



Anaesthesiology

RANDOMIZED CONTROLLED TRIAL OF THE EFFECT OF DEPTH OF ANAESTHESIA ON POSTOPERATIVE PAIN

Dr.M.Sakuntala\*

MD, Associate Professor, Department of Anaesthesiology, Government Theni medical College, Theni. \*Corresponding Author

Dr.K.Jadamuni

MD, Associate Professor, Department of Anaesthesiology, Government Theni medical College, Theni.

ABSTRACT

**Introduction:** Deep anaesthesia, as estimated by a low target bispectral index (BIS) of 30-40, would result in less postoperative pain than that achieved at a conventional depth of anaesthesia (BIS 45-60). **Methods:** Inclusion criteria: ASA I & II, Age between 18 and 65 years undergoing elective surgery. Duration of surgery <180 minutes, Patients undergoing general anaesthesia, Exclusion criteria: Preoperative diagnosis of malignancy, Pregnancy, Neuromuscular disease, epilepsy, psychiatric disease, severe asthma, chronic opioid use. Regional anaesthesia or neuroaxial block. A randomized controlled study at Govt Theni Medical College recruiting 50 adult patients under general anaesthesia requiring tracheal intubation. Anaesthesia was maintained with volatile anaesthetics and multimodal analgesia regimen. Patients were randomly assigned to either a low BIS (30-40) group or a high BIS (45-60) group 25 patients each (n=25). Postoperative pain was assessed by: pain on awakening (0-10, VRS awake) in PAC unit; pain on activity at 20-24 h after operation (VRSd1A), amount of opioid requirement over the first 24 hr. **Results:** There is a statistically significant difference in the post-operative fentanyl usage among low BIS group compared to high BIS group. (p value – 0.01) Considering VRS awake and VRS 24hr there is a statistically significant difference between low BIS and high BIS group (p value – 0.02 and p value – 0.005). **Conclusion:** Thus, we conclude that the intraoperative depth of anaesthesia have significant effect on the postoperative analgesic requirements and VRS scores.

KEYWORDS :

INTRODUCTION:

Effective postoperative pain management has been associated with enhanced recovery times, the prevention of long term post-surgical pain, and a reduction in hospital stay. Using the bispectral index (BIS) as a marker of depth of anaesthesia in patients undergoing major urological surgery, Soumpasis and colleagues<sup>4</sup> found higher pain scores and greater analgesic requirement in the high BIS group. Gurman and colleagues<sup>5</sup> used EEG spectral edge frequency in patients undergoing gastric banding and demonstrated pain scores in the recovery area to be 50% higher in the more lightly anaesthetized group compared with those with 'deeper' levels of anaesthesia. Finally, Sahn and colleagues reported lower pain scores and reduced analgesic requirement in patients undergoing laparoscopic cholecystectomy who were randomized to low BIS scores. This study aims at evaluating the effect of Deep anaesthesia, as estimated by a low target bispectral index (BIS) of 30-40, would result in less postoperative pain than that achieved at a conventional depth of anaesthesia (BIS 45-60).

METHODS:

After approval by the institutional Ethics Committee, 50 patients undergoing surgery under general anaesthesia with tracheal intubation from Government Theni Medical College gave their informed, written consent to participate in this study. Inclusion criteria: ASA I & II, Age between 18- and 65-years undergoing elective surgery. Duration of surgery <180 minutes, Patients undergoing general anaesthesia, Exclusion criteria: Preoperative diagnosis of malignancy, Pregnancy, Neuromuscular disease, epilepsy, psychiatric disease, severe asthma, chronic opioid use. Regional anaesthesia or neuroaxial block.

After informed written consent, the patient was randomized, by the method of concealed envelopes, to one of the two target BIS groups—Low-BIS (target BIS 30–40) and High-BIS (target BIS 45–60) each 25 patients (n=25). Pain scores were collected by investigators. Before the induction of anaesthesia, the BIS sensor was attached to the patient's forehead in accordance with the manufacturer's instructions with the cable to the patients left, and connected to the BIS monitor. Patients received standardized general anaesthesia consisting of an i.v. induction using propofol (1–2 mg/kg), neuromuscular blocking agent. The intraoperative i.v. opioid dosing regimen was 2 mg/kg fentanyl i.v. bolus on induction. Intraoperatively, Anaesthesia was maintained with volatile anaesthetics and multimodal analgesia regimen. The BIS was maintained intraoperatively at the desired target value by use of Inj. Propofol infusion. In addition, all patients received 1 g paracetamol at the time of skin closure.

After operation, pain relief was obtained in the postanesthesia care unit (PACU) with i.v. Fentanyl titrated to achieve a pain score of 4. Nausea and vomiting were noted.

The statistical analysis used in this study are mean, standard deviation and unpaired T test.

Chart 1: Age

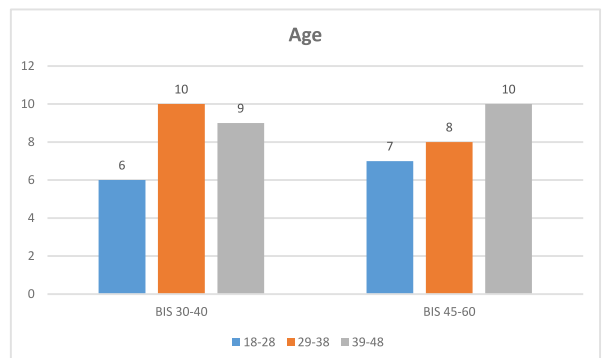


Chart 2: Sex

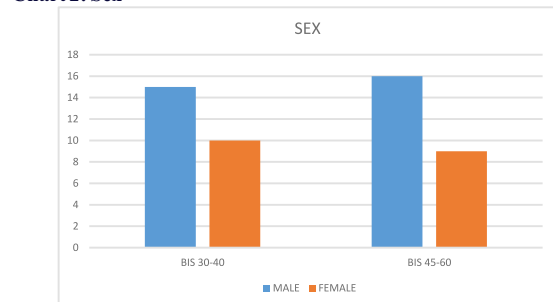
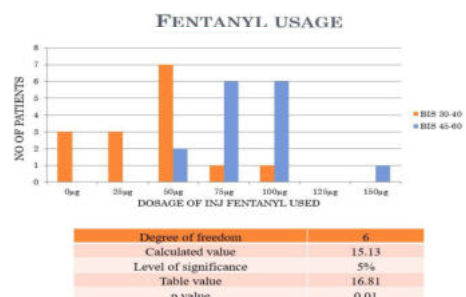


Chart 3: Fentanyl usage



Degree of freedom	6
Calculated value	15.13
Level of significance	5%
Table value	16.81
p value	0.01

Chart 4: VRS awake

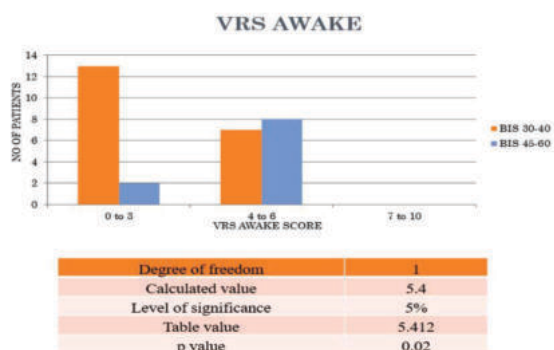
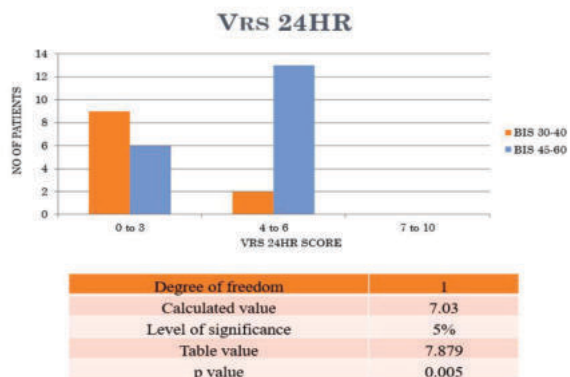


Chart 5: VRS 24 Hr



There is a statistically significant difference in the post-operative fentanyl usage among low BIS group compared to high BIS group. (p value – 0.01) which implies the post operative pain relief was better with the low BIS group than high BIS group. Considering VRS awake and VRS 24hr there is a statistically significant difference between low BIS and high BIS group (p value – 0.02 and p value – 0.005)

**CONCLUSION:**

The results of this study showed significant differences between patients subjected to an increased depth of anaesthesia and postoperative pain scores or analgesic requirements. Thus, we conclude that the intraoperative depth of anaesthesia have significant effect on the postoperative analgesics requirements and VRS scores.

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