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THE EFFECT OF ONDANSETRON IN DECREASE OF POST-SPINAL HYPOTENSION IN CAESAREAN SECTION: A COMPARISON OF TWO DIFFERENT DOSES WITH PLACEBO IN IQ CITY MEDICAL COLLEGE, DURGAPUR, WEST BENGAL, INDIA.

Anesthesiology

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ABSTRACT

BACKGROUND: Subarachnoid block is the preferred method of anaesthesia for caesarean section. Hypotension is the commonest side effects associated with spinal anaesthesia. 5-HT, a serotonergic receptor may be an important factor associated with inducing the Bezold-Jarisch reflex that may lead to bradycardia.

AIMS AND OBJECTIVE: To study the efficacy of Ondansetron for prevention of spinal anaesthesia induced hypotension in caesarean section primigravida individual and to investigate the administration of intravenous Ondansetron, a 5HT3 receptor antagonist, which could attenuate spinal-induced hypotension, bradycardia and shivering.

METHODS AND MATERIALS The study was conducted in the department of Anaesthesia, IQ City Medical College, Durgapur West Bengal from February 2014 to March 2015. One hundred twenty parturient aged 25 to 35 years were scheduled for spinal anaesthesia and were divided randomly in to three equal groups. The control group received normal saline and intervention groups received 4 mg and 8 mg of intravenous Ondansetron 5 minutes before spinal anaesthesia. Mean arterial pressure (MAP), Heart rate (HR), bradycardia, shivering were recorded before and after spinal anaesthesia every 5 minutes during first 20 minutes of surgery.

RESULT D: emographic data were not statistically different among groups.HR was statistically different between the experimental groups and the control group. Six females (15%) in the in the control group had HR <50 bpm, that required intravenous atropine compared to experimental groups (p=0.02). In the control group 8 (20%) females had MAP <80mm Hg and required vasopressors compared to experimental groups (p=0.04). There were no significant differences in MAP and HR between the experimental groups (p=0.06). Incidence of shivering in the control group was 35% (14) that was statistically more than experimental group (p=0.02).

CONCLUSION: Administration of two different doses of intravenous Ondansetron 4mg and 8 mg significantly attenuates spinal induced hypotension, bradycardia, shivering compared to the control saline group.

KEYWORDS

Ondansetron, Serotonin, Heart rate and Hypotension.

INTRODUCTION

Spinal anaesthesia has become the gold standard anaesthetic technique for elective caesarean section. It is simple, fast performed, powerful and reliable technique. The use of regional anaesthesia in lower segment caesarean section (LSCS) has increased a lot in last few decades. Spinal anaesthesia is the most practiced amongst all regional anaesthesia techniques [1]. It may result in different complications [2], Particularly hypotension is commonly encountered in LSCS [3]. The main problem is hypotension associated with decrease in cardiac output and uteroplacental flow which may induce foetal morbidity [4]. Hypotension results primarily from decreased vascular resistance, while bradycardia is secondary to a relative parasympathetic dominance, increased baroreceptor activity, or induction of the Bezold Jarisch Reflex [5]. The incidence of hypotension and bradycardia has been reported to be 33% and 13% respectively, in non-obstetric patients [5, 6]. In obstetric, non-labouring patients, the incidence of hypotension has been estimated to be as high as 50-60%, this is less common after the onset of labour [7]. The frequency may be very high in those primigravida reporting for emergency LSCS (60-100%) [8]. This Hypotension poses risk to both, mother and foetus [9]. Owczuk et al. observed that intravenous Ondansetron attenuated spinal-induced hypotension [10]. Pharmacological interventions are made to treat hypotension and phenylephrine and ephedrine have been used particularly for this purpose [11]. However, main emphasis has been on prevention of hypotension after administration of spinal anaesthesia. Apart from hypotension, incidence of nausea and vomiting is also very high in those who are undergoing LSCS. Without any prophylactic measure, it can vary between 50-80% [12]. And this can add to the sufferings already going through. Ondansetron is a 5-HT3 antagonist, and has been studied for its prophylactic role for nausea and vomiting in those who is undergoing LSCS [13]. It is therefore crucial to prevent and or to treat it quickly and effectively.

AIMS AND OBJECTIVE

1) Our aim was to study the efficacy of Ondansetron for prevention of spinal anaesthesia induced hypotension in caesarean section primigravida individual.
2) This study also aimed to investigate the administration of intravenous Ondansetron, a 5HT3 receptor antagonist, which could attenuate spinal-induced hypotension, bradycardia and shivering.

MATERIAL AND METHODS

This study was conducted in the department of Anaesthesia, IQ City Medical College, Durgapur, West Bengal from February 2014 to March 2015.

After local ethics committee approval and written informed consent, class I Primipare Parturient undergoing elective caesarean section at term were involved in this prospective, randomized, controlled, double blinded study. The patients were instructed before the procedure and written informed consent was obtained individually before surgery. Randomization was done by computer generated codes. Patients with contraindications to spinal anaesthesia, allergy to Ondansetron or local anaesthetics, History of hypertension, coronary artery disease or other cardiovascular diseases and patients under any medication were excluded. In the pre-anaesthetic room, non-invasive blood pressure (BP) and pulse rate (PR) were recorded including the base line values of pulse oxymeter (SPO_2). On arrival to the operating room, standard monitoring was applied to all patients, including pulse oxymeter, electrocardiogram and non-invasive arterial blood pressure. Oxygen was delivered via a venture facemask at a rate of 4 L/min. An 18 -gauge intravenous catheter was placed on the dorsum of non-dominant hand and patients received 5ml/kg ringer lactate solution. The temperature of the operating room during the perioperative period was kept at a set average temperature of 24 ± 0.6^{0}C for all cases. Heart rate (HR), Systolic (SBP), Diastolic (DBP) and Mean arterial pressure (MAP), and oxygen saturation (SPO_2) were recorded at time of spinal drug administration and at 2-minutes interval up to 20 minutes followed by 5 minutes intervals until the end of surgery [10].

The patients were divided in to three equal groups. Ondansetron 4 mg (n=40), Ondansetron 8 mg (n=40) and control saline group (n=40). All the patients were pre medicated by 10 mg oral chlordiazepoxide two hours before the operation. The patient in the control group (Group-C) received 10 ml of normal saline intravenously. The intervention groups received 4 mg Ondansetron (Group-A) or 8 mg Ondansetron (Group-B), diluted in normal saline to the same volume. In all groups' solution

were infused over 5 minutes just before performing spinal anaesthesia. All Primipare parturient, undergoing elective LSCS were blocked in the lateral position and 25 gauge needle were inserted by midline approach in to the space between L3-L4 or L4-L5 interspaces. After ensuring the correct position of the needle, 15 mg of 0.5% hypertonic bupivacaine was injected. Patients were immediately placed in the supine position after spinal block. The upper level of sensory blockade was evaluated by pin prick test from caudal to rostra direction at 5 minutes intervals up to 25 minutes. MAP and HR and the shivering were recorded every 5 minutes up to 20 minutes. Shivering was graded according to the previous studies as the following scale: Grade-I, No shivering, Grade-II- Fasciculation's in head and neck that was just visible as artefacts on ECG, Grade-III- obvious tremor on head, neck and limbs and Grade-IV- generalised tremor throughout the body. Patients in grades I and II are assumed to have no shivering and Grades III and IV denote shivering. In cases that MAP had dropped below 80 mm Hg or decrease more than 20%, 10 mg intravenous ephedrine was administered. When HR had dropped less than 50 beats per minute, 0.5 mg IV atropine were administered. If patients had needed more sedation during surgery, 1 mg midazolam were given intravenously.

TABLE-1: Comparing Demographic Data among the Study Groups.

	Group- A	Group-B	p value
Age (Years)	29.63±4.54	28.82±5.97	0.384
Weight (Kg)	65.2±5.55	70.72±4.27	0.722

Group c is the control group.

TABLE-2: Comparison of Hypotension between the study groups.

Hypotension	Group –A		Group-B	
	No.	%	No.	%
Present	8	20	9	22.5
Absent	32	80	31	77.5
p Value	0.006			

Group c is the control group and has received only 10 ml of normal saline.

Table -3: Comparison of bradycardia between study groups.

Bradycardia	Group-A		Group-B	
	No.	%	NO.	%
Present	10	25	11	27.5
Absent	30	75	29	72.5
p Value	0.021			

SELECTION CRITERIA

Inclusion Criteria: -

All 120 females Primipare Parturient, age 25 to 35 years, were included in this study.

Exclusion Criteria: -

1) Emesis gravidarum.
2) Contraindication to spinal anaesthesia.
3) Unstable hemodynamics.
4) Coagulation abnormalities.
5) Chronic hypertension.
6) Pre eclampsia.
7) Morbid obesity.
8) Drug allergy.

STATISTICALANALYSIS

Data were analyzed using SPSS version 2.0. Age and weight of the patients were compared using independent sample t-test. Hypotension and Bradycardia were noted down as "present" or "absent". Frequency of bradycardia and hypotension between the three groups was compared using Chi Square test. p value <0.05 was considered statistically significant. Data was summarized by descriptive statistics.

RESULT

All 120 Primipare Parturient completed the study. All the spinal blocks were successful with a satisfactory level of anaesthesia and all the data were analyzed. 120 parturient were recruited: 40 in each group showed no significant differences regarding demographic data. HR was statistically different between the experimental groups and the control group. Six females (15%) in the in the control group had HR <50 bpm, that required intravenous atropine compared to experimental groups (p=0.02). In the control group 8 (20%) females had MAP <80mm Hg and required vasopressors compared to experimental groups ($p=0.04$). There were no significant differences in MAP and HR between the experimental groups (p=0.06). Incidence of shivering in the control group was 35% (14) that was statistically more than experimental group (p=0.02). Parturient in both Ondansetron groups experienced significant hypotension or bradycardia that required treatment. 20% of the group-A had hypotension as compared to group-B (22.5). Moreover the bradycardia was noticed only 25% in group-A and 27.5% in group-B. Incidence of shivering were 6% in 4 mg and 3% in 8 mg Ondansetron induced groups respectively (P=0.07). Incidence of shivering was 35% in the control group that was statistically more than Ondansetron groups. (P=0.02). Level of sensory blockades was not statistically different between the study groups.

DISCUSSION

This study demonstrated that administration of two different doses of intravenous (4mg and 8mg) attenuates spinal induced hypotension, bradycardia and shivering compared to control group. There were no differences in hemodynamic profiles and shivering between the Ondansetron groups. ***Hypotension*** during spinal anaesthesia is a common side effect of this procedure, whereas bradycardia occurs rarely. Hemodynamic changes usually are benign, however in selected patients; it may lead to serious complications, including cardiac arrest, though it is a consequence of progressive bradycardia rather than progressive hypotension [14-16]. These complications results mainly from hyperactivity of the vagal nerve. It is worth emphasizing that the mechanism of hypotension may be different from those producing severe bradycardia and cardiac arrest. While hypotension is due to a decrease in systemic vascular resistance and preload (which originates from sympathetic block and blood redistribution), bradycardia is the consequences of the increase in baroreflex activity and BJR. Sympathovagal balance (parasympathetic system predomination) may provoke both kinds of side effects. Methods to decrease the extent of cardiovascular consequences of spinal anaesthesia including preloading with intravenous fluid, placing patients in positions facilitating venous return and administration of vasopressors or atropine. On the other hand prophylactic administration of pharmacologic agents may be much more effective than hydration [17-19, 14-16].

CONCLUSION

This present study demonstrates that combination of 4 mg of intravenous Ondansetron and 10 ml/kg of crystalloid preload is effective in reducing the frequency of bradycardia and hypotension. Though other effects of Ondansetron, like decreasing frequency of post operative nausea and vomiting, post dural puncture headache (spinal headache) and shivering associated with spinal anaesthesia, were not included in this study, however these effects add more advantages to its use in spinal anaesthesia.

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