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# A RANDOMISED TRIAL OF LOW DOSE COMBINED SPINAL EPIDURAL VERSUS SINGLE SHOT SPINAL ANAESTHESIA IN ELECTIVE CAESAREAN SECTION- EFFECTS ON MATERNAL HYPOTENSION AND FOETAL OUTCOME

Anesthesiology

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## ABSTRACT

It has been seen that Sequential combined spinal epidural (CSE) anaesthesia technique has a lower rate of hypotension (incidence 33%)than single shot spinal anaesthesia[SA]. Further reduction of the dose of intrathecal local anaesthetics2.5mg-7.5mg hyperbaric bupivacaine in low dose sequential CSE technique reduces the incidence of hypotension in caesarean section (C-section). Hence this randomized prospective study was planned for comparison of hypotension induced by low dose CSE and spinal anaesthesia in elective C section .

Our study period was from November 2016 to November 2017. During this period all the datas obtained were tabulated in excel sheet.Low dose CSE (n=74) or spinal anaesthesia (n=74)was randomly performed in 148parturients. 4 patients of each group were excluded because of major technical complications. Intrathecal 0.5% hyperbaric bupivacaine[22] 5 mg added by fentanyl 20 µg followed after 5 min 10 mL of 0.25% epidural bupivacaine was injected into the epidural catheter at L3-L4 space for low dose CSE. Intrathecal 0.5% hyperbaric bupivacaine 10 mg added with fentanyl 20 µg at L2-L3 or L3-L4 interspace was used for spinal anaesthesia[68]. Blood pressure was recorded every 2 minute till delivery of the baby , thereafter every 3 minute till completion of the surgery. Neonates after delivery were assessed at 1 and 5 minutes by Apgar score and umbilical artery blood gas.

All the mothers in both the groups ( CSE group and spinal group )were comparable regarding their demographic , duration of pregnancy as well as preoperative hemodynamic parameters. We found that the systolic blood pressure (SBP) was significantly low in spinal group compared to CSE group at almost every observational level till completion of surgery as depicted in different tables and figures. The incidence of hypotension ( p-value: 0.00022) and requirement of phenylephrine were significantly (p-value <0.0001) high in spinal group. Neonatal outcome as assessed by Apgar scoreat at1 minute(p value= 0.1464) , at 5 minute (p=0.1702) and umbilical artery blood gas (p value= 0.5406) was also comparable in both groups. All the results are well corroborated with the results of previously published studies.

## KEYWORDS

Low dose CSE, spinal, C-section, hypotension

## INTRODUCTION

Spinal anaesthesia is the preferred anaesthesia for Caesarean Section. Spinal anaesthesia has certain advantages over general anaesthesia, as it has a lower risk of aspiration of gastric contents and avoids airway manipulation with the use of endotracheal tubes. In caesarean delivery it has added advantages like lesser use of cardio respiratory depressant drugs and also gives the opportunity to the mother to enjoy the birth of her baby without experiencing any pain .So, spinal anaesthesia(SA) is considered the technique of choice for elective caesarean delivery due to its safety, effectiveness and low cost[1] . But like other techniques it has its own pitfalls. It is a common knowledge that a sensory block from $T_4$ to $S_5$ is necessary for caesarean section. Although spinal anesthesia is the most commonly used regional technique for caesarean section , but the upper level of the block may be highly variable and the technique may be dangerous both for thefetusand the mother if an uncontrolled maternal hypotension develops [2].The incidence of hypotension during spinal anaesthesia for caesarean section is reported to be as high as 71 % , despite fluid coloading ,lateral uterine displacement and use of vasopressors [3,4]. Maternal hypotension can cause nausea, vomiting dizziness in the mother and may also interfere with the surgical procedure [5].

Severe hypotension may be a contributory factor to cardiovascular collapse and maternal mortality[6, 7]. Hypotension can decrease uteroplacental blood flow resulting in impaired foetal oxygenation and foetal acidosis. Whether the mode of anaesthesia affects neonatal outcome is controversial. Lateral uterine displacement using a $15^0$ tilt is essential in parturients to prevent " supine hypotension syndrome " whereby compression of the inferior vena cava by the gravid uterus leads to reduced venous return and subsequent hypotension. Although fluid preloading is still widely used , its place in the management of hypotension induced by spinal anaesthesia has been questioned [8]. So, now crystalloid and colloid coloadinghas been used widely for the spinal induced hypotension[9] .The management of choice of this common problem is the use of intravenous (iv) vasopressors as required. Traditionally ,ephedrine has been recommended for the management of hypotension[10-12] ,but it has been associated with complications like supraventricular tachycardia , tachyphylaxis and foetal acidosis [13-17] .Phenylephrine is now considered first line agent to treat maternal hypotension as clinical studies have shown better umbilical cord blood acid base measurements with it [18,19].

Therefore management of spinal hypotension has been a key research area in the field of obstetric anaesthesia It has been seen that sequential CSE technique has a lower rate of hypotension[20] (incidence 33%)than single shot spinal anaesthesia. Further reduction of the dose of intrathecal local anaesthetics[21](2.5mg-7.5mg hyperbaric bupivacaine) in low dose sequential CSE. technique reduces the incidence of hypotension in caesarean delivery[22, 23](incidence 20% ). Incidence of other adverse effects such as nausea ,vomiting are also less in this technique.This is a matter of debate in several studies and for many years. Hence this randomized open labelledprospective study was planned for comparison of hypotension induced by low dose sequential combined spinal epidural anaesthesia and spinal anaesthesia in elective caesarean section .The foetal outcome was also compared between the two groups.

### Primary Objective

Incidence of maternal hypotension in low dose spinal epidural anaesthesia and single shot spinal anaesthesia and comparison of data between two groups

### Secondary objectives

Fetal outcome as assessed by

1. neonatal Apgar score at 1,5 min in low dose combined spinal epidural group and single shot spinal group and comparison of data between two groups.
2. Umbilical artery blood pH in low dose combined spinal epidural

anaesthesia group and single shot spinal anaesthesia group and comparison of data between two groups.

## MATERIALS AND METHODS

Randomised open labelled prospective study was conducted in Obstetrics OT and post operative recovery room,R.G.Kar Medical College and Hospital from November 2016 to November 2017. Maternal hypotension is the main problem. Hypotension is defined when systolic BP<100 mmHg or decrease in systolic blood pressure more than 20 % from baseline value.

### Study Variables

### Primary Variable

Incidence of hypotension (Hypotension is defined as systolic BP<100 mmHg or decrease in systolic blood pressure more than 20 % from baseline value)

### Secondary Variables

Fetal outcome as assessed by

1) Neonatal Apgar score at 1,5 min
2) Umbilical arterial blood pH –in both groups

### Inclusion Criteria

1. Age between 19 to 40 years
2. singleton pregnancy
3. Term gestation (37-42 weeks )
4. Elective caesarean section

### Exclusion Criteria

1. Age <19 yrs or >40 yrs
2. Significant foetal concern like known congenital foetal anomaly, IUGR
3. Chronic hypertension
4. Gestational hypertension
5. Preeclampsia
6. Diabetes mellitus
7. Contraindication to spinal anaesthesia –patient refusal for spinal anesthesia, uncooperative patient, gross spinal deformity, known coagulation abnormalities.

### Study Procedure

After obtaining approval of institutional ethical committee and written informed consent, eligible study candidates were allocated in two groups (spinal group and low dose combined spinal epidural group) using a computer generated table of random numbers. Patients were randomly assigned into two groups, 74 in each group. Sequentially numbered, sealed opaque envelope containing group allocation were opened by the anaesthesiologists responsible for neuraxial block (spinal anaesthesia and low dose CSE). Blinding of the clinicians and the investigators were not possible because the anaesthesiology team were constantly present in the O.T.as well as because of the nature of the intervention. Mothers were allowed to take oral fluid (oral clear fluid)2 hours prior to elective caesarean section. Intravenous access was secured. Inj Ranitidine 50 mg IV and inj Metoclopramide 10 mg IV was given to patients as premedication, 30 minutes prior to operation. After arrival in operation theatre, patient was placed in left lateral position at $15^0$tilt. Multichannel monitor (electrocardiogram, non-invasive blood pressure and pulse oximeter)were attached and baseline parameters were recorded. Blood pressure was recorded every 2 minute till delivery of the baby ,thereafter every 3 minute till completion of the surgery.Systolic blood pressure less than 100 mm Hg or decrease of 20% of the baseline was treated with intravenous phenylephrine bolus(100µg/ml).Oxygen was given by facemask if spo2<95%.Bradycardia <50 beats per minute was treated with intravenous atropine. Nausea and vomiting was treated by injection Ondansetron 4 mg intravenously.After delivery, umbilical artery blood gas was assessed for pH. Neonates were assessed at 1 and 5 minute by Apgar score.

### Statistical Analysis Plan

For statistical analysis data were entered into a Microsoft excel spreadsheet and then analyzed by SPSS 24.0. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. Two-sample t-tests for a difference in mean involved independent samples or unpaired samples. Paired t-tests were a form of blocking and had greater power than unpaired tests. A chi-squared test ($\chi 2$ test) was any statistical hypothesis test wherein the sampling distribution of the test statistic is a chi-squared distribution when the null hypothesis is true. Without other qualification, 'chi-squared test' often is used as short for Pearson's chi-squared test. Unpaired proportions were compared by Chi-square test or Fischer's exact test, as appropriate. p-value $\leq 0.05$ was considered for statistically significant .

## RESULT AND ANALYSIS

We found that in CSE, the mean age(mean± s.d.) of patients was 24.2714 ± 1.7768 years. In spinal, the mean age (mean± s.d.) of patients was 24.3429 ± 2.1051 years. Difference of mean age vs. group was not statistically significant (p=0.8286).

It was found that in CSE, the mean weight (mean± s.d.) of patients was 64.2571 ± 2.8523 kg. In spinal, the mean weight (mean± s.d.) of patients was 64.4429 ± 2.7433 kg. Difference of mean weight vs. group was not statistically significant (p=0.6952).

We found that in CSE, the mean height (mean± s.d.) of patients was 153.1143 ± 1.1739 cm. In spinal, the mean height (mean± s.d.) of patients was 153.2571 ± 1.3042 cm. Difference of mean height vs. group was not statistically significant (p=0.4969).

It was found that in CSE, the mean duration of pregnancy (mean± s.d.) of patients was 38.4571 ± .5018 weeks. In spinal, the mean duration of pregnancy (mean± s.d.) of patients was 38.4714 ± .5028 weeks. Difference of mean duration of pregnancy vs. group was not statistically significant (p=0.8666).

We found that in CSE, the mean baseline SBP (mean± s.d.) of patients was 128.7143 ± 5.4244 mmHg. In spinal, the mean baseline SBP (mean± s.d.) of patients was 127.4857 ± 7.0500 mmHg. Difference of mean baseline SBP vs. group was not statistically significant (p=0.2499).

It was found that in CSE, the mean SBP 0 (mean± s.d.) of patients was 127.3286 ± 5.3452 mmHg. In spinal, the mean SBP 0 (mean± s.d.) of patients was 125.4857 ± 6.0114 mmHg. Difference of mean SBP 0 vs. group was statistically significant (p=0.0573).

We found that in CSE, the mean SBP 2 (mean± s.d.) of patients was 126.0000 ± 5.7256 mmHg. In spinal, the mean SBP 2 (mean± s.d.) of patients was 122.6000 ± 5.9865 mmHg. Difference of mean SBP 2 vs. group was statistically significant (p=0.0008).

It was found that in CSE, the mean SBP 4 (mean± s.d.) of patients was 124.7286 ± 6.0191 mmHg. In spinal, the mean SBP 4 (mean± s.d.) of patients was 120.0571 ± 6.4040 mmHg. Difference of mean SBP 4 vs. group was statistically significant (p<0.0001).

We found that in CSE, the mean SBP 6 (mean± s.d.) of patients was 123.1857 ± 6.9580 mmHg. In spinal, the mean SBP 6 (mean± s.d.) of patients was 116.8857 ± 7.7526 mmHg. Difference of mean SBP 6 vs. group was statistically significant (p<0.0001).

It was found that in CSE, the mean SBP 8 (mean± s.d.) of patients was 121.4857 ± 8.1734 mmHg. In spinal, the mean SBP 8 (mean± s.d.) of patients was 113.3286 ± 9.7857 mmHg. Difference of mean SBP 8 vs. group was statistically significant (p<0.0001).

We found that in CSE, the mean SBP 10 (mean± s.d.) of patients was 120.1000 ± 9.6701 mmHg. In spinal, the mean SBP 10 (mean± s.d.) of patients was 110.4571 ± 11.0042 mmHg. Difference of mean SBP 10 vs. group was statistically significant (p<0.0001).

It was found that in CSE, the mean SBP 12(mean± s.d.) of patients was 118.2429 ± 10.8780 mmHg. In spinal, the mean SBP 12(mean± s.d.) of patients was 107.6571 ± 12.5003 mmHg. Difference of mean SBP 12 vs. group was statistically significant (p<0.0001).

We found that in CSE, the mean SBP 16 (mean± s.d.) of patients was 117.0143 ± 11.5099 mmHg. In spinal, the mean SBP 16 (mean± s.d.) of patients was 106.9286 ± 12.6254 mmHg. Difference of mean SBP 16 vs. group was statistically significant (p<0.0001).

It was found that in CSE, the mean SBP 19 (mean± s.d.) of patients was 115.5000 ± 12.3074 mmHg. In spinal, the mean SBP 19 (mean± s.d.) of patients was 107.7286 ± 11.4029 mmHg. Difference of mean SBP 19 vs. group was statistically significant (p=0.0002).

We found that in CSE, the mean SBP 22 (mean± s.d.) of patients was

114.7286 ± 11.8088 mmHg. In spinal, the mean SBP 22 (mean± s.d.) of patients was 109.5000 ± 10.1135 mmHg. Difference of mean SBP 22 vs. group was statistically significant (p=0.0056).

It was found that in CSE, the mean SBP 25 (mean± s.d.) of patients was 115.2143 ± 9.6967 mmHg. In spinal, the mean SBP 25 (mean± s.d.) of patients was 109.6857 ± 11.3464 mmHg. Difference of mean SBP 25 vs. group was statistically significant (p=0.0024).

We found that in CSE, the mean SBP 28 (mean± s.d.) of patients was 114.9714 ± 9.2673 mmHg. In spinal, the mean SBP 28 (mean± s.d.) of patients was 110.1571 ± 11.0265 mmHg. Difference of mean SBP 28 vs. group was statistically significant (p=0.0059).

It was found that in CSE, the mean SBP 31 (mean± s.d.) of patients was 114.8571 ± 7.7708 mmHg. In spinal, the mean SBP 31 (mean± s.d.) of patients was 109.7714 ± 10.0162 mmHg. Difference of mean SBP 31 vs. group was statistically significant (p=0.0010).

We found that in CSE, the mean SBP 34 (mean± s.d.) of patients was 114.8143 ± 6.2026 mmHg. In spinal, the mean SBP 34 (mean± s.d.) of patients was 109.8143 ± 8.1744 mmHg. Difference of mean SBP 34 vs. group was statistically significant (p=0.0001).

It was found that in CSE, the mean SBP 37 (mean± s.d.) of patients was 113.8571 ± 5.7213 mmHg. In spinal, the mean SBP 37 (mean± s.d.) of patients was 110.5000 ± 7.1216 mmHg. Difference of mean SBP 37 vs. group was statistically significant (p=0.0025).

We found that in CSE, the mean SBP 40 (mean± s.d.) of patients was 112.5600 ± 5.0915 mmHg. In spinal, the mean SBP 40 (mean± s.d.) of patients was 112.1212 ± 4.7681 mmHg. Difference of mean SBP 40 vs. group was not statistically significant (p=0.7373).

It was found that in CSE, 15(21.4%) patients had hypotension and in spinal, 36(51.4%) patients had hypotension. Association of hypotension vs. group was statistically significant (p=0.00022).

We found that in CSE, the mean requirement of phenylephrine (mean± s.d.) of patients was 23.5714 ± 50.8774. In spinal, the mean requirement of phenylephrine (mean± s.d.) of patients was 154.2857 ± 166.9728. Difference of mean requirement of phenylephrine vs. group was statistically significant (p<0.0001).

It was found that in CSE, the mean APGAR1 (mean± s.d.) of patients was 7.1571 ± .3666. In spinal, the mean APGAR1 (mean± s.d.) of patients was 7.2571 ± .4402. Difference of mean APGAR1 vs. group was not statistically significant (p=0.1464).

We found that in case, the mean APGAR5 (mean± s.d.) of patients was 8.5429± .5018. In spinal, the mean APGAR5 (mean± s.d.) of patients was 8.5429± .5299. Difference of mean APGAR5 vs. group was not statistically significant (p=0.1702).

We found that in CSE, the mean umbilical arterial pH (mean± s.d.) of patients was 7.3124 ± .0079. In spinal, the mean umbilical arterial pH (mean± s.d.) of patients was 7.3133 ± .0086. Difference of mean umbilical arterial pH vs. group was not statistically significant (p=0.5406).

## DISCUSSION

Spinal anaesthesia(SA) is considered the technique of choice for elective caesarean delivery due to its safety , effectiveness and low cost[1]. Despite this, hypotension is very common[2] and troublesome issue which can lead to maternal nausea , vomiting ,foetal hypoxia and acidosis. Also as the spinal technique is usually a single-shot technique, so it is not possible to improve an inadequate block.,without the intrathecal addition of opioids or the the local anesthetics. Epidural block may be inadequate in more than 25% of patients mainly because of difficulty in blocking sacral roots, resulting in visceral pain upon stimulation of the bladder[24].The combined spinal-epidural (CSE) technique can overcome the limits connected with the preceding techniques because it combines the predicted effects of spinal with the flexibility of peridural, with minimal demand for drugs when compared with the same techniques used singly. It has been shown that a low subarachnoid block can be extended significantly in a cephalad direction by an epidural 'top-up' of 10 ml of normal saline or LA given within 5 min of the subarachnoid block. This effect is known as epidural volume extension (EVE)[25].

The mechanism of this effect is probably related to compression of the subarachnoid space by the saline or LA in the epidural space, resulting in cephalad spread of local anaesthetic within the subarachnoid space. EVE allows CSE to be performed with small initial intrathecal doses of local anaesthetic and, as saline or LA is used for the epidural 'top-ups', the total dose of local anaesthetic used is reduced. EVE has been used successfully to provide anaesthesia for elective caesarean section[83]. In our study 10 mL of 0.25% epidural bupivacaine was injected into the epidural catheter within 5 min of the subarachnoid block for EVE in low dose CSE. This is supported by the study of Choi D H,Ahn H-J,Kim J-A et al[26] in 2006 in which they also have used 10 mL of 0.25% epidural bupivacaine within 5 min of the subarachnoid block for EVE for EVE in CSE. So, it has been seen that sequential combined spinal epidural anaesthesia (CSE) technique has a lower rate of hypotensionthan single shot SA.Rawal N et al[20] in 1988 have shown in their study that , the sequential CSE block was associated with a considerably lower frequency (33%) of hypotension in caesarean section.

Further reduction of the dose of intrathecal local anaestheticsin low dose sequential CSE technique reduces the incidence of hypotension in C section. In our study we have used low dose CSE with 0.5 % hyperbaric bupivacaine 5 mg and fentanyl 20 mcg, which was supported by the study of RucklidgeM et al[21] in 2012 . Theyused lower dose of local anaesthetics in CSE and shown that the incidence of hypotension will be lesser in low dose CSE. According to them with the backup of an epidural catheter low dose combined spinal anaesthetic technique using Bupivacaine 2.5 to 7.5 mg, was a valuable approach to reduce the incidence of spinal induced hypotesion.Our incidence of hypotension in low dose CSE was 21.4 %, which was supported by theKo J et al[22] study. In their study in 2007 their incidence of hypotension was 20 %, which corroborates with our study.

The two study groups were comparable in terms of age,weight ,height and duration of pregnancy . The preoperative non-invasive mean arterial pressure were also comparable in the two groups.

The incidence of hypotension was significantly less ( p-value: 0.00022) in CSE group than the spinal group in our study. The requirement of phenylephrine was also significantly less in CSE group (p-value <0.0001)This finding of our study corroborated with the finding of previous studies of A Brizzi et al[27](2005) , Choi D H et al[26] (2006 ), Ko J-S et al[22](2007), RucklidgeM et al[21] (2012 ) .In all these studies the incidence of hypotension was significantly less in CSE group than the spinal group .

The foetal outcome was similar in both the groups in our study. It is not significant. The foetal outcome was assessed by neonatal Apgar score at 1,5 min and umbilical arterial blood pH.The Apgar score at 1 minute (p value= 0.1464) ,at 5 minute (p=0.1702) and the umbilical arterialblood pH (p value= 0.5406) were comparable in both the groups. This finding was consistent with the study of ThorenTitti et al[2] (1994) and A Brizzi et al [27](2005). In their study also the foetal outcome in both the groups was same and not significant.

The results of two previously published studies using CSE were conflicting[28, 29]. Klimek M et al [28](2018) in their study has shown no significant difference between combined spinal-epidural and spinal anaesthesia for their outcomes vasopressor use and maternal hypotension.But in our study we found significant difference in two groups for maternal hypotension. Also, Benhamou Dan, Wong Cynthia et al[29] in 2009 did a study for the optimal technique of neuraxial anaesthesia in caesarean section. According to their study it will be controversial to state that low dose CSE will be more beneficial to prevent hypotension in caesarean section than single shot spinal anaesthesia using the same local anaesthetic drugs.However, the conflicting findings may be explained by the trial-sequential analysis suggesting insufficient data and the GRADE scores showing 'very low' quality of evidence for these outcomes[28].

## CONCLUSION

In conclusion , we found that the incidence of hypotension was lower in low dose CSE (21.4%) than single shot spinal anaesthesia (51.4%) . Foetal outcome was same in both groups.

**Table: Distribution of mean age, weight, height, duration of pregnancy in two groups**

| | | Number | Mean | SD | Minimum | Maximum | Median | p-value |
|---|---|---|---|---|---|---|---|---|
| **Age (in yrs)** | CSE | 70 | 24.2714 | 1.7768 | 20.0000 | 28.0000 | 24.5000 | 0.8286 |
| | SPINAL | 70 | 24.3429 | 2.1051 | 20.0000 | 29.0000 | 25.0000 | |
| **Weight (in kg)** | CSE | 70 | 64.2571 | 2.8523 | 60.0000 | 70.0000 | 64.0000 | 0.6952 |
| | SPINAL | 70 | 64.4429 | 2.7433 | 60.0000 | 69.0000 | 65.0000 | |
| **Height (in cm)** | CSE | 70 | 153.1143 | 1.1739 | 152.0000 | 156.0000 | 153.0000 | 0.4969 |
| | SPINAL | 70 | 153.2571 | 1.3042 | 152.0000 | 156.0000 | 153.0000 | |
| **Duration of pregnancy (in weeks)** | CSE | 70 | 38.4571 | .5018 | 38.0000 | 39.0000 | 38.0000 | 0.8666 |
| | SPINAL | 70 | 38.4714 | .5028 | 38.0000 | 39.0000 | 38.0000 | |

**Table: Distribution of mean SBP at deferent of time interval in two groups**

| | | Number | Mean | SD | Minimum | Maximum | Median | p-value |
|---|---|---|---|---|---|---|---|---|
| **Baseline SBP (in mm Hg)** | CSE | 70 | 128.7143 | 5.4244 | 114.0000 | 138.0000 | 130.0000 | 0.2499 |
| | SPINAL | 70 | 127.4857 | 7.0500 | 110.0000 | 138.0000 | 128.0000 | |
| **SBP 0 min** | CSE | 70 | 127.3286 | 5.3452 | 114.0000 | 138.0000 | 128.0000 | 0.0573 |
| | SPINAL | 70 | 125.4857 | 6.0114 | 110.0000 | 136.0000 | 126.0000 | |
| **SBP 2 min** | CSE | 70 | 126.0000 | 5.7256 | 112.0000 | 137.0000 | 127.0000 | 0.0008 |
| | SPINAL | 70 | 122.6000 | 5.9865 | 110.0000 | 136.0000 | 124.0000 | |
| **SBP 4 min** | CSE | 70 | 124.7286 | 6.0191 | 112.0000 | 137.0000 | 126.0000 | <0.0001 |
| | SPINAL | 70 | 120.0571 | 6.4040 | 104.0000 | 136.0000 | 120.0000 | |
| **SBP 6 min** | CSE | 70 | 123.1857 | 6.9580 | 104.0000 | 136.0000 | 125.0000 | <0.0001 |
| | SPINAL | 70 | 116.8857 | 7.7526 | 96.0000 | 134.0000 | 117.5000 | |
| **SBP 8 min** | CSE | 70 | 121.4857 | 8.1734 | 98.0000 | 136.0000 | 124.0000 | <0.0001 |
| | SPINAL | 70 | 113.3286 | 9.7857 | 90.0000 | 134.0000 | 114.0000 | |
| **SBP 10 min** | CSE | 70 | 120.1000 | 9.6701 | 90.0000 | 134.0000 | 124.0000 | <0.0001 |
| | SPINAL | 70 | 110.4571 | 11.0042 | 84.0000 | 134.0000 | 110.0000 | |
| **SBP 12 min** | CSE | 70 | 118.2429 | 10.8780 | 84.0000 | 132.0000 | 122.5000 | <0.0001 |
| | SPINAL | 70 | 107.6571 | 12.5003 | 80.0000 | 132.0000 | 108.0000 | |
| **SBP 16 min** | CSE | 70 | 117.0143 | 11.5099 | 84.0000 | 132.0000 | 122.0000 | <0.0001 |
| | SPINAL | 70 | 106.9286 | 12.6254 | 80.0000 | 132.0000 | 108.0000 | |
| **SBP 19 min** | CSE | 70 | 115.5000 | 12.3074 | 84.0000 | 132.0000 | 121.0000 | 0.0002 |
| | SPINAL | 70 | 107.7286 | 11.4029 | 88.0000 | 132.0000 | 108.0000 | |
| **SBP 22 min** | CSE | 70 | 114.7286 | 11.8088 | 84.0000 | 130.0000 | 119.5000 | 0.0056 |
| | SPINAL | 70 | 109.5000 | 10.1135 | 84.0000 | 130.0000 | 110.0000 | |
| **SBP 25 min** | CSE | 70 | 115.2143 | 9.6967 | 88.0000 | 130.0000 | 118.0000 | 0.0024 |
| | SPINAL | 70 | 109.6857 | 11.3464 | 78.0000 | 130.0000 | 110.0000 | |
| **SBP 28 min** | CSE | 70 | 114.9714 | 9.2673 | 78.0000 | 128.0000 | 118.0000 | 0.0059 |
| | SPINAL | 70 | 110.1571 | 11.0265 | 74.0000 | 130.0000 | 111.0000 | |
| **SBP 31 min** | CSE | 70 | 114.8571 | 7.7708 | 84.0000 | 128.0000 | 116.5000 | 0.0010 |
| | SPINAL | 70 | 109.7714 | 10.0162 | 74.0000 | 128.0000 | 110.0000 | |
| **SBP 34 min** | CSE | 70 | 114.8143 | 6.2026 | 96.0000 | 126.0000 | 116.0000 | 0.0001 |
| | SPINAL | 70 | 109.8143 | 8.1744 | 84.0000 | 126.0000 | 110.0000 | |
| **SBP 37 min** | CSE | 70 | 113.8571 | 5.7213 | 102.0000 | 128.0000 | 114.0000 | 0.0025 |
| | SPINAL | 70 | 110.5000 | 7.1216 | 96.0000 | 128.0000 | 110.0000 | |
| **SBP40 min** | CSE | 25 | 112.5600 | 5.0915 | 105.0000 | 126.0000 | 112.0000 | 0.7373 |
| | SPINAL | 33 | 112.1212 | 4.7681 | 102.0000 | 122.0000 | 110.0000 | |

**Table: Association of hypotension in two groups**

| | | CSE | SPINAL | TOTAL | Chi-square value | p-value |
|---|---|---|---|---|---|---|
| **Hypotension** | **No** | 55 | 34 | 89 | **13.6021** | **0.00022** |
| | Row % | 61.8 | 38.2 | 100.0 | | |
| | Col % | 78.6 | 48.6 | 63.6 | | |
| | **Yes** | 15 | 36 | 51 | | |
| | Row % | 29.4 | 70.6 | 100.0 | | |
| | Col % | 21.4 | 51.4 | 36.4 | | |

**Table: Distribution of mean requirement of phenylephrine, APGAR1, APGAR5 and Umbilical arterial pH in two groups**

| | | Number | Mean | SD | Minimum | Maximum | Median | p-value |
|---|---|---|---|---|---|---|---|---|
| **Requirement of phenylephrine** | CSE | 70 | 23.5714 | 50.8774 | 0.0000 | 250.0000 | 0.0000 | <0.0001 |
| | SPINAL | 70 | 154.2857 | 166.9728 | 0.0000 | 500.0000 | 100.0000 | |
| **APGAR1** | CSE | 70 | 7.1571 | .3666 | 7.0000 | 8.0000 | 7.0000 | 0.1464 |
| | SPINAL | 70 | 7.2571 | .4402 | 7.0000 | 8.0000 | 7.0000 | |
| **APGAR5** | CSE | 70 | 8.5429 | .5018 | 8.0000 | 9.0000 | 9.0000 | 0.1702 |
| | SPINAL | 70 | 8.5429 | .5299 | 8.0000 | 10.0000 | 9.0000 | |
| **Umbilical arterial pH** | CSE | 70 | 7.3124 | .0079 | 7.2900 | 7.3200 | 7.3100 | 0.5406 |
| | SPINAL | 70 | 7.3133 | .0086 | 7.2800 | 7.3200 | 7.3100 | |

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