Research Article

Spinal Anaesthesia in Sitting Position for 30 Seconds Vs Conventional Spinal Anaesthesia: Which is Better?

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ABSTRACT

Spinal anesthesia can be performed with the patient in either sitting or lateral position, and each position has its advantages and disadvantages. The injection of a local anesthetic into the subarachnoid space leads to temporary blocking of nerve conduction in the spinal nerve roots and paralysis of the autonomic, sensory and motor nerve fibers. After approval of institutional ethical committee and written informed consent, a randomized double blind study was done. Sixty patients admitted for lower abdominal surgery were randomly divided into 2 groups using slip in box technique: Group I: sitting for a period of 30 sec after intrathecal injection; Group II: made supine immediately after intrathecal injection. Data regarding onset of block, fixation time and level of block were noted. Postoperatively, the pain score was recorded by using visual analog pain scale (VAS) .Statistical analysis was done using the Statistical Package for Social Science (SPSS15.0 Evaluation version). It was found that the onset of analgesia, the fixation time of drug, the maximum fall in MAP recorded and the minimum average heart rate shows significant differences between Group I & Group II.Other parameters are not showing any significant changes.

The study concludes that sitting position for 30 seconds and consideration of point of dissection of upper and lower planes of body gives slow, predicted, and desired level of analgesia. Keeping the patient in sitting position helps to prevent high spinal and gives better haemodynamic stability. This technique should be incorporated in daily practice for better results after spinal anesthesia.

KEY WORDS: spinal anesthesia, sitting position, haemodynamic stability

INTRODUCTION:

A large number of number of elderly patients are undergoing surgery and spinal anesthesia appears to be beneficial in these patients for lower limb and urological surgeries[1,2]. Spinal anesthesia can be performed with the patient in either sitting or lateral position, and each position has its advantages and disadvantages[3]. Spinal anesthesia is one of the oldest and most frequently used regional anesthesia techniques. The injection of a local anesthetic into the subarachnoid space leads to temporary blocking of nerve conduction in the spinal nerve roots and paralysis of the autonomic, sensory and motor nerve fibers[4].

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In the conventional technique of spinal anesthesia in sitting position, where hyperbaric bupivacaine is used, the patients are made supine immediately. We have observed in our practice that many a times this gives higher level than desired or predicted. This may be due to rapid movement of the drug having density more than CSF. When the patients are made supine, the drug moves abruptly to give unpredicted level of analgesia. If we keep the patients in sitting position for 30 seconds, as the drug is hyperbaric, it will settle down than it will ascend up slowly to give slow, desired and predicted level of analgesia. The slow onset and slow distribution will reach desired level, prevent hypotension and provide better hemodynamic stability.[1] However, still there may be a lot to discuss about duration of sitting position that affect spread of the drug.[5]

Apart from routine factors like dose of drug, concentration, specific gravity, volume, speed of injection etc., we considered two planes of body, upper and lower. The operative table is kept in such position

that the upper body plane transect the lower body plane at the point where we desire to have level of analgesia. We predict the drug shall ascends up to that level, to give predicted and desired level of analgesia (Figure 1). Hence the purpose of this study was to evaluate the effect of the position for spinal anaesthesia, where we kept patients sitting for 30 second and consider the planes of body.

MATERIALS AND METHODS:

After approval of institutional ethical committee and written informed consent, a randomized double blind study was done. Sixty patients admitted for lower abdominal surgery were randomly divided into 2 groups using slip in box technique: Group I: sitting for a period of 30 sec after intrathecal injection; Group II: made supine immediately after intrathecal injection.

Inclusion criteria were: physical status I or II, either sex, age 18–50 years, presenting for lower abdominal surgeries [American Society of Anesthesiologists (ASA)]. Exclusion criteria comprised of patient with contraindications for neuro axial anesthesia.

Inside the operation theatre, a wide bore intravenous line was secured and all patients were monitored with automated noninvasive blood pressure (NIBP), pulse oximetry, and electrocardiogram. The patients were preloaded with Lactated Ringer's solution 10 mL/kg. After introducing 25G Pencil point spinal needles through L3–L4 interspaces in sitting position using aseptic precautions, 15 mg of 0.5% hyperbaric bupivacaine was injected intrathecally.

In Group I, patients were kept in sitting position for 30 seconds and made slowly supine, while in Group II the patients were given supine position immediately. In Group I the upper plane of body was adjusted with lower plane in a way that the plane will dissect at the level of T8 to give the predicted and desired level of analgesia, while in Group II the procedure was carried out as routine.

During the procedure, patient's vital signs were monitored with ECG, NIBP, Pulse, and Spo2. The onset of analgesia was assessed with pin prick for every 30 sec for first 5 min, than every 5 min for next 30 min, and last reading was noted at 60 min. Oxygen (2 L/min) was administered via a mask if the pulse oximeter reading decreased below 90%. 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 mephentermine 6 mg and IV fluids as required. Bradycardia, defined as heart rate < 50 bpm, was treated with IV atropine 0.3–0.6 mg.

Data regarding onset of block, fixation time and level of block were noted. Postoperatively, the pain score was recorded by using visual analog pain scale (VAS) between 0 and 10 (0 = no pain, 10 = most severe pain), initially every 1 hour for 2 hour, then every 2 hour for the next 8 hour. Statistical analysis was done using the Statistical Package for Social Science (SPSS15.0 Evaluation version).

Data are expressed as either mean and standard deviation or numbers and percentages. Continuous covariates were compared using analysis of variance (ANOVA). The comparison was studied using the Chi-square test or Fisher's exact test as appropriate, with the p value reported at the 95% confidence interval. $p<0.05$ was considered statistically significant.

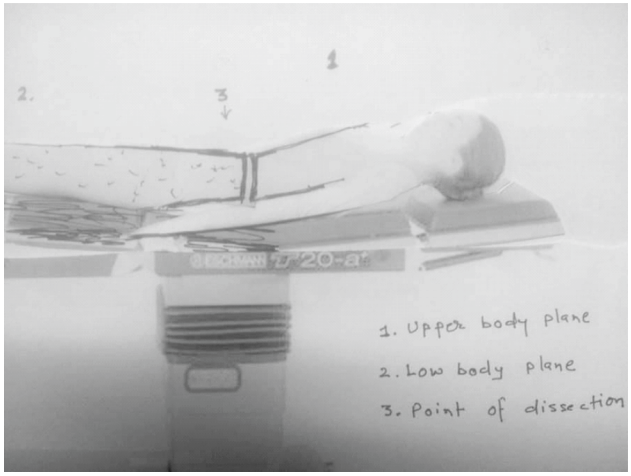

Figure 1: The upper body plane transect the lower body plane at the level of analgesia.

RESULTS:

All the required data was collected and tabulated. The groups were comparable with respect to age, height, and weight and ASA physical status [Table 1]. There was no much difference in type of surgical procedure performed.

The onset of analgesia in group I was 70 sec to 150 seconds with average of 110 seconds much slower, than in group II which was 50 to 90 with average of 70 seconds. When compared it was found there is significant differences with p value 0.0001. This slow onset of action is probably as we kept the patients sitting for 30 seconds in Group I, we feel it is as main reason for predicted level and better stability (Table no 2).

The fixation time of drug is the time after

Table 1: Demography.

Patients demography	Group I	Group II
Age (years)	30±8	34±9
Sex (M:F)	M/F	M/F
Height (cm)	160±8	158±6
Weight (kg)	60±10	60±10
ASA I:II	I&II	I&II
Duration of surgery (min)	90±30	90±30
Inguinal Hernia (No. of patients)	20	10
Urinary Bladder and Ureteric Surgery (No. of patients)	15	15

Table 2: Characteristics of sensory block.

Observations	Group I	Group II	p-value
Time from injection to onset of sensory block (sec)	110±40	70±20	0.0001
Fixation time (min)	12±6	8±4	0.0088
Highest sensory level	T 7.8	T 5.6	0.0003
Time of two segment regression from the highest sensory level (min)	90	60	0.038

(95%confidence df=58, SD=1.O3)

Table 3: Hemodynamic stability.

Observation	Group I	Group II	p-value
Pre op SAP (mm Hg)	118±12	106±6	0.3748
Post op SAP (mm Hg)	114±8	116±6	0.1342
Pre op diastolic BP (mm Hg)	84±4	80±6	0.5818
Post op diastolic BP (mm Hg)	78±4	76±4	0.0577
Minimum MAP RECORDED (mm Hg)	90±4	80±6	0.0001
HR(Per min)	66±6	60±8	0.0017
No Pt. Atropine given	1	6	Not significant
No pt. vasopressorgiven	0	4	Not significant

(95% confidence, df=58, S D=1.8)

which there is no further ascend of analgesia noticed with pinprick test. In Group I it was 6 to 18 min with average of 12 min, whereas it was 4 to 12 min with average of 8 min in Group II having p value less than 0.0088 (highly significant) (Table 2).

The highest level of analgesia in G I was T5 and lowest T10 with an average of T7.8, while it was T2 and T10 respectively with average of T5.6 in G II, the P value being less than 0.0003 (highly significant). We predicted to give T8 level by giving operative position in a way that the upper plane dissect the lower plane of body at T8 ,we could give average level T 7.8 (Table 2).

The average pre-operative systolic arterial blood pressure in G I was 118+12 mm of Hg, GII it was 106+6 with (p = < 0.3748 not significant) (Table no 3). The average post operative systolic arterial blood pressure was 114+8 in GI while it was 116+6 in GII. (P value <0.1342 not significant) (Table no 3).The average preoperative diastolic blood pressure in GI recorded was 84+4 and in GII it was 80+6(.p=<0.5818 not significant) (Table no 3). The average post operative diastolic blood pressure in GI was 78+4, in G II it was 76+4(P= <0.0577 not significant) (Table no 3). The maximum fall in MAP recorded was between 10 to 25 min. in G I which was 90+ 4 mm of Hg, while it was between 6 to 15 min. in G II 80 +6 mm of Hg. p value 0.0001highly significant.(Table no 3). The minimum average heart rate noted in G I was 66+6 while in G II , it was 60 + 8 with P value < 0.0017 ,it was highly significant with confidence level of 95%.(Table no 3).

In group II, one patient had bradycardia which was treated with 0.6 mg atropine, whereas none of the patient required vasopressors. In group II, 6 patient had bradycardia (pulse below 50/ min.) treated with inj atropine. Four patients had hypotension SAP (with systolic atrial pressure) below 80 mm of Hg treated with inj. mephenteramine.

DISCUSSION:

Spinal anesthesia was always considered as blind procedure having unpredictable level of analgesia and less hemodynamic stability. There are several studies carried out for duration of setting position for better outcome of anesthesia. The role of induction position during spinal anesthesia using hyperbaric bupivacaine is proven to some extent. There is some debate whether the induction position, during spinal anesthesia may affect the spread of isobaric local anesthetic drugs and eventually affects the characteristics of the nerve blockade. [6,7]Same type of results were also observed by study conducted byHye Young Kim in 2013.[8]

In present study, we have introduced two newer aspect, firstly to keep the patients sitting for 30 second (not being in hurry to give supine position), and secondly, one shall also look for the plane of body and the point of dissection of the planes.With sitting position for 30 sec, giving the patient body position according to upper-lower plane, we could give predicted level of analgesia as well as better hemodynamic stability.[9-11]

Povey and colleague (1987) studied the effect of sitting on spread of sensory block, they said analgesia level increases several segment after the patient had been put in supine after sitting position.[4] Bodily MN (1992) demonstrated that changes in position can alter the level of nerve block in Spinal anesthesia.[12] B.T.Veering (2001) studied effect of 0.5% bupivacaine in elderly patients in sitting position. They concluded that there was significant difference in maximum level of block and hemodynamic stability.[9]

The nerve block, level of analgesia and hemodynamic stability are affected by many factors. We are using bupivacaine which has higher density than CSF and it settles down caudally. By keeping the patients in sitting position, there is slow onset, which is predicted and has limited upward movement with better stability.

The knowledge of dermatome, sitting for 30 seconds and planes of body will help to give predicted level of analgesia. There are several studies carried out for duration of sitting position for better outcome of anesthesia. In a study for anal surgery sitting position was kept up to 20 min.[12] This does not mean that 30 second sitting position can give sub arachnoids block up to T8 or T10 block are only possible in sitting position, but for the patients requiring higher blocksT6 may be done with alteration in the volume and the point of dissection of planes of body.

In present study, the onset of spinal anesthesia was faster in patients who are made supine immediately after the subarachnoid block as compared to patients who were kept sitting position for 30sec showing highly significant difference. It was also observed that there is significant difference in the mean arterial pressure between patients who are made supine immediately after the subarachnoid block as compared to patients who were kept sitting position for 30sec. Similar results were also found by Essam E. Abd El-Hakeem et al[13].

CONCLUSION:

The study concludes that sitting position for 30 seconds and consideration of point of dissection of upper and lower planes of body gives slow, predicted, and desired level of analgesia. Keeping the patient in sitting position helps to prevent high spinal and gives better haemodynamic stability. This technique should be incorporated in daily practice for better results after spinal anesthesia.

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