

Assessment of awareness in geriatric population among patients undergoing elective abdominal surgical procedure under general anaesthesia using Isoflurane - a prospective observational study

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ABSTRACT:

BACKGROUND:

Intra-operative awareness is a nightmarish situation to patients undergoing general anaesthesia for surgical procedures. It is defined as unexpected and explicit recall of sensory perception of events while under anaesthesia¹. This may occur due to light plane of anaesthesia. Awareness occurs despite adequate anaesthesia delivery in 1-2 among every 1000 Cases². The use of BIS Monitoring also does not reduce awareness. There are many ways to assess intra-operative awareness of which Brice questionnaire is a relatively simple and easy test to administer for awareness. This study aims at evaluating the incidence of awareness using the Modified Brice Questionnaire.

METHODS:

A total of 100 elderly patients who were scheduled to undergo elective abdominal surgeries were recruited for the study. After Informed and written consent were obtained, they were briefed about general anaesthesia. They all underwent various elective abdominal surgical procedures under Isoflurane at a fixed MAC of 1.0. In the Post-operative period at 60 minutes at the end of Surgery, The patients were administered the Modified Brice questionnaire. The incidence of awareness was taken as the primary outcome. The Post-operative anxiety was taken as the secondary outcome.

RESULTS:

It was reported that the incidence of awareness among the study population was around 6% when administered general anaesthesia. Of the study population 11% of the individuals could recall dreams and about 12% suffered from anxiety after general anaesthesia. The questionnaire has a sensitivity of 78.26% (56.30% to 92.54%) and Specificity of 53.25% (41.52% to 64.71%).

CONCLUSION:

Awareness among geriatric population after general anaesthesia is Moderately reliably detected by using the Modified Brice questionnaire in addition to diagnosing post-operative anxiety among geriatric population undergoing general anaesthesia.

INTRODUCTION:

Intraoperative awareness is the unexpected and explicit recall of sensory perception during general anaesthesia. One of the most common concerns of patients about to undergo anaesthesia is that they will remember the intraoperative events. Although the risks associated with anaesthesia have progressively decreased, yet awareness during anaesthesia remains a serious complication with potential long term psychological sequelae.

Many patients may not voluntarily report their experiences without being asked directly. Some cases may not recall events shortly after surgery but may recall them 1-2 weeks later. Intraoperative awareness is therefore best assessed by formally interviewing patients postoperatively. Most of the patients have a vague auditory recall or a sense of dreaming and may not be unduly disturbed by this experience. In fact, dreams may be recalled more often than actual events and occasionally these are very distressing to the patient. Most cases of awareness are inconsequential, but some patients experience prolonged and unwanted outcomes like post-traumatic stress disorder and depression.

Intraoperative awareness is therefore best assessed by **formally interviewing patients postoperatively**. Most of the patients have a vague auditory recall or a sense of dreaming and may not be unduly disturbed by this experience. The modified brice questionnaire is one such modality, that asks a series of questions to establish the incidence of possibility of awareness. Thus this study attempted in the efficacy of the Brice questionnaire to ascertain the possibility of awareness under general anaesthesia.

Incidence of Awareness				Grand Total
	MAYBE	NO	YES	
NO	31	39	18	88
YES	5	7		12
Grand Total	36	46	18	100

METHODOLOGY:

After obtaining ethical committee clearance and 100 individuals who were of age above 60 years undergoing general anaesthesia for elective abdominal surgeries were recruited using simple random sampling. The inclusion criteria were 1) 60 years and above. 2) ASA physical I, II or III who are scheduled for elective surgery in the general anaesthesia requiring oral Endotracheal intubation were included in the study. The exclusion criteria were 1) Patients who have Alzheimer's disease. 2) Patients underwent surgery using LMA, 4) Patients transferred to Intensive Care Unit, 4) Patients who are not extubated after the surgery, 5) patients having any contraindication to GA. Informed and written consent was obtained from all the participants of the study and everyone were briefed by the primary investigator regarding GA and the Modified Brice Questionnaire.

Every patient was pre-medicated with T. Alprazolam 0.5mg, T pantaprazole 40mg stat and T. Metoclopramide 10mg Stat on the night before surgery. On the day of surgery, the patients were once again briefed about the modified Brice questionnaire and the procedure of induction of general anaesthesia was standardised among the population. They were all pre-medicated with Inj. Midazolam 1mg iv Stat and Inj. Glycopyrrolate 0.2mg iv Stat. They were then induced using Inj. Fentanyl 100mcg iv stat, Inj Propofol 2mg/kg iv stat, Inj. Atracurium 0.5mg/kg iv stat. the inhalational agent of choice was Isoflurane maintained at MAC 1 until the end of procedure. At the end of procedure, anaesthesia was cut off, reversed and extubated once adequate consciousness and neuromuscular recovery was established.

Approximately after 1 h of arrival in PACU, anesthesiologist (not involved in administering anesthesia) assessed intraoperative awareness. Anesthesiologist visited the patient and asked questions in his/her own language. First general information such as age, sex, ASA status, anesthesia technique used, history of chronic drug intake or substance abuse, and any previous history of awareness was obtained. The second part of the questionnaire was a modified form of Brice questionnaire, used by similar studies designed to assess intraoperative awareness, in the past.

Questionnaire:

- What is the last thing you remember before going to sleep?
- What is the first thing you remember after waking up?
- Do you remember anything between going to sleep and waking up?
- Did you dream during your procedure?
- What was the worst thing about your operation?

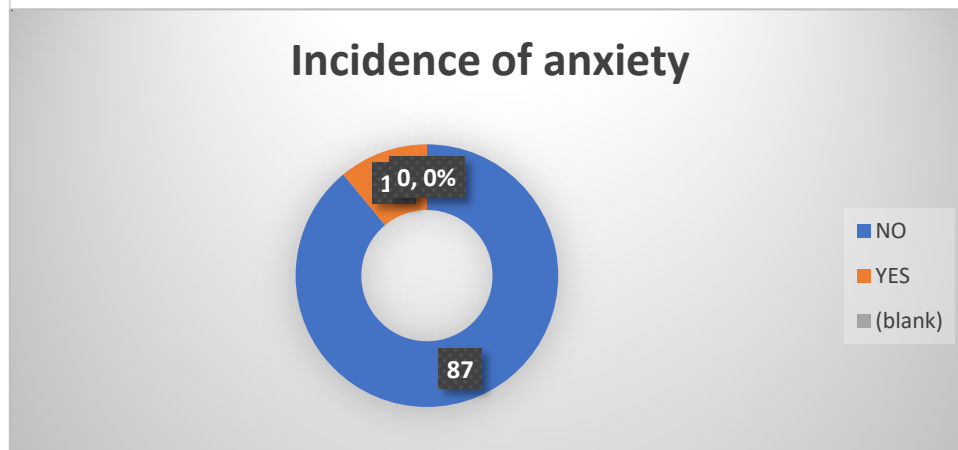
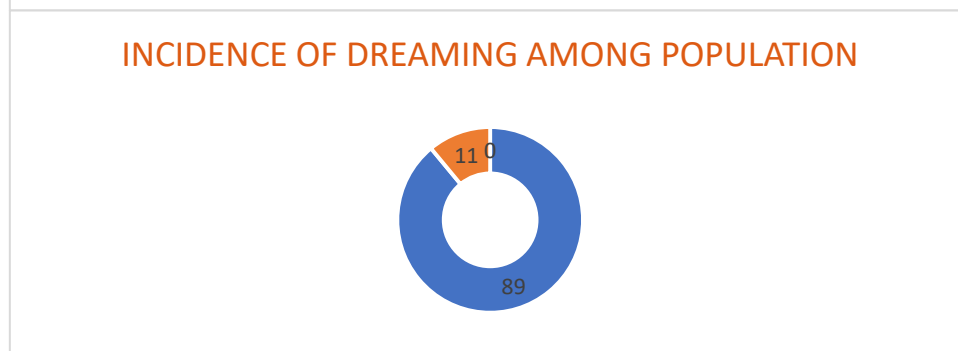
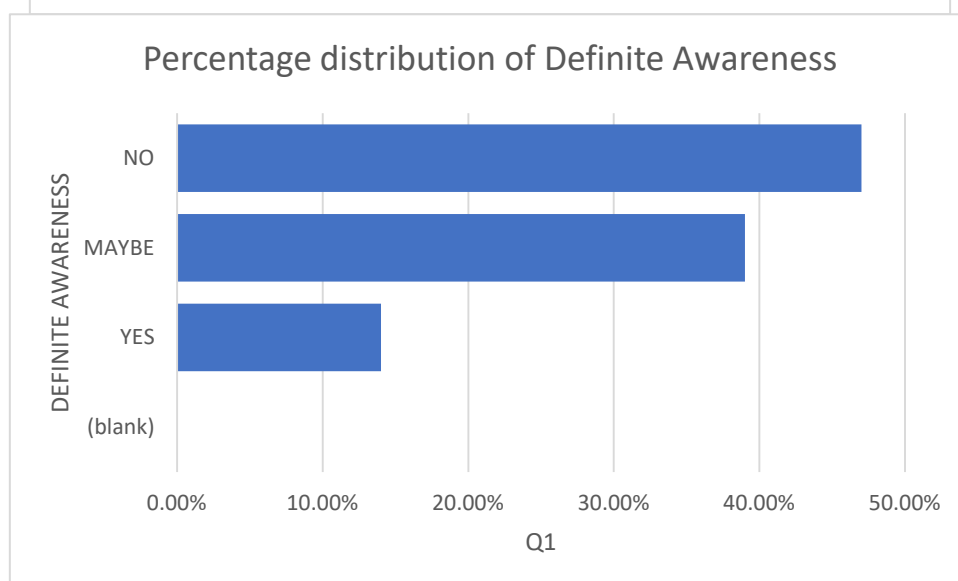
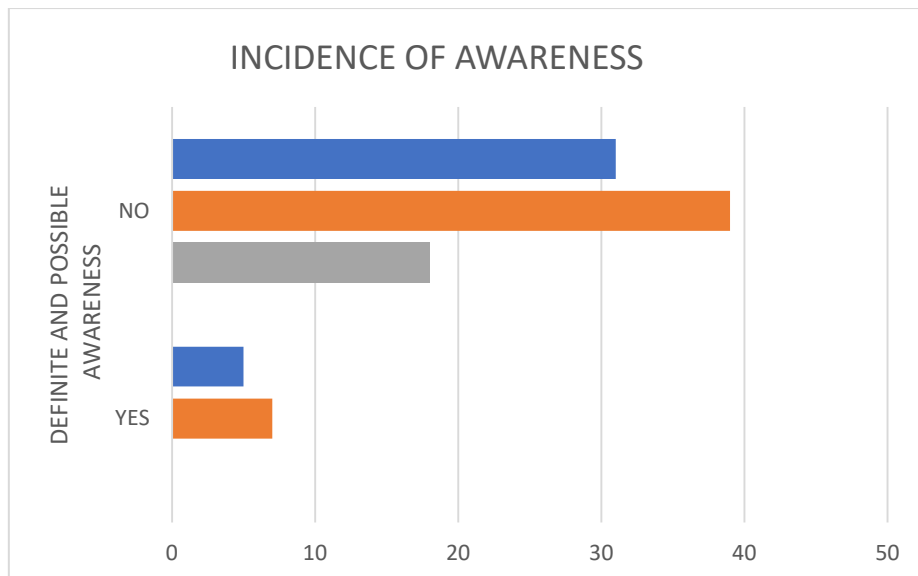
After the questionnaire was completed, it was analyzed, and patients were categorized into either having definite awareness, possible awareness, and no awareness. If the event recalled was confirmed by attending personnel present in operation theater, or investigators were convinced that memory was real, patients were categorized under definite awareness. If the patient was unable to recall any event definitely indicative of awareness, but memories could have been related to intraoperative events, he/she was categorized as possible awareness. No awareness was defined as a patient with no reported awareness or if the recalled events had a high probability of occurring in immediate pre- or post-operative period.

STATISTICAL ANALYSIS:

Statistical analysis was done using anova and parametric values were compared using Chi-squared test. The parametric values were evaluated using paired t test using SPSS software version 21.0

RESULTS:

According to the statistically analysed results, the Brice questionnaire established the incidence of awareness at 6% among the study population. The calculation revealed the sensitivity to be of 78.26% (56.30% to 92.54%) and Specificity of 53.25% (41.52% to 64.71%).



Statistic	Value	95% CI
Sensitivity	78.26%	56.30% to 92.54%
Specificity	53.25%	41.52% to 64.71%
Positive Likelihood Ratio	1.67	1.21 to 2.31
Negative Likelihood Ratio	0.41	0.18 to 0.91
Positive Predictive Value (*)	33.33%	26.61% to 40.81%
Negative Predictive Value (*)	89.13%	78.60% to 94.82%
Accuracy (*)	59.00%	48.71% to 68.74%

DISCUSSION:

In the Ranta,Seppo study, the incidence of awareness with recall (0.4%-0.7%) and the number of patients who remembered pain (2 of 19 patients with awareness) were of a magnitude similar to that reported in other studies. The patients with awareness received smaller doses of principal anesthetics than the patients without awareness. Previous clinical studies have not compared the doses or the modes of administration of anesthetics used in patients with and without awareness. Perhaps amnestic premedication and continuous administration of anesthetics are ways to reduce awareness during general anesthesia; this suggestion seems to be supported by our findings.

An unresolved question in studies of this type is the timing of the interview. Perhaps the interview should take place relatively soon after the patient awakens from the anesthesia. Brice et al. have described a patient who did not recall awareness recalled a week earlier at the end of an anesthetic.

Another problem is with the definition of this kind of complication. In clear cases of intraoperative awareness with recall, there is no problem in deciding whether the patient was aware during anesthesia. The decision is more difficult with a patient with confusing memories. Therefore, we have developed a classification of awareness into three grades ranging from clear, undisputed awareness to spurious, possible awareness. Grade 1 awareness in the present study includes patients remembering dreams, illusions, or hallucinations. The difficulty in defining awareness makes it difficult to compare studies of the incidence of awareness. Most previous studies have not clearly stated their definition of awareness.

The incidence of dreaming in the present study was greater than that in the study of Liu et al. but lower than that in earlier studies in which potent halogenated anesthetics were not used. In the current study, most of the dreams were emotionally pleasant or neutral. Some of the patients who experienced unpleasant dreams were classified as having experienced possible intraoperative awareness. Men have reported having experienced significantly more dreams than women. It seems important to follow the content of dreams in detail to uncover all cases of awareness and to report the sex distribution of the study population when reporting the incidence of perioperative dreaming.

Small incidence of awareness still complicates general anesthesia today. In addition, the lack of amnestic premedication and noncontinuous dosing of anesthetics may increase the risk of this complication. Continuous attention should be paid to these factors because intraoperative awareness is still a problem, although its prevention should be feasible in most cases.

In total the modified Brice questionnaire has a Positive Likelihood Ratio 1.67(1.21 to 2.31), Negative Likelihood Ratio 0.41 (0.18 to 0.91), Positive Predictive Value of 33.33% (26.61% to 40.81%), Negative Predictive Value 89.13% (78.60% to 94.82%) and an average accuracy of Accuracy of 59.00% (48.71% to 68.74%). Even though the sensitivity is lesser the high negative predictive value of the study means the questionnaire the establish the absence of awareness rather than finding out the presence of intra-operative awareness.

CONCLUSION:

Awareness among geriatric population after general anaesthesia is Moderately reliably detected by using the Modified Brice questionnaire in addition to diagnosing post-operative anxiety among geriatric population undergoing general anaesthesia.

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