

# Comparing the Effect of Unilateral with Bilateral Spinal Anaesthesia on Post Block Induced Hypotension in Patients Undergoing Infraumbilical Surgery

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Hypotension  
Between  
Unilateral And  
Bilateral Spinal  
Anesthesia

## ABSTRACT

**Objectives:** To compare the frequency of hypotension (changes in the systolic blood pressure) between unilateral and bilateral spinal anesthesia in adult patients undergoing infraumbilical surgeries.

**Study Design:** randomized control trial study.

**Place and Duration of Study:** This study was conducted at the Department of Anesthesia and Intensive Care, Nishtar Hospital Multan from January 2016 to January 2017.

**Materials and Methods:** Total number of patients divided into two groups by lottery method. Mean and standard deviation was calculated for qualitative variable like age and systolic BP. And for qualitative variables like efficacy and ASA status percentages and frequencies were calculated. stratification of data was done to control effect modifier and confounder like age, gender and ASA status. Chi square test was applied to calculate P value. P value less than 0.05 considered as significant.

**Results:** A total number of 60 patients were enrolled in the study and divided into two groups, group A (unilateral block) and group B (bilateral block). In unilateral group eight patients having ASA I and 22 patients of ASA II and in bilateral group 22 patients having ASA I and 21 patients of ASA II. Frequency of hypotension was 8 patients in unilateral group and 15 in bilateral group and remaining patients did not show any change in mean arterial BP in both groups.

**Conclusion:** In this study it was concluded that unilateral spinal anesthesia is more effective in terms of less hypotension as compared to bilateral spinal anesthesia for adult patients undergoing infraumbilical surgeries.

**Key Words:** Spinal Anesthesia, Unilateral anesthesia, Bilateral Anesthesia, Infraumbilical Surgery.

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## INTRODUCTION

Simplicity of its use, being reliable, rapid onset of action and minimal biochemical changes in the body due to its use are the features that have paved the ground for increasing popularity of spinal anesthesia in developing countries including Pakistan.

Anesthesiologist of the whole world are concerned about the hemodynamic changes resulting from spinal anesthesia.<sup>1,2</sup>

Hemodynamic side effects of spinal anesthesia and their relation to the outcome of procedure have given special attention in various studies.<sup>6</sup> One of the side effects that occur more commonly than any of the side effects of spinal anesthesia is hypotension which has been narrated in the literature to appear in 15% to 33% of cases.<sup>3</sup>

Bradycardia, nausea and vomiting, post-duralpuncture headache, urinary retention, cauda equine syndrome and spinal cord damage are other less common side effects of spinal anesthesia.<sup>4</sup> Intravascular volumeloading, use of vasopressors and patient positioning are the measures used to prevent and treat hypotension resulting from spinal anesthesia.

Unilateral spinal anesthesia is more beneficial and propitious in comparison to conventional (bilateral) spinal anesthesia due to the fact that it results in selective block on the operative side, decrease incidence of urinary retention, better mobilization and patient satisfaction.<sup>5,6</sup> Therefore, its preference over conventional (bilateral) spinal anesthesia should be sought particularly in patients at risk of hemodynamic instability. Restricted sympathetic block, efficient and adequate hemostatic vascular mechanisms in non-blocked areas can be given credit for compensation of vasodilation in other leg.<sup>7</sup> 68% incidence of hypotension in patients undergoing hip surgery under conventional spinal anesthesia was shown in a study by Miniville. Hyperbaric solution like inj. Bupivacaine 0.75% is communally used drug in spinal block.<sup>8</sup> To obtain unilateral spinal anesthesia, limited only to the operative side, lateral decubitus position should be

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maintained for a certain period of time leading to the benefits of faster resolution of block, early discharge and less side effects contrary to patients receiving bilateral block and suffering more side effects.<sup>9</sup>

From a long period of time efforts have been made to reduce the spinal anesthesia recovery by reducing the dose of long-acting local anesthetics 3-5 or using a short-acting spinal anesthetic with safe hemodynamic effects.<sup>10</sup>

Purpose and rationale of our study is to be sure of the advantageous nature of unilateral spinal anesthesia and comparison of hemodynamic changes with conventional (bilateral) spinal anesthesia. This will prove a great help for preparation of guidelines to make a better choice in selecting the type of spinal anesthesia in Pakistani patients. The technique with more hemodynamic stability and less incidence of hypotension will be prioritized in our community

## MATERIALS AND METHODS

Sixty patients fulfilling the inclusion criteria were selected after local ethics committee approval and patient's informed consent. Patient with infection at the place of injection (redness observed), any brain disorder, hypertension, diabetes mellitus with HbA1c more than 6.5 and fasting sugar more than 126 mg/dl at continuous three readings and with bleeding issues coagulopathy and known history of sensitivity to local anesthetic will be excluded from the trial. Lottery method was used for randomization to make two groups to allocate type of anesthesia between group A (unilateral block) and group B conventional (bilateral block). Before procedure, baseline parameters were recorded. Non-invasive blood pressure monitor, ECG, pulse oxymeter was used for monitoring purposes. Preloading with lactated Ringer's solution (10-20 ml/kg) was done.<sup>17</sup> Drugs and equipments required for resuscitation was made available during whole of the procedure. After explaining the procedure to patients, they were instructed to lie down on the operation table in lateral position with their surgical side down and back were exposed. After making sure that aseptic measures are taken, 2 ml (15 mg) of 0.75% hyperbaric bupivacaine was injected intrathecal in all patients at L4-5 or L3-4 intervertebral space using 27 gauges Pencil point spinal needle. Lateral decubitus position was maintained for Group A patients for 10 minutes with surgical side down. The position of Group B patient was immediately changed to supine position for 10 minutes. By checking the sensation of temperature with cold spirit swab on the operated and non-operated sides, effect of spinal anesthesia was confirmed. Loss of sensation to a cold stimulus at the T6 level within 10 minutes after administration of the local anesthetic was used to define successful anesthesia. Efficacy of spinal block was labeled as loss of sensation to a cold stimulus at the T6 level and full motor blockade within 10

minutes after administration of the local anesthetic. A systolic blood pressure drop of more than 25% of baseline values was labeled as hypotension. It was assessed at 3 minute intervals till 30 minutes. one or more readings of systolic blood pressure drop >30% was labeled as hypotension.

Hemodynamic data (mean arterial blood pressure) was recorded at intervals of 3 minutes after the spinal injection for 30 minutes. The patients were labeled hypotensive, If the blood pressure drops more than 30% of baseline values and they were treated first with fluids and then with a vasopressor drug as required by anesthetic on his clinical decision. Specially designed proforma was used for recording all the relevant data information. Mean and standard deviation were calculated for mean blood pressure and percentage of ASA status and frequency of hypotension in both group. Chi square test was used to check hypothesis, a P value less than 0.05 was consider significant.

## RESULTS

A total number of 60 patients included in the study. Mean age of patients was  $39.50 \pm 8.80$  in unilateral group and  $40.70 \pm 10.64$  in bilateral group (Table-1). Mean blood pressure at baseline was  $119.1 \pm 5.5$  in unilateral group and  $118.1 \pm 4.8$  in bilateral group.

**Table No.1: Demographics and mean Blood pressure**

Characteristics	Unilateral Group Mean $\pm$ SD	Bilateral Group Mean $\pm$ SD
Age	$39.50 \pm 8.80$	$40.70 \pm 10.64$
Mean Blood Pressure		
Baseline (BP)	$119.1 \pm 5.5$	$118.1 \pm 4.8$
After 3 min	$112.3 \pm 5.0$	$103.5 \pm 8.2$
After 6 min	$113.6 \pm 4.9$	$102.6 \pm 9.4$
After 9 min	$112.5 \pm 10.6$	$102.6 \pm 10.9$
After 12 min	$112.5 \pm 9.7$	$100.8 \pm 10.5$
After 15 min	$109.8 \pm 10.7$	$103.3 \pm 8.3$
After 18 min	$112.5 \pm 7.0$	$102.5 \pm 10.5$
After 21 min	$113.6 \pm 8.7$	$104.6 \pm 7.9$
After 24 min	$114.6 \pm 9.3$	$139.5 \pm 183.4$
After 27 min	$113.5 \pm 4.1$	$100.5 \pm 8.8$
After 30 min	$114.1 \pm 10.0$	$101.6 \pm 8.7$

After 3 minutes mean BP in group A was  $112.3 \pm 5.0$  and in group B was  $103.5 \pm 8.2$ , after 6 minutes mean BP was  $113.6 \pm 4.9$  in group A and in group B was  $102.6 \pm 9.4$ , after nine minutes mean BP in group A was  $112.5 \pm 10.6$  and in group B was  $102.6 \pm 10.9$ , after twelve minute it was  $112.5 \pm 9.7$  in group A and  $100.8 \pm 10.5$  in group B, after fifteen minutes mean BP of group A was  $109.8 \pm 10.7$  and in group B was  $103.3 \pm 8.3$ , after eighteen minutes mean BP of group A was  $112.5 \pm 7.0$  and in group B  $102.5 \pm 10.5$ , after twenty one minutes it was  $113.6 \pm 8.7$  in group A and  $104.6 \pm$

7.9 in group B, after twenty four minutes mean BP of group A was  $114.6 \pm 9.3$  and in group B was  $139.5 \pm 183.4$ , after twenty seven minutes mean BP of group A was  $113.5 \pm 4.1$  and in group B was  $100.5 \pm 8.8$ , after half hour mean BP of group A was  $114.1 \pm 10.0$  and in group B was  $101.6 \pm 8.7$  given in table-1. When we concern about frequency of ASA status, in unilateral group 8 patients were having ASA I and 22 patients having ASA II and in bilateral group 22 patients having ASA I and 21 patients were of ASA II (Table-2). Frequency of hypotension was 8 patients in unilateral group and 15 in bilateral group and remaining patients did not showed any change in MAP in both groups. P value = 0.05 a significant value (Table-4).

**Table-2: Frequency of ASA Status**

ASA Status	Groups		Total
	Unilateral	Bilateral	
ASA I	8	9	17
ASA II	22	21	43
Total	30	30	60
P Value		0.774	

**Table No.3: Frequency of Hypotension**

Hypotension	Groups		Total
	Unilateral	Bilateral	
Yes	8	15	23
No	22	15	37
Total	30	30	60
P Value		0.05	

## DISCUSSION

This randomized control trial was carried out at the Anesthesia Department and Intensive Care Units of Nishatr Hospital Multan.to compare the frequency of hypotension (changes in the mean arterial blood pressure) between unilateral and conventional bilateral spinal anesthesia in adult patients undergoing infraumbilical surgeries. According to our study results, the hypotension was found in 23(38.33%) patients (8 from unilateral group and 15 from bilateral group). Bilateral group patients showed statistically significant hypotension as compared to unilateral group patients. i. e p-value=0.05.

Inguinal hernia repair are mostly being performed under spinal anesthesia worldwide. Despite of its several complications like headache, nausea, vomiting, urinary retention, hypotension, bradycardia, dysrhythmia and cardiac arrest, it is considered relatively safe.<sup>11</sup> Especially in high risk patients, high sympathetic block leading to precipitous arterial hypotension remains a common issue associated with conventional spinal anesthesia. Continuous spinal anesthesia (CSA) and frequently unilateral spinal anesthesia (USpA) are preferred mode of anesthesia for lower extremity surgeries.

A study done byNaziaIjaz, Khawar Ali et al<sup>12</sup> reported a significantly low frequency of hypotension (6.7% in Unilateral group vs. 60% in Bilateral B, p = 0.00) and a decrease frequency of bradycardia in the patients who received a unilateral block (6.7% in Unilateral group vs. 10% in Bilateral group). The conclusion of this study correlates and is similar to our study.

Unilateral block has proven its worth in restricting the extent of sympathetic block to only operative side and sparing other side, thus resulting in minimal haemodynamic changes when compared with bilateral block.A study by U. Chohan et al<sup>13</sup> gives validation to this concept of superiority of unilateral spinal anesthesia over bilateral spinal anesthesia. USpA and single-dose spinal anesthesia showed significant difference in hypotension frequency when compared through a study done by Casati et al.<sup>14</sup>. Minimal hemostatic changes were narrated and shown by their study when 0.5% hyperbaric bupivacaine was administered with USA.

Same as in our study, Osinaike et al narrated that patients in the bilateral spinal anesthetic block group compared to those in the unilateral group had statistically significant decrease in the systolic blood pressure at the interval of 15, 30 and 45 minutes in comparison to the baseline (p = 0.003, 0.001 and 0.004 respectively)<sup>15</sup>. Kuusniemi<sup>16</sup> study shows that they spent 20 to 30 minutes in the lateral position and obtained 39% – 65% unilateral block. Miniville study on conventional spinal anesthesia in patients undergoing hip surgery showed a 68% incidence of hypotension. In a study conducted by Zahid A et al <sup>16</sup> reported that there is no markable difference in unilateral and bilateral spinal anesthesia with respect to heart rate and mean hypotension control and p value was 0.05.

In another study conducted byMushfiqu R, Mahbul H et al.<sup>18</sup> shown that duration of onset to sensory and motor block in unilateral group is significantly shorter as compare to bilateral group. Similarly hemodynamic stability was also higher in unilateral group. Result of this study was also comparable with our study. The results of this study were quite different from our study, so this topic needs more research work for confirmation of better way of spinal anesthesia administration. Similarly in a study conducted by Bergmann I et al.<sup>19</sup> reported that The motor block was strictly unilateral in 55 patients (98%) and the sensory block was strictly unilateral in 53 patients (94%). The median decrease in systolic blood pressure was 6 mmHg. In another study conducted by Sayyed Mostafa M et al. <sup>20</sup> unilateral technique was preferred over standard spinal anesthesia by hemodynamically as well as sensory and motor block

## CONCLUSION

In this study it was concluded that unilateral spinal anesthesia is more effective in terms of less hypotension as compare to bilateral spinal anesthesia for adult patients undergoing infraumbilical surgeries.

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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