

A PROSPECTIVE OBSERVATIONAL STUDY OF INTRA OPERATIVE AWARENESS AND RECALL DURING GENERAL ANESTHESIA

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Abstract

Introduction: Awareness with recall (AWR), originally coined as intra-operative awareness, is a recognized risk of general anesthesia (GA). Based on individual factors, patients respond differently to GA. The safety of GA has increased drastically over the past 20 years; however, there is continued opportunity for assessment, evaluation and treatment of AWR. Gibbs, Gibbs and Lennox (1937) first identified AWR in 1937.

Materials and Methods: The Present study was conducted at the Department of Anaesthesiology and Critical Care, Tertiary care center, Guwahati, Assam. Which includes 50 patients who underwent different routine general surgeries and 50 patients from Emergency. Pre-anaesthetic evaluation was done and noted down. In the operating room IV line established, multichannel monitor attached and standard monitoring including baseline pulse, NIBP, SPO2 and ECG connected. Entropy and NM monitoring equipment was attached. The choice of inducing agent, neuromuscular blocker and maintenance for general anaesthesia was based on the patient and nature of surgical procedure.

Results: These 200 patients were interviewed as per the protocol in hospital on the day of surgery. Our study found that among these 200 patients, 2 patients reported remembering something between going to sleep and waking up from anaesthesia, thus 2 cases of awareness were identified. 7 patients reported dreaming and 6 cases of possible awareness were identified.

Conclusion: Awareness occurs despite the usual clinical monitoring of anaesthetic depth like BP, HR and even with the use of entropy. There is currently no evidence that awareness and recall could be prevented by monitoring consciousness with sophisticated methods such as BIS or entropy. If a patient has suffered from awareness and recalls this postoperatively, psychiatric consultation and followup is recommended.

Key Words: Awareness, general anesthesia, entropy, ECG.

INTRODUCTION

Awareness with recall (AWR), originally coined as intra-operative awareness, is a recognized risk of general anesthesia (GA). Based on individual factors, patients respond differently to GA. The safety of GA has increased drastically over the past 20 years; however, there is continued opportunity for assessment, evaluation and treatment of AWR. Gibbs, Gibbs and Lennox (1937) first identified AWR in 1937. They proposed that a recorded “tape” of heart and brain waveforms would indicate when patients were aware, but the interpretation of such waveforms was too complex to undertake at that time (Avidan&Mashour, 2013).¹

The occurrence of awareness is often the consequence of light anaesthetic technique or smaller anaesthetic doses. The first case report of traumatic awareness and recall during general anaesthesia was described in 1950 by Winter bottom. Studies on the incidence of awareness began in 1960s. Awareness during anaesthesia falls in the domain of anaesthetist, so anaesthetist is held responsible in such cases.² Very large compensations have been awarded for awareness during anaesthesia in Great Britain (Payne 1994). An analysis of ASA closed claim project showed that 1.9% of claims were for awareness and blamed substandard care.³

The prevalence of awareness among non-cardiac and non obstetric cases is 0.1% to 0.2%(1, 3) In a study from Australia, Myles et al reported a frequency of awareness of 0.1%.⁴ The prevalence in cardiac cases ranges from 1.1 to 1.5%, in obstetric cases 0.4% and in major trauma cases 11-43%.(2 6,9, 10,11) Sadin et al performed one of the largest study on this topic which included 11785 patients, they identified 18 cases of awareness and reported an overall incidence of 0.16%. Prevalence of awareness was 0.18% in cases in which NMB agents were used and 0.1% in absence of NMB agents.⁵

The main objective of this study is to find the incidence of awareness and recall in patients who undergo different types of surgeries under general anaesthesia.

MATERIALS AND METHODS

An acknowledged and well-established method of detecting awareness involves the use of a structured Brice et al interview 1970 which asks the following questions:

1. What was the last thing you remember happening before you went to sleep?
2. What was the first thing you remember happening on waking up?
3. Did you dream or have any other experience in between?
4. What is the worst thing you remember about your operation/anaesthesia?

The Present study was conducted at the Department of Anaesthesiology and Critical Care, Tertiary care center, Guwahati, Assam. Which includes 100 patients who underwent different routine general surgeries and 100 patients from Emergency.

Patients who were excluded

1. Patients with abnormal mental status.
2. Patients not expected to survive.
3. Patients Transferred directly to ICU.
4. Patients who belong to Extremes of age (60).

Pre-anaesthetic evaluation was done and noted down. In the operating room IV line established, multichannel monitor attached and standard monitoring including baseline pulse, NIBP, SPO2 and ECG connected. Entropy and NM monitoring equipment was attached. The choice of inducing agent, neuromuscular blocker and maintenance for general anaesthesia was based on the patient and nature of surgical procedure.

Design of the Study and Setting: A prospective observational study for the incidence of awareness with recall during general anaesthesia was conducted. Patients for elective or urgent surgery requiring general anaesthesia were selected. Patient Interview, Detection and Evaluation
Our definition of awareness is when patient spontaneously or at interview stated or remembered that he or she was awake during operation. Awareness Classification

AWR-YES: when patient in response to structured questions is sure of having been awake at any time during the operation.

AWR-NO: when patient is sure of having been asleep during anaesthesia and operation.

AWR-POSSIBLE: when patient believes to have been awake and aware during anaesthesia/operation but not sure.

Dreams: YES or NO.

The detection of awareness depends on the interview technique, timing of interview and structure of interview.

In SMHS, out of 100 patients, (n/%)

Awareness cases = 1 (0.5%).

Possible awareness = 3 (1.5%).

Dreams = 5 (2.5%).

Statistical Analysis: The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc./Chicago, Illinois, USA). Continuous variables were summarised in the form of means and standard deviations and categorical variables were expressed as frequencies and percentages. Graphically the data was presented as bar diagrams. Chi – square test was applied for comparing categorical variables. A P-value of <0.05 was considered statistically significant.

RESULTS

Parameter	Awareness Study results			Total	
		Yes	No		Possible
Awareness	N	1	196	3	200
	%	0.5%	98%	1.5%	100%
Total	N (%)	1 (0.5%)	196 (98%)	3 (1.5%)	200 (100%)

Table 1: Awareness and Dreams Study Results

Parameter	Awareness Study results		Total
	Yes	No	
Incidence of dreams N (%)	195 (97.5%)	5 (2.5%)	200 (100%)

Table 2: Incidence of dreams

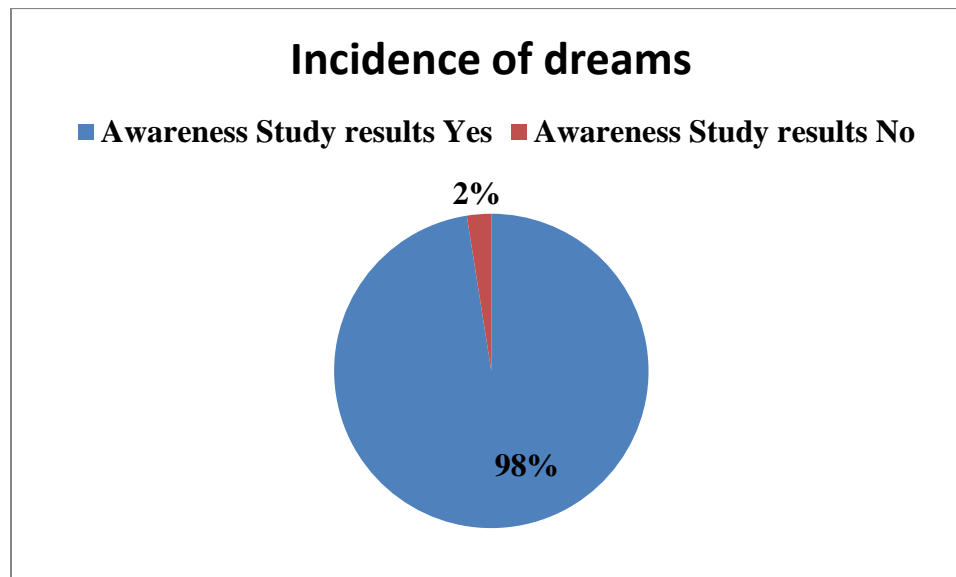


Figure 1: Incidence of dreams

Awareness and Dreams Study Results as per Nature of Surgery**Elective**

Total no. of cases = 100.

Awareness = 0 (0. %).

Possible awareness = 1 (1 %).

Emergency

Total no. of cases= 100.

Awareness = 1 (1%).

Possible awareness = 3 (3%).

			Awareness Study results			Total	P value
			Yes	No	Possible		
Nature of surgery	Elective	N	0	99	1	100	0.003
		%	0	99	1	100%	
	Emergency	N	1	96	3	100	
		%	1	96	3	100%	
Total		N	1	195	4	200	
		%	1%	195%	4%	100%	

Table 3: Possible Awareness Results

Since P-Value is <0.05, we conclude that there is no difference in the awareness study results among the two groups.

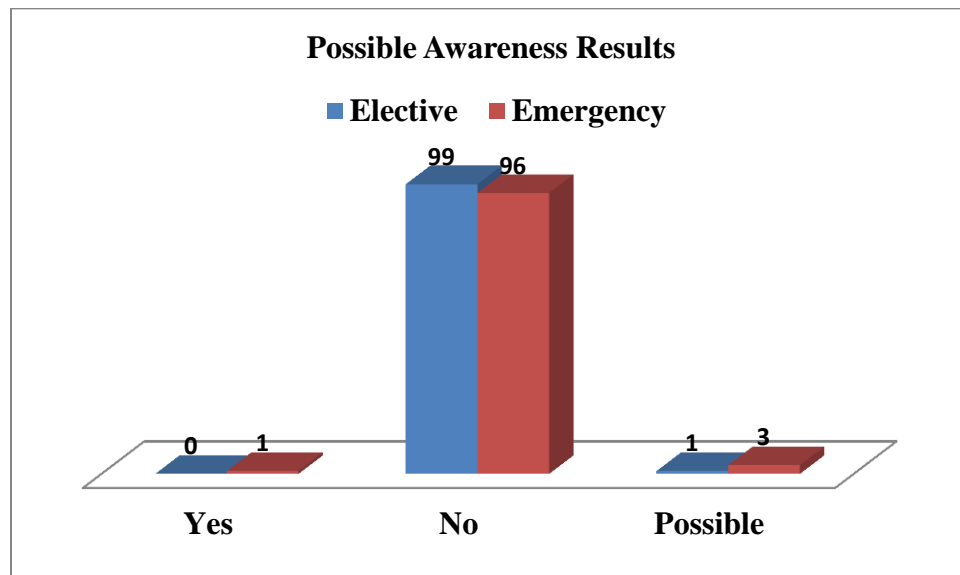


Figure 2: Possible Awareness Results

Crosstab			Dreams		Total	P Value
			No	Yes		
Nature of surgery	Elective	N	96	4	100	0.004
		%	96	4	100%	
	Emergency	N	98	2	100	
		%	98	2	100%	
Total		N	194	6	200	
		%	97	3	100%	

Table 4: Incidence of Dream: Elective versus Emergency

Since P-Value is <0.05 , we conclude that there is no difference in dreams among the two groups.

			Awareness study results			Total
			Awareness	No	Possible	
Gender	Female	N	1	96	3	100
		%	1%	96%	3%	100%
	Male	N	0	99	1	100
		%	0	99%	1%	100%
Total		N	1	195	4	200
		%	0.5%	97.5%	2%	100%

Table 5: Awareness and Dreams Study Results as per Gender

			Dreams		Total
			No	Yes	
Gender	Female	N	98	2	100
		%	98%	2%	100%
	Male	N	97	3	100
		%	97%	3%	100%
Total		N	195	5	200
		%	97.5	2.5%	100

Table 6: Gender wise Incidence

			Awareness Study results			Total
			Awareness	No	Possible	
ASA	I	N	2	96	2	100
		%	1%	98%	1%	100%
	II	N	4	92	4	100
		%	2%	96%	2%	100%
Total		N	6	188	6	200
		%	3%	94%	3%	100%

Table 7: Awareness and Dreams Study Results as per ASA Class

These 200 patients were interviewed as per the protocol in hospital on the day of surgery.

Our study found that among these 200 patients, 2 patients reported remembering something between going to sleep and waking up from anaesthesia, thus 2 cases of awareness were identified. 7 patients reported dreaming and 6 cases of possible awareness were identified.

DISCUSSION

The detection of awareness depends on the interview technique, timing of the interview and structure of the interview. A post operative visit by the anaesthesiologist without use of a structured interview is unlikely to elicit many cases of awareness. We used the same structured interview that has been used in prior investigations.⁶ we interviewed the patients in the hospital.

These awareness cases were followed retrospectively to study the intraoperative events and vitals, anaesthetic technique and preoperative status, including demographic data. We could not find any significant predictor of possible awareness in these cases of awareness. All the cases were monitored intraoperatively by using entropy from induction to emergence at fixed intervals of time and in these 2 cases of awareness entropy was found consistently above 60 but there was no association between increased entropy readings and the incidence of awareness as many patients had entropy above 60 but did not report awareness in our study.⁷

Awareness is caused by the administration of general anaesthesia that is inadequate to maintain unconsciousness and to prevent recall during surgical stimulation. Common causes include large anaesthetic requirements, equipment misuse or failure and smaller doses of anaesthetic drugs.⁸

Various studies found an increased risk of awareness with sicker patients undergoing major surgery, this finding may reflect the use of smaller anaesthetic doses and light anaesthetic techniques in sicker patients.⁹

In many cases, awareness during anaesthesia is a potentially avoidable adverse anaesthetic outcome. In light of followup studies suggesting that such victims of awareness may exhibit significant psychological after effects such as PTSD, attempts to further reduce its incidence are warranted.¹⁰

Because awareness occurred despite the usual clinical monitoring of anaesthetic depth (BP, HR and end tidal anaesthetic monitoring), a monitor of cerebral function and depth of anaesthesia may be of theoretical benefit.

CONCLUSION

Awareness occurs despite the usual clinical monitoring of anaesthetic depth like BP, HR and even with the use of entropy. There is currently no evidence that awareness and recall could be

prevented by monitoring consciousness with sophisticated methods such as BIS or entropy. If a patient has suffered from awareness and recalls this postoperatively, psychiatric consultation and followup is recommended.

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