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Evaluation the Effects of Intravenous *vs.* Spinal Dexmedetomidine during Anesthesia for Cesarean Sections with Severe Pre-Eclampsia

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Abstract

Background: Side effects of low-dose spinal anesthesia with opioids and adjuvants raised the essential requirement to look for better alternatives like dexmedetomidine for patients with severe pre-eclampsia undergoing cesarean section to provide satisfactory spinal anesthesia and improve its outcomes.

Aim: Evaluate and compare effects of intravenous and intrathecal dexmedetomidine on duration of spinal block, postoperative analgesia and incidence of adverse effects in parturient with severe Pre-eclampsia undergo Caesarean section.

Settings and design: A prospective, double blind controlled randomized and comparative study.

Methods: Sixty ASA II patients were randomized into 3 groups: Group I: (control group) (n=30) each patient received intrathecal hyperbaric bupivacaine 10 mg with 3 mL total volume. Group II: (Intrathecal dexmedetomidine group) (n=0) each patient received dexmedetomidine 5 µg diluted i n 0.5 ml saline and hyperbaric bupivacaine 10 mg with 3 mL total volume. Group III: (Intravenous dexmedetomidine group) (n=30) each patient received intravenous dexmedetomidine started at a loading dose of 1 µg/kg diluted in 50 ml saline and administered within 10 min. as a loading dose, followed by maintenance at a dose of 0.4 µg/kg/h diluted in 200 ml saline till the end of surgery and hyperbaric bupivacaine 10 mg in 3 ml total volume. Primary outcome is the duration of spinal block while secondary outcomes are the postoperative analgesia and the incidence of side effects.

Results: Time (min) to sensory regression to s1 level in group I, II, III was (200.23 ± 3.25, 230.4 ± 2.5, 294.1 ± 15.1) respectively, showed significance increase in group III. Time to reach motor block Bromage 3 was (5.5 ± 0.2, 5.7 ± 0.9, 8.5 ± 0.3) in group I, II, III respectively, there was significance increase in group III. Time of regression to Bromage 0 was assessed as (170.5 ± 2.35, 190.6 ± 3.51, 249.2 ± 20.2) in groups I, II, III respectively, showed significance increase in group III. Onset of 1st post-operative analgesic dose was assessed in the study groups (242.23 ± 15.01, 270.15 ± 25.00, 371.25 ± 88.54), showed significance increase in group III. Side effects showed significance decrease in group III.

Conclusion: Intravenously administered dexmedetomidine prolonged the duration of sensory and motor blockade with reduced side effects.

Keywords: Dexmedetomidine; Intravenous; Intrathecal; Severe Pre-eclampsia

Introduction

Neuraxial blockade for patients with pre-eclampsia undergoing cesarean section is a safe and potent anesthetic technique [1]. Fast onset, higher level blockade, lower failure rates, and cost-effectiveness are main causes that make spinal block is the preferred technique although it has numerous side effects which my occur intra operative as hypotension, bradycardia, respiratory depression, short period of block and postoperative complications as nausea, vomiting, shivering, prurites paresthesia, post dural puncture headache (PDPH), allergy, voiding difficulty and shortness of postoperative analgesia [2].

Aim of researchers work to decrease spinal anesthesia complications is necessary for rehabilitation, rapid functional recovery, allowing patients to return to their usual activity quickly and improve patient satisfaction and surgeon opinion [3]. Intrathecal adjuvants are progressively used for better post-operative analgesia. Intrathecal opioids are used to potentiate post-operative pain management but their side effects have raised the essential requirement to look for better alternatives [4]. Several authors demonstrated that although intrathecal addition of a low dose of dexmedetomidine results in significant prolongation of the duration of the sensory and motor blockade added to spinal anesthetics [5]. But it has high incidence of spinal anesthesia complications such as nausea, vomiting, shivering, prurites paresthesia, PDPH, allergy, total spinal anesthesia, and voiding difficulty.

Dexmedetomidine is a centrally acting α_2-agonist with sedative and analgesic effects; it is near to clonidine but has much greater α_2 to α_1 binding affinity [6]. Stimulation of the brain and spinal cord receptors retards neuronal firing, causing hypotension, bradycardia, sedation, and analgesia [7] .Depressing the liberation of C-fiber transmitters and by hyperpolarization of postsynaptic dorsal horn neurons are the

mechanisms of analgesic effect of dexmedetomidine. This antinociceptive action and safety of the use of dexmedetomidine on neonatal outcome is a very important issues which encourage us to use with spinal anesthesia either intravenously or intrathecally [8].

The aim of this study was to investigate and compare the effects of intravenous dexmedetomidine and when used as an additive to intrathecal 0.5% bupivacaine in decreasing the incidence of intra and post spinal anesthesia adverse effects and improving its quality (duration of spinal block, postoperative analgesia, hemodynamic stability, and neonatal outcome) in parturient with sever pre-eclampsia undergo Caesarean section.

Patients and Methods

This prospective randomized blind study of one year duration was performed on 90 patients scheduled for elective lower segment Caesarean section (LSCS). After approval from ethical committee; an informed consent was taken from the patients. Any unexpected risk occurring during the course of the study was cleared to ethical committees in time. Each patient received an explanation to the purpose of the study. All patients identified by a coded number to ensure privacy. Female patients aged 18:42 years old with severe pre-eclampsia at least 36 weeks gestation scheduled for elective cesarean delivery were included.Severe pre-eclampsia was defined as a systolic arterial blood pressure (SAP) of 160 mm Hg or more or a diastolic arterial blood pressure (DAP) of 110 mm Hg or more and proteinuria of 100 mg/dL or more. Patients with eclampsia, coagulopathy, placental abruption, severe fetal distress, contraindications to regional anesthesia or a history of allergy to local anaesthetics were excluded from the study. On arrival at the Operating Room, two peripheral venous cannulae and a urinary catheter were inserted and all the patients were preloaded with 10 ml / kg Lactated Ringer's solution. Monitoring consisted of echocardiogram (ECG), pulse oximeter and non-invasive blood pressure recording. Ramsay's score was used to monitor the sedation levels. Intravenous hydralazine 5 mg was given to all patients at 20-minute intervals, to decrease the DAP to about 90 mm Hg, prior to the start of anesthesia.

Patients were randomly classified using sealed envelopes into 3 groups: Group I: (control group) (n=30) each patient received intrathecal hyperbaric bupivacaine 10 mg in 2.5 ml and 0.5 ml saline with 3 mL total volume.Continous 50 ml saline infusion for 10 min followed by 200 ml saline infusion till end of surgery, Group II: (Intrathecal dexmedetomidine group) (n=30) each patient received dexmedetomidine 5 µg diluted in 0.5ml saline and hyperbaric Bupivacaine 10 mg in 2.5 ml with 3 mL total volume .Continous 50 ml saline infusion for 10 min followed by 200 ml saline infusion till end of surgery. Group III: (Intravenous dexmedetomidine group) (n=30) each patient received intravenous dexmedetomidine started at a loading dose of 1 µg/kg diluted in 50 ml saline and administered within 10 min as a loading dose, followed by maintenance at a dose of 0.4 µg/kg/h diluted in 200 ml saline till the end of surgery and hyperbaric Bupivacaine 10 mg in 2.5 ml total volume. Primary outcome is the duration of spinal block while secondary outcomes are the postoperative analgesia and the incidence of intra and postoperative side effects (All durations recorded considering the time of spinal injection as time zero).

The study drug solution was prepared by anesthetic nurse who was not being involved in the study or care of the patient. Both patient and anesthetist performed the block were blinded to the study drug.

Spinal anesthesia block was performed with the patient in sitting position, in which the patient sit on the border of the operating table with legs on stool, leaning forward arching his back. Under complete aseptic technique, iliac crest was palpated and thumb extended to meet the midline, feeling the expanse between L4-5. Spinal anesthesia performed as follows: using a 25-G spinal (needle B Braun medical, Germany) the epidural space identified by the loss of resistance technique. The needle then was further advanced until cerebrospinal fluid flowed from the cannula without restriction. Immediately the prepared solution was injected.

Sensory block: Sensory testing was evaluated by loss of pinprick sensation to 23G hypodermic needle and dermatomes levels was tested every 2 min until the highest level is stabilized by consecutive tests the midclavicular line bilaterally. On achieving T7 sensory blockade level (which is halfway between the level of the xiphoid process and the level of the umbilicus), surgery was allowed and we told the patient about the various sensations that she would sense like stretching of muscles and compression on abdomen by the surgeon assistant for baby delivery .In case of failed neuraxial block and total spinal, patient was given general anesthesia and the case was excluded from the study.

Motor Block: The motor block was assessed according to the modified Bromage scale. Bromage 0 the patient is able to move the hip, knee and ankle, Bromage 1 the patient is unable to move the hip but is able to move the knee and ankle, Bromage 2, the patient is unable to move the hip and knee but able to move the ankle, Bromage 3, the patient is unable to move the hip, knee and ankle. When Bromage 3 is reached surgery was allowed.

Before baby delivery 15 I .U oxytocine was given to the mother by the baby delivery as 5 I.U IV slowly bolus and 10 I.U as infusion followed by measuring of blood pressure, observing and asking the surgeon about the tone of uterus.

Intraoperative: Heart rate, Arterial blood pressure and Spo_2 were recorded in the following times at base line, immediate after spinal, 5, 10, 15, 30 and 45 min during surgery. Time (min) to achieve T7 sensory blockade was assessed by loss of pinprick sensation (onset of sensory blockade) from the time of injection. Time (min) to reach motor block Bromage 3 was assessed according to the Modified Bromage scale (onset of motor blockade) from the time of injection.

Hypotension, defined as a decrease of systolic blood pressure by more than 30% from baseline or a fall below 90 mmHg, was treated with incremental IV doses of ephedrine 5 mg and IV fluid as required.Bradycardia, defined as heart rate <50 bpm, was treated with IV atropine 0.3-0.6 mg.Side effects as nausea, vomiting and prurites were recorded.

Postoperative: The regression time (min) for Bromage 0 was recorded. Time to sensory regression to s1 level (which corresponds to lateral side of calcareous) was recorded. Sedation was recorded by Ramsay sedation score. The score, from 1 to 6, describes a patient as follows: Anxious and agitated or restless, or both, Cooperative, oriented, and calm, Responsive to commands only. Exhibiting brisk response to light or loud auditory stimulus. Exhibiting a sluggish response to light or loud auditory stimulus.Unresponsive. The duration between the administration of spinal block and the first desire for supplemental analgesia (onset of 1st post-operative analgesic dose).

First post-operative analgesic dose was 1 µg/kg intravenous fentanyl when VAS is 4 or more (visual analogue pain score (VAS) between 0 and 10{ 0= no pain, 10=most severe pain}) ,after that patient was

assessed for pain relief every 10 minutes and increments of 0.5 μg/kg IV fentanyl was given until pain is relieved .

After that, the pain score was every 4 h in 24 h and fentanyl was given in a dose of 1 μg /kg when VAS is 4 or more. Any out breaking pain was treated with increments of fentanyl in a dose of 0.5μg/kg. The total requirement of fentanyl was calculated in the different groups.Fentanyl was stopped if patient becomes sedated (Ramsay score more than 2), has respiratory rate less than 9 bpm, or oxygen saturation less than 95%.

The neonatal outcome: Apgar scores at 1st and 5th min. and incidence of apgar score <7 was recorded. Patients were discharged from the PACU (Post Anesthesia Care Unit) after sensory regression to s1 dermatome and Bromage 0.

Statistics

The sample size was chosen after reviewing many randomized Control studies on the same subject. The full detailed form is: SPSS 20, IBM, Armonk, NY, United States of America. Quantitative data were expressed as mean ± standard deviation (SD). Qualitative data were expressed as frequency and percentage. 1. Independent-samples t-test of significance was used when comparing between two means. 2. Chi-square (χ^2) test of significance was used in order to compare proportions between two qualitative parameters.

Results

As regard age, weight and duration of surgery, there was no significant difference between both groups; those data were recorded in (Table 1).

The study as regard HR comparison between groups in baseline, 5 min, 10 min, 15 min, 30 min, 45 min showed that, in group I there was decrease in mean value of HR at 15 min, 30 min, 45 min from (84.6 ± 6.3) to (72.6 ± 5.6), (71.4 ± 5.1), (70.3 ± 5.9) beats per minute (bpm) and also, in group II there was decrease in mean value of HR at 15 min, 30 min, 45 min from (83.4 ± 7.2) to (71.6 ± 6.1), (69.3 ± 5.2), (68.7 ± 5.4) (bpm), there was no significance changes between groups at baseline, 5 min, 10 min but at 15 min, 30 min, 45 min, there was significance decrease between group I and group III and also, between group II and group III while, between I, II there was no significance difference (Table 2).

As regard MAP comparison between groups at baseline, 5 min, 10 min, 15 min, 30 min, 45 min shows, in group I there was decrease in mean value of MAP at 15 min, 30 min, 45 min from (82.4 ± 8.1) to (68.4 ± 8.6), (67.4 ± 7.9) (65.6 ± 6.8) (mmHg) and also in group II there was decrease in mean value of MAP at 15 min, 30 min, 45 min from (80.9 ± 7.6) to (66.9 ± 9.1), (66.1 ± 8.6), (64.3 ± 5.9) (mmHg), there was no significance changes between group I, II, III at baseline, 5 min, 10 min but at 15 min, 30 min, 45 min, there was significance decrease between group I and group III and also between group II and group III while between I, II there was no significance difference (Table 3).

Comparison between groups as regard SpO_2 values at baseline, 5 min, 10 min, 15 min, 30 min, 45 min, shows there was no significant difference between all groups during all period of study (Table 4).

Comparison between groups as regard time (min) to achieve T7 sensory blockade shows delay in group III (5.9 ± 0.9) and was (2.3 ± 0.7, 2.6 ± 0.6) in group I and II. There were no significant changes between group I, II but there was significance increase in group III when compared to group I, II. While the time (min) to sensory regression to s1 level was (200.23 ± 3.25, 230.4 ± 2.5, 294.1 ± 15.1) in group I, II, III respectively, so intergroup comparison shows significant decrease between (I, II), (II, III), (I, III).

The time (min) to reach motor block Bromage 3 was assessed in group I, II, III and it was (5.5 ± 0.2, 5.7 ± 0.9, 8.5 ± 0.3). There were no significance changes between groups I, II but there was significance increase in group III when compared to group I, II.

The time (min) of regression to Bromage 0 was assessed in group I, II, III and it was (170.5 ± 2.35), (190.6 ± 3.51), (249.2 ± 20.2), so intergroup comparison shows significance decrease between (I, II), (II, III), (I, III). The time interval (min) between the administration of spinal block and the first request for supplemental analgesia (onset of 1st post-operative analgesic dose) was assessed in group I, II, III and it was (242.23 ± 15.01, 270.15 ± 25.00, 371.25 ± 88.54), so intergroup comparison shows significant decrease between (I, II), (II, III), (I, III) (Table 5).

Comparison between groups as regard Ramsay sedation score, Apgar scores, the total requirement of fentanyl in μg (in 24 h). There was no significance change between groups in Ramsay sedation score, Apgar scores. The total requirement of fentanyl in μg (in 24 h) in group I, II, III was (996.3 ± 134.2, 917.4 ± 130.8, 658.7 ± 123.9), intergroup comparison shows significance decrease between (I, II), (II, III), (I, III) (Table 6).

Comparison between studied groups as regard side effects (Nausea, vomiting, shivering and prurites, hypotension, bradycardia, respiratory depression paresthesia, PDPH and voiding difficulty), there were significance decrease in group III in side effects (Table 7).

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1

	Group I (n=30)	Group II (n=30)	Group III (n=30)	p value
Age (years)	27.3 ± 5.2	25.6 ± 5.6	26.4 ± 4.7	0.325
Weight (kg)	61.9 ± 10.3	66.4 ± 11.9	63.7 ± 11.2	0.274
Duration of surgery (min)	36.8 ± 6.4	37.6 ± 5.9	38.6 ± 5.2	0.319
Data are represented as mean ± SD; P>0.05 is considered statistically non-significant compared with the other two groups.				

Table 1: Patients' demographics.

Heart rate	Group I (n=30)	Group II (n=30)	Group III (n=30)	p value	P1	P2	P3
Baseline	90.3 ± 7.8	89.4 ± 6.5	90.1 ± 6.3	0.523			
5 min	89.9 ± 5.9	88.4 ± 5.6	90.7 ± 6.1	0.489			
10 min	84.6 ± 6.3	83.4 ± 7.2	85.1 ± 6.8	0.369			
15 min	72.6 ± 5.6	71.6 ± 6.1	86.9 ± 6.7	0.001*	0.511	0.001*	0.001*
30 min	71.4 ± 5.1	69.3 ± 5.2	85.7 ± 6.2	0.001*	0.120	0.001*	0.001*
45 min	70.3 ± 5.9	68.7 ± 5.4	82.6 ± 6.1	0.001*	0.278	0.001*	0.001*
Data are represented as mean ± SD; *P<0.05 is considered statistically significant compared with the other two groups.							

Table 2: Comparison between group I, II, III in heart rate values.

MAP	Group I (n=30)	Group II (n=30)	Group III (n=30)	p value	P1	P2	P3
Baseline	89.7 ± 8.9	91.4 ± 7.6	90.6 ± 8.1	0.415			
5 min	88.6 ± 7.9	86.4 ± 7.1	87.7 ± 6.8	0.349			
10 min	82.4 ± 8.1	80.9 ± 7.6	81.3 ± 7.9	0.319			
15 min	68.4 ± 8.6	66.9 ± 9.1	81.6 ± 8.7	0.001*	0.514	0.001*	0.001*
30 min	67.4 ± 7.9	66.1 ± 8.6	80.6 ± 7.4	0.001*	0.544	0.001*	0.001*
45 min	65.6 ± 6.8	64.3 ± 5.9	81.8 ± 5.5	0.001*	0.432	0.001*	0.001*
Data are represented as mean ± SD; *P<0.05 is considered statistically significant compared with the other two groups.							

Table 3: Comparison between group I, II, III in MAP values.

SPO_2	Group I (n=30)	Group II (n=30)	Group III (n=30)	p value
Baseline	96.7 ± 6.5	94.6 ± 7.2	95.3 ± 7.5	0.365
5 min	97.4 ± 8.3	95.7 ± 7.3	97.9 ± 7.8	0.381
10 min	98.5 ± 6.7	97.6 ± 6.3	96.9 ± 7.1	0.326
15 min	96.8 ± 6.3	98.5 ± 7.2	97.4 ± 6.8	0.412
30 min	97.3 ± 7.1	96.5 ± 7.2	98.8 ± 6.8	0.285
45 min	96.3 ± 7.4	97.8 ± 6.8	96.9 ± 7.1	0.397
Data are represented as mean ± SD; P>0.05 is considered statistically non-significant compared with the other two groups.				

Table 4: Comparison between groups I, II, III in SPO_2 values.

Discussion

The present study has found that the intravenous dexmedetomidine started at a loading dose of 1 μg/kg administered within 10 min as a loading dose, followed by maintenance at a dose of 0.4 μg/kg/h for spinal anesthesia significantly prolongs the duration of spinal block as a primary outcome where the time to sensory regression to s1 level was (200.23 ± 3.25, 230.4 ± 2.5, 294.1 ± 15.1) in group I, II, III respectively, so intergroup comparison showed significance decrease between (I, II), (II, III), (I, III) and the time of regression to Bromage 0 was (170.5 ± 2.35, 190.6 ± 3.51, 249.2 ± 20.2) in group I, II, III and also the intergroup comparison showed significant decrease between (I, II), (II, III), (I, III).

Also, we found that the addition of intrathecal dexmedetomidine to bupivacaine significantly reduced the onset time of spinal block compared intravenous dexmedetomidine, where the time to achieve T7 sensory blockade to group III was (5.9 ± 0.9) and was (2.3 ± 0.7, 2.6 ± 0.6) in group I and II, while the time to reach motor block Bromage 3 was (5.5 ± 0.2, 5.7 ± 0.9, 8.5 ± 0.3) in group I, II, III respectively.

	Group I (n=30)	Group II (n=30)	Group III (n=30)	p value	P1	P2	P3
Time to achieve T7 sensory blockade (min)	2.3 ± 0.7	2.6 ± 0.6	5.9 ± 0.9	0.001*	0.082	0.001*	0.001*
Time to sensory regression to S1 level (min)	200.23 ± 3.25	230.4 ± 2.5	294.1 ± 15.1	0.001*	0.001*	0.001*	0.001*
Time to reach motor block Bromage 3 (min)	5.5 ± 0.2	5.7 ± 0.9	8.5 ± 0.3	0.001*	0.241	0.001*	0.001*
The time of regression to Bromage 0 (min)	170.5 ± 2.35	190.6 ± 3.51	249.2 ± 20.2	0.001*	0.001*	0.001*	0.001*
The time interval between the administration of spinal block and the first request for supplemental analgesia (onset of 1st post-operative analgesic dose) (min).	242.23 ± 15.01	270.15 ± 25.00	371.25 ± 88.54	0.001*	0.001*	0.001*	0.001*
Data are represented as mean ± SD; *P<0.05 is considered statistically significant compared with the other two groups.							

Table 5: Comparison between group as regard time to achieve T7 sensory, regression to s1, Time to reach motor block, time of regression, time interval between the administration of spinal block and the first request for analgesia.

	Group I (n=30)	Group II (n=30)	Group III (n=30)	P value	P1	P2	P3
Ramsay sedation score	1 (1-1)	1 (1-1)	1 (0-1)				
Apgar scores	10 (9-10)	10 (9-10)	10 (9-10)				
The total requirement of fentanyl in µg (in 24 h)	996.3 ± 134.2	917.4 ± 130.8	658.7 ± 123.9	0.001*	0.024*	0.001*	0.001*
Data are represented as mean ± SD; *P<0.05 is considered statistically significant compared with the other two groups.							

Table 6: Comparison between group as regard Ramsay sedation score, Apgar scores and total requirement of fentanyl.

Side effect	Group I (n=30)	Group II (n=30)	Group III (n=30)	p value
Nausea, vomiting	2 (6.7%)	3 (10%)	1 (3.3%)	0.001*
Shivering	3 (10%)	2 (6.7%)	1 (3.3%)	0.001*
Prurites	1 (3.3%)	1 (3.3%)	0 (0%)	0.001*
Voiding difficulty	2 (6.7%)	2 (6.7%)	1 (3.3%)	0.001*
Respiratory depression	2 (6.7%)	2 (6.7%)	1 (3.3%)	0.001*
Paresthesia, (PDPH)	3 (10%)	3 (10%)	2 (6.7%)	0.001*
Incidence of back and waist pain	3 (10%)	3 (10%)	2 (6.7%)	0.001*
Data are represented as n (%); P<0.05 is considered statistically significant compared with the other two groups.				

Table 7: Comparison between studied groups as regard side effects.

Our results in agreement with Kamuran Elcıcek and his colleagues [9] who found that intravenously administered dexmedetomidine prolonged the duration of sensorial and motor blockade, provided sufficient sedation, and had few side effects.

The use of α_2 adrenoreceptor agonists as an adjuvant to local anesthetics in spinal anesthesia has been studied by Kanazi and his colleagues, they found that dexmedetomidine (3 µg) or clonidine (30 µg), when added to intrathecal bupivacaine for patients undergoing transurethral resection of prostate or bladder tumor under spinal anesthesia, produces a near prolongation in the time of the motor and sensory block and lesser onset of both motor and sensory block with steady hemodynamic condition and lack of sedation [10].

Gupta et al. [11] found that intrathecal dexmedetomidine is associated with prolonged motor and sensory block, hemodynamic

stability, and reduced demand for rescue analgesics in 24 h as compared to fentanyl.

Xiao-Yin et al. [12] found that the use of dexmedetomidine including intravenous and intrathecal could statistically significantly prolong the duration of sensory and motor block and the time to first request for postoperative analgesia. There was no increased risk of the side effects and the occurrence of hypotension, but the risk of bradycardia increased.

The postoperative analgesic consumption which is a secondary outcome significantly decreased in patients of group III (intravenous dexmedetomidine) when compared with intrathecal dexmedetomidine and control group, also there was significant reduction in postoperative analgesic consumption in group II when compared with group I, it was (996.3 ± 134.2, 917.4 ± 130.8, 658.7 ± 123.9) in group I, II, III respectively.

Also, this study has found that the time interval between the administration of spinal block and the first request for supplemental analgesia (onset of 1st post-operative analgesic dose) was (242.23 ± 15.01, 270.15 ± 25.00, 371.25 ± 88.54) in group I, II, III and the intergroup comparison showed significant decrease between (I, II), (II, III), (I, III). This is supported by Kanazi et al. and Gupta R et al. [10,11].

We found that the addition of (intravenous dexmedetomidine) to spinal anaesthesia did not affect the patients' hemodynamics compared with other two groups. While dexmedetomidine stimulation of the brain and spinal cord receptors reduces neuronal firing, causing hypotension, bradycardia, sedation, and analgesia [5,6]. Also, there was no significant change between group I, II, III in Ramsay sedation score and Apgar scores in our study, despite the fact that (intravenous dexmedetomidine) increases the incidence of confusion and drowsiness in eclamptic patients. We preferred to use sedation score and SpO_2 as the measures of respiratory depression over respiratory rate. Therefore, hemodynamic depression after intrathecal and intravenous dexmedetomidine need attentive monitoring of pulse rate, blood pressure and level of sedation.

Some limitations of this study should be noted. First, the study included only 90 participants with sever preeclampsia who fulfilled all the inclusion criteria and had undergone elective (LSCS). The sample size was restricted to 90 cases because of logistical reasons that was, the study drug was provided free of cost to all the study participants, limiting the inclusion of more cases.

Second, where our study focused on duration of spinal block as a primary outcome and postoperative analgesic consumption as a secondary outcome so, hemodynamics changes which measured in our work as a routine and the doses of consumpted atropine and ephedrine as standard drugs used in managements of hemodynamic imbalance were out of our study scopes. Also, the small interval during assess pain score postoperative (every 4 h in 24 h) encouraged us to use fentanyl instead long acting or non-steroidal drugs.

Third, we noted also that complications of spinal anesthesia were reduced with intravenous dexmedetomidine group at the end of the study while we did not arrange for studying the factors affecting them as the spinal needle size, dose of local anesthetic and other factors so we recorded complications only.

Conclusion

Intravenously administered dexmedetomidine prolonged the duration of sensory and motor blockade with reduced side effects.

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