

Lasers in Anesthesia

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Abstract

Laser anesthesia is a rising star in our field of anesthesiology and we as anesthesiologists should have an in-depth knowledge about laser and the pitfalls that may await us. The drive for me to write this article is to throw light in the area of laser, dangers of the medical laser, and precautions to be taken to ensure their proper use. We can prevent the potential hazards by ensuring proper preoperative evaluation, formulating protocols, early recognition of the catastrophic events, and swift actions. Here I have discussed a case of glottic carcinoma stage IA planned for laser excision of the growth. We have taken all the preoperative stringent measures necessary for the laser surgery the previous day. Emergency airway gadgets were kept ready in case of difficult intubation. The patient was intubated with the Mallinckrodt endotracheal (ET) tube and surgery was done under general anesthesia with controlled ventilation using Vecuronium injection + N₂O + medical air. The intraoperative period was uneventful. The patient was extubated after adequate reversal and the postoperative recovery was uneventful.

Key words: Anesthesia for airway surgeries, laser anesthesia, laser precautions

We had a 75-year-old male patient presenting to the ear, nose, and throat outpatient department (ENT OPD) with complaints of change of voice since 3 months. On evaluation, the patient was diagnosed to have glottic carcinoma stage IA and planned for laser excision of the growth [Figure 1]. A meticulous preoperative evaluation of the patient was done with particular attention to airway obstruction. The patient was instructed about the procedure the previous day and premedicated the night before the surgery after consent. General anesthesia with controlled ventilation was planned for the procedure. In addition to the routine preoperative precautions, stringent measures were taken, such as covering the windows of the operation theater with black tinted paper, placing warning signs regarding the use of the laser, and utilizing goggles. Diode laser was used for the surgery. On the day of the surgery he was kept *nil per os* (NPO) and the patient was premedicated with Glycopyrrolate injection 0.005 mg/kg intravenous (IV), Midazolam injection 0.03 mg/kg IV, and Fortwin injection 0.5 mg/kg IV. Our main anesthetic goals were, to provide adequate muscle relaxation for intubation, stabilization of the vitals, and adequate ventilation. Emergency airway cart with emergency gadgets were kept ready in case of any difficult intubation encountered. The patient was induced with Propofol injection 2 mg/kg IV and Loxicard injection 1.5 mg/kg IV, and after ensuring adequate face and

mask ventilation Succinylcholine injection 2 mg/kg IV was given. Laryngoscopy was done and the patient was intubated with a Mallinckrodt tube [Figure 2]. The endotracheal (ET) tube cuff was inflated with saline and methylene blue after the confirmation of the correct placement of the ET tube. The surgery was maintained with O₂ and medical air and Vecuronium injection 0.08 mg/kg IV was used as a muscle relaxant intraoperatively. The intraoperative period was uneventful. The patient was extubated after adequate reversal with Neostigmine injection 0.05 mg/kg IV and Glycopyrrolate injection 0.008 mg/kg IV. Postoperatively, the patient was given Diclofenac injection sodium 75 mg IV infusion for analgesia and observed for complications.

DISCUSSION

Introduction of laser is a surgical breakthrough for airway surgeries due to its compatibility for a variety of cases. However, upon the usage of laser, a lot of anesthetic life-threatening complications arise such as hyperreactive airway or large benign

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Figure 1: Growth on the vocal cord

or malignant tumors that may encroach the airway, resulting in obstruction. Hence, we should be cautious and vigilant during preanesthetic evaluation. Detailed examination of the airway is mandatory, accompanied with radiological investigations such as computed tomography (CT) and X-ray chest, in addition to pulmonary function tests and flow-volume loops. A good rapport is an added advantage with the operating surgeon in addition to having the knowledge of the laser being used for the surgical procedure being performed. Anesthetic gases are highly combustible and when used in combination with laser procedures they become hazardous and explosive. However, we can de-escalate the risk by using less combustible gases such as helium. In an unlikely event such as explosion and airway fire early recognition of the event, clear communication with the surgeon, and implementing the emergency crisis will be the key in managing such circumstances. Additional precaution should



Figure 2: Mallinckrodt endotracheal tube

be taken right from the drapes used for the surgery, cleaning solutions, tapes used for eye pads, to the instruments used for surgery, which should be matte finish to prevent the reflection of the laser beam.

Laser is an emerging star and in fact, has become an invaluable asset in the surgeon's armamentarium. Thus, we as anesthesiologists should be familiar and have a thorough comprehensible knowledge about the pitfalls that may await us. Potential hazards and catastrophic events can be prevented by simple measures such as thorough evaluation, proper planning, adequate risk-assessment, ensuing stringent protocols, early recognitions, and swift actions.

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Conflicts of interest

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