Original Research Article

Comparison of intravenous ondansetron and intrathecal fentanyl for intraoperative vomiting and nausea prevention during caesarean delivery under spinal anaesthesia

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Abstract

Background: There are very few studies that state the direct comparison between the fentanyl and ondansetron in preventing the nausea and vomiting during caesarean section for delivery. Hence the present study was done with the aim to compare the two drugs; Intrathecal fentanyl and IV ondansetron. **Materials and Methods:** A total of 58 patients were included in the study with elective term singleton pregnancy for Caesarean Section (CS). , group A (IT fentanyl) received 2 ml (10 mg) of 0.5% heavy bupivacaine followed by 0.4 ml (20 microgram) of IT fentanyl and 2 mL IV normal saline immediately after the placement of SAB. Group B (IV ondansetron) received 2 ml (10 mg) of 0.5% heavy bupivacaine followed by 0.4 mL IT normal saline and 2 mL (4 mg) IV ondansetron immediately after SAB. **Results:** During stage observation four cases from fentanyl group had nausea in comparison to one case from ondansetron group whereas none of the patient from any group had vomiting. There was no statistically significant difference in the incidence of nausea and vomiting in the other stages of surgery. **Conclusion:** The incidence of nausea and vomiting was lower in the ondansetron group. Incidence of nausea during 6th stage of the study was also less in ondansetron group in comparison to fentanyl group making it superior for prevention of intraoperative nausea and vomiting

Keywords: Caesarean section, Fentanyl, Nausea, Ondansetron, Spinal anaesthesia, Vomiting.

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INTRODUCTION

Goals for anesthesia for cesarean delivery must include the comfort and safety of the parturient, and the well-being of the fetus and neonate. Anaesthesia for Caesarean section traditionally takes place in the operating theatre itself to reduce the time from induction to delivery of the infant; 70% of UK obstetric units never use anaesthetic rooms for Caesarean section.[1] Induction is usually carried out with the patient catheterized, the abdomen draped, and surgeons scrubbed. The patient is positioned with left lateral tilt to avoid aortocaval compression. Some practitioners prefer a 30º head-up tilt, arguing improvement to maternal well being through an increased functional residual capacity (FRC), reduced breast interference to intubation, and reduced gastro-oesophageal reflux.[2,3] Striking the ideal balance between a reduction in the overall cesarean delivery rate without increasing the odds for urgent/emergent cesarean deliveries is complex, with clinical obstetric decisions potentially resulting in unplanned scenarios that could significantly impact anesthetic options.[4] The availability of improved anaesthesia devices and monitoring and the establishment of clinical recommendations for anaesthesia management of obstetric patients are believed to explain the decrease in morbidity and mortality associated with general anesthesia.[5, 6] Intraoperative nausea and vomiting occurs in

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as many as 66% of cesarean deliveries performed under regional anesthesia. This can be distressing to the patient, can make the surgery difficult to perform, and may increase the risk of aspiration of gastric contents. Several anti-emetics are proven to diminish this problem. 5-HT3 antagonists (ondansetron, granisetron) are effective in reducing nausea whose antiemetic properties are mediated through central (vomiting center, chemoreceptor trigger zone) and peripheral (intestinal and spinal) 5-HT3 receptor blockade.[7,8] The advantage of Intrathecal lipophilic opoids like fentanyl is that it decrease the intraoperative vomiting and nausea and also increases both the duration and the intensity of spinal anesthesia. Fentanyl has become the drug of choice because it is inexpensive and has very few side effects.[9] There are very few studies that state the direct comparison between the fentanyl and ondansetron in preventing the nausea and vomiting during caesarean section for delivery. Hence the present study was done with the aim to compare the two drugs; Intrathecal fentanyl and IV ondansetron.

MATERIALS AND METHODS

The present is the sectional randomized double-blind comparative was carried out in the department of the anaesthesiology. The institutional committee was informed about the study and ethical clearance certificate was obtained prior to the start of the study. A total of 58 patients were included in the study. All elective term singleton pregnancy for Caesarean Section (CS) with Physical status ASA II was included. All patients with a history of motion sickness, hyperemesis gravidarum, contraindications to regional anesthesia, or allergies to the study medications were excluded from the study. All the patients underwent pre-anaesthetic check-up before the day of surgery and on the day of surgery the information was reviewed. Investigations were done and reviewed on the day of surgery. For 8 hrs, the nil per oral status was maintained. No other premedication was allowed. When the patients entered in the operation theatre the oxygen saturation, heart rate, ECG and baseline pressure were recorded. Before the start of SAB the patients were infused with 10 ml/kg of ringer lactate solution. Study drugs were prepared by an anesthesiologist not involved in this study and was dispensed in unlabeled syringes. Subjects were randomized into two groups (A and B). Using a computer-based randomization, group A (IT fentanyl) received 2 ml (10 mg) of 0.5% heavy bupivacaine followed by 0.4 ml (20 microgram) of IT fentanyl and 2 mL IV normal saline immediately after the placement of SAB. Group B (IV ondansetron) received 2 ml (10 mg) of 0.5% heavy bupivacaine followed by 0.4 mL IT normal saline and 2 mL (4 mg) IV ondansetron immediately after SAB. The patients were draped and cleaned with betadine. With help of 2% lignocaine hydrochloride solution the local anaesthesia was given. This was followed by spinal blockage with 25 gauge needle at L2 – 3 interspace. After the in thecal injection the patients were placed in the supine position with the displacement of left uterine. With the help of cold and hot temperature, movement of limbs and sterile needle pricks the level of sympathetic, sensory and motor block was tested and analysed. Throughout the procedure the heart rate, ECG and oxygen saturation were monitored continuously. With the help of facemask, throughout the procedure and one hour post operative; there was continuous supply of 3 litres/min. For the treatment of hypotension there was incremental administration of 5 mg ephedrine. Patients who complained of pain were given 50 microgram IV fentanyl following the delivery of fetus and were excluded from the study. Other variables recorded included perioperative fentanyl or other analgesic use, intraoperative ephedrine usage, interval between spinal placement and first request for postoperative analgesics. APGAR score at one and five min were recorded by attending pediatrician. Numeric rating scale (NRS) with Wong-Baker faces was used to evaluate post-operative pain assessment with score of 0 as no pain and 10 with worst pain possible.

RESULTS

Total of 58 patients were included in the study, divided into two groups of 29 patients each. Patients in group 1 were administered with IT fentanyl and in group 2 were given IV ondansetron. Mallampati score 1 was found in 21 patients from group 1 and in 28 patients from group 2. Among total patients in both the groups, 20 cases had blockade level of T4 dermatome. Majority of cases had level of blockade of T6 with 12 cases in group 1 and 20 cases in group 2. Average duration of the surgical procedure was found to be 41.78 ± 11.21 minutes. APGAR score at 1 minute was not a significant finding with only 0.9% having scored less than five and none had score less than five at 5 min interval among both groups.

During stage observation four cases from fentanyl group had nausea in comparison to one case from ondansetron group whereas none of the patient from any group had vomiting. There was no statistically significant difference in the incidence of nausea and vomiting in the other stages of surgery. One case from fentanyl group and 5 cases from ondansetron group required IV Ephedrine during stage 6. Among total patients, mean NRS score in fentanyl group was 1.85 ± 2.08, 2.1 ± 1.11, 2.53 ± 0.10 and 2.43 ± 0.10 during 1st, 2nd ,3rd and 4th post-operative hour respectively whereas mean NRS score in ondansetron group was 2.90 ± 1.45, 2.98 ± 1.35, 3.10 ± 0.16 and 3 ± 2.23 during 1st, 2nd ,3rd and 4th post-operative hour respectively. (Table 1)

Table 1: Post operative NRS comparison between two groups

NRS score	Fentanyl group	Onden group
1st post op hr	1.85 ± 2.08	2.90 ± 1.45
2nd post op hr	2.1 ± 1.11	2.98 ± 1.35
3rd post op hr	2.53 ± 0.10	3.10 ± 0.16
4th post op hr	2.43 ± 0.10	3 ± 2.23

DISCUSSION

Due to peritoneal traction and exteriorization of uterus there are frequent episodes of nausea and vomiting during caesarean delivery that is performed under regional anaesthesia. Despite o administration of adequate dermatomal sensory blockade sometimes there is visceral pain. To prevent this various prophylactics antiemitics have been used.[7] Metoclopramide, droperidol, and the 5-HT3 antagonists are all effective in decreasing intraoperative nausea and vomiting during cesarean delivery. Unfortunately, side effects and cost issues may limit routine use. The best pharmacologic agents are 5-HT 3 antagonists and dopamine antagonists.[10] Ondansetron has been demonstrated to be an effective and well-tolerated drug with better safety profile which acts by blocking 5-HT 3 receptors on vagal afferent terminals and located centrally in the area postrema. In the present study on comparison of the various demographic variables there were no statistical differences among the variables of both the groups.[11] In study done by Griffiths *et al.*[12] 5-HT 3 antagonists were more effective than placebo at reducing intraoperative and postoperative nausea and vomiting. During entire period of 24 hours after recovery from general anaesthesia, incidence of nausea and vomiting was 29% and 26% in ondansetron group. Similar to this study, our study also showed efficacy of intravenous ondansetron for prevention of nausea and vomiting. Total incidence of nausea was 15.20 % vs 2.12% and vomiting 2.14 % v/s 0 respectively in group 1 and group 2. Incidence of nausea during 6th stage of the study was less in ondansetron group in comparison to fentanyl group making it superior for prevention of intraoperative nausea and vomiting. APGAR score was not a significant finding. Umbilical cord blood gas analysis and neonatal neurobehavioral scores may be more sensitive measure for neonatal assessment. In study by Palmer. *et al.*[13], 15 microgram fentanyl added to hyperbaric bupivacaine for subarachnoid anesthesia for cesarean section provided increased duration of analgesia of approximately 30 minutes. Manullang. *et al.*[7] study showed IT fentanyl group had a lower cumulative perioperative pain score than iv ondansetron group and required less supplementary intraoperative analgesia. In our study, mean NRS score for group 1 was lower in comparison to mean score of group 2 during 1st, 2nd, 3rd and 4th post-operative hour respectively in ondansetron group indicating better analgesic action with use of intrathecal fentanyl leading to reduced use of analgesics post operatively similar to the above mentioned study.

CONCLUSION

The incidence of nausea and vomiting was lower in the ondansetron group. Incidence of nausea during 6th stage of the study was also less in ondansetron group in comparison to fentanyl group making it superior for prevention of intraoperative nausea and vomiting

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