± 11.76	94.77 ± 12.84	0.9

Table 4 : Complications and mephentermine requirement.			
	Group O N=47	Group C N=48	P
Nausea & vomiting	4 (8.5%)	6(12.5%)	0.74
Vomiting	0	2	-
Drowsiness	5	0	0.026
Shivering	1	1	
Itching	0	0	
Bradycardia	O	o	
Mephentermine after delivery(mg)	8.06 ± 6.60	7.12±8.17	0.53
No of patients requiring more than 3 doses of mephentermine	0	3	

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