

## Successful tracheal intubation with the GlideScope® in a patient with CHARGE syndrome

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To the Editor:

CHARGE syndrome is a rare heterogeneous disorder characterized by multiple congenital anomalies with an incidence of 0.1–1.2 per 10,000 births [1]. The acronym CHARGE stands for five characteristic features of the syndrome: coloboma, heart defect, choanal atresia, retarded growth, genital hypoplasia, and ear anomalies [1]. Because of congenital malformations, CHARGE patients are likely to undergo multiple surgical interventions. CHARGE patients usually present with upper airway malformations and swallowing impairment, making perioperative airway management challenging [2]. We describe a case of successful airway management using the GlideScope (Verathon, Bothell, WA, USA) in a patient with CHARGE syndrome.

A 4-year-old boy (height 87 cm, weight 11 kg), admitted to our hospital for bilateral orchiopexy, had been diagnosed with CHARGE syndrome based on the presence of four major diagnostic criteria [1]. He had undergone several surgical procedures associated with his congenital anomalies, and the anesthetic records indicated that tracheal intubation had become increasingly difficult with growth (Table 1). General anesthesia was induced with inhalation of 5 % sevoflurane and 50 % nitrous oxide in oxygen. After confirming successful facemask ventilation, 10 mg rocuronium was administered. Direct laryngoscopy

with a Macintosh 2 blade provided a Cormack–Lehane grade IV view. The tip of the epiglottis could be viewed with a Pentax airway scope (AWS), and we could not get the blade under the epiglottis. Using a GlideScope GLV2, tracheal intubation with a 4.5-mm uncuffed tube was achieved by directing the tube blindly above the arytenoids. Anesthesia was maintained with 2 % sevoflurane and fentanyl (30 µg total). Upon emergence from anesthesia, retractive breathing with excessive lower airway secretion became apparent and bronchospasm was suspected. Administration of 50 mg intravenous hydrocortisone, 0.05 mg intramuscular epinephrine, and 0.5 mg transdermal tulobuterol gradually improved the respiratory condition, and the trachea was extubated after 30 min. The patient recovered uneventfully and was discharged home next day.

Preoperative assessment of CHARGE patients should include individual assessment for heterogeneous upper airway anomalies. Our patient presented with an asymmetrical and comparatively smaller face with micrognathia. Previous anesthetic records should be reviewed with consideration of possible anatomic changes of the upper airway with growth. Stack and Wyse reported more difficult tracheal intubation with growth in some CHARGE patients [3]. An appropriate strategy for difficult intubation in these patients is necessary. The laryngeal mask airway (LMA) and AWS are potential candidate devices commonly used for difficult intubations, but these were not effective in our case, likely because of the airway anomaly. Fiberoptic intubation is another option, but previous attempts proved difficult in this patient at age 3 during surgery for bilateral orchiopexy (Table 1). Our case indicates that the GlideScope may facilitate intubation in patients presenting with an upper airway anomaly for which neither the AWS or LMA is appropriate.

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**Table 1** Summary of the anesthetic records indicating increasing difficulty in tracheal intubation with growth

Age	Type of procedure	Device used for airway management	Assessment	Perioperative airway problems
4 months	PDA ligation	No records available	No records available	Required mechanical ventilation for 3 weeks postoperatively because of laryngomalacia
2 years	Palatoplasty tympanic ventilation tube placement	Mac 2 blade	C&L III difficult intubation. Intubated with 3.5-mm uncuffed ETT	Pre- and postoperative excessive oral secretions
3 years	Bilateral orchiopexy	Mac 2 blade, Trachilight, Fiberscope, ProSeal LMA (size 1.5, 2)	C&L IV impossible to intubate with Mac 2 blade or Trachilight. Impossible to visualize glottis with fiberscope. Impossible to ventilate with LMA.	Operation was canceled
4 years	Tympanic ventilation tube placement	LMA Ambu Aura-i (size 1.5)	Barely ventilated with shoulder pillow	Notable oral secretions
4 years	Bilateral orchiopexy	Mac 2 blade, AWS, GlideScope	C&L IV with Mac 2 blade. Impossible to intubate with Mac 2 blade or AWS. Intubated 4.5-mm uncuffed ETT with GlideScope	Excessive lower airway secretions with bronchospasm responsive to medication

*PDA* patent ductus arteriosus, *C&L* Cormack–Lehane grade, *ETT* endotracheal tube, *Mac* Macintosh, *LMA* laryngeal mask airway

In conclusion, we report successful tracheal intubation with the GlideScope in a CHARGE patient. The GlideScope is a potentially useful tool to facilitate expected difficult airway management because of an upper airway malformation. However, even with the GlideScope, the vocal cords were still not visualized.

**Conflict of interest** No conflict of interest exists.

## References

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