Prevention of Awareness by Using Bispectral Index Monitoring in a Patient with History of Awareness

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ABSTRACT
We describe a case in which risk of awareness was minimized by using bispectral index monitoring. The patient had a history of awareness in two previous surgeries. She was a 50-year obese female, known case of hypertension and acid peptic disease, with a history of hysterectomy and cholecystectomy performed 3 years and 2 years ago respectively, and gave a history of awareness in both operations. No details were available regarding the previous anaesthetic technique.


INTRODUCTION
Awareness during anaesthesia has been defined as explicit recall of sensory perception during general anaesthesia.¹ It is an uncommon phenomenon, occurring in about 0.1 - 0.2% of cases.² It can be a terrifying experience, representing a human and a medico-legal problem.³ Post-traumatic Stress Disorder (PTSD) is the most important long-term complication developing after a frightening or unpleasant life experience.⁴ Recently, a monitor that uses a processed Electroencephalogram (EEG) derivative, the Bispectral Index has been introduced into clinical practice for monitoring anaesthetic effects on the brain and has been shown to reduce the incidence of recall by 80%.⁵

We describe the case of a 50-year female who had intraoperative recalls during previous two surgeries was successfully managed to prevent awareness intraoperatively by using Bispectral Index monitor.

CASE REPORT
A 50-year female presented for ovarian cystectomy with a history of episodic pelvic pain and bleeding per vagina. She was a known hypertensive, on atenolol (β-blocker) 25 mg BD, also had a history of acid peptic ulcer disease for which she was on famotidine (H2 Blocker). She was previously anaesthetised for hysterectomy and cholecystectomy. In both anaesthetic experiences, she was aware, and has vivid recall of the surgical event, remembers the conversation between surgeons, clinking of surgical instruments, her inability to move but fortunately no pain.

Routine laboratory evaluations were normal. Preoperatively, patient was vitally stable, weighing 87.5 kg with a body mass index of 33.9 kg/m². Airway examination revealed Mallampatti grade-II. She was labeled as ASA-II. Premedication, Tab midazolam (Benzodiazepine) 7.5 mg, aspiration prophylaxis (Sodacitrate 30 ml, ranitidine I/V 50 mg and metoclopromide 10 mg), was given 1 hour pre-operatively.

In addition to routine monitoring in the operating room, (blood pressure, pulse, ECG, oxygen saturation, end tidal CO₂), Bispectral Index monitoring was also done. Electrode was placed on her forehead with a baseline reading of 98 (awake). The patient was induced with Sodium Thiopentone 450 mg and Succinylcholine 100 mg. The BIS monitor showed the reading of 44, at that time she was intubated with 7.5 mm Polyvinylchloride endotracheal tube using rapid sequence induction technique. Pethidine 100 mg was given as analgesic. After checking with nerve stimulator, atracurium 40 mg was given after 10 minutes of succinylcholine dose. Anaesthesia was maintained with mixture of nitrous oxide 50%, oxygen 50%, intermittent atracurium 10 mg and sevoflurane (1.8 - 3.7%). Maintenance dose of atracurium was given after 40 minutes (10 mg) of initial atracurium dose. She received a total 60 mg of atracurium. Throughout the procedure MAC value was kept around 1.5 - 2.4%. End tidal CO₂ value kept between 30 - 35 mmHg. Temperature was maintained between 36.6 - 37.0 Celsius. Bispectral Index monitor reading remained between 38 - 48 during anaesthesia. Surgery lasted for approximately two and half hours. Intraoperatively surgery was uneventful. The patient experienced no recall of any event during surgery and anaesthesia, when interviewed by anaesthesiologist in the immediate postoperative period and one day after the surgery.

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DISCUSSION

The risk of awareness is high in certain group of patients and in specific surgical procedures. These include trauma patients and surgical procedures like Coronary Artery Bypass Grafting (CABG) and cesarean section. So far, trauma patients have reported the highest incidence of intraoperative awareness.  

Awareness has considerable potential for patient morbidity including severe emotional distress and post-traumatic stress disorder. It also has important professional, personal, and financial consequences for the anaesthetist associated with this problem. Bispectral Index monitor is a recently developed method of ensuring loss of consciousness without overdosage of anaesthetic agents that result in apnea. Through the Bispectral Index monitoring, a single numeric value is obtained that indicates the depth of hypnosis by estimating the level of electrical activity in the brain after analysis of the frequency bands in the electroencephalogram. A number is assigned between 0 (isoelectric) and 100 (fully awake), making interpretation simple and available to any physician. Studies have demonstrated that a value of between 40 to 60 correlates well with adequate depth of anaesthesia, as assessed by movement at incision. The emerging data suggests that Bispectral Index monitoring is effective in reducing the incidence of awareness. Ekman et al. in their study showed that when anaesthesia was guided with BIS, a 77% reduction in the incidence of awareness was found. 

With the help of BIS monitoring we were able to ensure the amnesia throughout the procedure. In this case, there was no awareness in the postoperative interview. Therefore, we recommend for use of BIS monitor in such patients to prevent intraoperative awareness.

REFERENCES