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Comparison of Anaesthetic depth by Bi spectral index score in Trendelenburg and Reverse Trendelenburg position in Elective Open Cholecystectomy under General Anaesthesia.

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Introduction

General Anaesthesia is defined as drug induced loss of consciousness during which patients are not arousable even by painful stimulus. During general anaesthesia patients often require positive pressure ventilation.to maintain airway due to drug induced depression of neuromuscular function. Awareness in anaesthesia is a unpleasant complication which may lead to PTSD or Post Traumatic Stress Disorder (incidence 0.1-0.2%) 1 and for that monitoring of depth of anaesthesia is a major concern now a days. Various methods are being used to monitor the depth of anaesthesia like patients movement, autonomic changes (Evans score), EEG, AER, HR and others. In October 1996, the US FDA had approved BIS monitoring as an accepted measure of the hypnotics and sedative drugs. BIS is based on processing of different amplitude and frequency waves of EEG; derived through cortical surface electrodes. BIS value scaled from 0- 100 where 0 is isoelectric and 100 is fully awake. Since its inception BIS monitoring has gained popularity in daily practice. Different positioning done after induction of anaesthesia for better accessibility and ease of surgery according to site and nature of surgical field which can change the hemodynamic parameter of the patient and few researchers found that those changes can change the BIS parameter too. Present study is designed to demonstrate the variation of BIS score & patients hemodynamic vitals & PRST score in relation to change in patient position during elective cholecystecto my surgery under GA in our hospital setting.

Review of literature

Sandhu k (09) 2 stated that awareness is the post operative recall of sensory perception during general anaesthesia and this can be extremely distressing for the patients. Sebel (04) also found that awareness after general anaesthesia is infrequent phenomenon that may lead to post traumatic strss disorder (PTSD). BIS is very important tool to monitor depth of anaesthesia. Dahaba (05) 3 found that since its introduction in 1996, BIS has gained increasing popularity in daily anaesthesia practice.

Carter (10) [4] & Miya be (97) [5] also found the relation between change in BP with change in the patient position from supine to Trendelenburg or Reverse Trendelenburg position.

Kaki [6] conducted a study in 2009 & found that several factor affects depth of anaesthesia & among them patient positioning is one of the important factors. Mallik et al 8 also found that positioning of the patient is one among other factors which changes the depth of anaesthesia and subsequently BIS value.

Methodology

It is a cross sectional observational study conducted in Surgery O tog AGMC & GBP Hospital for two years. All the patients of both sexes admitted for elective open cholecystectomy under general anaesthesia, who gave consent to participate in the study and who are more than 18 years age with ASA grade I & II were included in this study. Those who did not give consent for study, who are ASA III, IV & V and who has history of hyper tension, diabetes mellitus, thyroid disorder, recent history of head injury, neuro deficoency, allergy with propofol & atracurium, hepatic or renal insufficiency, were excluded from the study. COVIDEN BIS Monitor (Complete monitoring system) PIN 185-0151(VT40899) & Ska ray star 90 multipara monitor were used in our study.

After getting approval from institutional ethical committee and after taking proper informed consent patients were included in our study. Pre operative fasting guideline maintained strictly. All the patients were Pre medicated with tab alprazolam 0.5mg, tab Ranitidine 150 mg. routine monitoring includes NIBP, Pulse oximetry, urine output and four electrodes of BIS monitoring attached to the forehead of the patient. All the patients were induced with inj propofol2mg/kg and intubated with inj succinyl choline 2mg/kg. all of them received premedication with inj glycopyrolate, Inj nalbuphine, inj ondansetron. Muscle relaxation main tained with inj atracurium (0.2mg/kg). after intubation ventilation is maintained with 33% oxygen, 67% nitrous oxide, 1% sevoflurane and paracetamol 1 gm infusion used for analgesia. After five minutes of induction keeping the patients in neutral position BIS value recorded in 5 minutes interval at 5,10 & 15 minutes, followed by change in position to head down three BIS value recorded at 20,25 & 30 min. The position of patient again reset to neutral position & BIS value recorded at 35,40 & 45 minutes. Lastly patient tilted to head up position (Reverse Trendelenburg) ang again values recorded at 50,55 & 60 minutes.

After completion of surgery reversal done with inj Neostigmine (0.05 mg/kg) and glycolpyrrolate (0.01mg/ kg) and shifted to post operative ward after extubation with close monitoring. They were interviewed after 24 hours for recall. Data were collected in Microsoft excel and analyzed using SPSS software version 15.0. Mean, Median, Mode & standard deviation calculated and t-test applied for testing of significance of mean between two groups.

Result and observation

The difference in demographic profile like age, sex & ASA status is not significant($p<0.05$). Most of our patients were ASA I. These are similar to study conducted by Sebel PS et al (2004)9 as they also found no significant relation between age, sex & ASA status.

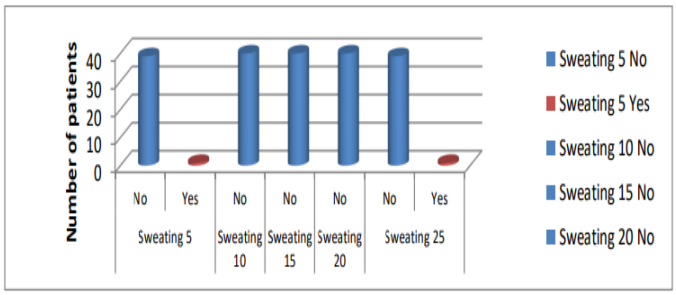
Age in Group	Frequency	Percent
≤30	12	30.0%
31-40	14	35.0%
41-50	11	27.5%
51-60	3	7.5%
Total	40	100.0%

Table 1

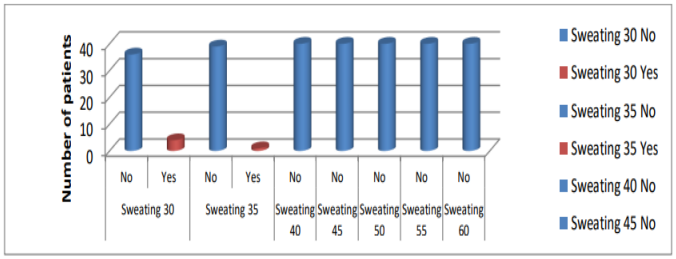
ASA	Frequency	Percent
I	30	75.0%
II	10	25.0%
Total	40	100.0%

Table 2

We observed that 2.5% patient has sweating at 5 min,2.5% had sweating at 25 min ,10% had sweating at 30 min and 2.5% had sweating at 35min. all of these were statistically significant.

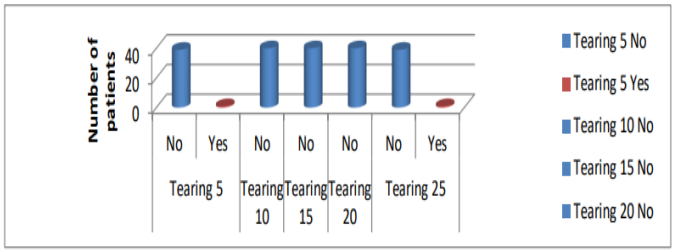


Graph 1:

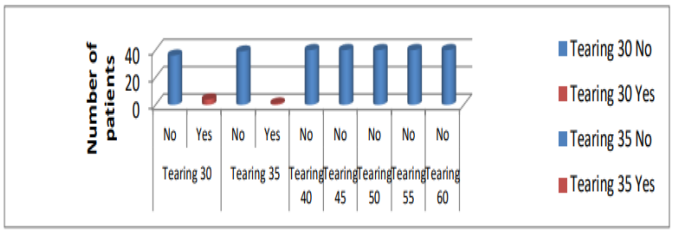


Graph 2:

We also found that 2.5% patient had tearing at 5 min,2.5% had tearing at 25 min, 10% patient had tearing at 30 min and 2.5% had tearing at 35 min and those were statistically significant.



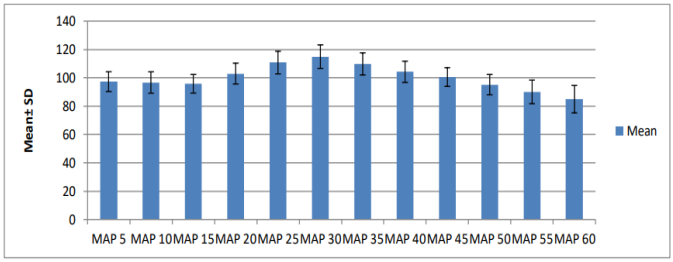
Graph 3:



Graph 4:

Present study showed that maximum patients had sweating & tearing at 30 min in Trendelenburg position with median BIS 66 which were statistically significant. No sweating or tearing seen at 40 & 60 minutes.

MAP was highest in Trendelenburg position at 30 minute and it decreased in neutral position but further decrease seen in head up (reverse Trendelenburg) position at 50,55 & 60 min and these are statistically significant.



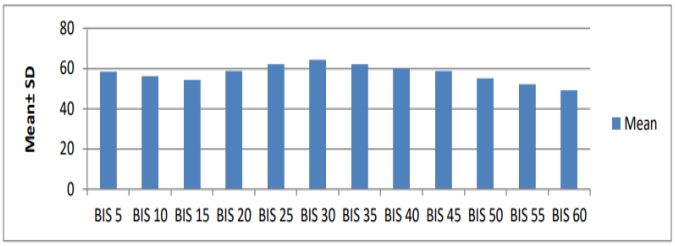
Graph 5:

Skytioti Metal 7 (2019) found that ETCo2 and Bispectral index were unchanged after induction. MAP decreased with anaesthesia, from 102 (91 to 108) to 72 (65 to 76) mmHg, then remained unchanged. Cardiac index decreased with anaesthesia and with pneumo periton eum.

Multiple regression analysis attributed the fall in internal carotid artery blood flow to reduced cardiac index (both HR and SV index contributing) and MAP ($P < 0.001$). Vessel diameter also declined ($P < 0.01$).

Heart rate also varied with different time interval. Maximum decrease in HR was seen after assuming reverse Trendelenburg position at 55 minute with median BIS score 53.

Finally in BIS score, we found that in Trendelenburg position (At 20,25 & 30 min) BIS increased at different time interval, highest median value of 66 at 30 minutes. BIS score decreased after onwards and maximally decreased after patient put in reverse Trendelenburg position at 50,55 & 60 minutes.



Graph 6:

Kaki AM et al (2009) [6] found that there was a significant increase in BIS values in head-down position (median 47 vs 40) compared with neutral position, whereas head-up position significantly decreased BIS (39 vs 41) compared with neutral position ($P < 0.05$). Changing a patient's position significantly affects the BIS values, which might affect the interpretation of Anaesthetic depth.

Mallick Set al (2015) 8 also showed that during comparison between two groups with different angulations, TBG >30° showed a higher BIS value than TBG < 0.05) trend was observed at all the 30, 60, 90, and 120th min interval. Interestingly, BIS values returned to preoperative levels following adopting final supine position. No incidence of awareness was reported in both the series throughout the study. Though awareness remains unaltered BIS value gets increased with higher angle of inclination in TBG position during LAVH operation.

Conclusion

- Trendelenburg position resulted in increased IS value whereas reverse Trendelenburg position decreases BIS value.
- Trendelenburg position causes increase in MAP, sweating and tearing of patients.
- Changes in patient position during surgery under general anaesthesia significantly changes BIS score and thereby depth of anaesthesia.

Limitations of the study

In spite of every sincere effort my study has lacunae.

The notable short comings of this study are

1. The sample size was small.
2. The study has been done in a single Centre.
3. The study was carried out in our tertiary care hospital, so hospital bias cannot be ruled out.
4. Ongoing COVID 19 pandemic and lockdown has further hampered the study.

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