PROPHYLACTIC SINGLE DOSE INTRAVENOUS ADMINISTRATION OF ONDANSETRON IN THE PREVENTION OF POSTOPERATIVE EMETIC SYMPTOMS DURING SPINAL ANAESTHESIA FOR CAESAREAN DELIVERY

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SUMMARY

In a placebo controlled study, we compared the efficacy and safety of 4 mg ondansetron, a 5-HT₁ receptor antagonist administered before spinal anaesthesia. We studied 40 patients undergoing caesarean delivery. None of the patients had any experience of anaesthesia before this trial. The study groups were similar for patients characteristics, surgical procedures, type, volume and concentration of local anaesthetics.

The frequency of nausea was 75% after placebo and 10% after ondansetron. The corresponding frequency of retching and vomiting were 60% after placebo and 5% after ondansetron.

We conclude that ondansetron is more effective than placebo (P < 0.001) in the control of emetic episodes before and after delivery of baby under spinal anaesthesia.

Keywords: Complications: Nausea, Vomiting Pharmacology: antiemetics, IV ondansetron Anaesthesia: obstetric, regional, spinal.

Incidence of nausea and vomiting may occur up to 66% of cases in caesarean delivery under regional anaesthesia, unless antiemetic agents were used prophylactically.¹² The occurrence of peripartum emetic episodes during the course of surgery under regional anaesthesia are distressing to the patient and disturbing to the surgeons. None of the currently available antiemetic regimens are entirely effective. Droperidol minimized the incidence of peripartum nausea and vomiting in caesarean delivery performed under spinal anaesthesia.¹ Use of droperidol may cause prolonged sedation² and respiratory depression.³ Metoclopramide has been considered the most effective single agent by Lussos et al.⁵ In some patient metoclopramide may cause distressing extrapyramidal reactions⁶ and sedations because of its activity as a dopamine antagonist.

Ondansetron, one of the new class of 5-hydroxytryptamine subtype 3 (5HT₁₃) receptor antagonists, has been shown to be effective in the prevention of chemotherapy induced emesis.⁷ Further it has shown, that ondansetron in 4 mg is the optimal intravenous dose for the prevention of postoperative nausea and vomiting.⁸

We undertook a double blind, randomized study to assess the efficacy and safety on ondansetron in comparison to placebo administered intravenously before induction of spinal anaesthesia for prophylaxis of nausea and vomiting during and after caesarean delivery.

Method

The protocol was reviewed and approved by the medical ethics committee of the hospital. All subjects gave informed consent in the presence of a witness.

Fourty parturients (ASA physical status I and II) scheduled for elective caesarean delivery during spinal anaesthesia were subjects for this study. Parturients were excluded if they had a history of nausea and/or vomiting in the 24 hours before induction of anaesthesia, history of gastro-intestinal disturbances, or maternal history suggestive of chronic uteroplacental insufficiency.

Each patient received 20 ml/kg of lactated Ringer’s solution (as recommended by Chestnut et al.) before administration of spinal anaesthesia to prevent hypotension. Before entering the operation theatre, patients were randomized in a double blind fashion to receive either 3 ml (4 mg) ondansetron or 2 ml normal saline intravenously. Twenty patients were in each group. All patients received oxygen via a face mask at a flow rate of 3 litres minutes⁻¹ since induction of spinal anaesthesia. Women were positioned in the right lateral decubitus and a 23 gauge Quinke spinal needle was introduced through mid line approach at the L₁–L₂ interspace. Patients received 2 ml...
PAN, RUDRA: IV ONDANSETRON FOR PONV DURING SA

of 0.5% bupivacaine (hyperbaric) subarachnoid injection. Aortocaval compression was avoided by placing a single folded blanket beneath the right buttock for left uterine displacement. The level of analgesia was assessed by pin-prick and all patients had analgesia up to T4–T5 level.

Blood pressure measurements were recorded every 5 minutes by auscultatory method until delivery of baby, then every 10 minutes till the patient was transferred to the recovery room. The eyes of the patient were covered with cotton pads to minimize anxiety evoked by the atmosphere of the operating theatre. Hypotension was defined as a decrease in systolic arterial blood pressure of 20% from baseline, or a systolic blood pressure below 100 mmHg.

Each patient was observed for the intraoperative occurrence of nausea and vomiting. Retching and / or vomiting were taken as positive responses for vomiting.

Each patient remained in the recovery room for 4 hours and was observed by the nursing staff for the postoperative occurrence of nausea and vomiting. Parametric data were analyzed by the student’s t-test and non-parametric data by chi-square analysis. A P-value of less than 0.05 was considered significant.

Results

There were 20 patients in each group (ondansetron and placebo). The two groups were similar with regard to maternal characteristics (Table 1). Caesarean deliveries were performed by one of the consultants.

<table>
<thead>
<tr>
<th>Table – 1: Maternal characteristics</th>
<th>Ondansetron</th>
<th>Placebo</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>26±4</td>
<td>27±5</td>
<td>NS</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>54±11</td>
<td>56±12</td>
<td>NS</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>155±6</td>
<td>153±8</td>
<td>NS</td>
</tr>
<tr>
<td>Parity</td>
<td>1±1</td>
<td>1±1</td>
<td>NS</td>
</tr>
<tr>
<td>Gestation (weeks)</td>
<td>39±1</td>
<td>39±1</td>
<td>NS</td>
</tr>
</tbody>
</table>

All figures are mean ± S.D.

NS: Not Significant

Patients who have received prophylactic ondansetron showed a satisfactory lower incidence of intraoperative nausea and vomiting as compared to placebo group 10 % versus 75% (P < 0.001) shown in Table 2. Moreover, the patients belonging to ondansetron group had overall decrease in the incidence of intraoperative retching and vomiting, 5% in the ondansetron group versus 60% in the placebo group (P < 0.001). Emetic symptoms before the delivery of baby observed in 65% of the women in the placebo group whereas, no women, in ondansetron group had emetic symptoms before delivery of the baby. Post delivery emetic symptoms observed in 65% of patients belonging to the placebo group as compared to 10% of patients treated with prophylactic ondansetron (P < 0.002).

<table>
<thead>
<tr>
<th>Table – 2: Intra-operative and early post-operative incidences of nausea, retching and vomiting associated with spinal anaesthesia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ondansetron</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>Nausea</td>
</tr>
<tr>
<td>Before delivery</td>
</tr>
<tr>
<td>After delivery</td>
</tr>
<tr>
<td>Retching and Vomiting</td>
</tr>
<tr>
<td>Before delivery</td>
</tr>
<tr>
<td>After delivery</td>
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<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Hypotension was observed in 10% (2 in 10) of patients in ondansetron group after induction of spinal anaesthesia as compared to 5% (1 of 20) in the placebo control group. The incidence of postdelivery hypotension was nil in both groups.

There were no apparent adverse maternal effect from ondansetron administration.

Apgar scores were 8 or more in all infants.

Discussion

In our study, there is one similarity regarding methodology with the study of Lussos et al.5 The attempts were made to control the occurrence of intraoperative nausea and vomiting and the patients had a sensory level block of at least T4 – T5 and received supplemental oxygen via a face mask. Intravenous crystalloids were liberally administered to prevent hypotension.

The incidences of emetic symptoms are high during the pregnancy because of increased concentration of progesterone in the system. Progesterone decreases gastrointestinal motility and reduces lower oesophageal pressure. These physiological and anatomical changes may predispose the pregnant patients to develop emetic sequelae. Furthermore, the incidence of nausea and vomiting during regional anaesthesia for caesarean delivery is relatively high. Factors attributed are younger age, surgical skill, peritoneal traction, exteriorization of the uterus, fundal pressure during difficult delivery, anaesthetic management and prevention.
of hypotension in women undergoing caesarean delivery with spinal anaesthesia. However, in our study, most of these factors were well-controlled, so that any difference in emesis-free episodes during spinal anaesthesia for caesarean delivery can be attributed to the study drugs.

In this study, we have observed that 4 mg intravenous administration of ondansetron prior to induction of spinal anaesthesia for caesarean delivery significantly decreased the incidence of emetic symptoms (10% versus 75%) without any maternal or neonatal effects.

Nausea has been considered to be a premonitory sign of hypotension, and is the subjective feeling of human subjects which precedes vomiting. Brainstem hypoxaemia may develop due to hypotension after induction of spinal anaesthesia and that could directly trigger the vomiting centre and cause emetic symptoms. In our study supplemental oxygenation in addition to prehydration and left uterine displacement, minimized the incidence of intraoperative nausea and vomiting.

No observed neonatal effects were found when neonatal Apgar scores and neurobehavioural scores were evaluated. Thus the results of our study confirmed that, preoperative administration of ondansetron maintain the neonatal safety.

In conclusion, our study suggests that intravenous administration of ondansetron 4 mg before the induction of spinal anaesthesia reduced the incidence of intraoperative emetic episodes significantly during spinal anaesthesia for caesarean delivery. This dosage also appears safe for the mother and the newborn. We recommend the preoperative use of 4 mg intravenous ondansetron in pregnant patients presenting for caesarean delivery receiving spinal anaesthesia.

References