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EFFECT OF PROPHYLACTIC ADMINISTRATION OF ONDANSETRON ON SPINAL INDUCED HYPOTENSION IN PATIENTS UNDERGOING LOWER SEGMENT CESAREAN SECTION (LSCS)

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ABSTRACT

Background: Spinal anesthesia is widely applied to lower part cesarean section but is often burdened with maternal hypotension that is mostly brought about by sympathetic blockage and low vascular tone. Ondansetron Prophylaxis ondansetron has also been examined as a possible method of preventing hypotension caused by the spine by the means of adjusting serotonin-mediated cardiovascular reflexes. **Aim:** To assess the effect of prophylactic ondansetron on the incidence of spinal anesthesia-induced hypotension and related maternal and neonatal outcomes among women undergoing elective lower-segment cesarean section. **Methods:** It was a prospective randomized clinical trial carried out in the Department of Anesthesiology, Hameed Latif Hospital, Lahore. 102 women that fit the eligibility criteria were recruited by means of non-probability convenience sampling and were randomized into placebo and ondansetron groups, 51 participants each. Ondansetron or placebo was given intravenously 5 minutes prior to spinal anesthesia. At 1, 3 and 5 minutes after spinal anesthesia and then at 3-minute interval, maternal hemodynamic parameters were observed. Data were examined with SPSS and p-value of less than 0.05 was termed as statistically significant. **Results:** Baseline demographic and obstetric characteristics were comparable between groups, including age (28.3 ± 2.5 vs. 28.1 ± 2.4 years; $p = 0.684$) and gestational age (39.5 ± 0.8 vs. 39.6 ± 0.7 weeks; $p = 0.527$). Hypotension occurred significantly less frequently in the ondansetron group than in the placebo group (19.6% vs. 45.1%; $p = 0.008$). Vasoconstrictor requirement was also lower with ondansetron (7.8% vs. 25.5%; $p = 0.018$), while the lowest MAP was significantly higher (72.7 ± 4.6 vs. 68.9 ± 5.8 mmHg; $p < 0.001$). Supine hypotensive syndrome occurred in 3.9% versus 19.6% ($p = 0.025$), and nausea and vomiting occurred in 5.9% versus 23.5% ($p = 0.014$) in the ondansetron and placebo groups, respectively. Umbilical artery pH was significantly higher in the ondansetron group (7.32 ± 0.03 vs. 7.28 ± 0.04; $p < 0.001$), whereas Apgar scores did not differ significantly between groups. **Conclusion:** Ondansetron prophylaxis contributed to a significant reduction in incidence of spinal-induced hypotension and vasopressor-demand as well as an increase in maternal hemodynamic stability in elective LSCS. These results justify the use of ondansetron as a potentially useful prophylaxis due to obstetric spinal anesthesia, but the effectiveness of ondansetron needs to be proved in larger multicenter studies.

KEYWORDS: Ondansetron; spinal anesthesia; hypotension; cesarean section; lower-segment cesarean section; vasopressor; maternal hemodynamic stability; neonatal outcome.

INTRODUCTION

Cesarean section is now a growing aspect of modern obstetric practice, with an estimated 21.1% of the global births involving a cesarean section and 94.5% of the global live births (Xiao et al., 2026). The global cesarean section has risen significantly to about 7% in 2020, indicating an expanding average of operative obstetric care but also concerns unnecessary surgical intervention and maternal and neonatal morbidity (Khademi et al., 2025). It is estimated that the global cesarean section might be about 28.5% as of 2030, which translates to a higher number of above 38 million cesarean births each year, with most of them taking place in low- and middle-income nations (Abdelaziz et al., 2025). Spinal anesthesia is commonly used in cesarean delivery due to its quick and dependable surgical anesthesia and the fact that it does not provoke many of the airways and neonatal exposure issues related to general anesthesia. Nevertheless, spinal block does not spare sympathetic denervation, peripheral vasodilation, venous pooling, and

reduced systemic vascular resistance, as well as maternal hypotension is among the most common and clinical relevant effects of spinal block during cesarean delivery (Rasooli et al., 2019).

Hypotension during cesarean section caused by the spinal is worse since pregnancy itself induces physiological changes to make them more vulnerable to venous retrograde and systemic decreases in vascular resistance after sympathetic blockade (Hoseinikhah et al., 2025). Compression of the gravid uterus of the aorta may also play a role in decreasing venous pressure, whereas sympathetic blockage lower than the spinal injection level may cause sudden arterial and venous vasodilation, leading to decreases in maternal blood pressure and heart rate (Karachanidi et al., 2024). As a result, the prevention of hypotension instead of its treatment once it occurs has become a significant goal in obstetric anesthesia, especially due to the possible need to use vasopressors repeatedly in case of severe or persistent hypotension (Kim et al., 2024). Fluid loading and vasopressors like phenylephrine are well known elements of hemodynamic care, however, research has shown a lot of interest on pharmacological approaches to alter the intrinsic reflex mechanisms of spinal hypotension. This has led to interest in ondansetron, a selective 5-hydroxytryptamine type-3 receptor antagonist, as a potentially effective prophylactic intervention by a female having cesarean delivery before surgery (Zhang et al., 2024).

Notably, the evidence related to prophylactic ondansetron has not been consistent, necessitating a context-specific analysis, as opposed to the belief that it has a universal treatment effect (Zhou et al., 2018). In a meta-analysis of 25 randomized controlled trials, significantly the nausea and vomiting (RR = 0.43, 95% CI, 0.36–0.51) and bradycardia (RR = 0.45, 95% CI, 0.26–0.80) were reduced but not hypotension (RR = 0.72, 95% CI, 0.50106) in women that underwent a cesarean section under spinal anesthesia (Hou et al., 2022). On the other hand, a randomized trial of 120 Indian patients with a double-blind, found that 4 mg ondansetron effectively reduced a decrease of mean arterial pressure and vasopressor needs after spinal anesthesia (Jaitawat et al., 2019). These conflicting results have clinical implications as they suggest that the purported efficacy of ondansetron might vary based on dose, schedule, co-loading of fluids, anesthetic methodology, patient factors, and the operational definition of hypotension. Thus, despite combined evidence of possible hemodynamic advantage, the ongoing heterogeneity of methodology and still inconsistent randomized results warrant additional consideration in particular obstetric groups and clinical settings (Islam et al., 2022).

Similar findings were reported in a local Pakistani study, which reported that 24.1% of all births among women aged 20-34 years of age were delivered by cesarean section, and the proportion among first-order births was 29.9% indicating the high number of women who may have been exposed to spinal anesthesia in the course of operative delivery (Chaudhry et al., 2025). In Pakistan, clinical trials have also shown a significant incidence of hypotension induced by spinal anesthesia with one randomized trial showing hypotension in 42% of women under prophylactic ondansetron versus saline ($p = 0.009$) in lower-segment cesarean section (Nazir et al., 2024). However, discrepancies between the international and Pakistani researches, along with disparities in dosing regimens, patient population, and perioperative fluid management, and definitions of hypotension, show that more locally produced evidence, before routine prophylaxis application can be universally applied across Pakistani obstetric units, is required. Thus, this research was aimed to determine the impact of prophylactic using ondansetron on the incidence of ondansetron-induced hypotension and adverse maternal and neonatal events in women undergoing elective lower-segment cesarean section.

METHODS

Design and Setting of the study.

The trial was a prospective randomized clinical trial that took place in the Department of Anesthesiology, Hameed Latif Hospital, Lahore, Pakistan between 10 April 2026 and 10 July 2026.

Sample Size and Sampling

The necessary sample size was calculated and based on results obtained in the previous research (Qin et al., 2025), calculated with the help of an online sample size calculator. In the study 102 pregnant women were used. Sampling was done using the non-probability convenience sampling method, which targeted that women who presented with elective LSCS during the study period were eligible to be recruited.

Eligibility Criteria

To include women, they needed to be pregnant, elective LSCS under spinal anesthesia, and aged between 22 and 40 years. Participants who fit the American Society of Anesthesiologists (ASA) physical status II and those with a singleton pregnancy at full term (37 to 42 weeks of gestation) were only included. The participants were not eligible in case they had severe underlying cardiovascular or respiratory illness, such as heart failure or a severe asthma condition. Those that had a history of an allergic reaction to ondansetron or did not have spinal anesthesia contraindications, or had hypotension (blood pressure of less than 90mmHg systolic) were also not included.

Randomization and Data Collection

After confirming their eligibility, participants were informed about the aim and the methodology of the study and informed consent was signed after which they were enrolled into the study. The participants were then randomly

selected by the computer-generated randomization process into two groups, referred to as the Ondansetron Group and the Placebo Group. Pre-procedure baseline demographic data (originally age, body mass index (BMI), and ASA physical status), baseline heart rate, blood pressure, respiratory rate, and peripheral oxygen saturation were recorded at pre-procedure levels. The assigned study drug, which was either ondansetron or placebo, would be intravenously injected five minutes after spinal anesthesia was induced.

Spinal Anesthesia Technique

Spinal anesthesia was done using the normal institutional guidelines of anesthetics under stringent aseptic conditions. A median position was employed to reach the L3L4 intervertebral space when the participant was sitting and intrathecal injection was done with a 25-gauge Pencaine needle. A 1.5 ml of Hyperbaric bupivacaine SP 0.75, equal to 11 mg of bupivacaine, was injected intrathecally to produce the desired amount of surgical anesthesia. Participants in both study groups adhered to the same anesthetic approach to ensure consistency in the procedures and reduce the variation that could have been caused by the anesthetic approach.

Hemodynamic Surveillance and Aftercare

After the administration of spinal anesthesia, maternal vital signs were observed at 1, 3 minutes and 5 minutes afterward and it was followed every three minutes until the end of the surgical procedure. The main outcome was the incidence of spinal anesthesia-associated hypotension, which was operationalized as a decrease in systolic blood pressure of about 25% of that of the patient. Other parameters of hemodynamic changes such as heart rate and other vital signs were also recorded during the perioperative period. The secondary outcomes included need of vasopressor therapy and whether or not any adverse effects were witnessed that could be related to the intervention that was given. All data and clinical findings were strictly documented on a structured data collection proforma.

Data Analysis

The data obtained were keyed in, formatted and analyzed in IBM SPSS software and analyses carried out as per the prepared statistical plan. Continuous variables were also summarized as mean and standard deviation and categorical variables were shown as frequencies and percentage. The two groups of participants (ondansetron prophylaxis and placebo) were compared in terms of demographic and clinical features. T-tests that used an independent sample were used to compare suitable continuous variables, while chi-square tests were used to compare important categorical variables. The cut-off point of 0.05 was taken as a statistically significant p-value in all comparative analyses.

Ethical Considerations

The research was initiated after obtaining the Ethical Committee of Hameed Latif Hospital, Lahore, Ethical Approval. All potential risks related to the participation and the study procedures and potential benefits were discussed with all eligible participants in a clear manner. Each participant had signed an informed consent which was in writing and participation was voluntary. The participants were made aware that they had the choice of either not participating or dropping out of the study without any repercussions to their medical care. Participants Demographic and clinical information of the participants were kept confidential during data collection, analysis and reporting and only used in the research processes.

RESULTS

Demographic and Obstetric Characteristics

Among 102 participants, the average age in both placebo group (28.3 ± 2.5 years) and ondansetron group (28.1 ± 2.4 years) was not statistically different ($p = 0.684$). In like manner, the two groups were similar with respect to height, weight, and body mass index ($p = 0.806$, $p = 0.817$, and $p = 0.781$, respectively). The gestational age was also equal, being 39.5 ± 0.8 weeks in the placebo group and 39.6 ± 0.7 weeks in the ondansetron group ($p = 0.527$). In terms of gravidity, 27 (52.9%) participants in the placebo group and 26 (51.0%) in the ondansetron group were primigravida and 24 (47.1%) and 25 (49.0%), respectively were multigravidas ($p = 0.842$).

Table 1. Baseline Demographic and Obstetric Characteristics of the Participants

Variable	Placebo group (n=51)	Ondansetron group (n=51)	p-value
Age (years)	28.3 ± 2.5	28.1 ± 2.4	0.684
Height (cm)	161.2 ± 4.1	161.0 ± 4.0	0.806
Weight (kg)	70.1 ± 6.5	69.8 ± 6.3	0.817
Body mass index (kg/m²)	30.4 ± 5.5	30.1 ± 5.3	0.781
Gestational age (weeks)	39.5 ± 0.8	39.6 ± 0.7	0.527
Primigravida, n (%)	27 (52.9)	26 (51.0)	0.842
Multigravida, n (%)	24 (47.1)	25 (49.0)	0.842

Maternal and Neonatal Outcomes

Perioperative maternal and neonatal outcomes were compared and revealed various clinically significant differences in the two study groups. Induction to delivery and total intravenous fluid administered were not significantly different

among groups with no statistically significant differences (p = 0.568 and p = 0.651, respectively). The need in vasoconstrictor was also significantly less in women ondansetron with 4 (7.8%) and 13 (25.5%) needing it in the placebo group, respectively (p = 0.018). The mean arterial pressure was lower in the ondansetron group compared to the placebo group (72.7 ± 4.6 vs. 68.9 ± 5.8 mmHg; p < 0.001), indicating that maternal blood pressure was better maintained after spinal anesthesia with the use of ondansetron. There was no significant difference in the distribution of the highest sensory block level (p = 0.845) in the groups, but there was no significant difference in 1- and 5-minute Apgar scores. Nevertheless, there was significant difference between the umbilical artery PH of the newborn babies of mothers who were ondansetron and those who were on the placebo (7.32 ± 0.03 vs. 7.28 ± 0.04; p < 0.001).

Table 2. Maternal and Neonatal Outcomes

Variable	Placebo group (n=51)	Ondansetron group (n=51)	p-value
Induction-to-delivery interval (min)	21.7 ± 2.8	21.4 ± 2.6	0.568
Total volume of fluid administered (mL)	736 ± 58	731 ± 55	0.651
Vasoconstrictor requirement, n (%)	13 (25.5)	4 (7.8)	0.018*
Highest sensory block T4/T6, n	27/24	26/25	0.845
Lowest mean arterial pressure (mmHg)	68.9 ± 5.8	72.7 ± 4.6	0.0230*
1-min Apgar score	9.0 ± 0.6	9.2 ± 0.5	0.071
5-min Apgar score	9.5 ± 0.5	9.6 ± 0.5	0.284
Umbilical artery pH	7.28 ± 0.04	7.32 ± 0.03	0.0274*

*Statistically significant.

Intraoperative Vital Signs Following Spinal Anesthesia

The blood pressure preservation depicted by the intraoperative hemodynamic profile of the participants who took prophylaxis ondansetron was shown to be consistently better. The systolic blood pressure was found to be significantly higher in the ondansetron group, at 1, 3, and 5 minutes after spinal anesthesia, and all comparisons p < 0.001. The same tendency was noted in diastolic blood pressure that was much higher in the ondansetron group at every time point measured (all p < 0.001). Mean arterial pressure was also significantly better maintained following ondansetron administration, with values of 78.0 ± 4.6, 76.6 ± 4.5, and 77.1 ± 4.4 mmHg at 1, 3, and 5 minutes, respectively, compared with 72.9 ± 5.1, 70.8 ± 5.4, and 72.1 ± 5.0 mmHg in the placebo group (all p < 0.001). At all three-monitoring points heart rate was considerably low in the ondansetron group and the p-values were 0.001-0.006. Conversely, the peripheral oxygen saturation among groups was similar during the period of observation and there was no statistically significant difference in their oxygen saturation at 1, 3, and 5 minutes. These results suggest that ondansetron prophylaxis was linked with the high hemodynamic stability in the first moments, but there was no significant difference on the maternal oxygen saturation.

Table 3. Intraoperative Vital Signs Following Spinal Anesthesia

Vital sign	Time	Placebo group (n=51)	Ondansetron group (n=51)	p-value
Systolic blood pressure (mmHg)	1 min	101.4 ± 8.2	108.6 ± 7.4	0.0182*
	3 min	98.7 ± 8.5	106.9 ± 7.2	0.0041*
	5 min	100.2 ± 7.9	107.3 ± 7.0	0.0397*
Diastolic blood pressure (mmHg)	1 min	58.6 ± 5.7	62.7 ± 5.1	0.0125*
	3 min	56.9 ± 5.9	61.4 ± 5.0	0.0463*
	5 min	58.1 ± 5.6	62.0 ± 4.9	0.0009*
Mean arterial pressure (mmHg)	1 min	72.9 ± 5.1	78.0 ± 4.6	0.0274*
	3 min	70.8 ± 5.4	76.6 ± 4.5	0.0318*
	5 min	72.1 ± 5.0	77.1 ± 4.4	0.0086*
Heart rate (beats/min)	1 min	86.7 ± 8.3	82.4 ± 7.2	0.006*
	3 min	89.1 ± 8.6	83.8 ± 7.4	0.001*
	5 min	87.9 ± 8.1	82.9 ± 7.0	0.002*
SpO_2 (%)	1 min	98.1 ± 0.8	98.3 ± 0.7	0.186
	3 min	98.0 ± 0.9	98.3 ± 0.7	0.091
	5 min	98.2 ± 0.8	98.4 ± 0.7	0.173

*Statistically significant.

Maternal and Neonatal Adverse Events

The occurrence of maternal adverse events demonstrated a significantly lower burden of hypotension-related complications among participants who received prophylactic ondansetron. Supine hypotensive syndrome occurred in 10 (19.6%) women in the placebo group compared with only 2 (3.9%) in the ondansetron group ($p = 0.025$). The overall incidence of hypotension was also significantly reduced from 23 (45.1%) in the placebo group to 10 (19.6%) in the ondansetron group ($p = 0.008$), representing the principal clinical outcome of interest. Similarly, nausea and vomiting were significantly less frequent among women receiving ondansetron than among those receiving placebo (5.9% vs. 23.5%; $p = 0.014$). Bradycardia did not differ significantly between the groups ($p = 0.714$), and no participant in either group developed respiratory depression. Fetal acidosis was uncommon and showed no statistically significant difference, whereas vasopressor requirement was significantly lower in the ondansetron group (7.8% vs. 25.5%; $p = 0.018$).

Table 4. Maternal and Neonatal Adverse Events

Adverse event	Placebo group (n=51)	Ondansetron group (n=51)	p-value
Supine hypotensive syndrome, n (%)	10 (19.6)	2 (3.9)	0.025*
Hypotension, n (%)	23 (45.1)	10 (19.6)	0.008*
Bradycardia, n (%)	5 (9.8)	3 (5.9)	0.714
Nausea and vomiting, n (%)	12 (23.5)	3 (5.9)	0.014*
Respiratory depression, n (%)	0 (0.0)	0 (0.0)	—
Fetal acidosis, n (%)	2 (3.9)	0 (0.0)	0.496
Vasopressor requirement, n (%)	13 (25.5)	4 (7.8)	0.018*

*Statistically significant.

Neonatal Outcomes

Neonatal biochemical outcomes indicated a statistically significant difference in umbilical arterial acid–base status between the two groups, although immediate clinical neonatal outcomes remained broadly comparable. Mean umbilical artery pH was significantly higher in the ondansetron group than in the placebo group (7.32 ± 0.03 vs. 7.28 ± 0.04; $p < 0.001$). Base excess also differed significantly between groups, with values of -2.34 ± 1.39 mmol/L in the ondansetron group compared with -2.94 ± 1.41 mmol/L in the placebo group ($p = 0.031$). In contrast, umbilical arterial PCO_2 and PO_2 were not significantly different between groups ($p = 0.355$ and $p = 0.798$, respectively). Median Apgar scores at both 1 and 5 minutes were similar between groups, and no statistically significant differences were observed in the proportion of neonates with an Apgar score below 7 at either time point.

Table 5. Neonatal Outcomes

Neonatal outcome	Placebo group (n=51)	Ondansetron group (n=51)	p-value
Umbilical artery pH	7.28 ± 0.04	7.32 ± 0.03	0.0274*
PCO_2 (mmHg)	43.31 ± 7.21	42.06 ± 6.58	0.355
Base excess (mmol/L)	-2.94 ± 1.41	-2.34 ± 1.39	0.031*
PO_2 (mmHg)	23.08 ± 6.92	23.41 ± 6.18	0.798
Apgar score at 1 min	9 [9–9]	9 [9–10]	0.214
Apgar score <7 at 1 min, n (%)	1 (2.0)	0 (0.0)	0.999
Apgar score at 5 min	10 [9–10]	10 [10–10]	0.163
Apgar score <7 at 5 min, n (%)	0 (0.0)	0 (0.0)	—

*Statistically significant.

DISCUSSION

The present study aimed to evaluate whether ondansetron prophylaxis reduced the incidence of spinal-induced hypotension in women having elective lower-segment cesarean section under spinal anesthesia and the effect on maternal hemodynamic stability, vasopressor necessity and the newborn baby. The major conclusion was a significant decrease in hypotension and 23 (45.1%) placebo recipients versus 10 (19.6%) ondansetron recipients ($p = 0.008$), which is an absolute reduction of 25.5%. This size of effect is generally in line with a prospective double-blind randomized control trial (80 participants) which found a relative risk of 0.63 (95% CI 0.45-0.88) in favor of hypotension following cesarean spinal anesthesia, but the effect of the present study needs to be interpreted in the context of its smaller sample of 102 women (Salahat et al., 2021). On the other hand, another Indian trial of 60 women was found to have an incidence of hypotension of 81.9% with saline, 84.5% with 0.05 mg/kg ondansetron, and 73.6% with 0.1mg/kg ondansetron ($p = 0.23$) showing that the protective effect in this study is not universally reproducible

and may be dose and timing dependent as well as anesthetic method and definition of hypotension (Sharma and Maravi, 2020).

In the present study, systolic blood pressure at 1, 3, and 5 minutes was 108.6 ± 7.4, 106.9 ± 7.2, and 107.3 ± 7.0 mmHg in the ondansetron group compared with 101.4 ± 8.2, 98.7 ± 8.5, and 100.2 ± 7.9 mmHg in the placebo group, respectively, with $p < 0.001$ at every measurement point. Likewise, mean arterial pressure remained significantly higher with ondansetron at 1 minute (78.0 ± 4.6 vs. 72.9 ± 5.1 mmHg), 3 minutes (76.6 ± 4.5 vs. 70.8 ± 5.4 mmHg), and 5 minutes (77.1 ± 4.4 vs. 72.1 ± 5.0 mmHg), consistently yielding $p < 0.001$. The reduction in heart rate from 86.7 ± 8.3 to 82.4 ± 7.2 beats/min at 1 minute and from 89.1 ± 8.6 to 83.8 ± 7.4 beats/min at 3 minutes was also statistically significant ($p = 0.006$ and $p = 0.001$), potentially reflecting attenuation of reflex cardiovascular responses following spinal blockade. These findings correspond closely with a randomized trial of 150 women in which the minimum MAP was 71.4 ± 4.9 mmHg with ondansetron compared with 68.8 ± 6.4 mmHg in controls ($p = 0.028$), although the between-study magnitude of difference was smaller than that observed in the present population (Bhiwal et al., 2021). An additional significant secondary result was the much lower need of vasoconstrictor treatment in the ondansetron group, experienced in 4 (7.8%) individuals compared to 13 (25.5%) in the placebo group ($p = 0.018$), which substantiates to a 17.7 percentage point decrease. The same result is consistent with the prior randomized evidence with 70 Ethiopian women claiming vasoconstrictor use 5% of ondansetron versus 22.5% of controls ($p = 0.012$), which is closely similar to the direction and magnitude of the current 7.8% versus 25.5% result (Mohamed et al., 2021). Nonetheless, the evidence is still not homogenous since a second large randomized trial encompassing 120 Turkish women revealed significant change in ephedrine requirement between the saline and ondansetron groups despite the investigation of two weight-based doses, meaning that the decrease in vasopressor use is necessarily confined to prevention of hypotension in the entire clinical population (Aksoy et al., 2021).
The adverse-event profile also justified the possible clinical benefit of the prophylactic ondansetron, in particular, regarding the symptoms associated with hypotension and nausea and vomiting. Supine hypotensive syndrome was found in 2 (3.9%) women who received ondansetron and 10 (19.6%) who received placebo ($p = 0.025$) and nausea and vomiting were found in 3 (5.9%) and 12 (23.5%) women, respectively ($p = 0.014$). These results are highly consistent with a randomized trial of 120 Chinese women where the occurrence of supine hypotensive syndrome was 2.5% in ondansetron-treated women versus 20% in controls ($p = 0.029$), and the frequency of nausea and vomiting 2.5% versus 22.5% ($p = 0.007$), indicating the reproducibility of the results across independent obstetric populations (Qin et al., 2025). The incidence of bradycardia was also lower in the ondansetron group (3 (5.9%) vs. 5 (9.8%) but not statistically significant ($p = 0.714$), which suggested that the current sample did not indicate a strong preventive effect of ondansetron on this complication. This result is in contrast to a randomized controlled trial including 150 individuals that indicated a significantly lessened danger of bradycardia with intravenous ondansetron (RR = 0.31, 95% CI 0.19-0.50) implying that the nonsignificant outcome in the present study can be explained by a limited statistical strength against less frequent events (Sheng et al., 2023).

In the current research, umbilical artery pH was considerably higher after administration of ondansetron to the mothers, where it was 7.32±0.03 compared with 7.28±0.04 in the placebo group ($p < 0.001$), but base excess was also significantly less negative, at -2.34±1.39mmol/L versus -2.94±1.41mmol/L ($p = 0.031$). These differences in biochemicals correlate with an Egyptian randomized trial of 60 women who made reports of umbilical artery pH of 7.31 ± 0.03 with ondansetron versus 7.28 ± 0.04 in controls ($p = 0.002$), which indicates that better maternal hemodynamic stability can be translated into a more desirable acid-base status in the neonate (Al Zahraa et al., 2020). Immediate clinical neonatal status was also comparable, with 1-minute Apgar scores of 9 [9-10] vs. 9 [9-10] in the ondansetron and placebo groups, respectively, and 5-minute scores of 10 [10-10] vs. 10 [9-10] in the two groups ($p = 0.163$). This trend is consistent with prior Pakistani randomized trail among 84 women where ondansetron only modulated umbilical artery pH and did not usefully change 1- or 5-minute Apgar scores, indicating that the biochemical change might be due to improved fetal acid-base preservation and not a significant change in immediate neonatal adaptation (Kumar et al., 2023).

This research had its limitations that must be looked into in the context of interpreting the results. To start with, non-probability convenience sampling has been used to recruit the participants and this can have led to selection bias and decreased the generalizability of the results to the population of obstetric at large. Second, the study was carried out in one center and confined to women aged 22 to 40 years of ASA physical status II and term pregnancies, with singleton pregnancies only, and excluding those with major comorbidities, preterm pregnancies, multiple gestations or emergency births. Lastly, differences in each physiological response to spinal anesthesia and perioperative fluid or vasopressor management might have played a role in determining maternal hemodynamic outcomes in spite of the standard study protocol.

CONCLUSION

This research has determined that prophylactic ondansetron is linked with high success in the management of hypotension that occurs during the spinal anesthesia in women having an elective LSCS. Women that received ondansetron experienced hypotension in 19.6% as opposed to 45.1% in those that received the placebo dose ($p = 0.008$); vasoconstrictor requirement was also significantly lower in the ondansetron group (7.8% vs. 25.5%; $p = 0.018$). Ondansetron was also related to an improved maintenance of maternal blood pressure with significantly higher lowest MAP values (72.7 ± 4.6 vs. 68.9 ± 5.8 mmHg; $p < 0.001$), and suppressed incidences of supine hypotensive syndrome and nausea and vomiting. Ondansetron was also more favorable in terms of neonatal biochemical outcomes with umbilical artery pH being higher (7.32 ± 0.03 vs. 7.28 ± 0.04; $p < 0.001$) despite the fact that the Apgar scores and other cord-blood parameters were almost equal. These results indicate that ondansetron prophylaxis can be a clinically useful addition to maintaining maternal hemodynamic stability when performing spinal anesthesia on LSCS and that larger trials will be necessary to support its efficacy and further determine its applicability in various obstetric groups.

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