

## TO SIMULTANEOUSLY CORRELATE THE OBSERVED BIS SCORES WITH HEMODYNAMIC CHANGES

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### Abstract

**Background & Method:** The present study was carried out in the Department of Anaesthesiology, Index Medical College Hospital & Research Centre, Indore with an aim to simultaneously correlate the observed BIS scores with hemodynamic changes. The study was carried out in 50 patients of ASA grade I & II scheduled for surgeries like laparotomy, hemithyroidectomy, cholecystectomy etc. During the above said study period, 50 patients posted for elective general surgeries under general anaesthesia underwent continuous EEG analysis. Patients underwent routine pre- anaesthetic evaluation and routine NPO protocols were followed.

**Result:** BIS scores showed changes at various stages in anaesthesia. On induction, BIS decreased to 46 and increased to 52 by 3rd min of intubation. On incision, the score increased to 63. At closure, it increased to 79. Post extubation, a score of 94 was achieved in 15 min.

**Conclusion:** The correlation between BIS and hemodynamics could not be statistically established. In view of significant disparities in BIS scores and hemodynamics in individual patients, anaesthesia management was suitably modified. We found that BIS values decrease with induction to 45 within 3 min by using propofol, and the BIS values increases to 51, 55, 59 in 30 sec, 1min and 3 min of intubation and reaches 62, 63 at 1 and 5 min after incision. In the maintenance phase the scores in our study were between 45 to 70 until 15 min before extubation, when the scores were maintained between 72-77, to facilitate recovery. Immediate post extubation BIS scores were 87 and it increased gradually to 93 within 15min.

**Keywords:** BIS scores & hemodynamic.

### Introduction

"Anaesthesia" was first utilized by the Greek scholar Dioscorides in the main century of the current time to depict the opiate impact of the plant mandragora. The word returned in the 1771 Encyclopedia Britannica, where it was characterized as a "privation of the senses." [1] After the presentation of ether sedation by Morton in 1846, Oliver Wendell Holmes authored the word to depict the new marvel that made surgeries conceivable.

The first is simply a pleasurable sensation of half inebriation; the second is one of outrageous delight, being like the sensations created by breathing nitrous oxide, or snickering gas; the third stage, the one to focus on, I think, for performing tasks in, is one of significant inebriation and insensibility [2].

The initial three phases enveloped acceptance of sedation, and the last two addressed careful sedation. After eleven years, consideration regarding chloroform phenomenal portrayals of ether and chloroform sedation depicted the accompanying signs: conjunctival reflex; standard, profound, programmed breathing; development of the eyeballs; and hindrance of the intercostal muscles. A considerable lot of these clinical signs were later "rediscovered." [4]

### Material & Method

The present study was carried out in the Department of Anaesthesiology, Index Medical College Hospital & Research Centre, Indore from August 2018 to July 2019 after approval of ethical committee with an aim to simultaneously correlate the observed BIS scores with hemodynamic changes. The study was carried out in 50 patients of ASA grade I & II scheduled for surgeries like laparotomy, hemithyroidectomy, cholecystectomy etc.

During the above said study period, 50 patients posted for elective general surgeries under general anaesthesia underwent continuous EEG analysis. Patients underwent routine pre- anaesthetic evaluation and routine NPO protocols were followed.

### Inclusion Criteria:

- Patients of either sex, aged 18 – 60 yrs, posted for elective surgical procedures expected to last at least one hour under general endotracheal anaesthesia.
- Patients belonging to ASA grade I & II.

### Exclusion Criteria:

- Patient refusal for the procedure.

- b) ASA grade III & IV.  
 c) Patients with known cardiac, renal, hepatic, neurological disorders, or any serious medical condition that would interfere with cardiovascular response assessment.  
 d) Use of benzodiazepines, anticonvulsants, alcohol, opioids or other psychotropic drugs (chronically or within 24 hr before the induction of anaesthesia).

Descriptive statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean  $\pm$  SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5% level of significance.

## Results

### Statistical Methods:

**Table 1: Changes in bispectral index throughout the procedure**

Time	Mean	S.D.
Basal	97.70	1.68
Induction - 03 min	46.31	10.64
Intubation - 30sec	52.43	12.25
Intubation - 03 min	62.28	9.26
Incision - 01 min	63.97	10.36
Incision - 03 min	63.82	10.17
Closure - 05 min	79.73	5.19
Extubation - 01 min	88.81	5.66
Extubation - 15 min	94.47	2.49

BIS scores showed changes at various stages in anaesthesia. On induction, BIS decreased to 46 and increased to 52 by 3rd min of intubation. On incision, the score increased to 63. At closure, it increased to 79. Post extubation, a score of 94 was achieved in 15 min.

**Table 2: Comparison of Age and BIS**

BIS	AGE IN YEARS		
	18-30	31-50	>50
Basal	96.83 $\pm$ 1.34	96.48 $\pm$ 1.3	95.22 $\pm$ 2.73
Induction - 03 min	45.17 $\pm$ 8.24	45.72 $\pm$ 9.29	45.11 $\pm$ 15.98
Intubation - 30 sec	50.33 $\pm$ 8.16	52.28 $\pm$ 12.74	51.44 $\pm$ 16.82
Intubation -01 min	54.67 $\pm$ 7.24	56.03 $\pm$ 11.6	52.44 $\pm$ 11.17
Intubation - 03 min	60.17 $\pm$ 7.63	60.17 $\pm$ 9.28	54.11 $\pm$ 13.23
Incision -01 min	61.25 $\pm$ 9.19	62.45 $\pm$ 11.4	65.11 $\pm$ 9.55
Incision - 03 min	62.67 $\pm$ 8.49	62.31 $\pm$ 10.74	63.89 $\pm$ 10.73
Closure - 05 min	80.42 $\pm$ 6.36	77.38 $\pm$ 5.54	80.33 $\pm$ 5.45
Extubation - 00 min	86.67 $\pm$ 4.38	87.52 $\pm$ 5.49	88.44 $\pm$ 6.04
Extubation - 05 min	89.5 $\pm$ 5.05	89.66 $\pm$ 3.95	90.33 $\pm$ 4.77
Extubation - 10 min	90.25 $\pm$ 3.93	91.45 $\pm$ 3.49	91 $\pm$ 4.15
Extubation - 15 min	93.33 $\pm$ 2.61	93.38 $\pm$ 2.6	92.67 $\pm$ 3.91

**Table 3: Comparison of Weight and BIS**

BIS	WEIGHT IN KG		
	30-50	51-60	>60
Basal	96.36 $\pm$ 1.97	96.75 $\pm$ 0.97	95.8 $\pm$ 1.55
Induction - 01 min	60.32 $\pm$ 15.94	56.17 $\pm$ 15.58	45.7 $\pm$ 15.36
Induction -03 min	46.5 $\pm$ 11.45	45.5 $\pm$ 7.22	42.6 $\pm$ 10.47
Intubation - 30 sec	52.18 $\pm$ 14.29	52.25 $\pm$ 8.16	49.5 $\pm$ 11.91
Intubation - 01 min	55.39 $\pm$ 11.4	55.75 $\pm$ 7.93	53.3 $\pm$ 11.51
Incision - 01 min	63.71 $\pm$ 9.96	59.33 $\pm$ 8.7	63.6 $\pm$ 13.72
Incision - 03 min	64.32 $\pm$ 8.06	58.33 $\pm$ 9.98	63.3 $\pm$ 14.16
Closure - 05 min	78.96 $\pm$ 5.45	79.33 $\pm$ 6.95	76.9 $\pm$ 5.57
Extubation - 00 min	88.75 $\pm$ 3.68	87.67 $\pm$ 6.62	83.7 $\pm$ 6.02
Extubation - 15 min	93.5 $\pm$ 2.27	94.58 $\pm$ 2.61	90.9 $\pm$ 3.28

**Table 4: Comparison of Gender and BIS**

BIS	GENDER	
	Male	Female
Basal	96.19±1.63	96.45±1.76
Induction – 01 min	55.33±16.86	57.17±16.37
Induction - 03 min	44.9±11.26	45.9±9.76
Intubation – 30 sec	49.33±13.09	51.34±11.88
Intubation -03 min	58.05±11.04	62±7.78
Incision – 01 min	59.81±11.18	61.69±9.61
Incision -03 min	61.33±10.86	63.66±9.51
Incision -05 min	77±5.51	79.83±5.81
Incision -10 min	83±0	74±2.83
Extubation – 00 min	85.81±5.52	88.69±4.83
Extubation -15 min	92.38±3.32	93.86±2.25

### Discussion

In our review, there was beginning expansion in HR by 14 bpm at acceptance and afterward expanded further to 20 bpm concurring with intubation which was measurably significant [5]. The HR got back to pattern 10 min post-entry point. Post extubation the HR expanded by 17 bpm which was exceptionally critical and gotten back to pre-employable worth by 15 min.

Systolic pulse diminished by 9 mmHg post acceptance and expanded by 24 mmHg from pre-usable qualities after intubation, both these qualities were measurably profoundly critical. Post extubation the tensions expanded by 32 mmHg which was profoundly critical.

Diastolic pulse fell by 6 mmHg by third min of acceptance and expanded by 16 mmHg after 1min of intubation which was measurably profoundly huge and again at extubation there was increment by 20 mmHg which was genuinely critical.

Kearse *et al.* [6], showed that a measurably huge contrast was found between patients who mounted a hemodynamic reaction (BIS  $67 \pm 10$ ) contrasted and the individuals who didn't (BIS  $45 \pm 14$ ). In this review, power ghostly edge and middle recurrence didn't recognize those subjects who reacted from the individuals who didn't.

Smajic J *et al.* [7] conducted a study comparing PRST Score to bispectral index monitoring to assess the depth of anaesthesia and concluded that BIS monitoring is superior to PRST scoring in monitoring depth of anaesthesia [7]. However, it is not a substitute for clinical assessment and hemodynamic monitoring. The use of BIS monitoring with clinical assessment allows precise decision making and balancing of anaesthesia [8].

### Conclusion

The correlation between BIS and hemodynamics could not be statistically established. In view of significant disparities in BIS scores and hemodynamics in individual patients, anaesthesia management was suitably modified. We found

that BIS values decrease with induction to 45 within 3 min by using propofol, and the BIS values increases to 51, 55, 59 in 30 sec, 1min and 3 min of intubation and reaches 62, 63 at 1 and 5 min after incision. In the maintenance phase the scores in our study were between 45 to 70 until 15 min before extubation, when the scores were maintained between 72-77, to facilitate recovery. Immediate post extubation BIS scores were 87 and it increased gradually to 93 within 15min.

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