

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

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## ABSTRACT

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

**Material and methods:** Present study was conducted in the General Surgery, Urology, Orthopaedics and Gynaecology/Obstetrics operation theaters of Nishtar Hospital, Multan from June 2010 to March 2011. A total of 100 patients divided in two equal groups were included in the study.

**Results:** In this study 100 patients of age range 20-80 years (mean age 61.37±17.108), 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 anaesthesia, Fall in blood pressure, Hypertension.

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## INTRODUCTION

Anaesthesia is basically divided in two categories i.e. general anaesthesia and regional anaesthesia (spinal, epidural, caudal anaesthesia and nerve blocks). Spinal anaesthesia causes hypotension due to blockade of sympathetic outflow. 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 vasopressor and inotropic drugs<sup>1</sup>.

Like normotensive patients, however, pre-eclampsia may also experience hypotension after spinal anaesthesia for caesarean delivery<sup>2</sup>. The following variables were independently associated with the development of early hypotension: age, female sex, body mass index > 30kg/m<sup>2</sup>, history of hypertension, diabetes mellitus, anaemia, baseline heart rate, systolic and diastolic blood pressure, pulse rate, 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 = 100 mmHg) 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>6,7</sup>. The incidence of hypotension was lower in normotensive than hypertensive group. Hypotension occurred in 9 out of 25 patients (36%) in normotensive patients while 15 out of 25 patients (60%) of hypertensive group developed hypotension<sup>8</sup>.

Hypertension has been a major health problem in many parts of the world for more than a century. In Malaysia, 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 disease. It has also become one of the most common causes for the cancellation of elective surgery<sup>9</sup>.

## MATERIAL AND METHODS

Present study was conducted in the General Surgery, Urology, Orthopaedics and Gynaecology/Obstetrics operation theaters of Nishtar Hospital, Multan from June 2010 to March 2011. A total of 100 patients divided in two equal groups were included in the study.

## RESULTS

According to age distribution, 14(14%) patients were between 20-40 years, 26(26%) were between 41-60 years and 60(60%) were between 61-80 years of age. Mean age was 61.37±17.108.

There 76(76%) male and 24(24%) were female. Out of 1000 patients, 50 (50%) were hypertensive while 50(50%) were found to be normotensive (Table1).

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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 (Table 2). 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 2 groups (Table 3).

Table 1: Gender distribution (n=100) \

Gender	=n	%age
Male	76	74
Female	24	24

Table 2: Distribution of patients according to fall in BP after spinal anaesthesia (n=100)

Fall in BP	=n	%age
Yes	48	48
No	52	52

Table 3: Distribution of patients according to hypertension (n=100)

Hypertension	Fall in BP	
	Yes	No
No hypertension	31	19
No normotensive	17	33

P value: .005

## DISCUSSION

Spinal anaesthesia is being widely utilized in orthopaedics, obstetrics and lower limbs<sup>10,11</sup> and lower abdominal surgeries. Spinal anaesthesia was introduced by August Bier, was first major regional technique in clinical practice<sup>9</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 over dose the drug, moreover if block is inadequate, there is little possibility to increase the effectiveness of the block.

The most common complication encountered with spinal anaesthesia is hypotension<sup>10</sup> with an abrupt decrease in arterial pressure resulting from the rapid onset and high level blockade<sup>11</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.

Studies have indicated that isobaric solution of bupivacaine are associated with a lower incident of hypotension when compared with hyperbaric solutions<sup>12</sup>. However, the choice of the local anaesthetic agent by itself was not the sole cause of hypotension seen with spinal anaesthesia<sup>13</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 patients while 15 out of 25 patients(60%) of hypertensive group developed hypotension<sup>7</sup>.

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

In present 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 20-80 years. There were 76 (76%) male and 24 (24%) female patients. From results it was seen that hypotension is more common in elderly male patients. In this study special attention was paid when SBP decreased significantly from baseline although changes in MAP reflect changes in SBP and DBP over a course of time and because it is usually used in study of patients to evaluate the effects of regional anaesthesia on BP in the patients. Blood pressure was measured in the study by an intermittent non-invasive technique to avoid any complication and to cause little discomfort in our 60 awakepatients<sup>14</sup>.

The severity of hypotension observed in this study on hypertensive elderly patients during isobaric bupivacaine spinal anaesthesia might be explained two ways. First in hypertensive patients there is a central redistribution of total blood volume so that they are more vulnerable to the loss of this central redistribution produced by spinal anaesthesia with concurrent decrease in venous return<sup>15</sup>. In the elderly continuous diuretic treatment can also lead to lower plasma volume<sup>16</sup>. The incidence of 500 to 750 ml of maintenance type solution to such patients who have been without oral intake for a varying period of time could have only partially counteracted fluid loss. Second the arterioles of hypertensive patients are capable of greater vasodilatation because of the presence of medial hyperplasia and hypertrophy<sup>17</sup>. Thus a similar degree of sympathetic blockade can induce greater decrease in blood pressure in hypertensive than in normotensive patients. This may explain our observations of the relationship between baseline systolic blood pressure and the decrease during bupivacaine spinal anaesthesia<sup>18</sup> and the persistent decrease during the first hour of hypertensive patients.

## 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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