

## ARTICLE

# DETERMINING RETELLING OF EVENTS DURING GENERAL ANESTHESIA IN OPEN-HEART SURGERY PATIENTS IN THE HOSPITALS AFFILIATED TO SHIRAZ UNIVERSITY OF MEDICAL SCIENCES

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## ABSTRACT

**Introduction:** patients' awareness of events during anesthesia are considerable complications more pronounced and increasing since the use of intravenous and general anesthesia. Awareness during anesthesia can lead to psychiatric complication and prolongation of post-surgery convalescence. This also has legal implications for the anesthesiologist. Given the importance of anesthesia awareness and the fact that the anesthesiologist are mainly responsible for ensuring sufficient depth of anesthesia and preventing awareness during anesthesia, the present study aimed to determine the incidence of awareness during anesthesia in the patients undergoing open heart-surgery.

**Methods:** One hundred patients older than 15 years of age and undergoing open-heart surgery were selected. They were examined and interviewed 24 hours after surgery to determine retelling of events during general anesthesia. **Results:** In this study, anesthesia awareness was detected in five patients (5%) among which 3 patients (3%) only recalled pain and two patients (2%) evoked auditory incidents during open-heart surgery under general anesthesia. **Conclusion:** anesthesia awareness was detected as 5% in this study according to anesthetics, pump time, hypothermia and the time of stopping injection of anesthetics and operative period. Anesthesia awareness was reported up to 43% in different articles depending on type of operation and changes in the above-mentioned factors.

## INTRODUCTION

Anesthesiologists aim to create a state of unconsciousness ensuring that the patients are immune to painful damages during surgery and in the most suitable physiological conditions since the beginning of science of anesthesia [1-3]. Awareness during anesthesia is defined as a case occurring during a preplanned period of general anesthesia in which brain becomes conscious due to some stimuli. Patients usually recall this period of consciousness [4-5]. Anesthesia awareness is an overwhelming and frightening experience causing emotional, sensual and stressful damages [7-6]. The patients with anesthesia awareness have recalled auditory perception, a sense of paralysis, anxiety, despair, fright [8-9], depression, anxiety attacks, sleep disorders, nightmares and feeling of being buried alive [7]. Experiencing pain during anesthesia awareness causes serious psychological impacts on the patients leading to mental disorder in the future. Being conscious and hearing something during surgery make the patient feel weak, paralyzed, distressed, helpless, anxious and frightened of death. In some cases, anesthesia awareness leads to serious problems such as sleep disorder, nightmares and anxiety during days. These effects may be transient or last for weeks or months. Patients are always frightful of what will happen if they undergo another surgery under anesthesia in the future and whether they experience another episode of anesthesia awareness [10]. Inadequate depth of anesthesia and anesthesia machine malfunction [e.g. empty cylinder, N<sub>2</sub>O, malfunctioned intravenous pump, disconnected anesthesia circuit] may be involved in induction of sufficient anesthesia. Incidence of anesthesia awareness was noted in some surgeries such as heart surgery and trauma [8].

## MATERIALS AND METHODS

This was a prospective study in which 100 patients undergoing open-heart surgery in the hospitals affiliated to Shiraz University of Medical Sciences were interviewed after the surgery when full anesthesia had worn off. The patients were questioned 24 hours after heart surgery when they were fully awake, alert and extubated the anesthetic drugs worn off.

Inclusion criteria: patients undergoing open-heart surgery under anesthesia, patients older than 15 years  
Exclusion criteria: patients younger than 15 years, patients with verbal communication problem, not familiar with Persian Language, the patients who are not extubated due to postoperative complication after 24 to 36 hours and should take more sedatives or analgesics to maintain cardiovascular stability and tolerance endotracheal tube.

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General anesthesia technique was used in this study. Following anesthetic drugs were used in this study.

Premedications: diazepam, midazolam, morphine, fentanyl, sufentanil

Induction of anesthesia: pentothal and pavilion

Preservatives: oxygen, halothane, nitrous oxide

Beginning cardiopulmonary bypass: diazepam + morphine + pavilion

Stopping cardiopulmonary bypass: diazepam + morphine or fentanyl + pavilion

Published: 10 October 2016

Cardiopulmonary bypass duration was from 30 minutes to 3 hours and ten minutes. The patients were indirectly asked the following questions:

1. What do you recall before anesthesia?
2. What do you recall immediately after the surgery and anesthesia?
3. Do you recall anything within preoperative-postoperative interval?

Then, the patients were asked the following questions. Their responses were recorded in a specific form.

1. Did you feel pain during the surgery?
2. Did you hear anything during the surgery?
3. Did you recall any dream from the surgery?
4. Do you want to add anything else you have experienced during the surgery?

Positive answers to any of the above questions shows an incidence of anesthesia awareness. It should be noted that 65 patients underwent open-heart surgery in the operating room in Namazi Hospital and 35 patients in Faghihi Heart Hospital among all studies patients (n = 100). These hospitals were affiliated to Shiraz University of Medical Sciences.

## RESULTS

In this study, 58 patients were males and 42 patients were females. The patients were between 15 and 75 years old. Weight of the patients varied from 34 kg to 120 kg. Duration of surgery varied from 2 hours to six hours and a half. Cardiopulmonary bypass duration varied from 30 minutes to 3 hours and ten minutes. Shown at [Table 1]

**Table 1:** Characteristics of the patients in terms of age, weight and duration of operation

	Minimum	Maximum	Mean
Age	15	75minutes	45
Weight	34	120 minutes	77
Duration of surgery	120 minutes	390 minutes	255 minutes
Cardiopulmonary bypass duration	30 minutes	190 minutes	110 minutes

According to classification of The American Society of Anesthesiologists,[Table 2] 15 patient were classified as ASA II, 53 patients as ASA III and 33 patients as ASA IV. None of the patients were classified as ASA I, V and VI.

The surgical operations performed for studied patients were 82 cases of coronary artery bypass graft (CABG), 9 cases of heart valve surgery, 7 corrective surgery of congenital heart defects and 2 cases of transplant coronary artery along with other cardiac surgeries.

**Table 2:** Distribution of studied patients based on type of open heart surgery and positive cases of anesthesia awareness

	No.	Anesthesia awareness	Awareness%
CABG	82	3	3.65%
heart valve surgery	9	1	11.11%
corrective surgery of congenital heart defects	7	1	14.28
transplant coronary artery	2	-	-
Total	100	5	5%

The results showed [Table 3] that 5 patients (5%) experienced anesthesia awareness among which three cases complained about pain and 2 cases evoked auditory perceptions. No case of dreaming was reported.

**Table 3:** Distribution of number and awareness% and reminders of pain, hearing and dreaming separately in positive cases

	No.	Percent
Awareness	5	5%
Pain	3	3%
Hearing	2	2%
Dreaming	0	0

## DISCUSSION

Anesthesia consciousness varies from dreaming to completely recalling every event during the operation. These incidents are categorized as auditory perception, feelings of pain, tactile sense and dreaming (15). Three cases of auditory perception, pain and dreaming were examined in this study [12, 15 and 16]. An incidence of anesthesia awareness was detected if the patients recalled at least one of the above cases. Research method consisted of asking some questions from the patients. The patients were interviewed 24 hours after the heart surgery when they were fully awake and alert and anesthetics and sedatives had worn off [16]. In this study, 5 patients experienced anesthesia awareness among which three cases complained about pain and 2 cases recalled hearing something during open heart surgery and general anesthesia. Incidence of anesthesia awareness varied in different studies from 1% to 2% [11]. However, anesthesia awareness was reported higher than that in some cases where inhalation and intravenous drugs were restricted or drug doses were reduced or not administered at all for some reasons. Incidence of anesthesia awareness would be higher than the above figure in open-heart surgery due to the use of cardiopulmonary bypass, hemodilution, hypothermia and not administering inhalation drugs for the pump. Incidence and complications associated with anesthesia awareness were reported as 7% in the studies in the context of cesarean section. This figure was even reported as 17% in some other studies [15-16]. In addition, the incidence of anesthesia awareness varied from 7% to 43% for those patients undergoing cardiac surgery, cesarean section or severe trauma under general anesthesia [11, 14]. Several factors are involved in incidence of anesthesia awareness including physical status (ASA) of the patients before surgery. Accordingly, the incidence of anesthesia awareness varies from 7% to 43% in those patients classified as ASA IV and V [11, 14].

In the present study, only one patient in ASA V, three patients in ASA III and one patients in ASA II experienced anesthesia awareness. Finally, it should be noted that none of the recommendations mentioned in various sources to prevent awareness during general anesthesia can guarantee complete absence of anesthesia awareness. These recommendations are regular and precise examination of anesthesia machine and ventilator before the surgery, use of adequate doses of intravenous drugs at the beginning and end of cardiopulmonary bypass, proper patient care, full and permanent consciousness of the anesthesiologist during the operation[13].

## CONCLUSION

According to statistics, anesthesia awareness was reported from 1 to 43% in different operations including caesarean sections, emergency surgeries and open-heart surgery based on operative time, hemodilution when installing the pump and hypothermia, type of anesthetics and the time of stopping these drugs. This figure was reported as 5% in the present study, which seem reasonable depending on terms of the study.

### CONFLICT OF INTEREST

Authors declare no conflict of interest.

### ACKNOWLEDGEMENT

None

### FINANCIAL DISCLOSURE

No financial support was received to carry out this project.

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