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CASE REPORTS

Use of Esketamine Combined with Dexmedetomidine for Difficult Tracheal Intubation in an Uncooperative Pediatric Patient with Severe Trismus: A Case Report

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ABSTRACT

Managing difficult airways in pediatric patients with severe trismus and poor cooperation is challenging because conventional sedatives may suppress spontaneous respiration. We report a case of a 15-year-old girl (weight 50 kg) with recurrent rhabdomyosarcoma causing severe trismus (0-finger mouth opening) and facial deformity. After premedication with atropine and methylprednisolone, sedation was achieved with a slow infusion of dexmedetomidine (20 μg over 10 minutes) followed by intravenous esketamine (20 mg, 0.4 mg/kg). This regimen preserved spontaneous breathing with oxygen saturation maintained at 99–100% throughout the procedure. Topical anesthesia of the nasopharynx was performed using 2% lidocaine spray (total dose 100 mg, approximately 2 mg/kg) via spray-as-you-go technique. Fiberoptic nasotracheal intubation was then successfully accomplished without coughing, body movement, or hemodynamic instability. No adverse events such as emergence reactions or hallucinations occurred. This multimodal sedation approach may offer a safe and effective alternative when preserving spontaneous respiration is critical in uncooperative pediatric patients with severely restricted mouth opening.

Keywords: Airway Management; Child; Dexmedetomidine; Esketamine; Fiberoptic Intubation; Rhabdomyosarcoma; Trismus

Introduction

Fiberoptic bronchoscopic (FB) intubation is a cornerstone for managing anticipated difficult pediatric airways, particularly when trismus and poor cooperation limit direct laryngoscopy (1). Success depends on maintaining spontaneous respiration and adequate airway topicalization while avoiding respiratory depression. Conventional sedatives such as propofol, midazolam, or opioids may suppress ventilatory drive, increasing hypoxia risk in patients with severe trismus and tumor-related airway distortion (2,3). Esketamine, the S-enantiomer of ketamine, preserves spontaneous breathing and pharyngeal reflexes, making it theoretically advantageous (4). Dexmedetomidine, a highly selective α2-adrenoceptor agonist, provides sedation and analgesia without significant respiratory depression and has been used successfully for awake fiberoptic intubation in both adults and children (5–7). However, the combined use of dexmedetomidine and esketamine for sedated fiberoptic intubation in uncooperative pediatric patients with severe trismus remains undocumented. In this case, a 15-year-old female with recurrent rhabdomyosarcoma presented with 0-finger mouth opening, facial deformity, and an ulcerated intraoral tumor. To secure the airway while preserving spontaneous ventilation, a dexmedetomidine-esketamine sedation regimen was employed.

Case Presentation

A 15-year-old female (weight 50 kg) presented with a diagnosis of left temporal rhabdomyosarcoma in August 2025. The planned procedure was excision of the temporal mass and reconstruction with a left anterolateral thigh musculocutaneous flap. Her past medical history included surgical resection, radiotherapy, and chemotherapy for left temporo-sphenoidal rhabdomyosarcoma. She was unable to eat orally, received enteral nutrition via a gastrostomy tube, and was malnourished.

Physical examination revealed a large mass in the left temporal region with local ulceration communicating with the oral cavity. Mouth opening was 0 finger-widths, indicating severe restriction (Fig. 1A). Jaw protrusion was impossible, and trismus prevented tongue protrusion, making Mallampati classification unfeasible. Neck extension and rotation were normal. Head and neck CT demonstrated a residual soft tissue mass measuring approximately 62 × 26 mm, with destruction of the left temporal bone, sphenoid wing, orbital floor, and zygomatic arch. The left foramen ovale was expanded, with tumor infiltration into the left maxillary sinus and mastoid air cells.

Based on these findings, the patient was anticipated to have a difficult airway. Her uncooperativeness for awake sedation intubation, combined with complete inability to open the mouth, made airway management extremely challenging. Fiberoptic bronchoscope-guided nasotracheal intubation under preserved spontaneous respiration was ultimately planned.

Given that traditional opioids and midazolam could lead to respiratory depression, and to provide adequate sedation while preserving spontaneous respiration, esketamine was chosen. Premedication included intravenous atropine (0.2 mg) and methylprednisolone (10 mg). Dexmedetomidine was administered as a slow infusion (20 μg over 10 minutes), followed by pre-oxygenation. Intravenous administration of 20 mg esketamine (0.4 mg/kg) was given. After the patient lost consciousness, topical anesthesia of the nasopharynx was performed with 2% lidocaine spray (total dose 100 mg, approximately 2 mg/kg) using a spray-as-you-go technique through the fiberoptic bronchoscope working channel. During this process, vital signs remained stable, breathing was steady, and oxygen saturation was maintained at 99–100%. Fiberoptic bronchoscope-guided nasotracheal intubation was then performed using a size 6.0 endotracheal tube, with no significant body movement or coughing. The endotracheal tube was secured after immediate confirmation by end-tidal CO_2 waveform, and SpO_2 remained above 99% throughout. After securing the airway, GA was induced with Sufentanil (0.2 μg/kg), Propofol (1.5 mg/kg), and Rocuronium (0.6 mg/kg). Then mechanical ventilation was initiated. General anesthesia was maintained intraoperatively with sevoflurane inhalation, continuous intravenous infusions of propofol and remifentanil, and rocuronium as needed. Surgery proceeded uneventfully for approximately 6 hours with stable hemodynamics and no airway complications. Fluid administration and blood loss were within expected limits. The patient was extubated in the post-anesthesia care unit and regained consciousness within 15 minutes. Vital signs remained stable, respiratory function was satisfactory, and she was transferred back to the ward in stable condition. She was eventually discharged after recovery without adverse memories related to the intubation.

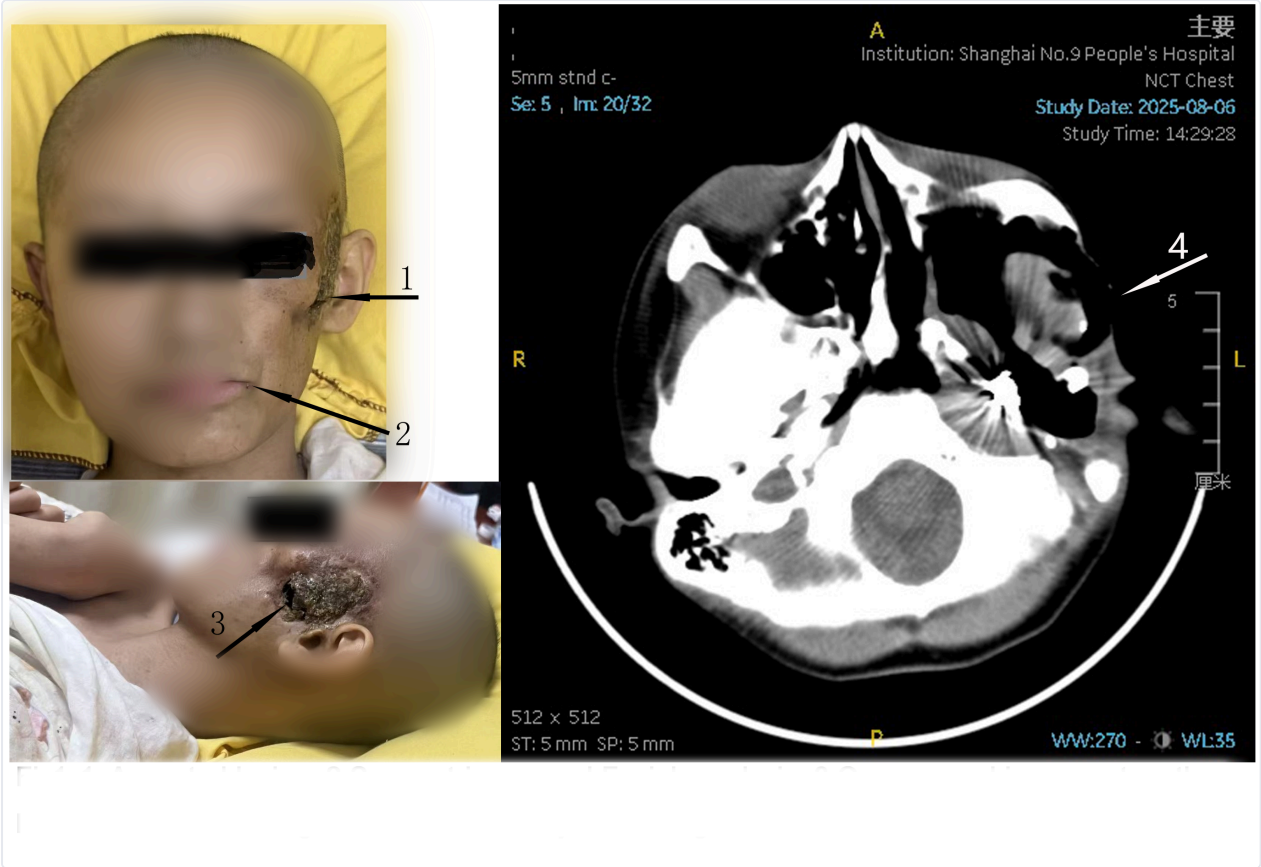

Figure 1. 1 A crusted lesion; 2 Severe trismus and Facial paralysis; 3 Open wound is present on the left face,communicating with the oral cavity; 4 CT image shows oronaoculaneous fistula.

Informed Consent

Written informed consent was obtained from the patient's guardian for publication of this case report and any accompanying images.

Discussion

Awake fiberoptic bronchoscope-guided intubation under preserved spontaneous respiration is the gold standard for anticipated difficult airways (1,8). However, for patients with mouth opening restriction who may be impossible to mask-ventilate — as in this case where facial tumor ulceration communicated with the oral cavity — hypoxia is difficult to avoid once respiratory depression occurs. Esketamine, the S-enantiomer of ketamine, provides potent analgesia and sedation while preserving spontaneous respiration (4). It does not affect the hypoxic ventilatory response. Previous studies have demonstrated its efficacy in pediatric sedation (9,10). Potential risks include emergence reactions, hallucinations, and increased secretions. Appropriate use of dexmedetomidine can effectively reduce these adverse reactions (11).

The rationale for selecting low doses of dexmedetomidine and esketamine in this case deserves further elaboration. We used a low-dose dexmedetomidine infusion (20 μg over 10 minutes, equivalent to approximately 0.4 μg/kg loading) followed by a single bolus of esketamine 0.4 mg/kg. These doses are at the lower end of the recommended ranges for procedural sedation. Low-dose dexmedetomidine (≤0.5–1.0 μg/kg) has been shown to preserve spontaneous ventilation and airway reflexes while providing adequate sedation and hemodynamic stability (5,6). Similarly, sub-dissociative doses of esketamine (0.2–0.5 mg/kg) maintain pharyngeal tone and spontaneous breathing, reduce the risk of apnea, and have a favorable safety profile (4). The combination allows synergy: dexmedetomidine provides baseline sedation and attenuates

esketamine-induced sympathetic stimulation and emergence phenomena, while esketamine contributes analgesia and deeper sedation without compromising respiratory drive. This balanced approach enabled us to perform fiberoptic intubation smoothly with no episodes of hypoxia, coughing, or hemodynamic instability. We believe this regimen is particularly advantageous in uncooperative pediatric patients with severe trismus, where any loss of spontaneous ventilation could be catastrophic.

Conclusion

For managing complex airways involving difficult mask ventilation and severe mouth opening restriction in an uncooperative adolescent, esketamine-assisted fiberoptic intubation with preservation of spontaneous respiration is a promising technique. More clinical studies are needed to validate its safety and efficacy in diverse patient populations.

REFERENCES

1. Frerk C, Mitchell VS, McNarry AF, Mendonca C, Bhagrath R, Patel A, O'Sullivan EP, Woodall NM, Ahmad I; Difficult Airway Society intubation guidelines working group. Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults. Br J Anaesth. 2015 Dec;115(6):827-48. doi: 10.1093/bja/aev371. Epub 2015 Nov 10. PMID: 26556848; PMCID: PMC4650961.
2. Apfelbaum JL, Hagberg CA, Connis RT, Abdelmalak BB, Agarkar M, Dutton RP, Fiadjoe JE, Greif R, Klock PA, Mercier D, Myatra SN, O'Sullivan EP, Rosenblatt WH, Sorbello M, Tung A. 2022 American Society of Anesthesiologists Practice Guidelines for Management of the Difficult Airway. Anesthesiology. 2022 Jan 1;136(1):31-81. doi: 10.1097/ALN.0000000000004002. PMID: 34762729.
3. Heinrich S, Birkholz T, Ihmsen H, Irouschek A, Ackermann A, Schmidt J. Incidence and predictors of difficult laryngoscopy in 11,219 pediatric anesthesia procedures. Paediatr Anaesth. 2012 Aug;22(8):729-36. doi: 10.1111/j.1460-9592.2012.03813.x. Epub 2012 Feb 20. PMID: 22340664.
4. Mion G, Himmelseher S. Esketamine: Less Drowsiness, More Analgesia. Anesth Analg. 2024 Jul 1;139(1):78-91. doi: 10.1213/ANE.0000000000006851. Epub 2024 Jan 31. PMID: 38295061.
5. Tang ZH, Chen Q, Wang X, Su N, Xia Z, Wang Y, Ma WH. A systematic review and meta-analysis of the safety and efficacy of remifentanil and dexmedetomidine for awake fiberoptic endoscope intubation. Medicine (Baltimore). 2021 Apr 9;100(14):e25324. doi: 10.1097/MD.0000000000025324. PMID: 33832107; PMCID: PMC8036033.
6. Mason KP, Zurakowski D, Zgleszewski SE, Robson CD, Carrier M, Hickey PR, Dinardo JA. High dose dexmedetomidine as the sole sedative for pediatric MRI. Paediatr Anaesth. 2008 May;18(5):403-11. doi: 10.1111/j.1460-9592.2008.02468.x. Epub 2008 Mar 18. PMID: 18363626.
7. Bergese SD, Candiotti KA, Bokesch PM, Zura A, Wisemandle W, Bekker AY; AWAKE Study Group. A Phase IIIb, randomized, double-blind, placebo-controlled, multicenter study evaluating the safety and efficacy of dexmedetomidine for sedation during awake fiberoptic intubation. Am J Ther. 2010 Nov-Dec;17(6):586-95. doi: 10.1097/MJT.0b013e3181d69072. PMID: 20535016.
8. Cook TM, Kelly FE. The Difficult Airway Society 2015 guidelines and the sacred cows of routine airway management. Anaesthesia. 2016 Apr;71(4):466-7. doi: 10.1111/anae.13440. PMID: 26994533.
9. Xing F, Zhang TT, Yang Z, Qu M, Shi X, Li Y, Li Y, Zhang W, Wang Z, Xing N. Comparison of dexmedetomidine and a dexmedetomidine-esketamine combination for reducing dental anxiety in preschool children undergoing dental treatment under general anesthesia: A randomized controlled trial. J Affect Disord. 2024 Feb 15;347:569-575. doi: 10.1016/j.jad.2023.12.011. Epub 2023 Dec 6. PMID: 38065480.
10. Xu C, Zheng G, Zhuo Y, et al. Intranasal Esketamine Premedication Reduces Sevoflurane Requirements During Laryngeal Mask Airway Insertion in Pediatric Patients: A Randomized Controlled Trial. Drug Des Devel Ther. 2025;19(12):6943-6953.

11. Sun L, Guo R, Sun L. Dexmedetomidine for preventing sevoflurane-related emergence agitation in children: a meta-analysis of randomized controlled trials. Acta Anaesthesiol Scand. 2014 Jul;58(6):642-50. doi: 10.1111/aas.12292. Epub 2014 Mar 3. PMID: 24588393.

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Data availability. Data sharing not applicable to this article as no datasets were generated or analyzed during the current case report.

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