Dental guards: Helpful or hazards? – A case report

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Dental guards are an airway adjunct recommended for patients at risk for dental injury during airway instrumentation; however, reportedly only 2% of anesthesiologists use dental guards during intubation. In this case report, a 64-year-old patient was admitted for a right retromastoid craniectomy with microvascular decompression of the fifth cranial nerve. The patient had crowns on all her maxillary teeth. The anesthesia team, which consisted of a student anesthetist, Certified Registered Nurse Anesthetist, and anesthesiologist, planned to prevent dental damage through the use of a dental guard (Bay Medical, Clearwater, Fla).

Prior to intubation a dental guard was inserted on the upper teeth. Induction, intubation, and surgery were uneventful, but in the recovery area the patient complained of a sore throat. After transfer to the intensive care unit, the patient continued to complain of secretions and sore throat and was noted to have hoarseness. When a Yankauer suction catheter was inserted, the dental guard was discovered in the patient’s mouth. Apparently during the busy sequence of events following intubation, the dental guard was overlooked and was displaced into the posterior oropharynx.

Recommendations for the proper use of dental guards are needed to avoid complications; however, there is a scarcity of information available in the conventional anesthesia literature regarding this intubation adjunct. We recommend careful documentation, clear communication with all team members, and attention to avoid displacement during subsequent airway manipulation.

Key words: Aspiration, dental guards, dental injury.

Introduction

In the practice of anesthesia, equipment is often implicated in accidents or near accidents. An analysis of major errors and equipment failure in anesthetic management indicated that while human error is the dominant factor associated with negative outcome, equipment misadventures represent 4% of anesthesia mishaps. Dental appliances (crowns and bridges) are often made from porcelain and acrylic and tend to be brittle. These appliances are likely to fracture under pressure.
during instrumentation of the airway. Difficult or improper laryngoscopy also may result in dislodgment of the prosthesis as a result of breakage of the cement bond.

Surveys of anesthesia departments and a review of malpractice liability claims identify the importance of dental complications in anesthesia practice. St. Paul Medical Service, a primary insurer, reported that the most frequent anesthesia-related claim made against nurse anesthetists paid between 1992 and 1996 was for dental damage. These claims represented 15.8% of total claims with average cost per claim of $2,943. Damaged teeth also result in the largest number of lawsuits against anesthesiologists.

Methods employed to minimize the risk of dental injury include early identification of patients at risk and precise documentation of pre-existing dental problems. Patients with extensive dental prostheses, loose or damaged teeth, or otherwise poor dentition must be counseled regarding possible risks during airway instrumentation. Adjunctive techniques or devices are sometimes used to modify the inherent risks to such patients. Careful laryngoscopic technique combined with the use of dental guards is one approach to minimizing the risk of dental injury. However, only 2% of anesthesiologists actually use a dental guard during intubation. In addition, precise post-instrumentation documentation is critical in not only ensuring lack of injury, but also in protecting the provider from possible litigation.

Case summary

A 64-year-old female with right trigeminal neuralgia resulting in chronic pain on the right side of her face, poor appetite, dysarthria, and dysphagia was admitted for a right retromastoid craniectomy with microvascular decompression of the fifth cranial nerve. The patient was seen in the preoperative holding area, and it was noted that there were crowns on all of her maxillary teeth. The patient expressed concern regarding damage that might occur to her teeth during intubation. The patient’s airway was assessed as a Mallampati class III and combined with her limited neck extension she was felt to be at risk of having a difficult airway. We elected to use a dental guard for this patient. In the holding area the patient received 50 µg of fentanyl and 2 mg of midazolam and was taken to the operating room at 7 AM. Following pretreatment with 3 mg of curare, anesthesia was induced with 250 mg of thiopental and 100 mg of succinylcholine. The patient was easily ventilated and an upper tooth dental guard (Bay Medical, Clearwater, Fla) was inserted prior to intubation. The patient wasatraumatically intubated with a #7.0 endotracheal tube. The endotracheal tube was taped, and an esophageal stethoscope, oral gastric tube, and soft airway were placed. After the airway and arterial line were secured, the patient was placed in the left lateral decubitus position with a 3-point head holder for operative stabilization of the cranium.

Anesthesia was maintained with oxygen, nitrous oxide, isoflurane, fentanyl, and cisatracurium. Surgery was uneventful and lasted a total of 3 hours. Muscle relaxation was reversed with 3 mg of neostigmine and 0.6 mg of glycopyrrolate. The patient was extubated in the left lateral decubitus position with positive pressure ventilation and was suctioned pre- and post-extubation. Vital signs were stable, and oxygen saturation was 100%.

The patient was taken to the postanesthesia care unit at 10:10 AM on 40% oxygen via facemask, with the head of the stretcher flat. She was very drowsy but arousable and followed commands. When the patient attempted to lift her head, the stretcher was elevated to 45 degrees. At this point the patient appeared to be distressed. When queried, the patient stated she was having “trouble swallowing,” and she nodded affirmatively when asked if her throat was sore. She was informed that the endotracheal tube was the probable cause of her sore throat.

The patient went back to sleep, vital signs were stable, and report was given to the recovery room nurse. During the report, the oxygen saturation remained 100% on 10 L of oxygen via facemask. At 11 AM, the oxygen was discontinued and the patient had a saturation of 96% on room air. At 11:45 AM, oxygen saturation was 90% and the patient was placed on 2 L oxygen via nasal cannula, which increased her saturation to 95%. The patient’s breath sounds were clear with a respiratory rate of 14 to 18 per minute.

The patient was discharged from recovery to the intensive care unit at 12:30 PM. The admitting intensive care unit nurse’s notes stated that the patient’s lungs were clear, respiratory rate was 16, and she was complaining of phlegm, sore throat, and her voice was noted to be hoarse. At 1:30 PM, the patient complained of secretions at the back of her throat and started coughing. Her daughter who was present inserted a Yankauer suction catheter, and the dental guard was suctioned out of the patient’s mouth. The attending anesthesiologist was informed and spoke with the patient and...
family immediately. The patient went on to do well with no adverse outcome, and she was discharged to home on her third postoperative day.

Discussion

Prior to undergoing surgery, the teeth are inspected by the anesthesia providers. If a patient is at high risk of dental injury, the patient may be referred to a dental surgeon and, if necessary, a customized appliance can be fabricated. Modified laryngoscopic techniques and the use of dental guards have been recommended for those at higher risk for dental injury during manipulation of the airway.

In this case report, the dental guard that was used was white polyurethane and available in 1 size (Figure). The dental guard did not fit the patient’s teeth well and was not secured externally. We speculate that the dental guard became displaced, fell back into the patient’s pharynx, and was pushed back further during postintubation manipulations. Because of this sequence, the dental guard was misplaced and became a possible cause of an adverse event.

Between 1977 and 1986, dental damage resulted in one third of all claims reported to the Medical Protection Society in Great Britain. Dental guards are adjuncts that may reduce the incidence of dental injury, yet a review of anesthesia literature indicates that information is sparse regarding specifically how they should be used to provide maximal dental protection while avoiding complications for patients during general anesthesia. Clear and consistent recommendations for dental guard use are needed to prevent iatrogenic complications.

Swallowing or aspiration of dentures and other foreign objects in the perioperative period has been widely reported. One case report discusses partial dentures that accidentally became dislodged during airway manipulation and required surgical removal. Another case involved a 36-year-old male who underwent emergency repair of a strangulated inguinal hernia under general anesthesia. Postoperatively the patient complained of a sore throat and dysphagia. His symptoms intensified over the next 3 days, resulting in marked stridor and respiratory distress.

Direct laryngoscopy revealed a large fragment of dental wedge in the laryngeal inlet. Because of the presence of severe supraglottic ulceration and edema, tracheal intubation was necessary. In a third case, a 16-year-old boy underwent endoscopic sinus surgery under general anesthesia. Upon extubation a nasal pack became dislodged and unknowingly was aspirated. The patient became hypoxic and stridor became evident. The extremely high peak airway pressures required to ventilate the patient warranted reintubation. With no sign of improvement, fiberoptic bronchoscopy was performed, and the nasal pack was removed from the tracheal tree.

Conclusion

Prevention of dental damage during intubation requires the use of good technique and may warrant the use of dental guards. Providers should insure that the dental guard is secure on the patient’s teeth or externally secured in such a way that it will not be displace into the posterior oropharynx. In our case, a customized dental guard may not have become loose, or a brightly colored dental guard might have been more visible to the providers when pushed back in the oropharynx.

Some dental guards have tabs or handles that protrude from the mouth and tend to minimize the chance of unrecognized displacement of the guard. A radiopaque strip within the dental guard...
would help to identify its position in the airway should an x-ray be necessary. In a letter to Anesthesiology in 1990, Leadbeater recommended a modified dental guard with one half of the right hand side removed to prevent restricting visualization during intubation.9

A suture secured to the dental guard (see Figure) also has been suggested to prevent displacement or loss of the dental guard during general anesthesia.9 We recommend that a string or suture be threaded through a hole made in the Bay Medical dental guard (Clearwater, Fla) and that the string be taped securely to the patient’s cheek prior to airway instrumentation. In addition, we recommend that use of the dental guard be clearly communicated to all team members and that the dental guard insertion and removal time be added to the checklist on the anesthesia record. Communication of the use of the dental guard will ensure that all members of the anesthesia care team are alerted that a dental guard has been used in the case and should be removed when appropriate. Precise documentation of insertion and removal will minimize the patient’s risk as well as the medicolegal risks to the providers.

REFERENCES

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