

CASE REPORT

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A case of a different approach for difficult airway: transorbital endotracheal intubation

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Abstract

Background: In patients who have undergone head and neck surgery and received radiotherapy, airway management presents serious difficulties for the anesthesiologist.

Case presentation: We report a case of a 23-year-old male patient undergoing an emergency operation due to a rhabdomyosarcoma pressed spinal cord that loss of muscle strength and loss of sensation developed below the level of thoracal 6–7 vertebrae. Because of the previous radiotherapy reducing the mouth opening (less than 1 cm), the patient was intubated by transorbital pathway without any difficulty.

Conclusions: Transorbital intubation seems to be a safe method and may be a good alternative to difficult airway in the patient undergoing orbital exenteration.

Keywords: Difficult airway management, Transorbital intubation, Fiberoptic intubation, Direct laryngoscopy, Case report

Key messages

- Various techniques have been available for difficult airway management.
- Radiotherapy for the head may cause restriction of mouth opening movement.
- Transorbital endotracheal intubation is an uncommon approach.
- Transorbital intubation is an easy and safe alternative for airway management.

Background

In patients who have undergone head and neck surgery and received radiotherapy, airway management poses serious difficulties for the anesthesiologist and is important because it requires a case-specific solution. Upper airway anatomy may be seriously impaired due to surgery and radiotherapy, so it may be difficult to provide a safe airway for anesthesia induction (Wallet et al., 2006; Foroughi et al., 1994; Sander

et al., 2002; Waldron et al., 2016; dos Reis Falcao et al., 2014). In this case report, we wanted to present our experience of transorbital intubation in a patient who underwent orbital exenteration due to rhabdomyosarcoma and had a limited mouth opening. The case report is published with the written consent of the patient and this manuscript adheres to the applicable Enhancing the QUALity and Transparency Of Health Research (EQUATOR) guideline.

Case presentation

A 23-year-old (59 kg, 165 cm) male patient was to be operated under emergency conditions due to the loss of muscle strength and sensation that developed due to the compression of the rhabdomyosarcoma at the level of the thoracic 6–7 vertebrae on the medulla spinalis. In his medical history, maxillectomy due to maxillary sinus rhabdomyosarcoma and subsequent recurrent tumor excision of zygomatic bone, orbit, hard palate, pterygopalatine fossa, temporal and masseter muscle invasion was performed. The patient received 11 cycles of chemotherapy and 13 cycles of radiotherapy after the first operation. The right orbital cavity was closed with a dressing

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(Fig. 1). When the dressing was removed, the root of the tongue was visible when the patient looked into the cavity from his head (Fig. 2). When the mouth was closed, breathing and air passage were provided from the cavity. In the airway examination, the mouth opening was less than 1 cm and there was a removable prosthetic palate (Fig. 1). His neck movements were also limited but it wouldn't be a problem for tracheostomy. The patient did not describe respiratory distress or effort dyspnea. On physical examination, there was no evidence of a blockage in the upper respiratory tract. The patient was breathing much more easily without restriction from the orbital cavity compared to the nose. The patient's mucosa was not fragile, therefore there was no risk of bleeding.

Detailed information was given to the patient about oral or nasal fiberoptic intubation, transorbital intubation, and tracheostomy. Standard anesthesia monitoring (electrocardiography, pulse oximetry, non-invasive arterial pressure measurement) was performed in the operating room. Lidocaine 10% topically was applied to the orbital cavity and tongue base; fentanyl 50 μg and 2 mg midazolam intravenously (IV) for sedoanalgesia were administered. Preoxygenation with 100% fraction of inspired oxygen (FiO_2) was applied for 3 min with a simple mask placed on the orbital cavity. The number four Macintosh blade was passed through the orbital cavity and inserted into the tongue base. Vocal cords were clearly seen and it was determined that there was no need for fiberoptic use. Anesthesia induction was provided with lidocaine (1 mg kg^{-1} IV), propofol (2 mg kg^{-1} IV), rocuronium (1 mg kg^{-1} IV), and fentanyl (2 $\mu\text{g kg}^{-1}$ IV). The patient was intubated with a direct laryngoscopy using spiral intubation tube no 7.5 at one time without any



Fig. 1 The patient's mouth opening



Fig. 2 View of the eye cavity (a) tongue, (b) concha. The patient's maxilla, zygomatic bone, orbita, hard palate, and pterygopalatine fossa were excised

difficulty. The intubation tube was detected at 22 cm (Fig. 3). No damage or bleeding occurred in the tissues. Maintenance of anesthesia was provided with 50% FiO_2 , 2–3% sevoflurane, 0.25–0.5 $\mu\text{g kg}^{-1} \text{min}^{-1}$ remifentanyl infusion, and if necessary rocuronium (0.15 mg kg^{-1} IV). Thoracic intradural extramedullary tumor excision was applied to the patient who was placed in the prone position during the 3-h operation. At the end of the operation, rocuronium was antagonized with sugammadex (4 mg kg^{-1} IV) and the patient was extubated when he fully recovered his spontaneous respiration. The patient, who was followed up for 24 h in the neurosurgery intensive care unit and 3 days in the service, was discharged without any sequelae.



Fig. 3 Location of the endotracheal tube after intubation

Discussion

In this case report, our experience of transorbital intubation in a patient with limited mouth opening without the chance of orotracheal intubation is presented.

In patients who received radiotherapy for head and neck cancer, it is often observed that the mouth opening movement is restricted. In patients requiring emergency surgery, the presence of trismus in the patients may jeopardize ventilation and intubation. Nasal intubation can be seen as a suitable alternative to endotracheal intubation in patients with extremely limited mouth opening (Wallet et al., 2006; Foroughi et al., 1994). It may be an unexpected alternative to tracheostomy to provide airway when nasal intubation is unsuitable or if the orbital cavity is open, transorbital intubation is the best alternative way in patients with limited mouth opening (Wallet et al., 2006; Foroughi et al., 1994; Sander et al., 2002). There are a limited number of case reports published in the literature on transorbital intubation for anesthesia. (Wallet et al., 2006; Foroughi et al., 1994; Sander et al., 2002; Waldron et al., 2016; dos Reis Falcao et al., 2014) Wallet et al. (Wallet et al., 2006) and Sander et al. (Sander et al., 2002) stated that transorbital intubation should be applied while preserving the patient's

breathing. Both authors stated that they performed intubation with fiberoptic bronchoscopy (Wallet et al., 2006; Sander et al., 2002). Waldron et al. (Waldron et al., 2016) applied general anesthesia induction after preoxygenation in a patient whose mouth opening was less than 5 mm and intubated their patients with fiberoptic. Foroughi et al. (Foroughi et al., 1994) started general anesthesia induction after guaranteeing airway patency in transorbital laryngoscopy under sedation and transorbital intubated the patient with a laryngoscope. Dos Reis Falcão et al. (dos Reis Falcao et al., 2014) performed oral laryngoscopy under sedation and preserving the patient's breathing, and after they saw the vocal cords through the orbital defect, they started general anesthesia induction. They intubated the patient through the transorbital defect using oral laryngoscopy.

Tracheotomy, transorbital or nasal fiberoptic bronchoscopy, and direct transorbital laryngoscopy were among our options for airway management of the patient. Oral laryngoscopy was not possible due to the limited mouth opening. Nasal intubation, on the other hand, was dismissed due to possible complications. Thus, transorbital direct laryngoscopy was decided as the first option. Despite this, the fiberoptic bronchoscopy and tracheotomy set was kept ready in the operating room. The patient's breathing was not suppressed before the airway was guaranteed. Similar to the method applied by Foroughi et al. (Foroughi et al., 1994), orbital direct laryngoscopy was performed under sedation and general anesthesia induction was initiated when it was seen that the airway opening was sufficient. Intubation was performed by visualizing the vocal cords with a laryngoscope advanced through the orbital cavity with induction of anesthesia after preoxygenation.

Conclusions

Transorbital intubation seems to be a safe and effective method in patients undergoing orbital exenteration and may be a good alternative to difficult airway in this patient group. Thus, a safe airway was provided between the orbit and the larynx, and the complications of tracheostomy were avoided.

Abbreviations

FiO₂: Fraction of inspired oxygen; EQUATOR: Enhancing the QUALity and Transparency Of Health Research; IV: Intravenously

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Authors' contributions

OD: Designed, literature searched, collected the data, wrote and critically reviewed the manuscript. CS: Designed, literature searched, collected the data, wrote and critically reviewed the manuscript. TB: Designed and critically reviewed the manuscript. All authors approved the final version of the manuscript.

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Consent for publication

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Competing interests

The authors declare that they have no competing interests.

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