TPM Vol. 32, No. S1, 2025
ISSN: 1972-6325
https://www.tpmap.org/

Open Access

EXTUBATION UNVEILED: A PROSPECTIVE STUDY OF RECALL OF DISCOMFORT ON TRACHEAL EXTUBATION ON GENERAL ANAESTHESIA

DR SHANTHI S[1], DR MANJU K[2], PRATHIKSHA[3],
DR. RAMYA CHELLAMMAL.M[4]

[1](POST GRADUATE),
[2](SENIOR RESIDENT)
[3](BACHELOR OF SCIENCE OPERATION THEATRE ANDANAESTHESIA TECHNOLOGY)
[4]SENIOR LECTURER, DEPARTMENT OF PEDIATRIC DENTISTRY, SREE BALAJI DENTAL COLLEGE & HOSPITAL, CHENNAI, INDIA
DEPARTMENT OF ANESTHESIOLOGY, SAVEETHA MEDICAL COLLEGE AND HOSPITALS,SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES, SAVEETHA UNIVERSITY, CHENNAI - 602105, TAMIL NADU, INDIA

Abstract

Background:
Tracheal extubation is an integral step in general anesthesia recovery and is often accompanied by coughing, agitation, and hemodynamic changes. Although these events are clinically recognized, their recall by patients has not been extensively studied. Awareness of the incidence of recalled discomfort during extubation can aid in optimizing perioperative counseling and airway management strategies.

Objective:
To determine the incidence of recall of discomfort during tracheal extubation following general anesthesia and to assess associations with patient demographics and anesthetic parameters.

Methods:
This prospective observational study was conducted over 12 months at a tertiary care teaching hospital. A total of 140 adult ASA I–II patients undergoing elective surgery under general anesthesia were enrolled. Standardized anesthetic protocols were followed, and extubation was performed per anesthetist's discretion. Postoperative structured interviews within 24 hours assessed recall of discomfort, tube removal, and first memory post-anesthesia. Descriptive and inferential statistics were applied.

Results:
Of the 140 patients (54% male), most were aged 20–40 years (53%). Endotracheal tube intubation was used in 90% of cases. Only 2% reported remembering tube removal and experiencing discomfort. The majority (98%) had no recall of extubation. First postoperative recollections occurred most often in the ward (55%) or during transfer (29%). No statistically significant association was found between recall and age, sex, or ASA grade.

Conclusion:
Recall of discomfort during tracheal extubation is rare. Observed agitation during emergence does not necessarily correlate with patient memory, supporting extubation timing decisions based on physiological readiness rather than perceived distress.

Keywords: Tracheal extubation, Recall, Discomfort, General anesthesia, Airway management

INTRODUCTION

General anesthesia (GA) is characterized by a reversible state of unconsciousness, analgesia, amnesia, and muscle relaxation, typically achieved through a combination of intravenous and inhalational agents. Airway management is a cornerstone of GA, with tracheal intubation being the most definitive method to secure the airway. Tracheal extubation, the removal of the endotracheal tube (ETT), represents a critical transition from mechanical to spontaneous ventilation and carries the risk of complications such as laryngospasm, bronchospasm, airway obstruction, hemodynamic fluctuations, and aspiration (1,2).

While there is substantial literature on extubation techniques and complication management, fewer studies have examined patient recall of the extubation process. Patients may exhibit movements such as coughing, bucking, or agitation during emergence, leading anesthesiologists to believe that they are experiencing discomfort (3). However, it is unclear whether such behaviors translate to conscious memory. Overestimating discomfort may prompt premature extubation, which can increase postoperative risks, including hypoventilation and airway compromise (4,5).

The prevalence of intraoperative awareness is estimated at 0.1–0.2% (6), but the incidence of recall of specific extubation events has been less frequently studied. Previous studies have reported rates ranging from 2–17% depending on anesthetic technique, drugs used, and timing of extubation (7,8). Understanding the frequency and nature of such recall is important for optimizing perioperative communication, guiding extubation strategies, and reassuring patients.

This study aimed to determine the incidence of recall of discomfort during tracheal extubation after GA and to identify any associated demographic or perioperative factors.

MATERIALS AND METHODS

This was a prospective observational study conducted in the Department of Anaesthesiology, Saveetha Medical College and Hospital. Institutional ethical clearance was obtained prior to study initiation, and written informed consent was taken from all participants.

Study Population

Inclusion criteria were adult patients aged ≥20 years, ASA physical status I–II, scheduled for elective surgery under GA with tracheal intubation or laryngeal mask airway (LMA). Exclusion criteria included ASA ≥III, inability to communicate postoperatively, emergency surgeries, and postoperative ICU admission.

Anesthetic Management

Anesthetic induction was standardized with intravenous fentanyl, an induction agent (propofol or thiopentone), and a neuromuscular blocking drug (atracurium or vecuronium). Maintenance was achieved with either inhalational agents (isoflurane or sevoflurane) or total intravenous anesthesia, with or without epidural supplementation.

Extubation Procedure

Reversal of neuromuscular blockade was performed using neostigmine and glycopyrrolate. Extubation was carried out either when patients were fully awake or under light anesthesia, depending on the anesthetist's judgment. Patients were transferred to the post-anesthesia care unit (PACU) or recovery room (RR) once vital signs were stable.

Data Collection

A structured interview was conducted on the first postoperative day. The questionnaire assessed:

- First memory after awakening
- Recollection of tube removal
- Presence of discomfort during extubation
- Orientation to place

If patients were unclear or confused, questioning was repeated later the same day.

Outcome Measures

The primary outcome was the proportion of patients recalling discomfort during extubation. The secondary outcome was the relationship between recall and demographic/anesthetic factors

Statistical Analysis

Data were analyzed using SPSS v25.0. Categorical variables were expressed as frequencies and percentages, and associations were assessed using the Chi-square test. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 140 patients met the inclusion criteria and were enrolled in the study. The age of participants ranged from 20 to over 60 years, with the majority (53%, n=75) falling within the 20–40-year age group. Patients aged 41–60 years constituted 34% (n=47), while those above 60 years accounted for the smallest proportion at 13% (n=18). Males represented 54% (n=76) of the study population, and females accounted for 46% (n=64). Regarding physical status, most patients (67%, n=93) were classified as ASA grade II, while 33% (n=47) were ASA grade I. Endotracheal tube (ETT) intubation was the predominant airway device used, being employed in 90% (n=126) of cases, whereas a laryngeal mask airway (LMA) was used in 10% (n=14).

In terms of postoperative awakening location, over half of the patients (57%, n=80) reported first regaining consciousness in the recovery room, followed by 40% (n=56) who first awoke in the ward, and a small minority (3%, n=4) who were awake in the operating theatre. When asked about their first memory after anesthesia, 55% (n=77) recalled being in the hospital ward, 29% (n=40) remembered the transfer process, 11% (n=16) remembered the recovery room, and 5% (n=7) were unable to provide a clear recollection due to confusion.

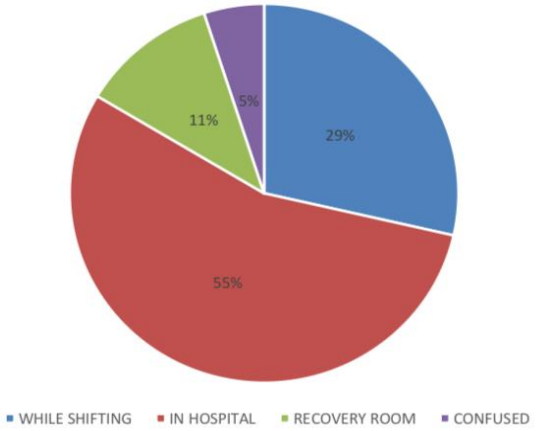

FIGURE 1- DISTRIBUTION OF THE PATIENTS BASED ON THEIR FIRST MEMORY AFTER ANESTHESIA

Regarding the primary outcome, only 3 patients (2%) reported remembering the removal of their breathing tube, and all three also described experiencing discomfort during the process. The remaining 98% (n=137) had no recollection of extubation or associated discomfort. Statistical analysis revealed no significant association between recall of discomfort and gender (p=0.461) or age group (p=0.539). Notably, although recall was slightly more frequent in females and in the 41–60-year age group, these differences were not statistically significant.

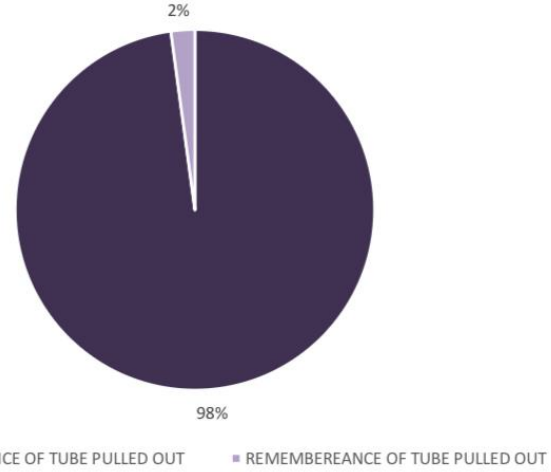

FIGURE 2 -DISTRIBUTION OF PATIENTS BASED ON REMEMBRANCE OF BREATHING TUBE PULLED OUT AFTER SURGERY

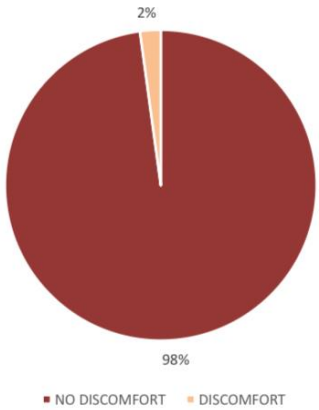

FIGURE 3-DISTRIBUTION OF PATIENTS BASED ON FEELS DISCOMFORT WHILE TUBE PULLED OUT

Overall, the findings indicate that recall of discomfort during tracheal extubation is extremely uncommon, and that most patients' earliest postoperative memories are of being in the ward or during transport, rather than of the extubation process itself.

DISCUSSION

Our findings demonstrate a low incidence (2%) of recall of discomfort during tracheal extubation. This aligns with the lower end of reported ranges in the literature (7,8). Even when patients exhibited agitation or coughing during emergence, almost all had no memory of the event the following day, suggesting that such behaviors are not reliable indicators of conscious distress.

Studies by Sato et al. (7) and Takahashi et al. (8) similarly reported low recall rates, emphasizing that physiological readiness, rather than perceived discomfort, should guide extubation timing. Inoue et al. (9) also found no difference in recall rates between cases managed by residents versus consultants, supporting that operator experience alone does not significantly influence recall.

From a clinical perspective, this suggests that anesthetists need not rush extubation in response to apparent discomfort, as premature removal may increase risks such as laryngospasm or aspiration (4,5). These results can also inform preoperative counseling, reassuring patients that they are unlikely to remember the extubation process.

Limitations

The study was limited by its single-center design, small number of patients with recall, and lack of standardized depth-of-anesthesia monitoring. The extubation method was left to anesthetist discretion, potentially introducing variability.

CONCLUSION

Recall of discomfort during tracheal extubation after GA is rare. Physical signs of distress during emergence do not necessarily reflect conscious memory. Extubation decisions should be based on airway safety and physiological readiness rather than perceived discomfort.

REFERENCES

1. Cook TM, Woodall N, Frerk C. Major complications of airway management in the UK: results of the Fourth National Audit Project. Part 1: Anaesthesia. Br J Anaesth. 2011;106(5):617-31.
2. Frerk C, Mitchell VS, McNarry AF, et al. Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults. Br J Anaesth. 2015;115(6):827-48.
3. Popat M, Mitchell V, Dravid R, Patel A, Swampillai C, Higgs A. Difficult Airway Society guidelines for the management of tracheal extubation. Anaesthesia. 2012;67(3):318-40.

4. Benham-Hermetz J, Mitchell V. Safe tracheal extubation after general anaesthesia. BJA Educ. 2021;21(12):421-9.

5. Piepho T, Cavus E, Noppens R, et al. S1 guidelines on airway management: guideline of the German Society of Anaesthesiology and Intensive Care Medicine. Anaesthesist. 2015;64(1):27-40.
6. Sandin RH, Enlund G, Samuelsson P, Lennmarken C. Awareness during anaesthesia: a prospective case study. Lancet. 2000;355(9205):707-11.
7. Sato T, Mimuro S, Kurita T, et al. Recall of extubation after remimazolamanaesthesia with flumazenil antagonism during emergence: a retrospective clinical study. J Anesth. 2022;36(5):688-92.
8. Takahashi M, Nakahashi K, Karashima Y, Kitaguchi K, Furuya H. The memory of tracheal extubation during emergence from general anesthesia. Masui. 2001;50(6):613-8.
9. Inoue S, Abe R, Tanaka Y, Kawaguchi M. Anaesthesia management by residents does not alter the incidence of recall of tracheal extubation: a teaching hospital-based propensity score analysis. Braz J Anesthesiol. 2017;67(3):251-7.