

CASE REPORT

AIRWAY MANAGEMENT

Airway burn during tracheostomy in the operating room: a case report

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ABSTRACT

Fire in operating rooms (ORs) has been a topic of interest for the past many years. Staff persons dealing daily life scenarios in ORs should anticipate and firefighting and rescue gear must be made available. In case of fire during any procedure specially during ENT surgery, maxillofacial surgeries, or whenever the use of diathermy and laser is used in close proximity to airway. We report a case of a 54 yrs old female, who caught airway fire in OR due to the use of unipolar diathermy. She was planned for tracheostomy as prolonged ventilation was expected in that patient. Airway fire algorithm was followed with low FiO₂ as much as patient tolerated, affected area was flushed with normal saline and soaked gauzes were placed. The airway fire was successfully controlled. OR airway fire can be managed with proper planning, baseline knowledge, skills, fire protocols, algorithms awareness and rapid response team work.

Keywords: Airway Fire; Tracheostomy; Diathermy; Laser; Burnt Cuff; ETT

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1. INTRODUCTION

The authors report a case observed at their institution, discuss the possible causes and management of such incidence, and the proposed guidelines for the prevention of this complication. Reflections to the incidence reveal that the team involved in this case, neither anticipated this event in such a minor laser-free procedure, nor the surgical team was equipped with proper gadgets to stop the fire. Risk of fire was not a part of 'Timeout' at our center before this event.

Staff education, risk stratification, operating room preparation, availability of the specific equipment, surgical procedures, diathermy use, and anticipation of risk of fire in all ENT surgeries, were discussed at an

appropriate level and revised after this event for future prevention.

2. CASE REPORT

A 54 years old female, a known patient of hypertension, diabetes mellitus and hyperlipidemia, was admitted in ICU for right basal pneumonia. She ended up with invasive ventilation. Tracheostomy was planned, as she was anticipated to require long term ventilation.

ENT surgeon reviewed the patient and she was scheduled for elective surgical tracheostomy. After preoperative assessment the patient was moved to the operating room (OR), intubated with a 7.5 mm cuffed



Figure 1: (a) burnt cuff (b) burnt endotracheal tube

PVC ETT and ventilated. Standard operative protocols were followed. Surgery started in due course of time.

The patient was ventilated with 100% oxygen with sevoflurane, MAC 1, using circle system of a Drager Fabius anesthetic machine. Once the operating surgeon reached trachea, the anesthetist partially withdrew the tracheal tube as the trachea was opened with unipolar diathermy at cutting mode. A sudden gush of flames burst out of the tracheal stoma with a loud noise. The oxygen supply was immediately disconnected, area was flushed with saline, ETT was removed and tracheostomy was inserted successfully without the onset of hypoxia or any other systemic disturbance. The tracheostomy tube was attached to the circuit and the ventilation resumed. Small subcutaneous tissue was burnt at the stoma and was flushed and debrided. No deep burn was noted and no sign of any muscle damage was seen.

Examination of the ETT showed extensive burn around the cuff, as shown in Figure 1 (a & b). No signs of inhalational injury were noticed at that time, airway examination was done by laryngoscopy no pharyngeal or oral burn was seen. The patient was transferred back to

intensive care unit (ICU) afterwards with a working tracheostomy *in situ*.

3. DISCUSSION

The purpose to report this case is to add value to the future clinical practices, previously cases on airway fire during tracheostomy already reported in literature this study is also related to these cases because operation theatre contains equipment, cylinders, anesthetic gases, volatile agents, e.g. nitrous oxide, ether, chloroform, halothane and cyclopropane, fresh gas availability, oxygen source, lasers and electric current all create an environment enrich source of instant fire. un-noticed, unanticipated incident can be happened during any procedure using diathermies and alcohol-based solutions, some researches labelled all these surgery consumables as fire triad.

In this case probable cause of airway fire was failure to withdraw the endotracheal tube sufficiently at the start of cauterization, ETT cuff deflation occurred with unipolar diathermy use, may be high flow of oxygen rich gas into surgical field helped the ignition.

Such sequel can be prevented by using scalpel or bipolar diathermy instead of unipolar diathermy for tissue cutting to minimize the risk of airway fire. Procedures specially pertaining to ENT surgery, maxillofacial surgeries or whenever the use of diathermy and/or laser is decided in the close proximity to airway, there is always a risk of cuff rupture or ETT burn. The preventive measures include staff training, exit door awareness, placement of algorithms with picture presentation on walls, saline soaked gauzes at airway trolley, saline filled syringes in case of emergency to flush the burn site, use of scalpel for tissue cutting instead of laser or unipolar diathermy, ETT removal as early as possible meanwhile airway secured by tracheostomy tube, minimize the time of procedure, always anticipate edematous airway, with previous multiple manipulations, prolonged intubation, secretions, sick patients with poor respiratory reserves often airway is difficult to manage in emergency situations. One can do fiberoptic airway examination post burn to rule out extent of tissue injury.

4. CONCLUSION

This kind of incidence can be prevented in future by anticipation, minimizing fire sources, use of low FiO₂ strategy as much as patient can tolerate, preparation before procedure, operating room fire algorithm orientation, and operating room fire awareness programs. OR airway fire is still a challenging condition for anesthetist but can be managed with proper planning,

baseline knowledge, skills and rapid response team work.

5. Ethical considerations

Written consent was obtained from the husband of the patient for publishing this report for academic purposes.

6. Conflict of interest

The authors declare no conflict of interests, and no external or industry funding was involved.

7. Authors' contribution

All authors took part in the management of the patient and the preparation of this manuscript.

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