

## **A Meta-Analysis Study on Intraoperative Awareness with Recall and Need for Proper Guidelines**

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### **ABSTRACT**

The main objective of the article is to provide the necessary awareness on decision making in order to support better patient care. The awareness is through advisory technique with more emphasis on practical application. The article has analysis of the opinions from experts on synthesis. More so, there is provision of better ways to clinical data feasibility, open forum consultations and surveys from experts on anesthesia. The main emphasize of the article is decision making in improvement of the patient care. Although advisories are important, the aim should always be decision making and the article focuses on practice in order to improve medical knowledge. The article gives an outline on additional measures to be taken to improve the medical practice according to Anesthesiology. The article emphasizes the advisory from the anesthesiologists and all the supporting physicians. In addition, there is also provision of advisory to individuals who administer general anesthesia. Review of the article on Metal-Analysis study has identified many characteristics of patients who have been associated with the risk of little awareness. The review has explained the procedures to be followed when dealing with situations of higher risks on intraoperative awareness. The anesthetic techniques on intraoperative awareness are also included in the preoperative awareness.

**Keywords:** intraoperative awareness,

### **INTRODUCTION**

#### **A Meta-Analysis Study Review**

Intraoperative awareness from surgical operations with general anesthesia is rare as explained by most anesthesiologists and patients. However, the surgery has undesirable and adverse implication on the patient due to the resulting pain. Such a consideration demonstrates the possible consequences of poor techniques in anesthesia, failure of equipment, or inadequate monitoring. The associated risks could lead to the development of traumas, cardiopulmonary bypasses and obstetric interurrences that are side effects of the process of intraoperative awareness. Meanwhile, the involuntary experience and memory of the surgical events are often devastating to a patient, which remains an area of interest for the study. Intraoperative awareness with an explicit recall of the episodes of the procedure is significant in achieving patient safety, monitoring standards and search for conscious correlation<sup>(1)</sup>.

The medical use of anesthesia is purposely for inducing unconsciousness in a patient through drug administration. However, the provision is

essential in cardio-circulatory, amnesia, anxiolysis,

analgesia, hormonal suppression, and motor reactions during the stressful surgical proceeding. Despite the initiative to inhibit the effects of pain, intraoperative memory associated awareness occurs when a patient is capable of processing information and produces an accurate response to stimuli. Such a move is depicted by the various phases of interoperation that are independent. For instance, the declarative memory appears when the patient can recall events and experiences during the administration of the medication<sup>(1)</sup>. As well, procedural memory takes effect when the victim is unable to express the facts verbally, though post-operative behaviors manifest the changes during the anesthesia. In such regard, psychological tests are recommended for the detection of the implicit/procedural memory following the performances<sup>(2)</sup>.

Consequently, the wakefulness state appears in intraoperative awareness where one can

respond to multiple stimuli during the surgical operation. However, the patient is unable to remember his/her experiences and reactions when conscious based on the consequences of the anesthesia. Such a description indicates that the consciousness effect is not similar amongst patients. The disparities in the memory assessments can be considered by helplessness, anxiety, fear, insomnia, paralysis, tactile, and hearing sensation that occur diversely in patients<sup>(3)</sup>. As well, the post-traumatic stress disorders, like neurosis, can also be evident in affected, which call for psychiatric care. Therefore, intraoperative awareness during the administration of anesthesia is rare and could be challenging to examine due to the incidences of occurrence that are likely to complicate the enactment of the preventive measures to guide the procedures. For example, the identification and assessment of risks, causes, and psychological consequences are challenging.

#### ***Intraoperative Awareness with Recall***

The intraoperative awareness with recall is considered for both explicit and consciousness recall of the surgical events during patient operations. The significant determinant in the proceedings is the entire process through the under-dose of the anesthetic products or agents regarding the patient's basic physiological requirements<sup>(4)</sup>. Despite the alterations that are incurred, the incidence can be corrected by establishing good preventive ensures that various amongst individuals. However, the prevention guidelines are temporary remedies since they are unable to eradicate the experience altogether<sup>(5)</sup>. Therefore, it is necessary that every patient that is likely to be subjected to general anesthesia is informed by the intraoperative awareness with the recall because it can occur but on rare occasions.

The experiences from such knowledge can range from perceptions of acoustic isolation to the victim's complete awake, immobility, and painful experience<sup>(6)</sup>. However, the variations in intraoperative awareness are facilitated by the wide range of methodological disparities that are established in the assessment, and remarkable differences in the variations of anesthesia procedure<sup>(7)</sup>. Besides, the traditional measure for the events encountered during the surgery is the post-operative recall as a measured outcome of the situation, intraoperative consciousness, and the explicit recall. Such considerations are likely to

influence the dissociation in distinguishing between one another<sup>(8)</sup>. Therefore, considering past studies, the number of patients who demonstrated evidence of intraoperative awareness postoperative recall of the surgery are always limited.

However, on conduction of larger, prospective, multiple types of research of intraoperative awareness in adults with recall while undergoing surgical operations with general anesthesia reporting one or two incidences in North America and Europe over 1000 populations<sup>(9)</sup>. The statistics translate to a range of 0.1 – 0.2% and up to 1% of a highly vulnerable population<sup>(10)</sup>. However, retrospective studies have suggested that the estimations of the figures have exhibited under-detection because the patients themselves undergoing the experience are exempted from the survey, which reflects poorly on the intraoperative awareness assessment outcomes. On the other hand, the incidences in children are slightly higher than that of the adult patients with percentiles of 0.2 to 1.2<sup>(11)</sup>. However, more information was based on a large number of pediatric anesthetics that was evident of intraoperative awareness in infants

#### ***Method of evaluating intraoperative awareness***

Various prospective researchers have come up with the Brice interview model as a method of evaluating intraoperative awareness amongst patients with explicit recall. Such a move has depicted the consistency in the results of the events to an estimate of 1 to 2 patients per 1000 . On the contrary, measurement tools that lack particular format of questions on awareness, information on quality assurance and reports on national projects have also been established to assess the medical experiences under general anesthesia. As well, the approaches have revealed that the incidences are lesser compared to the population magnitude<sup>(12)</sup>. However, it is uncertain whether the disparities exhibited in the different assessments are due to the marked differences in patient's populace, clinical severity, the technique of anesthesia or method of risk awareness detection.

Nevertheless, in an attempt to resolve the laid strategies that seem controversial, incidences of intraoperative awareness were compared amongst populations with explicit recall amongst single patient's population receiving both standard postoperative evaluation and modified Brice's

interviews<sup>(13)</sup>. From the interviews, the number of individuals detected with the condition under independent, spontaneous report basis was less concerning the people with explicit recall. Despite the spontaneous reporting, the interview method cannot be considered as the actual standard for conducting the psychometric testing on memory and awareness<sup>(1,14)</sup>. As well the events have been related to the constant emergence of high-risk opportunities in the alternate approaches. Therefore, the qualitative assurances of the initiatives can be underestimated in the intraoperative awareness of persons based on the studies and limitation in the documented methodologies.

Further, the intraoperative awareness can lead to the possible development of post-traumatic and stress disorders considering the explicit recall. For instance, the incidences of awareness that are explained to be a symptom group comprising of post-traumatic stress disorders<sup>(15)</sup>. However, the experience has led to the development of longitudinal examinations that are aimed at persons that had been earlier established for prospective observations and awareness intervention studies. The assessment of psychological outcomes and closed claims on past experiences of the situation of victims that are to undergo the same procedure has shown the intraoperative awareness issues<sup>(16)</sup>. Such a move demonstrates the negative consequence of surgery on explicit recall that creates post-awareness associated with post-traumatic stress disorders. However, the condition is not a significant in the evaluation of patient's problems.

Meanwhile, follow-up activities on long-term surgical patients previously determined to have intraoperative awareness concerning explicit recall suggested no long-termed effects of the experiences in the course of the study. The scenario could be recognized because the earlier events did not suggest any sign of trauma to the victim<sup>(17)</sup>. Although, recent studies have indicated that symptoms of the post-traumatic stress disorder are increasingly common among after exhibition of a possible intraoperative awareness<sup>(18)</sup>. In such a situation, the significance of the neuromuscular paralysis in the traumatic experience is noted. Therefore, the screening approach and the patient's populace are considered to be associated with the low conditions of post-traumatic stress disorders after series of intraoperative awareness reports.

Thus, the controversial issues no longer take effect on awareness with the explicit recall, which can result in post-traumatic stress disorders or an indication of the signs.

### **Risk factors**

Based on the epidemiological studies, the risking factors for intraoperative awareness can be patient related, based on the surgical operation or anesthetic technique used in the particular procedure<sup>(19)</sup>. The patient-related risks include studies on gender, where the intraoperative awareness incidences are evident to be higher in women than in man due to the difference in physiological properties, that is, females recovery process tends to faster than in males. Furthermore, age factor is essential, in that, young patients have a similar response over the adults in general anesthetic examination, which makes the intraoperative awareness to be implied faster than in children than the elderly<sup>(1)</sup>. The patient's previous history of alcohol and other substances use critical since the addicts tend to resistant to anesthesia and require higher doses compared to people who do not indulge in drug abuse<sup>(20)</sup>. Nevertheless, the pre-anesthetic treatments and physical condition of the client should be checked due to increased vulnerability that is evident amongst patients that have undergone major surgeries<sup>(21)</sup>. For instance, the use of benzodiazepines has reduced the incidence of intraoperative awareness with explicit recall.

The surgery type of related risks is experienced in obstetric anesthesia that has been analyzed by different studies to have low percentages and occur during the time of skin incision and fetal extraction<sup>(16)</sup>. As well, the implications are felt during the period of great surgical stimulation that is exhibited by little anesthetic concentration. The factor is triggered by fast sequential induction with no opioids and reduction in the inhaled portion of inhalation anesthesia drugs. Further cardiac surgeries pose vulnerability to intraoperative awareness, especially involving the cardiopulmonary bypass<sup>(22)</sup>. In such a provision, increased infusion of the anesthesia previously, during, and later on, the extracorporeal circulatory system increases chances of the incidence and other related complications.

Consequently, in the anesthesia technique related risk, inhalation anesthetic medications have been reported to be linked to situations of

vaporization that reduces the dosage and can inflict the intraoperative awareness<sup>(23)</sup>. Such malfunctions of the anesthesia agent should be corrected due to the potential danger on their failures during the surgical procedure. Therefore, the anesthesiologist should regularly monitor the concentration of the drug. As well, the administration of the neuromuscular blocking agents should be considered to prevent risks of motor paralysis in the patient<sup>(24)</sup>. Such a scenario demonstrates the wrong drug administered where sedative agents should be considered for anesthetic induction.

### **Assessment**

The assessment of technical skills needed during surgery, is one of the most critical aspects in surgical education<sup>(25)</sup>. There is great need for safe performance of the outlined procedures to ensure safety of patients. Great concern of the public on the surgical skills has helped the physicians to increase competence in their skills, to ensure most of the surgical operations are successful. The assessment of residents on the skills needed during operations should not only be summative but also formative. The assessment of intraoperative to most of the residents can be challenging, and great surgical skills should be exercised through continuous practice. Therefore, medical knowledge and the best motor skills are essential to all medical practitioners. Some of the surgical specialists lack a well explained procedure that brings about surgical competence<sup>(16)</sup>.

Operative assessment might be formative to give the best feedback in providing the best educational procedure to be followed by the surgical specialists<sup>(16)</sup>. More so, the assessment should be summative, to increase the competence of the residents skills. Written assessment dealing with operative skills has been of great importance in various surgical fields. Intraoperative assessment has a role of monitoring the skills needed in a certain procedure. The assessment usually provides a procedure appropriate in exercising the technical skills. For example, in Hemorrhage control, the best procedure would be to start applying pressure in an effort to reduce bleeding, then seeking the assistance from the suction field before the process of inspecting the caused injury. The necessary equipment should always be at hand before starting the activity of controlling the various bleeding points<sup>(26)</sup>.

The process of intraoperative assessment today starts with reviewing the assessment tools before highlighting the common elements needed for the operation. In addition, one should then review the best procedure to complete the process of intraoperative assessment, and this would promote the safety of the operation<sup>(10)</sup>. This will help in reducing the risk of mortality in hospital operations. In an effort to prevent the various complications occurring during the surgery, there are various ways to prevent the occurrence of complications relating to the anesthesia. Some examples of the complications like intraoperative hypothermia should be prevented<sup>(27)</sup>. They result from frequent blood transfusions and the patients should reduce such practices. There should be patient satisfaction in the hospitals after a surgery, and this should be the aim of all surgeons.

### **Preventive Measures**

There are various measures to prevent complications resulting from intraoperative events. Such include managing of all the patients' expectations<sup>(21)</sup>. The management of patient's anticipations will lead to their satisfaction from the services offered by physicians. All patients suffering from anesthesia and some other related issues should get satisfied from the hospital where they are offered the services<sup>(18)</sup>. More so, monitoring should be another service offered to patients to prevent anesthesia complications<sup>(24)</sup>. There are various ways of monitoring patients like neuro-monitoring and tidal end concentration on anesthetic<sup>(28)</sup>. There are various standards that should be met while monitoring patients; like ensuring there is a person left in charge of patients, there is adequate oxygen for patients and favorable ventilation in the wards<sup>(29)</sup>.

Moreover, an adjuvant medication is another preventive measure that involves use of a medication that not only relieves pain but also helps in its future management. Some of the examples of adjuvant medications include sedatives and antidepressants<sup>(7)</sup>. Such medications help in relaxing the muscles to manage the pain. More so, the avoidance of the full neuromuscular blockade is an important measure to prevent the various complications. Therefore, the surgeons should have special technical skills to utilize during an operation. The patients should have people in charge of them, who can monitor them<sup>(30)</sup>.

### **EEG Readings**

Electroencephalogram is a common test utilized in evaluation of the electrical work of the brain. There are electrical impulses in the brain that usually help the brain in communicating, and EEG helps in the realization of the issues associated with the brain activities<sup>(31)</sup>. Therefore, it is very important to carry out EEG readings. EEG tests determine the various wave patterns in the brain. More so, the recordings are essential in determining any abnormal patterns in the brain. In an EEG recording, there is an outline of electrical impulses, which looks like valleys. There are very important measurements for confirming conditions related with brain disorders. EEG records disorders like epilepsy, various injuries from the head, brain inflammation, disorders like stroke, and problems with the memory and brain tumor. Usually, an EEG is carried out to a person with comorbid conditions to investigate the activities of the brain. The significance of an EEG test is that it is safe and has no risks<sup>(30)</sup>.

Preparation for an EEG is important and usually starts with thorough washing of the hair before the day of the test. More so, reducing the drinks that contain caffeine is also important before undertaking the EEG test, and consultations should be frequent with the doctor. Neurologists are the interpreters of the results from an EEG test and they provide the details to the doctor for interpretation. For the normal results to be realized, the brain should indicate all the electrical activities as a wave patterns. If the results are abnormal, the EEG test may indicate a tumor, some evidence of drug abuse, a sleep disorder, or much other disorder<sup>(32)</sup>.

A good constructed history helps in further investigation, since the other psychiatrist in getting better results will later help earlier physiologists. History is also important in determining the upper tracing in EEG. The earliest recording of the EEG test was by Hans Berger but later, other scholars came in to investigate further and improve the research on EEG. This shows the great importance of constructed history<sup>(29)</sup>.

### **Need For a Proper Guideline**

Guidelines are essential to Anesthesiologists because they will help in operating the right patient at the right site. This will help in avoiding the various inconveniences

and ensuring universal recommendations. More so, proper guidelines will help in prevention of any harm while administering anesthetics, thus relieving pain<sup>(31)</sup>. Moreover, proper guidelines will help in preparation to avoid blood loss. This helps in increasing the safety of the patients, and brings satisfaction among those receiving the services<sup>(9)</sup>. Guidelines also help in minimizing surgical risks of infection, hence ensuring that all the surgical instruments are sterilized.

### **Special courses**

There are special courses in the field of medicine like dentistry and surgery, which uses various instruments like anesthetic machine that help in measuring the supply of different gases like oxygen nitrogen, usually mixed to anesthetic vapor to assist in regulating pressure rate in patients<sup>(29)</sup>. Moreover, there are other instruments like oxygen mask that is used in transferring oxygen medications. Endoscope is also an instrument used by dentists and surgeons to investigate the trachea in case of any disorders. The machine also looks inside.

### **CONCLUSION**

In conclusion, Intraoperative awareness is a type of a serious complication occurring during general anesthesia. It may result to lack of maintenance of a total unconsciousness, thus resulting to suffering among patients. All the patients should have enough anesthesia to boost them until they finish their operation. If this does not occur, complications would result, hence resulting to a lot of suffering. The medical use of anesthesia is for inducing unconsciousness, and this is through drug administration. The drugs should always be taken by patients before any operation to take place. The drugs would relieve pain and ensure the operation is successful. If a patient is not administered with anesthesia, there will be complications because the pain will make the patient stressful. Provision of awareness on decision making to improve the patient health is the main objective from the article. The awareness is through advisory technique with more emphasis on practical application.

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