Fiberscope Assisted Videolaryngoscope Intubation in the Surgical Treatment of TMJ Ankylosis

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Abstract Temporomandibular ankylosis is characterized by the formation of a bony mass which replaces normal temporomandibular joint (TMJ) articulation. Anaesthetic management in these patients requires expertise and dependable intubation technique that allows successful intubation due to anticipated difficulty in accessing the airway. A novel technique of endotracheal intubation is used for the successful airway management during the surgical treatment in patients with TMJ ankylosis with the assistance of fiberscope and GlideScope® videolaryngoscope. GlideScope® videolaryngoscope is a recently introduced system for tracheal intubation that has a dedicated video camera encased into a laryngoscope blade and provides better panoramic view than the conventional laryngoscopes. This technique avoids complications such as trauma to soft tissue structures surrounding the glottis during the passage of the tube over the fiberscope. It gives a clear view of the tube and its cuff position during intubation. It also abbreviates the time required for intubation which is a crucial determinant in this subset of patients owing to the difficult airway associated with paediatric age group.

Keywords GlideScope · Videolaryngoscope · Temporomandibular joint ankylosis · Intubation technique

Introduction

Ankylosis or ‘stiff joint’ is the development of significant or complete limitation of movement of the temporomandibular joint (TMJ) by bone or fibrous tissue caused mainly by trauma, systemic diseases, or infections [1]. The treatment option for TMJ ankylosis is surgical only with or without condylar reconstruction. Anaesthetic management in this subset of patients requires a comprehensive preoperative airway evaluation and subsequent management by virtue of anticipated difficulty in accessing the airway. The intrinsic and unique advantages of novel intubation aids may be utilised for this purpose. We report a novel technique of endotracheal intubation for the successful airway management during the surgical treatment in patients with TMJ ankylosis with the assistance of fiberscope and GlideScope® videolaryngoscope. After the literature search, we found that a similar technique has been used in few case reports for the airway management but not in the case of TMJ ankylosis which poses the challenge of the difficult airway.

Technique

A 6 year old boy, weighing 20 kg, was brought by his parents to the outpatient department of dentistry of our institution with the chief complaint of reduced mouth opening and inability to eat properly. On examination, mouth opening was approximately 12 mm with decreased condylar movements on both sides. On confirming the

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Fig. 1 Photograph of GlideScope® screen showing the flexible fiberscope tip being used as a stylet for intubation in TMJ ankylosis patient

Fig. 2 Photograph of GlideScope® screen showing fiberscope insertion into the trachea of patient and clear bloodless field

diagnosis of bilateral TMJ ankylosis, patient was shifted to the operating room and planned for nasoendotracheal intubation with fiberscope (PENTAX® Europe GmbH, slim FI-10P2 intubation fiberscope, distal tip diameter 3.4 mm) and GlideScope® (Verathon Inc. Bothell, WA, USA) videolaryngoscope. Anaesthesia was induced with sevoflurane (2–4 %) in 100 % oxygen. After successful mask ventilation, we planned for visualization of glottic aperture using reusable GlideScope® with paediatric size blade. Initially, all operating room lights were turned off to allow better visualization of GlideScope® screen and also the fiberoptic light source which could be seen traveling down the trachea. In view of limited mouth opening, we initially inserted the GlideScope® blade tip in the retro-molar space for visualizing the glottic aperture. After visualizing the glottic aperture, we introduced the cuffed endotracheal tube (6.0 mm internal diameter), premounted on the flexible fiberscope via nasal route till the posterior

choanae. The insertion cord of the flexible fiberscope was then introduced into the oropharynx through the ETT, till its distal tip was visualized on the monitor screen of the videolaryngoscope (Fig. 1). Further, under the direct visualization on the monitor screen of the videolaryngoscope the distal tip of the insertion cord was further introduced into the trachea using the angulation control lever (Fig. 2). The ETT tube was subsequently rail-roaded over the insertion cord and placed successfully in the trachea. In this case we used the insertion cord of the flexible fiberscope as a stylet without using its optics and intubated the trachea after visualizing the glottis aperture with videolaryngoscope.

Thereafter, the child was paralyzed by atracurium besylate 10 mg IV and anaesthesia was maintained with sevoflurane (1 MAC) in oxygen and nitrous oxide (50–50 %) and intermittent doses of atracurium for muscle relaxation and fentanyl for analgesia. Intraoperative period remained uneventful and mouth opening of more than 3.5 cm was achieved after interpositional gap arthroplasty. After conclusion of surgical intervention and ensuring adequate mouth opening and translational jaw movements, anaesthesia was reversed with neostigmine 1 mg IV and glycopyrronium 200 µg IV and subsequent extubation of the trachea was performed.

Discussion

The management of TMJ ankylosis is a challenge to oral maxillofacial surgeons as well as anaesthesiologists in view of a difficult airway and high chances of recurrence. The main objectives of surgery are to create a gap to mobilize the joint thereby improving patient's nutrition and oral hygiene. Other objectives are to improve aesthetics by restoring normal facial growth pattern (based on functional matrix theory) and to prevent recurrence [2, 3].

GlideScope® videolaryngoscope is a recently introduced system for tracheal intubation that has a dedicated video camera encased into a laryngoscope blade and provides better panoramic view than the conventional laryngoscopes with enormous success in managing airway with abnormal anatomy [4–6]. We preferred to introduce the blade of the videolaryngoscope through the retromolar approach over the standard midline approach, owing to the limited mouth opening. Singh et al. [7] have successfully used a similar technique for GlideScope® blade insertion in patients with restricted access for airway manipulation due to bucked teeth.

Flexible fiberscope guided intubation is still considered as a gold standard for ETT intubation in this subset of patients. But in situations where there is limited mouth opening just appropriate for insertion of GlideScope®

blade, then the aforementioned technique may be employed. On search of literature, we found few reports describing this technique of video-assisted ETT intubation with success, particularly in patients with arduous laryngeal and pharyngeal anatomy [8–10]. The technique may certainly avert the complications such as trauma to soft tissues structures surrounding the glottis during the passage of tube over the fiberscope [11, 12]. The clear view of tube and its cuff position during intubation also gives added advantage to the anaesthesiologist for easy and faster intubation. It may also abbreviate the time required for intubation, a crucial determinant in this subset of patients owing to the difficult airway associated with pediatric age group. This technique has certain limitation like there should be approximately 12–15 mm mouth opening before intubation to allow the insertion of GlideScope® blade. In addition, the aforesaid technique may be employed in patients with deep neck space infection (such as retropharyngeal, peritonsillar, parapharyngeal, prevertebral and pretracheal spaces) leading to anomalous and difficult airway but requires extreme caution during airway manipulation to avoid complications such as abscess rupture, aspiration and subsequent acute airway obstruction.

Conclusion

Fiberscope assisted videolaryngoscope intubation may be used as an alternative technique for airway management in the surgical treatment of TMJ ankylosis, as this technique has added advantages of enhanced visualisation of intubation field and decreased chances of trauma to delicate soft tissue structures. In addition, the insertion cord of the fiberscope with the lever controlled distal tip may be used as a modified stylet for guiding the ETT in clinical situations with anomalous and difficult upper airway anatomy and hence increasing the chances of successful intubation. The flexible fiberscope may further be used to confirm the

correct placement of the ETT in the trachea by using its optics.

Conflict of interest None.

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