



AN OBSERVATIONAL STUDY TO ASSESS THE HEIGHT OF SUB ARACHNOID BLOCK BY USING MOBILE APPLICATION "CLINOMETER"

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ABSTRACT

When Sub-arachnoid block (SAB) is given, head tilt is given to achieve level of block up to a particular dermatome. Now-a-days, **Clinometer** is a new technique to measure the accuracy of degree of head tilt.

In our observational study, we used this application to give a head tilt of a particular degree as well as to measure the involvement of highest dermatome.

Pt with lower degrees of tilt blocked lower dermatomes and those with higher degrees of tilt involved higher dermatomal blockade.

Using **Clinometer** to assess the degree of head tilt is a useful aid to determine optimum level of block after giving local anaesthetic for below umbilical surgeries.

KEYWORDS : Clinometer, Sub-arachnoid block.

INTRODUCTION :

When sub-arachnoid block (SAB) is given we inject local anesthetic drug in sub arachnoid space and trendelenburg position is used to achieve level of block to a particular dermatome. The height of the blockade depends upon many factors like amount of drug used, speed of injection of the drug, height of the patient, site of injection, degree of Trendelenburg etc. The extent of tilt given to a particular pt is subjective most of the times and generally it is not calibrated. We as anaesthetist perhaps never think that what was the degree of tilt a particular pt received in attaining a particular level of block.

With the advancement of technology we have entered the era of smart phones. **Clinometer** is a very useful application on smart phones which accurately measures the degree of inclination given to the mobile phone. On keeping this mobile phone on the OT table we can accurately measure the degree of inclination of the OT table. This is an area which is underexplored in spite of being very simple.

With this background we aimed to do a study to determine the role of degree of Trendelenburg (Angle) given to patient in attaining a particular level of dermatomal block after spinal anaesthesia.

An observational study was designed and was done on 110 patients. The study included pt from 18 years to 60 years, both sex were included. Patients of ASA grade 1 and 2 were included and height criteria was 150-170 cms. Patients with contraindication to SAB were excluded from the study.

Apparatus used were usual like Multipara monitor, Hyperbaric 0.5% Bupivacaine injection, Spinal needle (25 G Quincke's spinal needle), Syringes, Gloves, Betadine solution (10%), Spirit etc. along with Mobile with application clinometer.

METHODOLOGY :

After informed consent and pre anaesthetic check up patients were taken in OT. Patients were kept in supine position on OT table and monitors attached. Each patient preloaded with 10 ml/Kg of Ringer lactate. Setting zero degree in **Clinometer** application was done at the level of iliac crest in supine position. It guided us to position the table in a horizontal position.

After positioning the OT table patients were taken for SAB in sitting position. Painting and draping was done. After local infiltration with 2 ml of 2% Inj lignocaine SAB was given in L3-L4 space with 25G Quincke's needle and 3.4-3.6 ml of Hyperbaric 0.5% Bupivacaine was injected. The rate of injection was 0.2ml/sec approximately. After injecting the drug, patient was made supine. **Clinometer** was placed at the level of iliac crest and Trendelenburg position was given, degree of which was observed on **Clinometer** & noted down. Highest dermatome blocked was noted down by observing response to pin prick on particular dermatome. Pt with tilt of 6.1°-7.0°, 7.1°-8.0° and 8.1°-9.0° are grouped as A, B and C respectively.

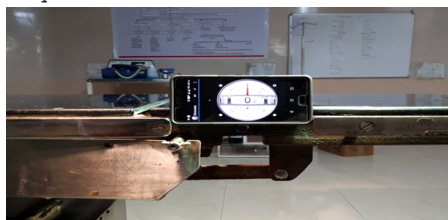


Figure 1: Mobile with clinometer application showing zero degree of table tilt in horizontal position.

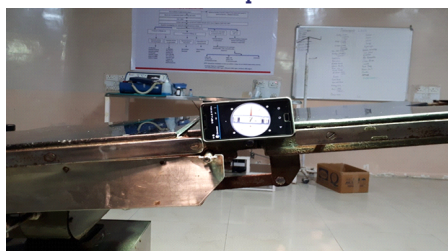


Figure 2: Mobile with clinometer application showing seven degree of table tilt.

RESULT :

Total of 110 patients taken for the study of which 47 patients were of the age group 21-30 years and the percentage was 42.7%, 21 patients of the age group of 31-40 comprising of 19.1% of total no of patients. There were 15 patients of the age group of 41-50 years i.e. 13.6 % of total and 27 patients of the age group of 51-60 years comprising 24.5 % of the total no of patients.

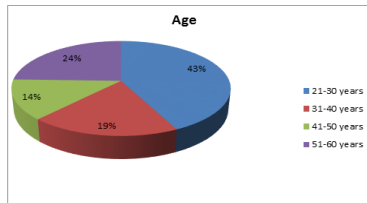


Chart 1 : Pie chart showing age distribution.

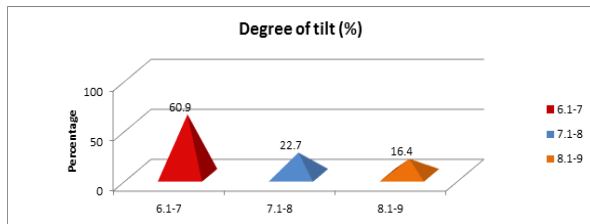
Of total 110 patients 21 Patients were female comprising of 19.1 % of total and 89 patients were males comprising of 80.9 % of total no of patients.

Of total 110 patients 74 patients were given 3.4 ml of drug i.e. 67.3 % were given 3.4 ml volume. 1 patient was given 3.5 ml of drug that is 0.9 %. Of total and 35 patients were given 3.6 ml of drug i.e. 31.8 % patients were given 3.6 ml of drug.

Table 1 : Frequency distribution of drug volume.

Volume of drug	Frequency	Percent
3.40	74	67.3
3.50	1	.9
3.60	35	31.8
Total	110	100.0

The frequency of distribution of degree of tilt was under three groups. 67 patients were given trendelenburg tilt of 6.1 - 7.0 degrees making it 60.9% of the total. 25 patients were given head down tilt of 7.1-8.0 degrees i.e. 22.7 % of the total and 18 patients were given a tilt of 8.1-9.0 degrees comprising of 16.4% of the total.



Graph 1 : Frequency distribution of degree of tilt.

The dermatomal distribution of the drug with a given trendelenburg angle was studied. With head down tilt of 6.1-7 degrees (Group A) showed blockade up to T10 in 31 patients i.e. 46.27 % of the pt of group A. In this group 23 patients i.e. 34.33% showed lower level of blockade up to T12. 8 patients (11.94%), 4 Patients (5.97%) and 1 patient (1.49%) showed higher level of blockade up to T8, T6 and T4 respectively.

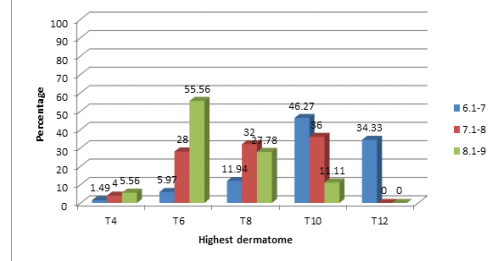
With head down tilt of 7.1-8 degrees (Group B) showed blockade up to T10 in 9 patients i.e. 36 % of the pt of group B. In this group no patient had blockade up to T12 but the percentage of higher dermatomal blockade increased as 8 patients (32 %), 7 Patients (28 %) and 1 patient (4%) showed higher level of blockade up to T8, T6 and T4 respectively.

With head down tilt of 7.1-8 degrees (Group C) showed blockade up to T6 in 10 patients i.e. 55 % of the pt of group C. In this group no patient had blockade up to T12 and the percentage of lower dermatomal blockade decreased as 5 patients (27.78 %) and 2 patients (11.11 %) showed higher level of blockade up to T8 and T10 respectively. In group C the percentage of higher level of blockade i.e. up to T4 increased as 1 patient (5.56%) showed T4 blockade.

Table 2 : Dermatomal spread with different degree of tilt.

Degree of tilt	Highest dermatome					Total
	T4	T6	T8	T10	T12	
6.1-7	1(1.49)	4(5.97)	8(11.94)	31 (46.27)	23 (34.33)	67

	7.1-8	1(4)	7(28)	8(32)	9(36)	0	25
8.1-9	1(5.56)	10 (55.56)	5(27.78)	2 (11.11)	0	18	
Total	3	21	21	42	23	110	



Graph 2 : Dermatomal spread with different degree of tilt.

DISCUSSION :

Jones et al (2003) compared measured and estimated angles of table tilt at caesarean section and found that most anaesthesiologists overestimate the degree of tilt. In our study too measured angles were lesser than what we have expected visually.

In February 2010, Desari et al at Brighton and Sussex University Hospitals NHS Trust conducted a national, online questionnaire and performed a survey on anaesthetists to quantify iPhone usage and they found that medical applications were used by 80% of the responding anaesthetist. We also found that anaesthetists liked the use of mobile application and wanted to use the application to exactly quantify the table tilt.

R B Dixit and M M Meena (2016) have mentioned in Saudi Journal of anaesthesia regarding use of the application and emphasised on Degree of tilt given in patients, Comfort regarding availability of smart phone and Comfort regarding the use of the application and we also have found the application easy to use.

We have tried to use this mobile application to calibrate the degree of inclination of head low position and respective height of blockade achieved. Clinometer can be used in our daily practice to get an estimated level of height of block with the calibrated table tilt. With the use of this application we can individualize the level of blockade according to type of surgery for example lower limb surgeries, inguinal surgeries, obstetric and gynecological surgeries, lower abdominal surgeries etc. This application is also very helpful to avoid unwelcomed incidences of high spinal block.

CONCLUSION :

With Trendelenburg angle of 6.1°-7° and 7.1°-8° the dermatome maximally involved was T10. With angle of 8.1°-9° the dermatome maximally involved was T6. So the method explained above can be used in day to day practice by anaesthetists to calibrate degree of head tilt and get an estimated level spinal blockade.

REFERENCES

- Jones SJ, Kinsella SM, Donald FA. Comparison of measured and estimated angles of table tilt at Caesarean section. Br J Anaesth. 2003;90:86-7.
- Dasari KB, White SM, Pateman J. Survey of iPhone usage among anesthetists in England. Anaesthesia. 2011;66:630-1.
- R B Dixit and MM Meena Use of an Android application "clinometer" for measurement of head down tilt given during subarachnoid block. Department of Anesthesiology, R.D. Gardi Medical College, Ujjain, Madhya Pradesh, India. Saudi J Anaesth. 2016 Jan-Mar; 10(1): 29-32.
- Crawford JS, Burton M, Davies P. Time and lateral tilt at Caesarean section. Br J Anaesth. 1972;44:477-84.