CASE REPORT

Use of GlideScope for double lumen endotracheal tube insertion in an awake patient with difficult airway

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Abstract There is scientific evidence that an anticipated difficult airway must be managed with the patient being awake. The GlideScope has been proven to be a useful device to intubate the trachea in some instances when difficult airway is present, and particularly in the awake patient. It has also been used for double lumen tube (DLT) in the anaesthetized patient, but its use with DLT in both circumstances, awake patients with difficult airway has not been described.

GlideScope enabled us to achieve accurate local anesthetic spraying and a successful endotracheal intubation with a double lumen tube (DLT) in an awake patient with predicted difficult airway and bronchoaspiration risk. Different ways to resolve cases like this can be found in the anesthetic literature, but we think this could be another option to bear in mind. We also describe a new variation in the maneuver of introducing a DLT into the trachea under GlideScope view as DLT presents with some difficulties when introduced under normal circumstances.

This option could add some risk for the patients when used in inexperienced hands and there is not sufficient scientific evidence in the literature to recommend it for all cases.

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PALABRAS CLAVE

GlideScope\textsuperscript{®}; Double lumen tube; Difficult airway; MADgic\textsuperscript{®}; Endotracheal intubation

Uso del Glidescope para la inserción de un tubo de doble luz en paciente despierto con vía aérea difícil

Resumen Existe evidencia científica de que la vía aérea difícil anticipada debe manipularse con el paciente despierto. Se ha demostrado la utilidad del GlideScope ante una vía aérea difícil y específicamente en el paciente despierto y también ha sido utilizado para introducir tubos de doble luz (TDL) en pacientes anestesiados, pero su uso con TDL en paciente despierto con vía aérea difícil todavía no ha sido descrito.

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Use of GlideScope for double lumen endotracheal tube insertion in awake patient

GlideScope nos permitió conseguir una adecuada anestesia tópica de la vía aérea e intubación endotraqueal con un tubo de doble luz en un paciente despierto con vía aérea difícil prevista y riesgo de broncoaspiración. En la bibliografía se halla diferentes maneras de resolver casos similares, pero pensamos que la descrita puede ser otra opción a tener en cuenta. También se describe una nueva variación en la maniobra de introducción del TDL en la tráquea con GlideScope.

La maniobra descrita podría suponer algún riesgo para el paciente en manos inexpertas y no hay suficiente evidencia científica para generalizar su recomendación.

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Introduction

Double lumen tube (DLT) for selective lung isolation can present with some difficulties when introduced under normal circumstances, and in patients with difficult airway the concern is higher. There is scientific evidence that an anticipated difficult airway must be best managed with the patient awake.1 One possibility, described in the scientific literature, consists of the prior introduction of a single lumen tube using fiberoptic bronchoscope (FOB) which is later replaced by a DLT by means of an airway exchange catheter.2,3 The GlideScope has been proven to be a useful device to intubate the patient’s trachea in some cases of difficult airway4 and especially in the awake patient,5 and has also been used to intubate patients with DLT under general anesthesia.6 However, to the best of our knowledge, DLT intubation in awake patients with difficult airway has not been described.

Case report

A 36 year-old male (weight 71 kg, height 159 cm) was scheduled for a minimal invasive oesophagectomy via thoracoscopic and laparoscopic approach followed by a small laparotomy and cervical anastomosis. The patient was positioned in the prone position initially, and later turned supine with neck hyperextension. He had been diagnosed with an oesophageal cancer, and had received chemotherapy and radiotherapy. He was operated several years ago for a cystic cerebellar astrocytoma and received radiotherapy due to recurrence. No reference to intubation was found at that time. The inspection of the patient’s airway revealed a Mallampati class III, 3 cm inter-incisor distance, 5 cm thyromental distance and a maximum neck flexion-extension range of 90°. A difficult intubation was expected. We decided to perform an awake intubation with a (DLT) and to use the GlideScope video laryngoscope (GVL; Saturn Biomedical Systems, Burnaby, BC, Canada). There was a back-up plan which consisted of fiberoptic intubation with the patient with a Univent system tracheal tube (Vitaïd, Williamsville, NY, USA). After careful explanation the patient accepted and signed an informed consent.

In the operating room he was premedicated with 2 mg iv midazolam and pre-oxygenated with nasal prongs (4 L/min of oxygen). Five minutes later a perfusion of remifentanil 0.1 µg kg⁻¹ min⁻¹ was started. Topical anesthesia with lidocaine 10% was sprayed (five puffs, 50 mg). The MADgic atomizer (Wolfe Tory Medical, Inc., Salt Lake City, USA) was used with 2% lidocaine for anesthesia of the epiglottis, the vocal cords (VC), and upper trachea with the “spray as you go” technique. A total of 3 ml (60 mg) of lidocaine were used. The GlideScope view showed a Cormack-Lehane score of Ia. The GlideScope was inserted again 2 min later, and a 37Fr left side DLT (Mallinckrodt Broncho-cathTM Endobronchial tube, left; Tyco Healthcare Group LP, Athlone, Ireland), with the distal 15 cm previously bent to follow the curve of the GlideScope blade, was introduced with the concavity facing the palate and a counter-clockwise movement was applied while advancing the DLT to the VC. The bronchial tip of the DLT was easily introduced throughout the VC, but there was resistance to the advance and the stylet was withdrawn 3 cm, and together with digital direct pressure forwards on the DLT, and smooth clockwise and anticlockwise rotations the tube was inserted into the trachea. As soon as capnography was detected, 140 mg propofol and 70 mg rocuronium were administered. An additional 90° anti-clockwise movement was applied to the DLT in order to align the distal tube tip with the left main bronchus. The whole maneuver last 15 min. The correct placement of the DLT was verified by auscultation, and pulmonary collapse was successfully performed. Surgery lasted 6 h and at the end, the DLT was changed by a standard single lumen one using an 11 Fr airway exchanger (C-CAE-11.0-100; Cook Critical Care, Bloomington, IN, USA) under direct GlideScope view. The patient was extubated 3 h afterwards in the ICU with no complications.

Discussion

There is scientific evidence that an anticipated difficult airway must be managed while the patient is awake.1 The patient described showed several factors indicating a difficult intubation (Mallampati score III, 3 cm inter-incisor distance, previous neck radiotherapy), and the possibility of a full stomach due to the esophageal neoplasm,2 despite an adequate fasting time.

With a DLT we expected a more accurate lung isolation than with the use of a single tube with a blocker. There can be problems with a DLT insertion if a difficult airway is present.
There are several ways of inserting a DLT in a patient with a difficult airway. Fiberoptic guided intubation in awake patients with single lumen endotracheal tube and use of bronchial blockers remains the recommended technique, with another option being changing the DLT a delayed by means of an another tube using an airway exchange cather.\textsuperscript{2,3}

The GlideScope videolaryngoscope has been a useful device when a difficult airway is present\textsuperscript{4} and especially in the awake patients with single lumen endotracheal tubes. It has also been used for DLT insertion in patients under general anesthesia.\textsuperscript{5} We did not find any references on DLT insertion on awake patients with the GlideScope device. The decision to introduce a left DLT in an awake patient with an expected difficult airway using the GlideScope was based on our team experience (unpublished data) with this device in awake patients. The intubation was performed successfully and the management was comfortable for the patient and the anesthesiologist.

The collaboration of the patient was essential. We provided adequate prior explanation and ensured he had a good understanding of the procedure; on the other hand, an adequate sedation and local anesthesia was also extremely valuable. The MADgic atomizer is a device for spraying topical anesthetics in the laryngo-tracheal area, which provides atomized topical solution directly to the mucosa of the airway. The applicator portion can also be adapted to an individual patient’s anatomy,\textsuperscript{6} and has been used in difficult airway management, as we do.

When using single lumen endotracheal tubes, Cooper\textsuperscript{8} recommended the stylet to be shaped to the same curvature as the GlideScope blade (approximately 60° bend). However, this angulation can hinder the passing of the tube through the VC despite the complete visualization. The tip of the tube sometimes collides with either the anterior commissure of the VC or the anterior wall of the cricoid cartilage, thus preventing advancement of the tube into the trachea. Another handicap is added when using DLT, as the distal tip has a preformed angle.

Hernandez et al.\textsuperscript{9} suggested bending the stylet of the DLT so that the distal 16–20 cm of the DLT curve follows the curve of the GlideScope, and when the bronchial cuff passes through the vocal cords (VC), withdraw the stylet about 2 cm and rotate the DLT 90° counter-clockwise while advancing the tube. Bustamante et al.\textsuperscript{7} pre-curved the distal tip 10–12 cm with a 60° angle, and when the tip reaches the vocal cords, gently remove the stylet to get more flexibility, performing a 180° rotation (in order to align the axis of the tip lumen with the patients’ tracheal axis) and advancing the tube with an additional 90° clockwise rotation. In our case, we angulated the DLT following the curvature of the GlideScope blade, inserted the bronchial tip between the vocal cords, withdrew the stylet 2–3 cm and, as it was not possible to advance the DLT, changed the stylet angulation with the fingertip so the distal tip axis was less perpendicular to the anterior side of the trachea. This way, the DLT was easily introduced into the trachea.

One advantage of the GlideScope for the introduction of a DLT, as opposed to FOB guided DLT intubation, is that it allows us to see the passage of the tip of the bronchial lumen through the VC, and to detect possible problems when advancing it into the trachea.\textsuperscript{9}

For tube exchange at the end of surgery, we used a tube exchanger catheter under GlideScope vision, as is our protocol of exchanging tubes in difficult airway or long-time intubated patients.\textsuperscript{10}

In summary, the GlideScope allowed us to perform a successful endotracheal intubation with a DLT in an awake patient with predicted difficult airway and bronchosapiration risk. Although there are several options, this is another one to bear in mind. The described maneuver could add some risk for the patients in inexperienced hands, and there is not sufficient scientific evidence in the literature to recommend it for all cases.

**Conflict of interest**

The authors declare no conflicts of interest.

**References**