

# Assessment of Effect Phenylephrine with Oxytocin on the Prevention of Oxytocin-Induced Hypotension in Caesarean Section Under Spinal Anaesthesia

Nisha Thomas 

Assistant Professor, Pk Das Institute of Medical Sciences, Vaniamkulam, Ottapalam, Kerala, India.

## Abstract

**Background:** The aim is to assess the effect of co-administration of different doses of phenylephrine with oxytocin on the prevention of oxytocin-induced hypotension in caesarean section under spinal anaesthesia. **Subjects and Methods :** Forty- eight adult females in age ranged 18- 48 years with elective and emergency lower segment caesarean section (LSCS) were recruited and were classified into 3 groups of 16 each based on lottery method. Group I patients received oxytocin 3U and phenylephrine 50  $\mu\text{g}$  diluted to 10 cc with normal saline as an infusion over 5 minutes, group II patients received oxytocin 3U and phenylephrine 75  $\mu\text{g}$  diluted to 10 cc infusion over 5 minutes and group III patients received oxytocin 3U and normal saline diluted to 10 cc infusion over 5 minutes. Parameters such as height, weight, sensory block, duration of surgery (minutes), extraction time of baby from induction (minutes) and extraction time of baby from skin incision (minutes), incidence of hypotension and dose of rescue vasopressor given was recorded and compared in all groups. **Results:** The mean age in group I was 27.2 years, in group II was 28.4 years and in group III was 28.1 years. The mean height was 161.2 cm in group I, 160.5 cm in group II and 162.1 cm in group III. The mean weight was 65.4 kgs in group I, 64.2 kgs in group II and 66.5 kgs in group III. A non- significant difference was observed in all three groups ( $P > 0.05$ ). The duration of surgery found to be 52.3 minutes in group I, 53.2 minutes in group II and 52.8 minutes in group III. Extraction time of baby from induction was 10.8 minutes, 10.9 minutes and 11.2 minutes and extraction time of baby from skin incision was 6.5 minutes, 7.2 minutes and 7.8 minutes in group I, II and III respectively. Dose of rescue vasopressor given ( $\mu\text{g}$ ) was 42.3, 5.7 and 91.2. Incidence of hypotension was seen in 13, 2 and 14 and episodes of hypotension was 0 seen in 14 in group II, 1 seen in 11, 2 and 13 and 2 seen in 2, 0 and 1, MAP before oxytocin infusion was 81.2, 81.2 and 76.2 and MAP after oxytocin infusion was 65.2, 74.9 and 64.9 in group I, II and III respectively. **Conclusion:** Results showed that co-administration of phenylephrine 75  $\mu\text{g}$  with oxytocin 3U reduces the incidence of oxytocin-induced hypotension compared to phenylephrine 50  $\mu\text{g}$  with oxytocin 3U during caesarean section under spinal anaesthesia.

**Keywords:** Caesarean Section, Spinal Anaesthesia, Oxytocin.

**Corresponding Author:** Nisha Thomas, Assistant Professor, Pk Das Institute of Medical Sciences, Vaniamkulam, Ottapalam, Kerala, India.  
E-mail: [nisha7ditto@gmail.com](mailto:nisha7ditto@gmail.com)

Received: 26 March 2021

Revised: 05 May 2021

Accepted: 18 May 2021

Published: 20 June 2021

## Introduction

In pregnant ladies, Postpartum haemorrhage (PPH) is one of the major reasons for mother death. It is evident that in approximately 45%-55% of cases, the main cause for mortality is uterine atony. [1] Spinal anaesthesia (SA) used in pregnancy can lead to hypotension. [2,3] Uterotonic agents are widely used for reducing maternal mortality. Postpartum haemorrhage can be prevented by the application of oxytocin which is a potent uterotonic agent. Oxytocin induced hypotension is also seen with the use of oxytocin similar to SA. [4] The reason for the hypotension in this condition is due to action of oxytocin receptors seen in blood vessels and heart. [5]

This SA and oxytocin induced hypotension can be inhibited by the use of phenylephrine, mephentermine, crystalloids and ephedrine. [6] The main effect on control of blood pressure is obtained with phenylephrine. The main administration of phenylephrine is via infusion and as a bolus dose. [7] Increase in cardiac output, heart rate and decrease in systemic vascular resistance are effects of phenylephrine on body. [8] The incidence of nausea, vomiting and hypotension decreases significantly with the use of phenylephrine. [9] Other effect is improvement of fetal arterial perfusion as compared to ephedrine. Considering this we attempted present study to assess effect of co-administration of different doses of phenylephrine with oxytocin on the prevention of oxytocin-induced hypotension in caesarean section

under spinal anaesthesia.<sup>[10]</sup>

### Subjects and Methods

A sum total of forty- eight adult females in age ranged 18- 48 years with elective and emergency lower segment caesarean section (LSCS) were recruited for this prospective, observational study. Approval was obtained from higher authorities (Review & Ethical committee).

We classified these patients into 3 groups of 16 each based on lottery method. Group I patients received oxytocin 3U and phenylephrine 50 µg diluted to 10 cc with normal saline as an infusion over 5 minutes, group II patients received oxytocin 3U and phenylephrine 75 µg diluted to 10 cc infusion over 5 minutes and group III patients received oxytocin 3U and normal saline diluted to 10 cc infusion over 5 minutes. Parameters such as height, weight, sensory block, duration of surgery (minutes), extraction time of baby from induction (minutes) and extraction time of baby from skin incision (minutes), incidence of hypotension and dose of rescue vasopressor given was recorded and compared in all groups. Results were expressed as mean, frequency and with the use of student's t test, the level of significance was determined (P< 0.05).

### Results

The mean age in group I was 27.2 years, in group II was 28.4 years and in group III was 28.1 years. The mean height was 161.2 cm in group I, 160.5 cm in group II and 162.1 cm in group III. The mean weight was 65.4 kgs in group I, 64.2 kgs in group II and 66.5 kgs in group III. The difference was non-significant (P> 0.05) [Table 1, Figure 1].

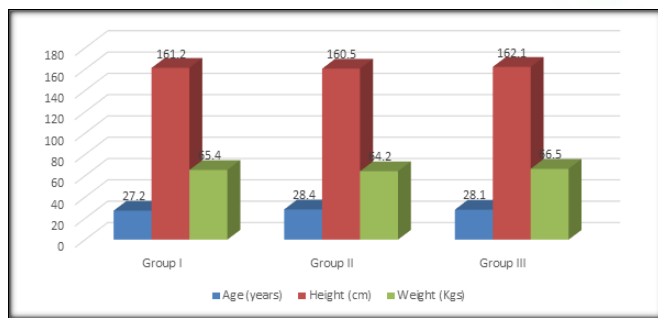


Figure 1: Baseline demographics

A non- significant difference was observed in all three groups (P> 0.05). The duration of surgery found to be 52.3 minutes in group I, 53.2 minutes in group II and 52.8 minutes in group III. Extraction time of baby from induction was 10.8 minutes, 10.9 minutes and 11.2 minutes and extraction time of baby from

skin incision was 6.5 minutes, 7.2 minutes and 7.8 minutes in group I, II and III respectively [Table 2, Figure 2].

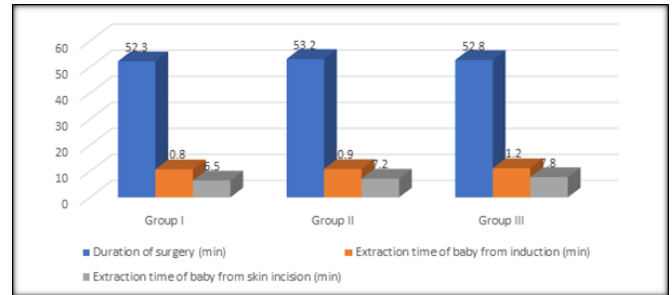


Figure 2: Comparison of parameters

Dose of rescue vasopressor given (µg) was 42.3, 5.7 and 91.2. Incidence of hypotension was seen in 13, 2 and 14 and episodes of hypotension was 0 seen in 14 in group II, 1 seen in 11, 2 and 13 and 2 seen in 2, 0 and 1, MAP before oxytocin infusion was 81.2, 81.2 and 76.2 and MAP after oxytocin infusion was 65.2, 74.9 and 64.9 in group I, II and III respectively. The difference was non- significant (P> 0.05) [Table 3, Figure 3].

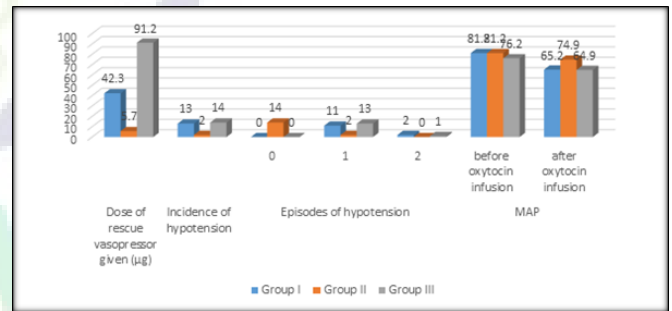


Figure 3: Assessment of MAP and hypotension

### Discussion

Endogenous oxytocin is a 9–amino acid polypeptide produced in the posterior pituitary.<sup>[11,12]</sup> The exogenous form of the drug.<sup>[13,14]</sup> The uterotonic effect of oxytocin is important in reducing blood loss from the site of placental attachment and decreasing the risk of postpartum haemorrhage, thus making it the primary choice among uterotonics.<sup>[15,16]</sup> We attempted present study to assess effect of co-administration of different doses of phenylephrine with oxytocin on the prevention of oxytocin-induced hypotension in caesarean section under spinal anaesthesia.

We observed that the mean age in group I was 27.2 years, in group II was 28.4 years and in group III was 28.1 years. The

**Table 1: Baseline demographics**

Parameters	Group I	Group II	Group III	P value
Age (years)	27.2	28.4	28.1	>0.05
Height (cm)	161.2	160.5	162.1	>0.05
Weight (Kgs)	65.4	64.2	66.5	>0.05

**Table 2: Comparison of parameters**

Parameters	Group I	Group II	Group III	P value
Duration of surgery (min)	52.3	53.2	52.8	>0.05
Extraction time of baby from induction (min)	10.8	10.9	11.2	>0.05
Extraction time of baby from skin incision (min)	6.5	7.2	7.8	>0.05

**Table 3: Assessment of MAP and hypotension**

Parameters	Variables	Group I	Group II	Group III	P value
Dose of rescue vasopressor given ( $\mu\text{g}$ )		42.3	5.7	91.2	<0.05
Incidence of hypotension		13	2	14	<0.05
Episodes of	0	0	14	0	<0.05
	1	11	2	13	
	2	2	0	1	
MAP	before oxytocin infusion	81.2	81.2	76.2	>0.05
	after oxytocin infusion	65.2	74.9	64.9	<0.05

mean height was 161.2 cm in group I, 160.5 cm in group II and 162.1 cm in group III. The mean weight was 65.4 kgs in group I, 64.2 kgs in group II and 66.5 kgs in group III. Chikara et al,<sup>[17]</sup> found mean age in lactated ringer solution group was 25.27 years and in hydroxyethyl starch group was 26.19 years. The mean spinal uterine incision time was 15.88 in lactated ringer solution group and 17.18 in hydroxyethyl starch group. There was 443 ml and 479 ml mean blood loss in groups respectively. There was significant difference in systolic blood pressure, heart rate in both groups. There was no significant difference in the incidence of maternal nausea and vomiting, as well as APGAR scores at 1 and 5 min.

We found that the duration of surgery found to be 52.3 minutes in group I, 53.2 minutes in group II and 52.8 minutes in group III. Extraction time of baby from induction was 10.8 minutes, 10.9 minutes and 11.2 minutes and extraction time of baby from skin incision was 6.5 minutes, 7.2 minutes and 7.8 minutes in group I, II and III respectively. Dose of rescue vasopressor given ( $\mu\text{g}$ ) was 42.3, 5.7 and 91.2. We observed that incidence of hypotension was seen in 13, 2 and 14 and episodes of hypotension was 0 seen in 14 in group

II, 1 seen in 11, 2 and 13 and 2 seen in 2, 0 and 1, MAP before oxytocin infusion was 81.2, 81.2 and 76.2 and MAP after oxytocin infusion was 65.2, 74.9 and 64.9 in group I, II and III respectively. Gangadharaiah et al,<sup>[18]</sup> found that age, height, weight, level of sensory block at 20 min and duration of surgery were comparable in all the groups. The incidence of hypotension (Group A – 90%, Group B – 10%, Group C – 98%,  $P = 0.001$ ), magnitude of fall in mean arterial pressure (Group A- $15.03 \pm 6.12$  mm of Hg, Group B –  $6.63 \pm 4.49$  mm of Hg and Group C- $13.03 \pm 3.39$  mm of Hg,  $P < 0.001$ ) and rescue vasopressor requirement (Group A- $45 \pm 15.25$  mg, Group B- $5 \pm 15.25$ , Group C- $91.66 \pm 26.53$ ,  $P < 0.001$ ) were significantly lower in Group B compared to A and C.

### Conclusion

Results showed that co-administration of phenylephrine 75  $\mu\text{g}$  with oxytocin 3U reduces the incidence of oxytocin-induced hypotension compared to phenylephrine 50  $\mu\text{g}$  with oxytocin 3U during caesarean section under spinal anaesthesia.

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**How to cite this article:** Thomas N. Assessment of Effect Phenylephrine with Oxytocin on the Prevention of Oxytocin-Induced Hypotension in Caesarean Section Under Spinal Anaesthesia. *Asian J. Med. Res.* 2021;10(2):5-8.

DOI: [dx.doi.org/10.47009/ajmr.2021.10.2.AN2](https://doi.org/10.47009/ajmr.2021.10.2.AN2)

**Source of Support:** Nil, **Conflict of Interest:** None declared.