Anaesthesia *Cases*

Awake fibreoptic intubation in a 10-year-old patient with a known difficult airway due to Goldenhar syndrome

Published: 07 Jun 2014

http://dx.doi.org/10.21466/ac.AFIIA1P.2014

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Summary

A 10-yr-old female with Goldenhar syndrome presented for elective dental surgery. She was known to have a difficult airway and it was suggested that she should have an elective tracheostomy under sedation as the safest option to secure her airway prior to surgery. The patient and her parents refused tracheostomy and were keen to explore other options. We proceeded to secure her airway using awake fibreoptic intubation. Surgery was uneventful and the patient was extubated and discharged on the same day. The use of a fibreoptic scope is well described in children; however awake intubation in paediatrics is uncommon, with most procedures being performed under deep sedation or general anaesthesia due to problems with patient cooperation [1,2]. This case report describes the use of awake fibreoptic intubation in paediatrics for the management of an anticipated difficult airway.

Introduction

A 10-yr-old female presented for elective dental restorations and extractions under general anaesthesia. She had a diagnosis of Goldenhar syndrome (Oculo-Auriculo-Vertebral syndrome). This is a rare congenital disorder characterised by incomplete development of the ear, nose, soft palate, lip, and mandible. The syndrome is characterised by eye abnormalities in association with ear, mandible or vertebral anomalies [3].

Affected individuals display great phenotypical variability, however there is a potential for a difficult airway due to micrognathia and mandibular hypoplasia. There may be difficulty in maintaining a facemask seal due to hemifacial microsomia. Difficult intubation arises from a combination of asymmetrical mandibular hypoplasia, hemifacial microsomia, tracheal deviation and craniovertebral abnormalities such as the possibility of C1-2 subluxation and potentially limited neck mobility [4].

Report

The patient presented to the pre-operative clinic and was assessed by a consultant anaesthetist and a consultant otolaryngologist. She had a history of obstructive sleep apnoea with an apnoea-hypopnoea index of 9.1 but did not use continuous positive airway pressure (CPAP) masks because of an ineffective facemask seal. Her previous anaesthetic record was reviewed in detail. She had undergone a gas induction for elective surgery 2 years previously and the record emphasised that there was difficulty with mask ventilation, requiring two anaesthetists and a

nasopharyngeal airway to maintain oxygenation. Furthermore, three attempts were taken by an experienced consultant using a fibreoptic scope in order to successfully intubate her trachea.

Examination revealed a 19.2 kg female with retrognathia, glossoptosis, severely limited mouth opening (0.5cm), Mallampati grade 4 and an old tracheostomy scar. Nasendoscopy by an ear, nose and throat (ENT) consultant revealed a narrowed nasopharynx, glossoptosis and retroverted epiglottis. Her severely limited mouth opening was attributed to temporomandibular joint fusion following a mandibular rib graft. The lack of oral space indicated that insertion of a supraglottic airway device or laryngoscope would be challengin. The patient and parents refused elective tracheostomy under sedation due to the poor quality of life the patient had experienced after a tracheostomy had been performed as a toddler. As the dental work to be undertaken was likely to be difficult and extensive with significant potential for intra-operative bleeding, it was essential to secure the airway prior to surgery. Following multidisciplinary discussion we decided to proceed with awake nasal fibreoptic intubation to secure the airway prior to induction of general anaesthesia.

The patient and her parents gave informed consent for awake intubation with written consent for photography and publication. Consent was given for an emergency tracheostomy as a life-saving event. A 22 gauge intravenous cannula was sited pre-operatively. Full monitoring was instituted and supplemental oxygen applied to the oropharynx using nasal cannula. The ENT consultant was present in theatre in the event an emergency tracheostomy was required. Premedication was with 0.1 mg glycopyrrolate and 0.5 mg midazolam. Oxymetazoline spray was instilled into each nostril. The airway was topicalised with 4 ml nebulised and gargled 4% lidocaine. Remifentanil and propofol infusions (0.05 $mcg.kg^{-1}.min^{-1}$ and 75 $mcg.kg^{-1}.min^{-1}$ respectively) were titrated to maintain conscious sedation with the patient awake and co-operative. A 3.3 mm Pentax fibreoptic scope was loaded with a 5.0 mm I.D. cuffed nasotracheal tube. This was advanced through the right nares into the trachea with a further 1 ml of 2% lidocaine sprayed using an epidural catheter fed through the suction channel (figure). The tube was advanced into the trachea and position confirmed by a normal capnography trace. General anaesthesia was then induced with a propofol bolus, the tube was sutured to the nares and surgery proceeded uneventfully.

The patient was extubated awake and discharged on the same day. She reported full recall of the intubation but stated her experience was ‘not too bad’ and was willing to undergo the procedure again in the future if required.

Discussion

Failures in airway management remain the main cause of anaesthesia-related morbidity and mortality. When faced with a known difficult airway all measures must be taken to anticipate potential problems and avoid a ‘can’t intubate can't ventilate’ situation. As always, the goals of airway management are to maintain oxygenation and minimise airway trauma.

Performing an awake fibreoptic tracheal intubation for an anticipated difficult airway is the gold standard in adults but in children is rarer [5]. Uncooperative patients and parents can impair the success of an awake fibreoptic tracheal intubation in children. Our patient agreed to undergo an awake intubation as she was highly motivated and wished to avoid a tracheostomy. Her parents and her were, however, made aware that a tracheostomy might be required in a life-saving situation and consented to this. The presence of an ENT surgeon able to perform emergency tracheostomy is essential in cases of predicted and known difficult paediatric airways.

Other challenges in paediatrics include the need for awake intravenous access and potential for local anaesthetic toxicity during topicalisation of the airway. Previous data has recommended the maximum dose of lidocaine for topical airway anaesthesia in adults as 9 $mg.kg^{-1}$ [6]. This limited the amount of topical lidocaine that could be safely given to our patient at her weight of 19.2 kg. Care was also taken to liaise with the maxillofacial team to avoid dental local infiltration with lidocaine, and levo-bupivacaine infiltration was used at the end of the case to minimise the risk of local anaesthetic toxicity.

Conscious sedation during fibreoptic intubation is desirable for anxiolysis; particularly in a patient who may present for repeated surgical procedures. In paediatrics, conscious sedation can be difficult to titrate and must be performed by an experienced practitioner in order to avoid airway

compromise and maintain patient cooperation. The presence of three anaesthetists (a senior trainee and two consultants) enabled one practitioner to be solely responsible for administering and titrating intravenous sedation. This allowed the patient to maintain her airway and obey commands throughout whilst being adequately sedated to tolerate the procedure.

This case report highlights that successful awake fibreoptic tracheal intubation of the difficult paediatric airway can be achieved using a combination of topical anaesthesia and carefulconscious sedation. Ideally this should be performed in a tertiary paediatric centre with ENT help immediately available.

Acknowledgements

Published with the written consent of the patient's parents.

Competing Interests

No external funding and no competing interests declared.

Image

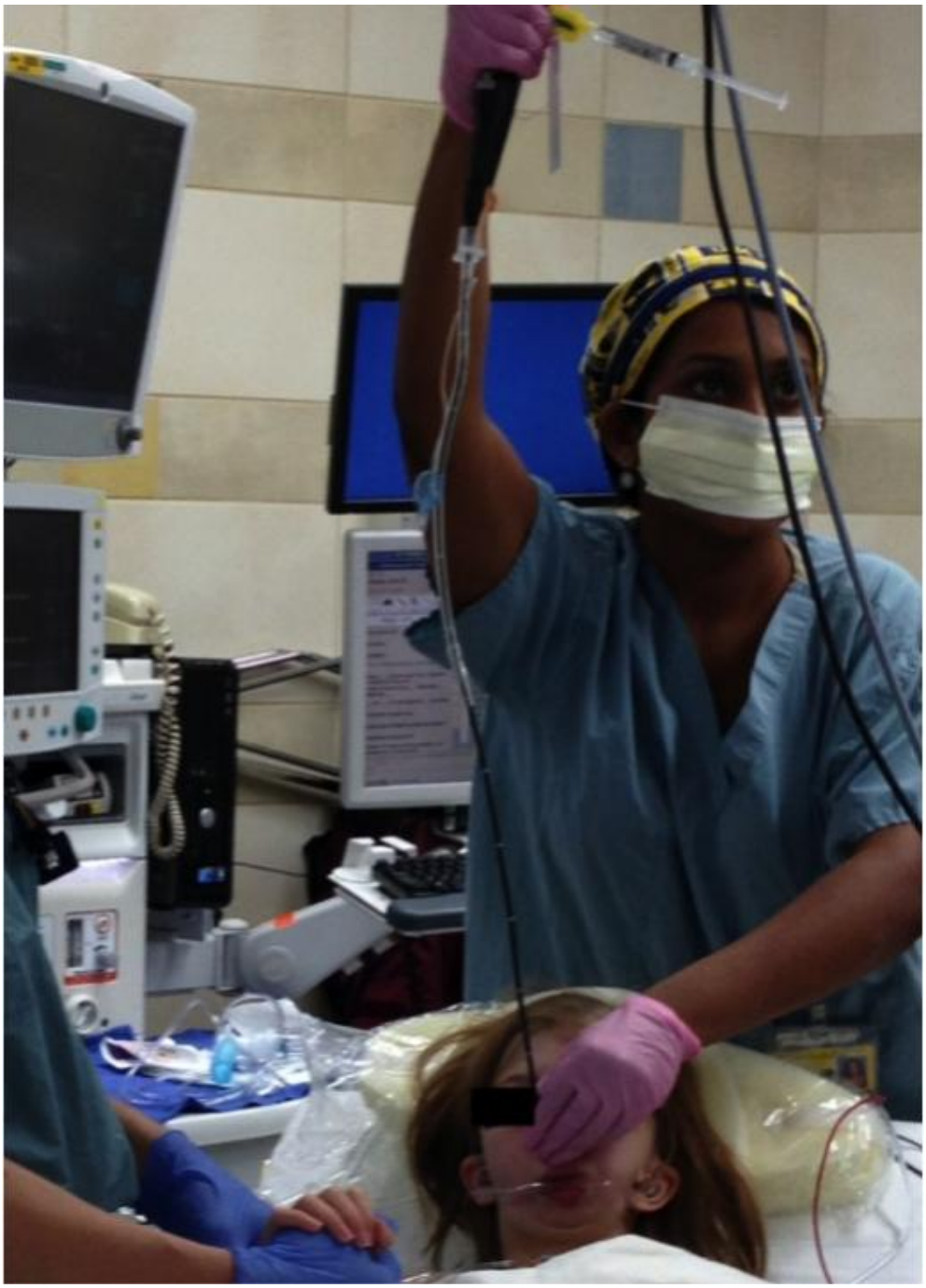

Figure 1. Awake fibreoptic intubation is performed. Oxygen is provided to the oropharynx using nasal cannula. An epidural cathether fed through the scope suction channel enables lidocaine topicalisation.

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