

# Comparison of Spinal Anaesthesia Induced Fall in Blood Pressure in Normotensive and Hypertensive Patients

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## ABSTRACT

**Aim:** To compare the spinal anaesthesia induced fall in blood pressure in normotensive and hypertensive patients.

**Methods:** This Cross sectional study conducted in General surgery, Urology, Orthopedics and Gyne / Obstetric operation theaters in Nishtar Hospital Multan from March 2014 to October 2014.

**Results:** In our study one hundred patients of age range 20-80years (mean age of 61.37±17.108std) having 76(76%) male and 24(24%) female patients, the incidence of fall in blood pressure was 17(34%) out of 50 in normotensive while 31(62%) out of 50 hypertensive patients, showing that hypotension is more common in elderly male patients.

**Conclusion:** Spinal anaesthesia induced fall in blood pressure is more common in hypertensive patients than in normotensive patients

**Keywords:** Spinal anesthesia, Fall in blood pressure, hypertension

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## INTRODUCTION

Spinal anesthesia is a way to eliminate pain during certain procedures or surgeries by injecting medication into the spinal canal to interrupt nerve transmissions from the lower half of the body.

The Greek philosopher "Dioscoride" first used the term Anaesthesia in the 1<sup>st</sup> century AD to describe the Narcotic like effects of the plant "Mandragora" The present use of term to denote the sleep like state that makes painless surgery possible is credited to "Oliver Wendell Holmes" in 1846. In the united states use of the term "Anaesthesiology" to denote the practice or study of anaesthesia was first proposed in the 2<sup>nd</sup> decade of the 20<sup>th</sup> century to emphasize growing scientific basis of the specialty. Anaesthesia is basically divided in to two categories i.e., General Anaesthesia & Regional Anaesthesia (spinal anaesthesia, epidural anaesthesia, caudal anaesthesia, and Nerve blocks).

Spinal anaesthesia is a popular and widely used anaesthetic technique for lower abdominal, pelvic and lower limb surgery. It has proven to be convenient, economical and easily motivated technique which provides excellent anaesthesia and post operative analgesia. Spinal anaesthesia causes hypotension due to blockade of sympathetic out flow. Neuraxial blocks typically produce variable decreases in blood pressure that may be accompanied by decrease in heart rate and cardiac contractility which can be prevented either by pre-loading the patients or by using vaso-pressor and inotropic drugs<sup>1</sup>.

Like normotensive patients, however, preeclampsics may also experience hypotension after

spinal anesthesia for cesarean delivery<sup>2</sup>. The following variables were independently associated with the development of early hypotension : age, female sex, body mass index >30 kg m<sup>-2</sup>, history of hypertension, diabetes mellitus, anaemia, baseline heart rate, systolic and diastolic blood pressure, pulse pressure, rate pressure product, vascular overload index, sensory level of blockade higher than or equal to T6<sup>3</sup>.

Maternal hypotension is the most frequent complication of a spinal anaesthetic for caesarean section with an incidence approaching 100%<sup>4</sup>.

The incidence of hypotension (systolic arterial blood pressure, SAP < or =100mmHg) was more frequent in the spinal group than in the epidural group (51% versus 23%)<sup>5</sup>.

Systemic hypotension is the most common complication of spinal anaesthesia, with an incidence of 25-82%<sup>6</sup>. The incidence of hypotension was lower in normotensive than hypertensive group. Hypotension occurred in 9 out of 25 patients (36%) in normotensive patient while 15 out of 25 patients (60%) of hypertensive group developed hypotension<sup>7</sup>.

Hypertension has been a major health problem in many parts of the world for more than a century. In Malaysia, according to the National Health and Morbidity Survey II, the prevalence of hypertension in the adult population has reached 24%. Hypertension is an important risk factor for diseases such as coronary artery disease and cerebrovascular diseases. It has also become one of the most common causes for the cancellation of elective surgery<sup>8</sup>.

However, controversy still surrounds the acceptance of hypertension as an independent risk factor for anaesthesia. Some researchers have suggested hypertension increases the peri-operative morbidity and mortality, while others have refuted this claim<sup>9</sup>. In addition, there is a lack of agreement as to what constitutes a safe range of blood pressure in the peri-operative period<sup>10</sup>. A recent review reported an association between hypertensive disease and peri-operative cardiac outcomes<sup>11</sup>. However, this association was statistically but not clinically significant.

Haemodynamic instability is more likely to occur in patients with hypertension. Severe hypertension and hypotension may occur in the hypertensive patient during the perioperative period<sup>12</sup>. Much of the abnormal haemodynamic responses seen intra-operatively reflect the response to antihypertensive medications and the cardiovascular response to anaesthetic drugs. Risk of adverse events related to hypertension occurring during surgery can be reduced by good pre-operative control of the blood pressure, and continuation of pre-operative antihypertensive therapy<sup>13</sup>.

The objective of the study was to compare the spinal anaesthesia induced fall in blood pressure in normotensive and hypertensive patients.

## MATERIAL AND METHODS

This Cross sectional study conducted in General surgery, Urology, Orthopedics and Gyne /Obstetric operation theaters in Nishtar Hospital Multan from March 2014 to October 2014.

## RESULTS

One hundred patients were chosen for the study from general surgery, orthopaedics, urology and gynae & obs departments who underwent spinal anaesthesia for different types of surgeries. There were 76(76%) male patients and 24(24%) female patients. According to age distribution 14 patients were between 20-40years, 26 patients were between 41-60 years and 60 patients were between 61-80 years of age shown in (Table 2) with mean age of 61.37±17.108 std. Out of one hundred patients 50(50%) patients were hypertensive while 50(50%) were found to be normotensive shown in (Table 4).

Fall in blood pressure after spinal anaesthesia was found in 48(48%) patients while in rest of patients no fall in blood pressure found after spinal anaesthesia shown in (Table-5). When the results of Fall in blood pressure after spinal anaesthesia in normotensive and hypertensive patients were compared it was found that 17(34%) patients out of

50 in normotensive while 31(62%) patients out of 50 hypertensive were found to show fall in blood pressure after spinal anaesthesia with statistical significant difference between two groups shown in (Table 6).

Table-1: Distribution according to age groups

Age (years)	n	%age
20-40	14	14
41-60	26	26
61-80	60	60

Table 2: Distribution of patients according to hypertension

Hypertension	n	%age
Yes	50	50
No	50	50

Table 3: Distribution of patients according to fall in blood pressure after spinal anaesthesia

Fall In Blood Pressure	n	%age
Yes	48	48
No	52	52

Table 4: Comparison fall in blood pressure in normotensive and hypertensive patients

Hypertension	Fall in BP		Total
	Yes	No	
Yes	31	19	50
No	17	33	50

Table 5: Age distribution according to hypertension (n=48)

Age (years)	n
20-40	2
41-60	6
61-80	40

Table 6: Gender distribution according to hypertension (n=48)

Gender	n	%age
Male	43	89.6
Female	5	10.4
Total	48	100.0

## DISCUSSION

Spinal anaesthesia is being widely utilized in orthopaedics, obstetric & lower limbs<sup>14</sup> and lower abdominal surgeries. Spinal anaesthesia, introduced by August Bier 1898, was first major regional technique in clinical practice<sup>15</sup>. It is simple to institute, rapid in its effect and produces excellent operating conditions. Spinal block is usually a single shot technique so; there is tendency to overdose the drug. Moreover if block is inadequate, there is little possibility to increase the effectiveness of the block. The advantages claimed with spinal anaesthesia for such surgery include reduced blood loss, better operating conditions, minimal effects on arterial O<sub>2</sub> and CO<sub>2</sub> tensions of the patient, preference by

surgical and nursing staff and a generally comfortable recovery<sup>16</sup>.

The most common complication encountered with spinal anaesthesia is hypotension<sup>17</sup> with an abrupt decrease in arterial pressure resulting from the rapid onset and high level blockade<sup>18</sup>, which is due to sympathetic nervous system blockade. As a result, decreased systemic vascular resistance and peripheral pooling of blood occurs which decreases cardiac output. In some cases, these cardiovascular effects may manifest as profound hypotension & bradycardia. Even a mild drop in blood pressure is significant in high risk patients such as the elderly and in those with underlying organ dysfunction in whom the auto-regulatory mechanism may be abnormal<sup>19</sup>. Several interventions can be planned for prevention of hypotension after combined spinal anaesthesia<sup>20</sup>.

Studies have indicated that isobaric solution of bupivacaine are associated with a lower incident of hypotension when compared with hyperbaric solutions<sup>21</sup>. However the choice of the local anesthetic agent by itself was not the sole cause of hypotension seen with spinal anaesthesia<sup>22</sup>. Changes in arterial pressure were more profound and unpredictable in untreated hypertensive than in normotensive patients<sup>23</sup>.

The incidence of Systemic hypotension approaches to 25-82%<sup>6</sup> but the incidence of hypotension was lower in normotensive than hypertensive group. Hypotension occurred in 9 out of 25 patients (36 %) in normotensive patient while 15 out of 25 patients (60%) of hypertensive group developed hypotension<sup>8</sup>.

In obstetrics and gynaecology the incidence of Maternal hypotension approaches to 100%<sup>4</sup> but it was observed that the incidence of hypotension (systolic arterial blood pressure, SAP < or =100 mm Hg) was more frequent in the spinal group than in the epidural group (51% versus 23%)<sup>5</sup>.

In our study the incidence of fall in blood pressure was 17(34%) out of 50 in normotensive while 31(62%) out of 50 hypertensive patients of age range 20-80years with mean age of 61.37±17.108 std in the study there were 76(76%) male patients and 24(24%) female patients. From results it was seen that hypotension is more common in elderly male patients.

In our study special attention was paid when SBP decreased significantly from baseline although changes in MAP reflect changes in both SBP and DBP over a course of time and because it is usually used in study of patients to evaluate the effects of regional anesthesia on BP in these patients blood pressure was measured in this study by an intermittent noninvasive technique to avoid any

complication and to cause little discomfort in our 60 awake patients<sup>24</sup>.

Data from the current study showed that isobaric bupivacaine spinal anaesthesia produced a more marked hypotensive effect in the hypertensive than in normotensive elderly patients. It can be argued that hypertension was inadequately controlled. Treatment of hypertension, current recommendation strongly suggest that antihypertensive medications should be continued even right up the morning of surgery<sup>25</sup> as in our study. In younger hypertensive patients undergoing extradural analgesia. Dagnino and prys-Roberts found abrupt decrease of arterial pressure in untreated patients<sup>26</sup>.

However undergoing spinal anaesthesia Veigas et al showed an attenuation of systolic blood pressure in patients treated with propranolol or metoprolol<sup>27</sup>. Although in the current study no significant difference was found between adequately and inadequately treated patients regarding baseline diastolic blood pressure. It should be noted in this study that patients with higher baseline systolic blood pressure exhibited abrupt decreases in systolic blood pressure. This also suggests that preoperative antihypertensive therapy should be continued in order to reduce the magnitude of systolic blood pressure decrease with spinal anaesthesia.

The clinical implication of this investigation is that pre existing hypertension can be recognized as an important factor to explain blood pressure changes during isobaric bupivacaine spinal anaesthesia in elderly patients. The effectiveness of measures to prevent and treat hypotension in this approach will be investigated.

## CONCLUSION

This study confirms that the spinal anaesthesia induced fall in blood pressure is greater in hypertensive elderly male patients than in normotensive patients.

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