



A CLINICAL COMPARITIVE ASSESMENT OF SPREAD OF SPINAL ANAESTHESIA DEPENDING ON ABDOMINAL GIRTH AND BMI

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KEYWORDS :

AIM:

The greatest challenge in spinal anaesthesia is to control the spread of local anaesthetics through CSF and provide adequate block without the spread related complications. This study compares and interprets spread of spinal anesthesia in patients with normal BMI , increased BMI and abdominal girth with fixed amount of intrathecal hyperbaric Bupivacaine and Buprenorphine as additive; also effect of vertebral column on the spread of spinal anaesthesia

- Patients below the age of 18 years.
- Pregnant patients.
- Patients with anatomical deformities
- Any known liver, kidney or lung disorder. Neuromuscular disorders like myasthenia gravis, GB syndrome etc.
- Failed spinal

MATERIALS AND METHOD:

60 random patients posted for elective surgeries under spinal anaesthesia were selected. Height, weight, BMI, abdominal girth, vertebral column length were measured and classified according to BMI to groups. Under aseptic precautions Inj Bupivacaine(H) 3ml and Injection Buprenorphine 30 mcg was given intrathecally at L3-L4 space. Cephalad spread attained after 20 mins were noted.

STATISTICAL ANALYSIS

- Data was entered into Microsoft excel data sheet and was analyzed.
- Categorical data was represented in the form of Frequencies and proportions.
- Chi-square test was used as test of significance for qualitative data.
- P value <0.05 is considered as statistically significant

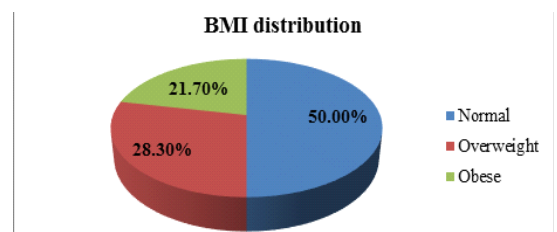
INCLUSION CRITERIA

- Patients belonging to ASA physical status class I and II.
- Patients with age group of 18-50 years, of either sex.
- BMI 18 kg/m² to 40 kg/m²

EXCLUSION CRITERIA

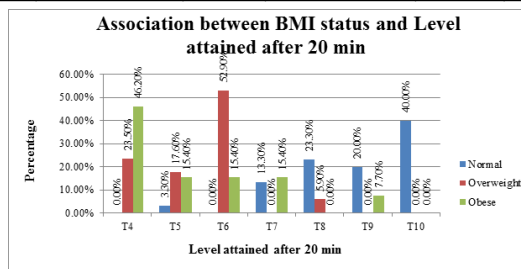
- Allergy to drug, any other history of allergy.

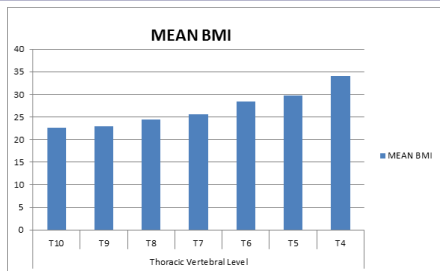
BMI DISTRIBUTION AMONG SUBJECTS



LEVEL ATTAINED DISTRIBUTION AMONG SUBJECTS

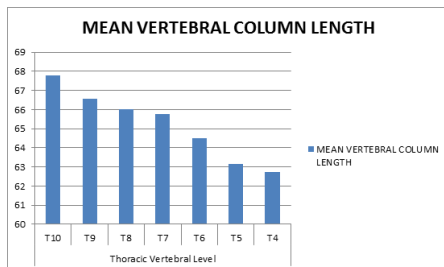
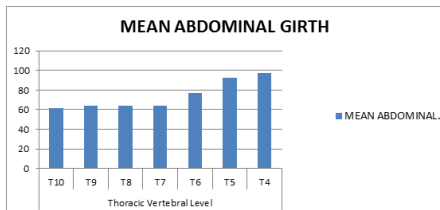
		BMI Status							
		Normal		Overweight		Obese		Total	
		Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %
Level attained after 20 Min	T4	0	0.00%	4	23.50%	6	46.20%	10	16.70%
	T5	1	3.30%	3	17.60%	2	15.40%	6	10.00%
	T6	0	0.00%	9	52.90%	2	15.40%	11	18.30%
	T7	4	13.30%	0	0.00%	2	15.40%	6	10.00%
	T8	7	23.30%	1	5.90%	0	0.00%	8	13.30%
	T9	6	20.00%	0	0.00%	1	7.70%	7	11.70%
	T10	12	40.00%	0	0.00%	0	0.00%	12	20.00%





Subjects with Normal BMI, 40 % attained T10 level, among those with Overweight, 52.9% attained T6 level and among those with obesity, 46.2% attained T4 level.

Obese subjects had higher level of sensory blockade and normal subjects had lower level.



BMI, Vertebral Column Length and Abdominal Girth comparison with respect to Thoracic Vertebral Level

		BMI		Vertebral column length		Abdominal Girth	
		Mean	SD	Mean	SD	Mean	SD
Thoracic Vertebral Level	T4	34.12	4.36	62.75	2.96	97.40	23.35
	T5	29.73	1.75	63.17	1.72	92.67	21.04
	T6	28.35	1.08	64.50	3.51	76.91	10.77
	T7	25.60	1.71	65.75	3.65	64.33	6.09
	T8	24.48	1.09	66.00	4.63	63.92	3.75
	T9	22.89	.75	66.57	3.15	63.86	1.95
	T10	22.60	0.67	67.80	8.60	61.63	4.21

RESULTS:

Subjects with mean BMI among who attained T10 level is 22.6 ± 0.67, and who attained T4 level is 34.12 ± 4.36. Mean Vertebral Column Length among those who attained T4 was 62.75 ± 2.96 cms (lowest Vertebral Column Length) and among those who attained T10 level was 67.80 ± 8.60 cms (highest). Mean Abdominal Girth among those who attained T4 level was 97.40 ± 23.35 cms (highest) and among those who attained T10 level was 61.63 ± 4.21 (Lowest). In the study, the body mass index & abdominal girth has a positive relationship with cephalad spread of spinal anesthesia and vertebral column had a negative relation.

CONCLUSION:

Thus BMI, abdominal girth and vertebral column length would affect the maximum level of sensory blockade in spinal anaesthesia

DISCUSSION:

• Patients with increased body mass index generally, but not always, have a greater abdominal girth, as body shapes differ among individuals. The lumbosacral cerebrospinal fluid volume is the primary determinant of

sensory block extent during spinal anesthesia, and increased intra-abdominal pressure can decrease lumbosacral cerebrospinal fluid volume.

- Another probable mechanism of decreased lumbosacral cerebrospinal fluid volume due to increased intra-abdominal pressure there will be epidural venous engorgement, which leads to shrinkage of the dura on the subarachnoid space.
- The vertebral column length was the other main relevant factor to the spread of spinal anesthesia. Logic might suggest that there would be less cephalad spread of spinal anesthesia for a fixed amount of local anesthetic in taller patients. Indeed, study by Hartwell BL et.al has shown that vertebral column length is significantly correlated with spinal anesthesia spread. In patients with greater BMI, abdominal girth or shorter vertebral column length would require less local anaesthetic to get an expected block level

REFERENCES:

1. Greene NM. Distribution of local anesthetic solutions within the subarachnoid space. *Anesth Analg* 1985;64:715-30
2. Zhou, Qing-He, wang-Pin Xiao, and Ying-Yan Shen. "Abdominal girth, vertebral column length, and spread of spinal anaesthesia in 30 minutes after plain bupivacaine 5Mg/ml." *Anaesthesia and analgesia* 119.1 (2014): 203-06
3. Kim, Byung Ki and Dong Ai An. "influence of height and vertebral length on spinal anaesthesia with 0.5% hyperbaric bupivacaine." *korean journal of anaesthesiology* 35.6 (1998): 1089.
4. Hartwell BL, Aglio LS, Hauch MA, Datta S. Vertebral column length and spread of hyperbaric subarachnoid bupivacaine in the term parturient. *Reg Anesth* 1991;16:179
5. Pargger, H., A. Aeschbach, K. Hampl, J. Drewe, and M. Schneider. "The influence of age, height, and weight on cephalad spread of anaesthesia after spinal injection of plain 0.5% Bupivacaine." *Anaesthesiology* 81. SUPP LEM EN T (1994).
6. Wei, Chang Na, Yin-Fa Zhang, Feng Xia, Li Zong Wang, and Qing-He Zhou. "abdominal girth, vertebral column length and spread of intrathecal bupivacaine in term parturients." *International journal of obstetrics anaesthesia* 31 (2017): 63-67.
7. Cohen J, Cohen P, West SG, Aiken LS. *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*. 3rd ed. Mahwah, NJ: Lawrence Erlbaum Associates, 2003