Tracheostomy, lingular tonsillectomy and sleep-related breathing disorders

I. D. Conacher1*, D. Meikle2 and C. O’Brien3

1Department of Cardiothoracic Anaesthesia, 2ENT Department and 3Paediatric Department, Freeman Hospital, Newcastle upon Tyne NE7 7DN, UK

*Corresponding author

Laser resection of lingual tonsils and formal closure of a tracheostomy improved the airway in a 14-yr-old patient with Down’s syndrome. Non-invasive airway support to treat obstructive sleep apnoea was postponed with this treatment. During the anaesthetic a laryngeal mask airway was used to support the airway after lingual tonsillectomy, to assess the suitability of de-functioning the tracheostomy. Laryngeal mask airways assist management of lingual tonsils. Lingual tonsil hypertrophy can lead to obstructive sleep disorders.

Keywords: surgery, laser; surgery, otolaryngological; equipment, airway; complications, obstructive sleep apnoea

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Lingual tonsillar hypertrophy (LTH), like hypertrophy of pharyngeal tonsils and adenoids, occurs in childhood and in adults with lymphoid proliferative conditions. Occasionally, it needs treatment. Haemorrhage at resection and reactive oedema are less frequent if lasers are used. We report a case in which laser resection of lingual tonsils enabled formal closure of a tracheostomy and postponed treatment with constant positive airway pressure for episodic nocturnal hypoxaemia.

Case report

A female with Down’s syndrome had developed airway problems in early childhood, treated with adeno-tonsillectomy and then a tracheostomy. This was successful at first but bacterial infections of the lower respiratory tract became troublesome. Nocturnal desaturation developed because of obstruction of her tracheostomy, and supraglottic airway obstruction. During the day, a significant proportion of her breathing by-passed the tracheostomy tube and was noted to be through the nose and mouth. At examination under anaesthesia, using the tracheostomy, hypertrophied lingual tonsils were seen, obstructing a view of the epiglottis and rima glottidis. When she was 14, treatment was started to restore a normal airway, including resection of lingual tonsils to avoid obstruction when the tracheostomy was closed.

Anaesthesia was induced by breathing air, oxygen and sevoflurane from a Bain breathing attachment connected to the tracheostomy tube. This was then changed to a low-flow carbon dioxide absorption system. Isoflurane was substi-
tuted for sevoflurane for maintenance of anaesthesia during surgery.

The procedure was in three stages. Residual adenoidal tissue was curetted, and then a KTP laser system was used to dissect out the lingual tonsils. This was done under direct vision using an operating laryngoscope, until the upper airway was clear. Anaesthesia was deepened, the tracheostomy cannula was removed and the stoma covered with an air-tight dressing. A 6.5 mm cuffed oro-tracheal tube was inserted before the operating laryngoscope was removed. The quality of the spontaneous breathing was assessed by observing the movement of the reservoir bag of the anaesthetic circuit, movements of the rib-cage and abdomen, and signs of use of the accessory muscles of respiration. No abnormalities or cause for concern were detected. The oro-tracheal tube was replaced with a laryngeal mask airway (LMA\(^1\)) (size 2), to support the upper airway and continue the anaesthetic. Again the quality and effort of respiration was observed. There was no change in clinical measurements, including \(\text{SpO}_2\) (98–100%), and respiration was not laboured. This suggested that there was no clinically significant glottic or supraglottic obstruction so the tracheostomy was surgically closed. The patient was nursed in an intensive care unit overnight, breathing from a standard oxygen mask. Some blood was expectorated without difficulty, and then stopped. When the patient was seen 3 months later, the airway was clear and there was minimal evidence of obstructive sleep apnoea (OSA) on early and formal polysomnography.

Discussion

The extent of obstruction caused by LTH is not well known. At laryngoscopy, enlarged soft, papillomatous lingual tonsils can completely obstruct any view of the larynx particularly following the use of neuromuscular blocking agents, which abolish skeletal muscle support for the airway. In one report, a soft tissue x-ray of an adult with LTH, showed the airway with an acute, ‘chicane like’ course posterior to the lingual tonsils and a superior border formed by the compressed epiglottis.\(^2\) When neuromuscular blocking agents have been given, without suspecting LTH, the outcome has sometimes been fatal.\(^3\)–\(^5\) In these situations there may be a ball-valve obstruction effect which prevents lung inflation and oxygenation during positive pressure ventilation. Similar effects could occur with non-invasive forms of positive pressure ventilation if lingual tonsils are not first removed. This may be particularly relevant in situations, such as Down’s syndrome, in which hypotonia and macroglossia also contribute to a ‘floppy’ upper airway.\(^1\)\(^6\)\(^7\)

There are several potential indications for LMAs to manage problems with lingual tonsils. When lingual tonsils were undetected until laryngoscopy and after neuromuscular drugs had been administered, an LMA was used as an immediate treatment.\(^2\) Other reports indicate the value of the LMA in similar cases and in the ‘cannot intubate, cannot ventilate’ condition.\(^8\)–\(^10\) However, the LMA may only be a temporary or partial solution to an urgent airway problem, and allow time to make a cricothyrotomy or tracheostomy.\(^10\)

In this patient, the LMA was used to give a clear surgical field, and indicate the quality of the glottic and sub-glottic airway, whilst minimizing the risk of contact damage in the recently traumatized upper airway. The final patency of the upper airway, including naso and hypopharynx, was assessed during recovery. Since this operation, there has been some deterioration, probably more in the nature of the Down’s syndrome than a recurrence of LTH. More than a year after the surgery, the airway remains adequate and non-invasive support is not needed.

For formal lingual tonsillectomy, an LMA would obstruct the surgery. In these circumstances, the airway can be secured by fashioning of a tracheostomy before the procedure, use of guided naso-tracheal intubation, or some method of ‘tubeless’ general anaesthesia and spontaneous ventilation such as using Boyle-Davis gags etc.\(^4\) In addition the LMA can be used with a tracheal tube passed through it.\(^8\)

Two recent reviews of childhood sleep related breathing disorders do not mention LTH as part of adeno-tonsillar hypertrophy syndromes, nor is there any suggestion that lingual tonsils may be a contributory element to mechanical obstruction.\(^11\)\(^12\) The development of these disorders of childhood is complex and multifactorial but adeno-tonsillar hypertrophy is frequent. Treatment by surgical removal of the adenoidal and pharyngeal tonsillar lymphoid tissue is first line management for childhood OSA. A small percentage are not improved and some develop recurrence in adolescence.\(^12\) Lingual tonsillar hypertrophy can cause OSA in adults, but it may be underrated in its potential to be a cause of mechanical obstruction in children, particularly those with Down’s syndrome,\(^1\) and it should be considered if adeno-tonsillectomy does not cure OSA or prevent its recurrence.

References


\(^{1}\) LMA\(^5\) is the property of Intavent Limited.
Airway management in an infant with congenital centrofacial dysgenesia

B. Carenzi1*, R. M. Corso2, V. Stellino1, G. D. Carlino1, C. Tonini2, L. Rossini2 and G. Gentili1

1Department of Neurosurgery, Section of Anaesthesia and Intensive Care, A.S.L. Città di Bologna, Ospedale `Bellaria-C.A. Pizzardi', via Altura 3, Bologna, Italy. 2Institute of Anaesthesiology and Intensive Care, University of Bologna, Ospedale Policlinico S. Orsola Malpighi, Italy

*Corresponding author: via Renata di Francia 44, I-44100 Ferrara, Italy

The use of a laryngeal mask airway (LMA) on two occasions, in a 53-day-old and 270-day-old male infant with Tessier N.3 and N.4 facial defects, using sedation and topical anaesthesia is described. The LMA was used to manage the airway and facilitate inhalation induction of anaesthesia as the facial deformities were thought to be too extensive for the safe use of a facemask.

The LMA is an alternative to a facemask and secures the airway and facilitates the inhalation induction of anaesthesia in paediatric patients with severe facial deformities.

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Congenital cleft cheeks are rare and disfiguring malformations with an incidence of 1.43±4.85/100 000. The aetiology is multifactorial and includes maternal infections such as toxoplasmosis, alterations in phenylalanine, and intake of anticomitial and thalidomide drugs. Tessier in 1990 classified them according to the anatomical defects as facial, craniofacial and laterofacial.1 Tessier N.3 includes harelip extending to a wing of the nose and connected to the medial palpebral angle;2 Tessier N.4 is described as an anomaly of the bony tissue with a wide harelip extending to the cheek, orbital dystopia, anomalies of the eyeball and reduced ocular-oral distance.3 Surgical treatment of these malformations involves several corrective operations over the years and include: (1) medial canthopexy to safeguard the integrity of the eyeball; (2) reconstruction of the cheek defect; (3) bone graft to the orbital region; and (4) attempts to expand the orbital cavity in patients presenting with micropthalmia and anophthalmia.2 Airway management in these patients is often problematic when using conventional facemasks.4

The laryngeal mask airway (LMA) has become an accepted aid in cases of difficult tracheal intubation in both adults and children.4±9 In addition the LMA has been used successfully as a conduit for fibrescope-assisted tracheal intubation in patients with congenital syndromes such as Pierre-Robin, Treacher-Collins, and Goldenhar, known to present with difficult airways.10±14 We describe the use of an LMA as a part of the anaesthetic strategy in an infant with congenital centrofacial dysgenesia.

Case report

A 53-day-old male infant, weighing 4.4 kg, with Tessier's facial anomaly N.4 on the left side and N.3 on the right side²LMA is the property of Intavent Limited.

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