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Original Research Paper

Anesthesiology

COMPARISON OF HAEMODYNAMIC RESPONSE WITH ONDANSETRON VS METOCLOPRAMIDE IN EMERGENCY CAESAREAN SECTION

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ABSTRACT **Background:** Although, ondansetron, a 5-HT3 receptor antagonist is safer, its efficacy and safety has not been evaluated in patients of this region. **Aim:** To evaluate hemodynamic changes with ondansetron with metoclopramide as a premedication during spinal anaesthesia in emergency caesarean sections. **Methods:** This retrospective study included 30 patients ((aged 20-35 years) American Society of Anesthesiologists grades I and II)) scheduled for emergency CS. The subjects were excluded if contra-indications for spinal anesthesia, known allergy to ondansetron, receiving serotonin agonists or antagonists, ischemic heart disease, chronic hypertension or pregnancy-induced hypertension (PIH). The patients were randomly classified into two groups (15 patients in each group): Group O was given 4 mg ondansetron diluted in 5 ml normal saline slowly IV (over 1 min) 5 min before spinal anesthesia. Group M was given 10 mg metoclopramide in 5 ml of normal saline slowly IV (within 1 min) 5 min before spinal anesthesia. Results: In group O mean systolic BP was significantly high at 5 min ($P<0.0001$), 15 min ($P<0.0001$), 30 min ($P<0.0001$), and 45 min ($P=0.002$) in comparison to group M. Mean diastolic BP was significantly high at 15 min ($P<0.0001$), 30 min ($P<0.0001$), and 45 min ($P<0.0001$) in comparison to group M. At 5 min intraoperative, there was no significant difference in diastolic BP in both groups ($P=0.759$). Mean heart rate was significantly high at 15 min ($P<0.0001$), 30 min ($P=0.014$), and 45 min ($P=0.007$) in comparison to group M. At 5 min intraoperative, there was no significant difference in diastolic BP in both groups ($P=0.753$). **Conclusion:** Premedication with 4 mg IV ondansetron before spinal anesthesia in an emergency cesarean section maintain hemodynamic changes.

KEYWORDS : Spinal Anaesthesia, Ondansetron, Metoclopramide

INTRODUCTION

Despite safer technique of spinal anesthesia many side effects, including hypotension, nausea, vomiting, bradycardia, and other dysrhythmias have been reported.[1] In nonobstetric population, incidence of hypotension is suggested to be 33% and bradycardia 13%.[2] However, in obstetric population, the incidence is reported to be as high 50-60%.[3] Hypotension results due to decrease in systemic vascular resistance and central venous pressure from sympathetic block.[4] Sudden bradycardia can occur from shift in cardiac autonomic balance toward the parasympathetic system from activation of left ventricular mechanoreceptors or chemoreceptors Bezold-Jarisch reflex (BJR) or from an increase in baroreflex activity.[4]

Serotonin released during low-volume states has been suggested as a possible trigger for the BJR.[5] Ondansetron is a 5-HT3 receptor antagonist that offers potentially important therapeutic benefits.

A study showed usefulness of 5-HT3 antagonist in in prevention of hypotension and bradycardia caused by the BJR in obstetric population.[6] In our institution, ondansetron is routinely used; however, its efficacy and safety has not been studied and compared yet with metoclopramide, an antiemetic drug commonly used for aspiration prophylaxis in caesarean section (CS) in full stomach patients.

Subjects And Methods

This retrospective study included 30 patients ((aged 20-35 years) American Society of Anesthesiologists grades I and II)) scheduled for emergency CS. The subjects were excluded if contra-indications for spinal anesthesia, known allergy to ondansetron, receiving serotonin agonists or antagonists, ischemic heart disease, chronic hypertension or pregnancy-induced hypertension (PIH).

All patients were prehydrated with intravenous (IV) 500 ml lactated ringer. Baseline heart rate and systolic and diastolic BP were measured before spinal anesthesia.

The patients were randomly classified into two groups (15 patients in each group): Group O was given 4 mg ondansetron diluted in 5 ml normal saline slowly IV (over 1 min) 5 min before spinal anesthesia. Group M was given 10 mg metoclopramide in 5 ml of normal saline slowly IV (within 1 min) 5 min before spinal anesthesia.

Spinal anesthesia was performed in sitting position with 26-gauge spinal needle with 2 ml 0.5% hyperbaric bupivacaine was injected in L3-L4 lumbar vertebrae.

Systolic and diastolic BP, and heart rate were recorded at baseline and intra-operatively at 5 min, 15 min, 30 min, and 45 min.

Data Analysis

Data were presented as frequency, percentage, mean, standard deviation (SD), median, and/or interquartile range (IQR). Skewed data were compared using Mann Whitney U test. Student t-test was used to compare normative data. P value <0.05 was considered significant. Statistically analysis was performed using MedCalc Statistical Software version 19.3 (MedCalc Software bv, Ostend, Belgium; https://www.medcalc.org; 2020).

RESULTS

General Characteristics

All of the subjects were in ASA class 1 (100%). Subjects in group O and group M had comparable age ($P=0.586$). Median duration of hospital stay was non-significantly lower in group O in comparison to group M ($P=0.786$) (Table 1). Baseline systolic and diastolic BP, and heart rate were comparable between both groups ($P>0.05$).

Table 1: General Characteristics

	Group O (n=15)	Group M (n=15)	P value
Age (years)	30.0 [26.0, 31.0]	28.0 [26.0, 31.0]	0.586
ASA class I, n	15	15	-

Duration of surgery (minutes)	51.0 [50.0, 55.0]	54.0 [48.0, 57.0]	0.786

Data Expressed As Median [IQR; Q1, Q3] Unless Mentioned

Intra-operative Characteristics

Systolic BP

In this study, we observed that in group O mean systolic BP was significantly high at 5 min (P<0.0001), 15 min (P<0.0001), 30 min (P<0.0001), and 45 min (P=0.002) in comparison to group M (Table 2).

Table 2: Change In Systolic BP Intra-operatively

	Group O (n=15)	Group M (n=15)	P value
Before surgery	125.33±2.66	126.4±3.20	0.328
5 min	103.4±3.02	95.67±3.01	<0.0001
15 min	112.67±1.80	85.2±3.76	<0.0001
30 min	98.0±1.96	82.4±2.41	<0.0001
45 min	105.13±2.33	102.13±2.45	0.002

Data Expressed As Mean± SD

Diastolic BP

In this study, we observed that mean diastolic BP was significantly high at 15 min (P<0.0001), 30 min (P<0.0001), and 45 min (P<0.0001) in comparison to group M. At 5 min intraoperative, there was no significant difference in diastolic BP in both groups (P=0.759) (Table 3).

Table 3: Change In Diastolic BP Intra-operatively

	Group O (n=15)	Group M (n=15)	P value
Before surgery	75.47±3.23	74.0±3.39	0.256
5 min	63.07±2.99	62.8±1.47	0.759
15 min	71.80±2.37	63.5±1.81	<0.0001
30 min	63.0±2.17	58.7±1.87	<0.0001
45 min	66.6±2.16	63.33±1.80	<0.0001

Data Expressed As Mean±SD

Heart rate

Our study observed that mean heart rate was significantly high at 15 min (P<0.0001), 30 min (P=0.014), and 45 min (P=0.007) in comparison to group M. At 5 min intraoperative, there was no significant difference in diastolic BP in both groups (P=0.753) (Table 4).

Table 4: Change In Heart Rate Intra-operatively

	Group O (n=15)	Group M (n=15)	P value
Before surgery	80.4±4.61	80.27±5.05	0.940
5 min	75.47±3.91	75.87±2.97	0.753
15 min	73.40±3.58	68.20±1.61	<0.0001
30 min	74.6±3.62	71.67±2.40	0.014
45 min	76.07±4.41	79.8±2.366	0.007

Data Expressed As Mean±SD

DISCUSSION

This study observed that the ondansetron significantly maintained both systolic and diastolic BP as well as heart rate, when used as a premedicant before spinal anesthesia in CS.

Hypotension occurs frequently during spinal anesthesia. Physiologic research indicated that hypotension results from peripheral pooling of blood that decrease venous return to the heart and decrease cardiac output from a decrease in systemic vascular resistance or from a combination of both.[7]

The decrease in preload caused by spinal anesthesia may initiate vagally mediated cardiac-depressant reflexes. Later, bradycardia and hypotension from stimulation of cardiac chemoreceptor and mechanoreceptor were established.[8,9]

Spinal anesthesia related triggering of BJR is known to result from stimulation of 5-HT3 receptors in vagal nerve endings,[10] resulting in release of serotonin from activated thrombocyte.[11]

A study revealed that the granisetron was significantly effective, at preventing paradoxical bradycardia and preventing a fall in the systolic blood pressure (SBP) due to bleeding.[12] Tsikouris et al.[6] revealed that IV granisetron decreased the change in HR and prevented recurrence of Tilt-table syncope in 47% of 17 patients but did not alter the time to syncope or presyncope.

One of the limitations of the present study is that sample size is very small.

CONCLUSION

Premedication with 4 mg IV ondansetron before spinal anesthesia in an elective cesarean section significantly reduces the hypotension, bradycardia and the need for vasopressors, which is not seen with metoclopramide.

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