EFFECT OF SYNTOCINON ADMINISTRATION ON INTRAOPERATIVE MEAN ARTERIAL PRESSURE (MAP) DURING ELECTIVE CESAREAN DELIVERY

Muhammad Danish Hanif, Awais Ali Khan*, Aijaz Ali Bhugio, Raja Mushtaq Hussain, Aamir Aslam Awan*, Zaeem Ali Khan**

Combined Military Hospital Quetta Pakistan,* Combined Military Hospital Kharian Pakistan, **Riphah International University Islamabad Pakistan

ABSTRACT

Objective: The objective of the study is to compare the effect of syntocinon administration on intraoperative mean arterial pressure in elective caesarean delivery.

Study Design: Randomized Comparative Trial.

Place And Duration of Study: Department of Anaesthesiology Combined Military Hospital Quetta from Aug 2011 to Sep 2012.

Material and Methods: All full term females fulfilling inclusion criteria underwent elective caesarean delivery in the operation theatre of CMH Quetta as indoor patients, under spinal anaesthesia and aseptic measures. In group A,10 IU syntocinon I/V bolus followed by 40 IU/L of Normal Saline @ 32 drops/min was given immediately after baby delivery. In group B, 2.5 IU syntocinon I/V bolus followed by 15 IU/L of Normal Saline @ 32 drops/min was given immediately after baby delivery.These women had their intra-operative mean arterial pressure(MAP) recorded at the time of bolus, then after 2min, 5min, 10 min and 15 min. Intra-operative MAP readings were compared among the two groups.

Results: MAP was significantly higher (*p*-value =0.001) when low dose Syntocinon (2.5 IU syntocinon I/V bolus followed by 15 IU/L of Normal Saline at the rate of 32 drops/min) is given immediately after baby delivery without compromising its therapeutic beneficial effect.

Conclusion Administration of low dose syntocinon during elective caesarean delivery has the same therapeutic effects but with an added advantage that MAP remains stable.

Keywords: Caesarean delivery, Hypotension, Mean Arterial Pressure (MAP), Syntocinon.

INTRODUCTION

Among the various uterotonics, oxytocin is the most commonly used agent. It is routinely administered after delivery, whether spontaneous or operative, by bolus and infusion to initiate and maintain adequate uterine contractility after placental delivery, to minimise blood loss and prevent PPH. Prophylactic routine use of oxytocin has been shown to reduce the incidence of PPH by up to 40%, implying that in every 22 women receiving oxytocin, one PPH could be prevented[1]. Oxytocin is given to women during Caesarean section to decrease blood loss. It causes hypotension and tachycardia[2]. Whilst its cardiovascularside-effects are widely known there is little agreementas to the mechanism by which they occur[3–6]. The magnitude of these effects is dose-related[7]. However, these effects are notwidely appreciated by clinicians as highlighted in the Confidential Enquiry into Maternal Deaths (CEMD) publishedin 2001[8]. The significant hemodynamic changes after administering 10 IU of oxytocin could have contributed tothe deaths of two women who were already cardiovascular compromised. More

Correspondence: Dr Awais Ali Khan, Graded Surgeon, 144- Medical Battalion, Goma Siachin Glacier, Pakistan
Email: doctor.awaisalikhan@gmail.com
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recently, Pinder and colleagues[9] studied thehemodynamic effects of IV boluses of oxytocin, 5 and10 IU, in women having Caesarean section under spinal anesthesia and confirmed the dose-related effects of oxytocin. Weis and colleagues[7] showed that patients receiving aninfusion were more haemodynamically stable; these workersused 10 IU of oxytocin. We compared two different doses of syntocinon and found that the frequency of hypotension is reduced (*p*-value <0.001) when 2.5 IU syntocinon I/V bolus followed by 15 IU/L of Normal Saline at rate of 32 drops/min was given immediately after baby delivery. The rationale of this study is to find out the better protocol with minimum frequency of intra-operative hypotension while administering syntocinon during elective caesarean delivery

Table: Comparison of mean arterial pressure at different times between groups.

Group	Mean Arterial Pressure (mm Hg)					
	Before bolus	At bolus	2 min	5 min	10 min	15 min
Group A (n=50)	95 ± 1.5	80 ± 3.5	68 ± 2.3	65 ± 1.5	60 ±1.8	65 ± 2.1)
Group B (n=50)	94 ± 1.3	90 ± 3.3	88 ±3.4	85 ±2.1	87 ± 1.7	89 ± 1.1
p-value	0.100	<0.001	<0.001	<0.001	<0.001	<0.001

MATERIAL AND METHODS

These randomized controlled trials were conducted at department of Anaesthesiology, Combined Military Hospital (CMH), Quetta from Aug 2011 to Sep 2012. Full term females between 18-35 year of age were included in the study. Those having pregnancy induced hypertension, bleeding disorders, immuno-compromised and having any sort of systemic illness were not included in the study. Those who fulfilled the sample selection criteria were admitted in gynae/obs ward for elective caesarean delivery. Permission from hospital ethical committee was obtained. A written informed consent was taken from the patients. A total of 100 females were selected and randomized either to group A and B based on table of random numbers. All baseline investigations were done prior to the procedure. All the patients underwent elective caesarean delivery in the operation theatre of CMH Quetta as indoor patients, under spinal anaesthesia and aseptic measures. All the patients were pre-loaded with I/V Ringer Lactate Solution @ 10-15 ml/kg bodyweight prior tospinal anaesthesia, 1.6ml of 0.75% Abocain is given for spinal anaesthesia in order to achieve anaesthesia till T-6 level. In group A, 10 IU syntocinon I/V bolus followed by 40 IU/L of Normal Saline @ 32 drops/min was given immediately after baby delivery. In group B, 2.5 IU syntocinon I/V bolus followed by 15 IU/L of Normal Saline @ 32 drops/min was given immediately after baby delivery. Intra-operative mean arterial pressure of all the patients was recorded at the time of bolus, then after 2min, 5min, 10 min and 15 min. Intra-operative MAP readings were compared among the two groups. Data for each patient was recorded on a patient's performa.Follow up was ensured by taking contacts of patients. Control of bias and confounding factors was done by strictly following the exclusion criteria. Data had been analyzed using SPSS version 15 descriptive statistics were used to describe the results. Independent samples, t-test was applied to compare age & MAP at different times. A *p* value <0.5 was considered as signified.

RESULTS

A total of 100 females were recruited for study after careful scrutiny using above mentioned inclusion and exclusion criteria.

Mean age in group A was 26.17 years (SD=1.77) and in group B was 27.57 years (SD= 1.33) with insignificant difference (*p*= 0.100).

MAP before was 95 mmHg (SD=1.5) in group and 94 mmHg (SD = 1.3) in group B with insignificant (*p*=0.100)

At bolus MAP in group A was 80 mmHg (SD=3.5) and in group B it was 90 mmHg (SD=3.3) with significant difference (p=0.001). Difference in MAP was significant at 2 min (p=0.001) at 5 min (p=0.001), at 10 min (p=0.001) and at 15 min (p =0.001). (Table).

DISCUSSION

There have been discussions within the obstetric anaesthesia community about the correct dose of syntocinon and its method of administration[10]. Despite the controversy, it seems that more anaesthetists are using low dose of syntocinon as recommended by CEMD[11]. This is supported by the work of Pinder and colleagues who showed dose-related haemodynamic effects of oxytocin[9] although they underestimated the potential reduction in MAP attributable to the use of non-invasive blood pressure measurements. Our study has further reinforced this trend to the use of lower dosage by showing greater haemodynamic stability when 2.5 IU syntocinon I/V bolus followed by 15 IU/L of Normal Saline at rate of 32 drops/min is given.

Several papers have described the hemodynamic effects of oxytocin in the non-pregnant as well as pregnant population during cesarean delivery. Early studies used transthoracic bio impedance and thermo dilution technology[12,13] More recently; beat by beat pulse wave form monitors[14–16] and additional studies using transthoracic bio impedance[15,17] have provided a clinical picture of peripheral vasodilatation, hypotension, and increased cardiac output mediated by an increase in heart rate andstrokevolume. These effects are sometimes poorly tolerated when ventricular function is abnormal, and in the presence of mitral or aortic stenosis, or hypovolemia. A fatality was recorded in the Confidential Enquiry into Maternal Deaths of the United Kingdom in the triennium 1997– 1999, when oxytocin 10 IU was administered during the resuscitation of a hypovolemic patient during spinal anesthesia for cesarean delivery[18]. In the most recent Report on Confidential Enquiries into Maternal Deaths in South Africa for the triennium 2005–2007, there were two deaths in which oxytocin was contributory. In one case the cardiovascular effects of a high dose compounded those of spinalhypotension.Intheother,apoorlyresuscitated patient undergoing emergency cesarean delivery received 10 IU of oxytocin and a fatal cardiac arrest ensued[19]

Several empirical regimens have been proposed for oxytocin administration during caesarean delivery, and this has led to many different practices in its administration worldwide. It is recommended to give 20 units of oxytocin per litre of crystalloid infused at 10 ml/minute until the uterus contracts satisfactorily and bleeding is controlled, and then, the infusion is reduced to 1–2 ml/minute[20]. In a survey on the use of oxytocin for caesarean delivery, it was found that 295 out of 360 departments of anaesthesiology administer oxytocin as a bolus (85.3%) and 48 (13.9%) give it as a slow infusion[21]. The dosage ranged from 1 to 80 IU and one out of eight departments administered 10 IU or more as bolus.

Our study shows that low dose of syntocinon can effectively minimize the intra-operative hypotension without compromising the therapeutic benefits. Intra-operative hypotension of syntocinon has been described previously but the extent of physiological compromise has not been described using intra-operative measurements. Our study demonstrated a significant decrease in mean arterial pressure in group A which received high dose (10 IU syntocinon I/V bolus followed by 40 IU/L of Normal Saline @ 32 drops/min) syntocinon as compared to group B (2.5 IU syntocinon I/V bolus followed by 15 IU/L of Normal Saline at rate of 32 drops/min), without compromising the affectivity.

CONCLUSION

Administration of low dose syntocinon during elective caesarean delivery has the same

therapeutic effects but with an added advantage that MAP remains stable.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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