

CASE REPORT

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Iatrogenic uvular injury after endotracheal intubation: recommendations for clinical practice

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Abstract

Background Uvular injury is a rare complication of endotracheal intubation. It presents as a triad of sore throat, foreign body sensation in pharynx, and halitosis.

Case presentation A 26-year-old male who underwent endotracheal intubation for general anesthesia developed sore throat and foreign body sensation after the procedure. The patient was diagnosed as a case of iatrogenic uvular necrosis (grade III uvular injury) leading to auto-amputation (grade IV uvular injury) attributed to compression of the uvula due to the endotracheal tube placement. The patient was counseled regarding the etiology of the disease and was treated conservatively.

Conclusions Uvular injury is a rare complication that can easily be prevented by corrections in technique and experience. This report emphasizes the establishment of principles of diagnosis, prevention, and treatment of uvular injury.

Keywords Uvular necrosis, Uvular edema, Uvular ulceration, Uvular hydrops, Uvular auto-amputation

Background

Sore throat and cough are one of the most frequent complaints after endotracheal intubation for general anesthesia and are often overlooked. One differential diagnosis that should be considered for postoperative sore throat is uvular injury (Evans and Lo 2009). The incidence of uvular necrosis is 0.03%. Iatrogenic uvular injury that may develop into uvular necrosis is typically described as a triad of postoperative sore throat, foreign body sensation, and halitosis (Reid et al. 2020).

Intubation with endotracheal tube (ETT) is a common procedure typically done in adults with a single-lumen cuffed plastic tube with an average internal diameter ranging from 7.0 to 8.5 mm. Uvular injury is one of the

rarest complications of ETT intubation (Reid et al. 2020; Xiao et al. 2021).

Case presentation

A 26-year-old 70-kg male patient presented to the surgical department with bilateral gynecomastia for the past 6 months that caused him to have significant social and psychological distress. His past medical history was unremarkable, and he did not have any relevant history for use of drugs, supplements, allergies, or genetic disorders.

On examination, he was vitally stable with pulse 86-bpm blood pressure 120/80 mmHg, respiratory rate 16 breaths per minute, temperature 97.8 °F, and SpO₂ of 95% at room air. He had bilateral symmetrical gynecomastia. The systemic examination was unremarkable. There was no significant history or examination finding that would explain the patient's gynecomastia and was thus considered as an idiopathic case. He was planned for a subcutaneous mastectomy under general anesthesia as a day-care surgery.

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He was classified as ASA grade 1, Mallampati class 1, and Cormack-Lehane grade 1. General anesthesia was induced with midazolam 1 mg, propofol 120 mg, and atracurium 40 mg. The trachea was easily intubated with a single-lumen polyvinyl-chloride ETT with an internal diameter of 7.5 mm using a Macintosh laryngoscope blade size 3 and fixed at the 21-cm mark. Per-operative analgesia was given using morphine 6 mg and paracetamol 1 g. The surgery lasted 95 min and was uneventful. The neuromuscular blockage was reversed using atropine 1.2 mg and neostigmine 2.5 mg. The patient was extubated once he was fully awake and was shifted to the recovery room.

About 2 h after surgery, the patient complained of having sore throat for which he was advised diphenhydramine syrup. On the second postoperative day, he complained of persistent cough, feeling of something “stuck to the back of the throat,” and halitosis. An otorhinolaryngology review was done. On examination of the oropharynx, the uvula had a well-demarcated dark-red gangrenous ulcer, and the base of the uvula was hyperemic (grade III uvular injury).

His condition was diagnosed as postoperative uvular necrosis and was managed conservatively. He was prescribed ammonium hydroxide mouthwash and normal saline gargles. On the 5th postoperative day, the necrosed segment of the uvula sloughed off spontaneously (Fig. 1). Afterwards, the patient had complete resolution of his symptoms. He was called for a follow-up after 2 weeks to the surgical outpatient department. His symptoms were completely resolved, and on examination, his uvula was shortened; however, there was no signs of erythema, necrosis, or slough indicating resolution of uvular injury.

Discussion

Postoperative sore throat is a common complication of ETT intubation occurring in about 40% of all surgeries (Evans and Lo 2009; Reid et al. 2020). However, persistent sore throat (>2 days) along with development of other symptoms should alert the surgeon to assess the patient for a specific underlying pathology, one of which is postoperative uvular injury (Reid et al. 2020; Xiao et al. 2021).

ETT intubation is performed on millions of patients worldwide everyday with well-documented complications. Postoperative uvular injury is an extremely rare complication of endotracheal intubation with a total of only 53 reported cases found within the literature (Pamnani et al. 2014; Bright et al. 2021). The first ever case was reported in 1978 (Reid et al. 2020). The overall incidence of postoperative uvular injury is only 0.034% making it one of the rarest postoperative complications (Pamnani et al. 2014).



Fig. 1 Grade IV uvular injury (auto-amputated uvula): shortened uvula with irregular border

The uvula is a part of the small palate that hangs within the back of the throat and aids in phonation and swallowing. Postoperative uvular injury typically involves compression of this highly vascular structure which, after a prolonged period, can lead to ischemia and epithelial damage, resulting in uvular injury (Reid et al. 2020).

Males are significantly more likely to develop uvular injury, comprising about three-quarters of all reported cases (Reid et al. 2020; Pamnani et al. 2014; Bright et al. 2021). An elongated uvula seen during preoperative assessment is also associated with increased risk of uvular injury (Ziahosseini et al. 2014). Supine positioning during surgery can significantly increase the chances of developing uvular injury since the uvula is more likely to be compressed in this position (Chatterjee et al. 2018 Jan). Furthermore, upper respiratory tract infection before surgery, recreational substance use, and cigarette smoking are also important predisposing risks. Other factors that have been attributed to the condition include the type or length of the procedure, variation in skill or technique of anesthetist, and the type, size, or position of airway device. However, there are no studies linking these factors to uvular injury (Bright et al. 2021).

We have proposed a grading system for uvular injury developed after an extensive literature review as displayed in Table 1. Figure 2 shows the diagrammatic representation of each injury.

Table 1 Description of Zameer’s grading of uvular injuries Grades of injury

	Description	Treatment
Grade I	Acute uvular edema seen as a distended and enlarged uvula with a translucent shiny appearance and increase turgor	Conservative management: Saline gargles, antihistamines, topical lidocaine, and/or mouth washes
Grade II	Uvulitis seen as an inflamed erythematous uvula and soft palate with or without small hemorrhages and ecchymosis	Conservative management: Saline gargles, antihistamines, topical lidocaine, and/or mouth washes. May require steroids or antibiotics
Grade III	Uvular necrosis seen as clearly demarcated black or gray-white-colored necrosed or ischemic segment of uvula which may be elongated	Trial of conservative management is given. If persistent, consider surgical excision
Grade IV	Uvular auto-amputation or cut uvula seen as a shortened uvula with an irregular border	Microsurgical reconstruction (optional)

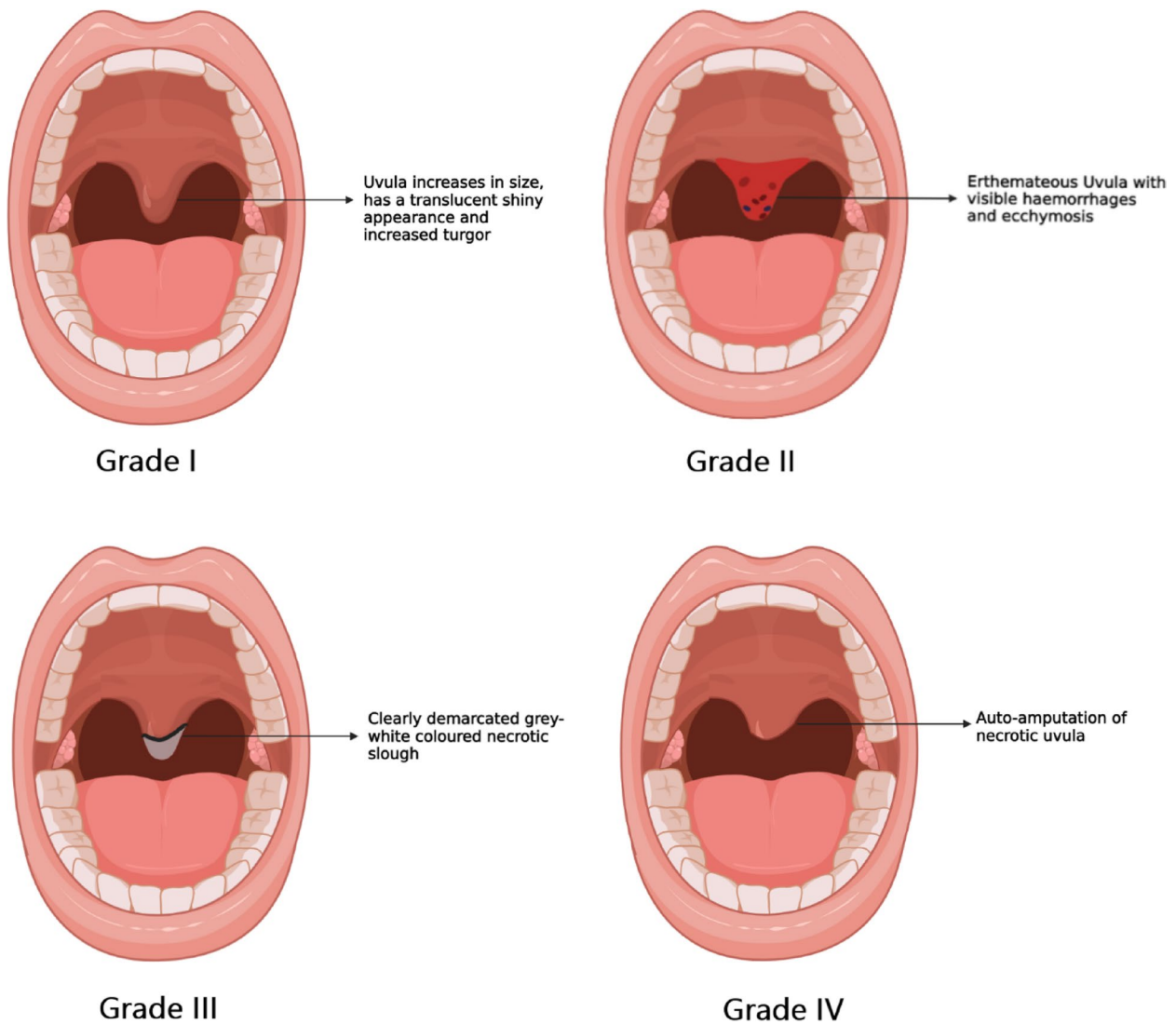


Fig. 2 Zameer’s grading of uvular injuries

If the patient can swallow their own secretions, then they can be managed as outpatients (Budde et al. 2018). All cases are given an initial trial of conservative

management which includes saline gargles, ammonium hydroxide mouth washes, topical lidocaine, and/or antihistamines. In complicated cases, steroids or antibiotics

may also be prescribed. Steroids can limit the inflammatory process, while antibiotics can prevent secondary infections (Bright et al. 2021). About 94% of all cases resolve with conservative management, while only 6% require surgical excision (Reid et al. 2020).

Immediate surgical excision can be considered in grade III injuries especially if there is a clear demarcation of the devitalized and the normal uvula. This will reduce the foreign body sensation but may not relieve the inflammatory process (Goldin and Ji 2013). About 91% of cases will resolved in 2 weeks, but, if there is persistence of uvular necrosis, especially after 2 weeks of conservative management, then surgical amputation of the gangrenous segment may be done (Reid et al. 2020; Goldin and Ji 2013).

For grade IV uvular injuries, typically no treatment is required. However, in severe cases of velopharyngeal insufficiency, one can expect nasalization of phonation or weaker consonants due to nasal air emission, but in most cases, these changes are hardly noticeable (Goldin and Ji 2013). These patients may be offered options on microsurgical reconstruction (Lee et al. 2014).

Uvular injuries do not leave any permanent symptoms (Pamnani et al. 2014). However, in rare cases, it can cause airway obstruction, bleeding, infection, and dysphagia that can make postoperative nutrition difficult (Xiao et al. 2021).

We make the following recommendations to reduce the likelihood of developing uvular injury after ETT intubation:

1. Preoperative examination should also include assessing the size of the uvula especially in cases that are planned to be done in supine position. An assessment of predisposing factors can guide the anesthetist in being cautious while intubating patients (Ziahosseini et al. 2014).
2. Care should be taken to use low-pressure suction to minimize trauma to oropharyngeal structures. Suctioning under direct vision within the oral cavity can limit the development of uvular injury (Reid et al. 2020; Ziahosseini et al. 2014). Overzealous suctioning is especially detrimental during extubation since the muscle reflexes may be reduced or absent (Lee et al. 2014).
3. The use of video laryngoscopy is recommended for ETT intubation where it is feasible and where the patient has predisposing factors (Budde et al. 2018).
4. The tube once properly inserted should be secured to one side of the midline (Reid et al. 2020; Chatterjee et al. 2018).
5. Patients with postoperative sore throat should be advised saline gargles early to prevent further dam-

age to the mucosal lining and limit the inflammatory process (Bright et al. 2021; Ziahosseini et al. 2014).

Conclusions

Uvular injury is a rare complication of a common procedure, ETT intubation, which can easily be prevented with proper preoperative evaluation. Most cases can be managed conservatively. The study also emphasizes the establishment of diagnostic, preventive, and managerial principles for uvular injury.

Abbreviation

ETT Endotracheal tube

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None to declare

Authors' contributions

SMI, MF, and HAK were core members of the primary treating team of the patient and selected the case report. SZ, AF, and UA did the extensive literature review and interpreted the patient data. SZ, AF, and UA wrote the first draft. SMI, MF, and HAK critically reviewed the draft and corrected the manuscript for the final version. All authors approved of the final paper and take accountabilities for all aspects of the report.

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Availability of data and materials

The dataset generated or analyzed during the current study is not publicly available due to patient confidentiality but are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

An informed written consent to participate in the study was taken from the patient. Confidentiality was maintained at all levels of the study.

Consent for publication

An informed written consent for publication was taken from the patient.

Competing interests

The authors declare that they have no competing interests.

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