

Comparison between Effect of Bupivacaine and Bupivacaine With Dexamethasone on Duration of Analgesia in Spinal Anaesthesia for Elective Caesarean Section

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ABSTRACT

Aim: To compare mean duration of analgesia with intrathecal Bupivacaine alone versus intrathecal Bupivacaine plus Dexamethasone, for elective caesarean section.

Methods: This Randomized controlled trial was conducted in the Department of Anaesthesia, Nishtar Hospital Multan from February 2013 to August 2013. Sixty 60 patients were included. They were divided in two groups. Each group comprised 30 patients.

Results: The mean duration of analgesia in group BD was 391.93 ± 25.51 and in group BS was 179.43 ± 23.32 [P-value <0.05].

Conclusion: The results of the study conclude that the addition of intrathecal dexamethasone to bupivacaine significantly improved the mean duration of analgesia when used for elective caesarean section.

Key words: Bupivacaine, intrathecal, analgesia, spinal anaesthesia, dexamethasone

INTRODUCTION

Spinal anaesthesia is a widely used regional anaesthetic technique for the procedures below umbilicus with added advantage of retaining consciousness, excellent surgical field, extended pain relief, low incidence of thrombo-embolism and earlier return of gastrointestinal function. Bupivacaine is the drug of choice in spinal anaesthesia¹, as it provides effective block for 90-120 minutes. To prolong its analgesic effects, various additives have been tried like, Opioids², Phenylephrine³, Adrenaline^{4,5}, Clonidine⁶ and Neostigmine.⁷ But these adjuncts have their complications like respiratory depression with Opioids, hypertension and tachycardia with vasoconstrictors and excessive sedation as observed with Clonidine.

Dexamethasone is a synthetic glucocorticoid with a wide range of usage like, treatment of allergies, relief of inflammatory symptoms, analgesic property⁸, reduction of nausea and vomiting⁹, as an adjunct to local anaesthetic agent for brachial plexus block.¹⁰ In 2011, a study was done in Iran, which evaluated the effects of addition of 8 mg Dexamethasone to 15 mg (3cc) of 0.5% hyperbaric Bupivacaine in spinal anaesthesia for orthopaedic surgery. They observed that the duration of analgesia enhanced from 202 ± 43.67 minutes (Control Group) to 401 ± 72.44 minutes in interventional group, with p value <0.001.¹¹ In pregnancy, reduced dose of intrathecal local anaesthetic is required due to the physiological changes in the parturient¹²⁻¹⁴

Rationale of the study is to compare the two modalities as no study on caesarean section has been done so far with the reduced amount of bupivacaine and dexamethasone combination. If the outcome is found to be promising, then the superior of the two modalities will be used in future during caesarean section.

PATIENTS AND METHODS

This Randomized controlled trial was conducted in the Department of Anaesthesia, Nishtar Hospital Multan from February 2013 to August 2013. Sixty patients were included. They were divided in two equal groups. Each group comprised 30 patients. In group BD (case) and BS (control) were enrolled.

RESULTS

In group BD, there were 9 (30%) patients of age range 18-25 years, 10 (33.33%) between 26 to 30 years, 5 (16.66%) of age range 31-35 years and 6 (20%) were between the 36-40 years range. In group BS, there were 12 (40%) patients of age range 18-25 years, 8 (26.66%) between 26 to 30 years, 6 (20%) of age range 31-35 years and 4 (13.33%) were between the 36-40 years range (Table 1). The mean gestational age of the patients in group BD was 36.43 ± 2.51 weeks. 6 (20%) patients were between 31-34 weeks gestational age group. 18 (60%) patients were in range of 35-38 weeks. 6 (20%) were in the range of 39-42 weeks of gestation. The mean gestational age of the patients in group BS was 35.67 ± 2.18 weeks. 8(26.66%) patients were between

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31-34 weeks gestational age group. 19 (63.33%) patients were in range of 35-38 weeks. 3 (10%) were in the range of 39-42 weeks of gestation (Table 2). Frequency and percentages were calculated for parity in both groups. In Group BD, 7 (23.33%) were primi-gravida, 8(26.66%) were para 2, 6 (20%) were para 3, 3(10%) were para 4, 4(13.33%) were para 5 and 2(6.66%) were grand multipara. In Group BS, 3(10%) were primi-gravida, 10(33.33%) were para 2, 10(33.33%) were para 3, 4(13.33%) were para 4, 3(10%) were para 5 and no patient was grand multipara (Table 3). Stratification for age of the patients was done (Table 4), which shows 402.56±25.81 in Group-BD and 175.5±16.30 minutes in Group-BS between 18-25 years, 386.20±29.65 in Group-BD and 182.75±32.25 minutes in Group-BS between 26-30 years, 387.60±29.03 in Group-BD and 187.00±25.58 minutes in Group-BS between 31-35 years, while 389.17±12.48 in Group-BD and 173.25±12.48 minutes in Group-BS between 36-40 years. Regarding stratification for parity of the patients, we recorded 395.33±28.76 minutes in Group-BD and 175.13±21.49 minutes in Group-BS were between para1-3 while 382.71±15.20 in Group-BD and 193.57±25.11 minutes in Group-BS were between para 4-5. Finally 388.50±9.19 minutes in Group-BD were grand multipara. P-value 0.00 (<0.05) in each parity class is significant (Table 5). Regarding stratification for weight of the patients, we recorded 408.50±18.80 minutes in Group-BD and 193.75±34.97 minutes in Group-BS were between 40-50 kgs while 387.89±25.28 in Group-BD and 177.47±18.94 minutes in Group-BS were between 51-60 kgs. Finally 392.75±28.16 in Group-BD and 176.57±27.96 minutes in Group-BS were between 61-70 kgs. P-value 0.00 (<0.05) in each weight class is significant (Table 6).

Table 1: Age distribution of the patients (n=60)

Age (years)	Group-BD (n=30)		Group-BS (n=30)	
	No.	%	No.	%
18-25	9	30.0	12	40.0
26-30	10	33.3	8	26.7
31-35	5	16.7	6	20.0
36-40	6	20.0	4	13.3

Table 2: Gestational age of the patients (n=60)

Gestational age (weeks)	Group-BD (n=30)		Group-BS (n=30)	
	No.	%	No.	%
31-34	6	20.0	8	26.7
35-38	18	60.0	19	63.3
39-42	6	20.0	3	10.0
36-40	6	20.0	4	13.3

Table 3: Frequency and percentages of parity (n=60)

Parity	Group-BD (n=30)		Group-BS(n=30)	
	No.	%	No.	%
Primi	7	23.3	3	10.0
Para 2	8	26.7	10	33.3
Para 3	6	20.0	10	33.3
Para 4	3	10.0	4	13.3
Para 5	4	13.3	3	10.0
Grand multipara	2	7.7.0	-	-

Table 4: Stratification for age of the patients (n=60)

Age (years)	Group-BD (n=30)	Group-BS (n=30)	P value
18-25	402.56±25.81	175.50±16.30	0.00
26-30	386.20 ± 29.65	182.75 ± 32.25	0.00
31-35	387.60 ± 29.03	187.00 ± 25.58	0.00
36-40	389.17 ± 12.48	173.25 ± 22.55	0.00

Table 5: Stratification for parity of the patients (n=60)

Parity	Group-BD (n=30)	Group-BS (n=30)	P value
1-3	395.33±8.76	175.50±16.30	0.00
4-5	382.71±15.20	193.57±25.11	0.00
>5	388.50±9.19	-	-

Table 6: Stratification for weight of the patients (n=60)

Weight	Group-BD (n=30)	Group-BS (n=30)	P value
40-50	408.50±18.80	193.75±34.97	0.00
51-60	387.89±25.28	387.89±25.28	0.00
61-70	392.75±28.16	176.57±27.96	0.00

DISCUSSION

Post operative pain is the concern of every patient undergoing any kind of surgical procedure. It alters the physiological response of the body and also affects a person's psychology. By early and effective management of post operative pain a physician may achieve the goals of early mobilization thus preventing the associated co-morbidities. Different combinations of drugs along with regional anaesthesia block techniques are being effectively deployed to target different phases of pain pathway from perception to central modulation. Thus one can use reduced amount of a single analgesic drug and avoid its adverse effects. Intrathecal single shot of local anaesthetic agents produce excellent surgical field and may render a patient pain free even after 2-3 hours of surgery. This period can be extended and long term benefits in terms of limiting opioid analgesic dosage, by addition of some adjuncts. In this study, we compared the duration of analgesia of hyperbaric Bupivacaine alone and in combination with Dexamethasone during spinal anaesthesia,

employed for elective caesarean section, on 60 patients. The collected data when analyzed on SPSS version 17, proved that instillation of combination of Dexamethasone and hyperbaric Bupivacaine provided more duration of analgesia 391 ± 25.51 minutes as compared to hyperbaric Bupivacaine alone 179.43 ± 23.32 minutes with p-value < 0.05 which is statically significant.

In a randomized, prospective, double-blind, case-control, clinical trial at Department of Anesthesiology, Babol University of Medical Sciences, Iran; Bani-Hashem and colleagues¹¹ enrolled 50 adult patients, scheduled for orthopedic surgery under spinal anesthesia. The patients were randomly allocated to receive 15 mg hyperbaric bupivacaine 0.5% with 2 cc normal saline (control group) or 15 mg hyperbaric bupivacaine 0.5% plus 8 mg dexamethasone (case group) intrathecally. They found sensory block duration in the case group was 119 ± 10.69 minutes and in the control group was 89.44 ± 8.37 minutes which was significantly higher in the case group ($P < 0.001$). The duration of analgesia was 401.92 ± 72.44 minutes in the case group; whereas it was 202 ± 43.67 minutes in the control group ($P < 0.001$). In our study, the mean duration of analgesia was significantly prolonged when Bupivacaine and Dexamethasone combination was used and this also decreased the requirement of rescue analgesia in the form of injection Tramadol. Similar results were observed by Vieira et al¹⁰, where Dexamethasone plus Bupivacaine combination increased duration of analgesia in ultrasound guided interscalene brachial plexus block.

In a prospective, randomized, double-blind investigation, Vieira and co-workers¹⁰, enrolled 88 individuals undergoing shoulder arthroscopy. Patients received interscalene brachial plexus block using 20 ml of bupivacaine 5 mg/ml (-1) with 1: 200,000 epinephrine and clonidine 75 microgram. Patients were randomly assigned to receive either dexamethasone 8mg or 0.9% NaCl as an adjuvant to the mixture. Dexamethasone prolonged median sensory (1457 vs. 833 min, $P < 0.0001$) and motor (1374 vs. 827 min, $P < 0.0001$) blockade compared with the control. At 24 h, the dexamethasone group had lower median verbal analogue scale scores compared with control (3.0 vs. 6.0). At 48 h, the two groups had similar median pain scores (4.0 vs. 5.0, dexamethasone vs. control, respectively). The opioid requirement in oxycodone equivalency was lower in the dexamethasone group than in the control group for the first 24 h, and similar thereafter.

Kim et al¹⁴ also observed the prolongation of analgesia with addition of Dexamethasone to Levobupivacaine when used for interscalene brachial plexus block. Reduction in consumption of

oxycodone with Dexamethasone was observed by Jokela and colleagues after laparoscopic hysterectomy when inj. Dexamethasone was administered before induction of anaesthesia.

These findings confirm that glucocorticoids like Dexamethasone have quality to improve analgesia. It also justifies the hypothesis of the study that, "there is difference in mean duration of analgesia with Bupivacaine alone versus combination of Bupivacaine and Dexamethasone during spinal block for elective caesarean section". So Dexamethasone can be used in combination with Bupivacaine in spinal anaesthesia to prolong analgesia in post operative period of caesarean section. However more studies are needed to support the evidence.

CONCLUSION

This study concluded that during elective caesarean sections, intrathecal Dexamethasone in combination with Bupivacaine can significantly increase the duration of analgesia when compared with bupivacaine alone.

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