

Original Research

Assessment of spinal anaesthesia induced hypotension in elective caesarean section

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ABSTRACT:

Background: Spinal anaesthesia is the method of choice for caesarean section, especially in case of elective procedures. The present study was conducted to assess spinal anaesthesia induced hypotension in elective caesarean section. **Materials & Methods:** 128 full-term pregnant women with American Society of Anaesthesiologists' (ASA) physical status grade I or II who were scheduled to undergo elective CS under spinal anaesthesia (SA) were recorded. Parameters such as gravida, ASA grade, live births, number of previous NVD, CS, history of hypertension, hypothyroidism, gravida etc. was recorded. **Results:** Out of 128 females, 18 had no hypotension, 30 had mild, 40 had moderate and 30 had severe hypotension. BMI >30 was seen in 7, 10 and 6 in mild, moderate and severe hypotension. ASA grade III was seen in 8, 12 and 10 in mild, moderate and severe respectively. Gravida >4 was seen in 0, 2 and 8 in mild, moderate and severe respectively. History of stillbirth was seen in 16, 22 and 10 mild, moderate and severe respectively. Previous NVD >2 was seen in 8, 12 and 10 in mild, moderate and severe respectively. Previous CS >2 was seen in 10, 20 and 0 in mild, moderate and severe respectively. The difference was significant ($P < 0.05$). **Conclusion:** Risk factors for spinal anaesthesia induced hypotension during CS could be age, BMI, weight gain, gravidity, history of hypotension.

Key words: Hypotension, spinal anaesthesia, Gravida

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INTRODUCTION

Spinal anaesthesia is the method of choice for caesarean section, especially in case of elective procedures, because it avoids the most common risks associated with general anaesthesia, such as aspiration, difficult intubation and negative effects of general anaesthetics on the foetus.¹ However, certain side effects may also result from spinal anaesthesia, the most common being hypotension caused by the preganglionic sympathetic block. Spinal block-induced sympatholysis leads to vasodilatation and consequently causes hypotension in mothers. A decrease in systolic pressure can compromise uterine blood flow and foetal circulation, and thus cause foetal hypoxia and acidosis.²

The maintenance of arterial blood pressure is felt to be important to ensure adequate regional perfusion. While spinal anaesthesia (SA) may confer significant benefits when compared to general anaesthesia, it is frequently associated with arterial hypotension.³

Identification of the associated risk factors with SA-induced hypotension might help to prevent and recognise early patients most at risk, to avoid dramatic consequences in mother and neonate.⁴

Caesarean section (CS) is now one of the most commonly performed major operations in women throughout the world. While regional or general anaesthesia (GA) are both acceptable for caesarean delivery, use of GA has decreased dramatically in the past few decades due to a higher risk of anaesthesia-related maternal mortality. As a consequence, spinal anaesthesia (SA) is now the technique of choice for CS.⁵ The present study was conducted to assess spinal anaesthesia induced hypotension in elective caesarean section.

MATERIALS & METHODS

The present study comprised of 128 full-term pregnant women with American Society of Anaesthesiologists' (ASA) physical status grade I or

II who were scheduled to undergo elective CS under spinal anesthesia (SA). All patients were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Parameters such as gravida, ASA grade, live births,

number of previous NVD, CS, history of hypertension, hypothyroidism, gravida etc. was recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

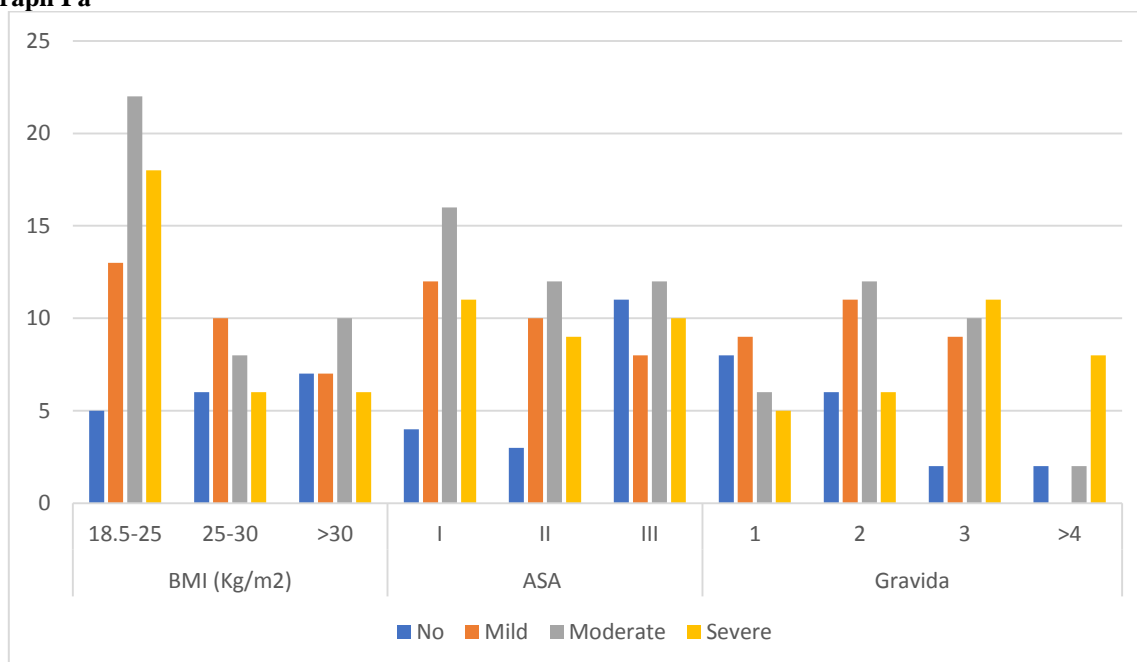
RESULTS

Table I: Maternal variables

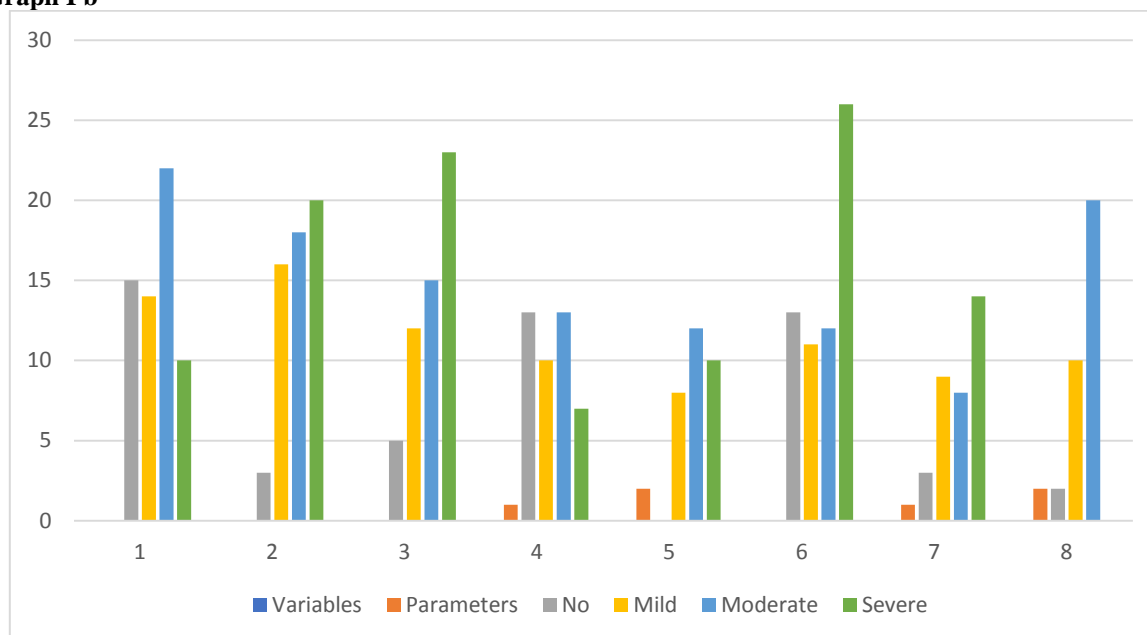
Variables	Parameters	No	Mild	Moderate	Severe	P value
BMI (Kg/m ²)	18.5-25	5	13	22	18	0.05
	25-30	6	10	8	6	
	>30	7	7	10	6	
ASA	I	4	12	16	11	0.04
	II	3	10	12	9	
	III	11	8	12	10	
Gravida	1	8	9	6	5	0.05
	2	6	11	12	6	
	3	2	9	10	11	
	>4	2	0	2	8	
History of still birth	No	15	14	22	10	0.03
	Yes	3	16	18	20	
Previous NVD	0	5	12	15	23	0.01
	1	13	10	13	7	
	2	0	8	12	10	
Previous CS	0	13	11	12	26	0.02
	1	3	9	8	14	
	2	2	10	20	0	

Table I, graph I a, b shows that out of 128 females, 18 had no hypotension, 30 had mild, 40 had moderate and 30 had severe hypotension. BMI >30 was seen in 7, 10 and 6 in mild, moderate and severe hypotension. ASA grade III was seen in 8, 12 and 10 in mild, moderate and severe respectively. Gravida >4 was seen in 0, 2 and 8 in mild, moderate and severe respectively. History of stillbirth was seen in 16, 22 and 10 mild, moderate and severe respectively. Previous NVD >2 was seen in 8, 12 and 10 in mild, moderate and severe respectively. Previous CS >2 was seen in 10, 20 and 0 in mild, moderate and severe respectively. The difference was significant (P<0.05).

Graph I a



Graph I b



DISCUSSION

Spinal anaesthesia causes hypotension via several pathophysiological mechanisms, the most significant being rapid onset of sympatholysis due to increased sensitivity of nerve fibres to local anaesthetics during pregnancy.^{6,7} The level of blockage of the sympathetic chain is connected to the degree of cranial spread of the local anaesthetic within the subarachnoid space, it is often difficult to predict and usually reaches several dermatomes above than the sensory block level.^{8,9} Higher sensitivity to local anaesthetics combined with aortocaval compression of the pregnant uterus are the main reasons for increased incidence and higher levels of hypotension in pregnant women, compared to non-obstetric patients. Pregnant women also exhibit an increased level of sympathetic activity compared to parasympathetic activity.¹⁰ Sympatholysis therefore leads to a higher degree of peripheral vasodilatation and a predominance of parasympathetic activity, consequently reducing the venous return and cardiac pre-load, and resulting in bradycardia, nausea and vomiting. The reduced pre-load in turn results in reduced cardiac output (CO), leading to systemic hypotension. This state is further aggravated by aortocaval compression.¹¹ The present study was conducted to assess spinal anaesthesia-induced hypotension in elective caesarean section.

We found that out of 128 females, 18 had no hypotension, 30 had mild, 40 had moderate and 30 had severe hypotension. BMI >30 was seen in 7, 10 and 6 in mild, moderate and severe hypotension. ASA grade III was seen in 8, 12 and 10 in mild, moderate and severe respectively. Fakerpour et al¹² evaluated a wide range of variables (related to parturient and anaesthesia techniques) associated with the incidence of different degrees of SA-induced hypotension during elective CS on 511 mother–infant pairs. The incidence of mild, moderate and severe hypotension

was 20%, 35% and 40%, respectively. Eventually, ten risk factors were found to be associated with hypotension, including age >35 years, body mass index ≥ 25 kg/m², 11–20 kg weight gain, gravidity ≥ 4 , history of hypotension, baseline systolic blood pressure (SBP) 100 beats/min in maternal modelling, fluid preloading ≥ 1000 ml, adding sufentanil to bupivacaine and sensory block height >T4 in anaesthesia-related modelling ($P < 0.05$).

We observed that gravida >4 was seen in 0, 2 and 8 in mild, moderate and severe respectively. History of stillbirth was seen in 16, 22 and 10 mild, moderate and severe respectively. Previous NVD >2 was seen in 8, 12 and 10 in mild, moderate and severe respectively. Previous CS >2 was seen in 10, 20 and 0 in mild, moderate and severe respectively. Advanced age is a factor that has been repeatedly identified in the current literature as a predictor of SA-induced hypotension.¹³ Different studies have demonstrated a tendency towards a greater decrease in SBP in older age groups. In accordance with previous studies, our study suggested that age >35 years was the cut-off point, whereas the onset of tendency towards hypotension was later in non-parturient patients receiving SA. It seems that reduction in cardiac reserve and changes in baroreceptor and sympathetic nervous system responses may play certain roles in increasing the risk of hypotension in older patients.¹⁴

CONCLUSION

Authors found that the risk factors for spinal anaesthesia induced hypotension during CS could be age, BMI, weight gain, gravidity, history of hypotension.

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