CASE REPORT

Endotracheal intubation of a paediatric patient with an umbrella wire embedded in the palate to the posterior wall of the nasopharynx using a GlideScope video laryngoscope

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SUMMARY

The penetration of foreign bodies into the oropharynx can be life-threatening. Airway management in patients who have a foreign body penetrated into their oropharynx is a challenging problem for the anaesthetist. In this case report, we aimed to share our experience of endotracheal intubation performed with GlideScope video laryngoscopy in a 3-year-old, 15 kg patient. The patient underwent general anaesthesia to facilitate the removal of an umbrella wire that had become embedded in her soft palate.

BACKGROUND

Foreign bodies that have penetrated the oropharynx, which are mostly encountered in children 3–5 years of age, may lead to intracranial damage and can be life-threatening.^{1 2} Foreign bodies that have penetrated the mouth may also result in difficulty in bag-mask ventilation and endotracheal intubation, bleeding and aspiration.²

An important aspect of this case is that a GlideScope video laryngoscope (GVL; Verathon Medical, Bothell, Washington, USA) was used to facilitate the intubation of a patient with a palatal foreign body. The use of a GVL may decrease trauma and complications as it requires less manipulation of the airway, it does not require the alignment of the oropharyngeal-laryngeal axes for intubation and it is indirect. It also offers a potentially novel approach.³

This article reports a case of a 3-year-old girl with an umbrella wire embedded in the palate to the posterior wall of the nasopharynx, which was removed under general anaesthesia relying on our experience in airway management.

CASE PRESENTATION

A 3-year-old girl weighing 15 kg was admitted to our emergency department with an umbrella wire embedded in her palate due to a fall while playing in the street (figure 1). Her medical history was unremarkable except for hearing impairment. The physical examination revealed stable vital signs and normal respiration without oral bleeding.

INVESTIGATIONS

X-ray (figure 2) and CT showed a foreign body advancing to the skull base.

TREATMENT

The patient, who was evaluated by ear, nose and throat (ENT) specialists and neurosurgeons, was scheduled for an operation under general anaesthesia to remove the foreign body. The umbrella wire was preoperatively cut at the level of the lip using a wire-cutter to facilitate the bag-mask ventilation (figure 3). A 22G intravenous cannula was placed in the dorsum of the left hand. The patient, who was under routine monitoring by ECG, non-invasive blood pressure and pulse oximetry in the operating theatre was administered 50 mg/kg cefazolin sodium, 0.2 mg atropine and 1 mg midazolam. Three alternative plans were provided for airway management of the patient. For plan A, GVL and endotracheal intubation after rapid-

Figure 1 An embedded umbrella wire in the palate.

Figure 2 Lateral X-ray showing the umbrella wire.

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Figure 3 The umbrella wire cut at the level of the lip.

sequence induction were planned. An arrangement for fibre-optic intubation was made as B plan in case intubation with GVL failed. As the ENT surgeon is also an airway specialist, emergency tracheostomy was available in case plans A and B were to fail. The patient, who had neither eaten nor had anything to drink for 4 h, underwent modified rapid-sequence induction through preoxygenation with 100% O₂ for 2 or 3 min, followed by 2 µg/kg fentanyl, 2 mg/kg propofol and 1 mg/kg succinylcholine. The styletted endotracheal tube (size 4.5) was used for intubation after shaping it to an approximately 60° angle to resemble the curve of a size 2 blade during GVL. The patient was intubated using GVL with a size 2 blade successfully on the first attempt; the Cormack-Lehane score was 1. Anaesthesia was maintained with sevoflurane 1.5–2.5% and nitrous oxide in oxygen. Controlled mechanical ventilation with an initial tidal volume of 7–8 mL/kg and respiratory frequency of 20 breaths/min was adjusted to maintain the end-tidal CO₂ between 35 and 40 mm Hg. The umbrella wire was removed from the palate (figure 4) and the incision site was sutured. After controlling the bleeding, anaesthetic agents were stopped and the patient was extubated.

OUTCOME AND FOLLOW-UP

The patient was discharged with antibiotics the day after surgery. No problem was observed after checking the patient a week and then a month after the operation.

DISCUSSION

A literature review revealed several case reports of penetrating oral injuries due to toothbrushes, toys, spoons, forks, sticks,

Figure 4 Removed umbrella wire.

pens and pencils, which had been accidentally embedded in different parts of the oropharynx.^{1 2 4 5} However, there were no case reports in the literature of oropharyngeal injuries due to an umbrella wire. Such injuries may complicate anaesthesia. If patients with oropharyngeal injuries due to embedding of a foreign body have a full stomach it could lead to an increased risk of aspiration during induction. The presence of a foreign body embedded in the mouth may also cause some difficulties in bag-mask ventilation, laryngoscopy and endotracheal intubation.⁶ In addition, removal of the foreign body or imposing a force on the palate before endotracheal intubation may result in bleeding. Foreign bodies should be characterised by radiological imaging modalities in the preoperative period for making certain of their localisation.⁷ Anaesthesiologists should also evaluate these patients carefully and take a decision on the safest non-invasive treatment option. Fibre-optic intubation while the patient is awake or has spontaneous respiration under sedation may be preferred when there is a foreign body in the mouth. However, there may not be optimal airway exposure using fibre-optic intubation if there is bleeding.⁸ In this condition, emergency surgical airway management may be necessary.

In the current case, the umbrella wire was cut, using a wire-cutter, preoperatively at the level of the lip to facilitate the bag-mask ventilation, and the endotracheal intubation was performed through GVL without moving the head and neck.

GVL can be used not only for endotracheal intubation, but also for evaluation of the oropharynx and hypopharynx, to view the glottis and to remove foreign materials from these areas. Morris *et al*⁹ reported two cases of removal of foreign materials using GVL. Bose *et al*¹⁰ reported removal of a broken dilator, which was causing airway obstruction, from the trachea using GVL and, in their case, forceps. Warner *et al*¹¹ reported removal of a foreign body, which was causing airway obstruction, successfully with Magill's forceps assisted by GVL in a 7-year-old patient.

Conclusion

In conclusion, we suggest that using GVL is an effective alternative to facilitate endotracheal intubation with less head and neck manipulation.

Learning points

- ▶ Oropharyngeal foreign bodies should be characterised radiographically prior to removal.
- ▶ Patients of this type, especially on a full stomach, are generally at risk of aspiration because of the possibility of bleeding in the mouth.
- ▶ In cases of predicted difficult airways anaesthetists should prepare back-up plans/follow documented algorithms (eg, DAS, SAM, etc) and use alternative intubation devices to facilitate intubation if necessary.

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Competing interests None.

Patient consent Obtained.

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