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"Anticipation of Hypotension in Elderly Patients Undergoing Lower Limb Orthopaedic Surgery Following Spinal Anaesthesia Using Randomised Double Blinded Observational Study"

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Abstract: *Elderly patients are more prone to develop hypotension due to decreased physiological reserve. Our study aimed at predicting correlation between incidence of hypotension & Perfusion Index. Perfusion index is defined as ratio of pulsatile blood flow to non-pulsatile blood flow measured using pulse oximeter. MATERIAL & METHODS- In our study 100 elderly patients of both the genders, belonging to ASA-1&2, were selected based on baseline Perfusion Index, posted for elective surgery. Group-A-includes patients with Perfusion Index >3.5Group-B-includes patients with Perfusion Index ≤3.5Baseline Perfusion Index was noted by another anaesthesiologist, who assigns the group & not involved in the further study. Spinal anaesthesia was performed in sitting position with 23G Quincke's needle in L2-L3 or L3-L4 space with Inj.Bupivacaine 0.5% hyperbaric 10mg + Inj.Dexmedetomidine 10µg added to it. Motor blockade was attained upto T10level. Perfusion Index was noted every 5 minutes for first 20 minutes & every 15 minutes till the end of surgery. Hypotension was defined as MAP <65 mmHg. Statistical analysis was interpretated with Chi-square test, independent sample t-test. RESULTS- The development of hypotension was more observed in group-A patients. There was significant correlation between baseline Perfusion Index >3.5 & number of episodes of hypotension (P <0.05) CONCLUSION- Incidence of hypotension is more when Perfusion Index >3.5 following spinal anaesthesia.*
Keywords*- Elderly, Hypotension,Mean arterial pressure, Perfusion Index, Spinal anaesthesia.*

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I. Introduction

Elderly patients are more prone to develop hypotension following spinal anaesthesia due to decreased physiological reserve. Hence to predict the incidence of hypotension, Perfusion Index(PI) can be used as non-invasive monitoring measured by using pulse oximeter.[1] Perfusion index is defined as ratio of pulsatile blood flow to non-pulsatile blood flow in peripheral vascular tissue.

AIM-To anticipate the incidence of hypotension in elderly patients based on baseline PI.

II. Materials And Methodso

After taking approval from institutional ethics committee, our study was conducted from May 2017-October 2017 on 100 elderly patients posted for elective orthopaedic lower limb surgeries. Informed written consent was taken from all the patients.

INCLUSION CRITERIA: Age 55-75 years
Weight 55-65 kgs
ASA 1 & 2
Hemoglobin>10gm%

Exclusion Criteria: Severe respiratory or cardiac disease, uncontrolled hypertension, significant dehydration, peripheral vascular diseases.

Baseline PI was noted by one person, who assigns the group & not involved in further study.

Group A- includes patients with PI >3.5

Group B- includes patients with PI ≤3.5

Monitors were disconnected & spinal anaesthesia was performed by another person(for double-blinding) in sitting position with 23G Quincke's needle at L2-L3 or L3-L4 space with Inj.Bupivacaine 0.5% heavy 15mg + Inj.Dexmedetomidine 10µg added to it. All the monitors were again connected. Sensory blockade was attained

uptoT10 level (>T10 level were excluded from the study). Mean Arterial Pressure(MAP) was noted every 5min for first 20min & every 15min till the end of surgery. Hypotension was defined as MAP <65mmHg. PI was measured using pulse oximeter probe of '*MindrayBeneview T5*' monitor. Statistical analysis was done with unpaired *t*-test and chi-square test.

III. Results

Both the groups were comparable in demographic data. The difference between the two groups with respect to MAP was statistically significant for first 25min & most significant during first 5-20 minutes.

Table 1: Demographic Data

DEMOGRAPHIC DATA	GROUP A	GROUP B	P-VALUE
AGE (YEARS)	66.72±5.50	67.60±5.02	0.4053
GENDER(M:F)	18:32	21:29	0.6818
WEIGHT (KGS)	60.74±9.00	59.84±11.25	0.6596

No significant difference between both the groups and hence comparable in terms of demographic data and p-value is statistically insignificant (p-value >0.05).

Fig 1: Mean Arterial Pressure Comparison In Both The Groups During Surgery

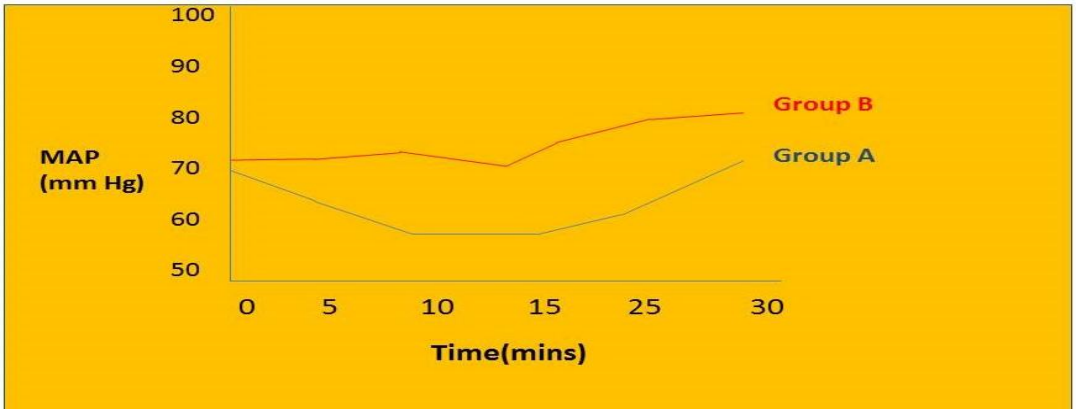

Table 2: Statistical Analysis

	GROUP A	GROUP B
INCIDENCE OF HYPOTENSION (%)	68%(34/50)	14%(7/50)
mean±SD	65.76±11.73	76.86±9.36
1 EPISODE OF HYPOTENSION	20 PATIENTS	7 PATIENTS
2 EPISODES	8 PATIENTS	2 PATIENTS
3 EPISODES	6 PATIENTS	0

Hence Group A required multiple rescue doses of Ephedrine.
Sensitivity & specificity of baseline PI with a cut-off of 3.5 was 68% & 86% respectively.

IV. Discussion

The principle of SpO2 is based on absorption of light of different wavelength 660nm & 940nm emitted through vascular bed of finger. Pulsatile component represents the fluctuations in volume of arterial blood & non-pulsatile component is from connective tissue, bone & venous compartment.[2]

- The baseline PI cut-off point of 3.5 was suggested in a study by Toyama *et al.*, PI >3.5 are more prone to develop hypotension.[3]
- Spinal anaesthesia induced hypotension is mainly result of sympathetic blockade & decreased systemic vascular resistance leading to haemodynamic alterations and these effects are more pronounced in geriatric population.[4]
- LIMITATIONS-ABG was not done, which could have ruled out hypoxia resulting from hypo-perfusion. Doppler studies were not performed to rule out peripheral vascular disease.

V. Conclusion

Incidence & severity of hypotension and requirement of Ephedrine was more in patients with PI >3.5. Hence Perfusion Index can be used as a predictor of spinal anaesthesia induced hypotension as a non-invasive method of monitoring.

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