

# Placement Of A Double Lumen Tube Over An Airway Exchange Catheter In An Unanticipated Difficult Airway Without Fiberoptic Bronchoscope—A Case Report

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## Citation

R Sareen, A Chatterjee, K Sharma, N Kumar, R Arora. *Placement Of A Double Lumen Tube Over An Airway Exchange Catheter In An Unanticipated Difficult Airway Without Fiberoptic Bronchoscope—A Case Report*. The Internet Journal of Anesthesiology. 2008 Volume 19 Number 2.

## Abstract

Correct placement of a double lumen tube (DLT) can become a difficult procedure. We report a case of an unanticipated difficult airway in which a 39Fr Left sided DLT was inserted using an airway exchanger and reinsertion of the stylet. This was done after prior insertion of a single lumen tube (SLT) over a bougie in a 48 year old male with Carcinoma of the Lingular lobe of left lung, in a situation where a fiberoptic bronchoscope and other equipment for selective lung ventilation were not readily available.

## ABBREVIATIONS

DLT: Double Lumen Tube, SLT: Single Lumen Tube, OLV: One Lung Ventilation, VATS: Video Assisted Thoracoscopic Surgery, AKT: Anti Koch's Treatment, PFT: Pulmonary Function Tests, CBG: Capillary Blood Gas, ECG: Electrocardiogram, LMA: Laryngeal Mask Airway, GEB: Gum Elastic Bougie, ETCO<sub>2</sub>: End Tidal Carbon Dioxide, FOB: Fibre optic Bronchoscope.

## INTRODUCTION

Management of a difficult airway is one of the most challenging tasks for anesthesia care providers. This practice of late has become complex with the introduction of new airway devices. VATS is becoming increasingly popular and demands a well collapsed lung.

One lung ventilation is a high priority indication for thoracoscopic procedures and is usually achieved by intubation with a double lumen tube. Relatively small operations such as wedge and segmental resections also benefit from a DLT because of better visualization lung morphology that facilitate identification and separation of planes and fissures.

In general, three types of devices are available for providing one lung ventilation (OLV) during anesthesia: DLTs, bronchial Blockers and endobronchial tubes. Placement of these tubes is challenging in the presence of a difficult airway. The use of "Difficult tubes" cannot be avoided

despite the presence of a difficult airway in video assisted thoracoscopic surgeries (VATS).[12]

In a patient with a recognized difficult airway, awake intubation with a fiberoptic bronchoscope can be attempted. Unanticipated difficult airway, however, can be a challenging experience for the anaesthetist to provide OLV.

We report a case where a 39Fr left DLT was successfully placed in an unanticipated difficult airway using an airway exchange catheter.

## CASE REPORT

A 48 year old male, weighing 87 Kg, height 172cms, a known case of Ca lingular lobe left lung, with a past history of left pleural effusion and anti Koch's treatment and subarachnoid haemorrhage with an aneurysm of basilar artery treated with coiling, was posted for VATS lobectomy. His blood counts and other routine blood investigations were normal. X Ray Chest showed the presence of a para cardiac opacity in the left lower lobe. ECG showed J point elevation in V<sub>2</sub>-V<sub>3</sub> and T inversion in aVL. PFTs suggested moderate obstruction with good reversibility. CBG showed a pO<sub>2</sub> of 73mmHg corresponding to an O<sub>2</sub> saturation of 94%. Patient was on Tab Phenytoin 300mg HS which he had taken the night before the surgery.

His airway examination revealed an adequate mouth opening with normal dentition. The tongue was large, and only the

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soft palate could be visualized making it a Modified (Samssoon and Young)<sup>[3]</sup> Mallampatti <sup>[4]</sup> Grade III view. Thyromental distance and neck movements were normal.

Routine monitors namely the ECG, Pulse oximeter, Capnograph and a non invasive BP (NIBP) were attached.

No difficulty in intubation was anticipated hence patient was induced on Fentanyl, Thiopentone and Vecuronium and mask ventilated with O<sub>2</sub>, N<sub>2</sub>O and Isoflurane for three minutes and a Guedel's Airway in situ.

Direct Laryngoscopy revealed only the tip of epiglottis to the view (Cormack and Lehane <sup>[5]</sup> Grade III). An attempt was made with the 39Fr left DLT but failed. The patient was mask ventilated and it was decided to intubate with a single lumen 8.5 Cuffed tube. However, a further attempt at intubation failed. The difficult airway cart was brought in and intubation was again attempted with an intubating LMA #4 which was small in size as was evidenced by air leak and failure of the chest to expand. An LMA #5 not being available, the patient was mask ventilated and intubation with a 8.5 cuffed SLT succeeded over a Gum Elastic Bougie (GEB) with the help of direct laryngoscopy with a Macintosh laryngoscope. Since the procedure was thoracoscopic, one lung ventilation was required. An airway exchange catheter (Cook Airway Exchange Catheter EF, 100cm in length) was passed through the SLT and the tube was withdrawn. The stylet from the bronchial lumen of the DLT was removed and the DLT was threaded over the airway exchanger passed through its bronchial lumen, with the help of Macintosh laryngoscope. Once the tracheal cuff had been negotiated past the cords, as was confirmed by the ETCO<sub>2</sub> after inflation of the cuff, the airway exchanger was removed and the stylet re-introduced into the bronchial lumen. The cuff was deflated and the tube pushed in further till resistance was felt. The tube was then rotated 90° to the left and manoeuvred into the left bronchus in the usual fashion. The stylet was withdrawn and cuff inflated. The position was confirmed clinically by auscultation. Lung separation during the procedure was excellent with no desaturation.

### **DISCUSSION**

During video assisted thoracoscopy (VAT), the lung should be well collapsed.<sup>[12]</sup>

In general, three types of devices are available for providing one lung ventilation during anaesthesia: DLTs, bronchial

blockers and endobronchial tubes.

OLV in a patient with recognized difficult airway can be achieved by awake intubation with a fibreoptic bronchoscope using a DLT, Univent or an SLT.

Bronchial Blockers are becoming increasingly sophisticated and range from long used Fogarty embolectomy catheter to the more recently developed Torque Control Blocker Univent (Vitaaid, Lewiston NY), to the more recent wire guided endobronchial blocker (Arndt blocker; Cook Critical Care, Bloomington, IN).<sup>[67]</sup> These devices however lack versatility and spectrum of therapy that can be delivered through a DLT including toilet of the blocked lung and differential ventilation.

Of the various tools available for lung separation, the gold standard is a DLT. Placement of a DLT is more complicated than that of a standard tracheal tube because the DLT is larger in diameter, longer and has a more fixed shape.<sup>[8]</sup> Moreover, rupture of the proximal endotracheal cuff of the DLT may occur during difficult intubation because the thin walled cuff is located 8-11 cm from the tip of the DLT, where it can easily be torn on maxillary teeth.<sup>[9]</sup>

Intubation using direct laryngoscopy is usually successful in the majority of the patients, even when a line-of-sight view of the glottis is not possible. Although poor glottic visualization is encountered between 1.5-8.5% of attempts,<sup>[10]</sup> success can generally be achieved with additional force, external laryngeal manipulation, and the use of airway adjuncts such as articulated laryngoscopes, bougies and stylets or alternative techniques such as a lightwand or intubating laryngeal mask.<sup>[11]</sup>

Flexible fibreoptic devices are well suited for many settings where a line-of-sight view cannot be achieved and other aids like the video laryngoscope (Glidescope),<sup>[11]</sup> the fibreoptic laryngoscope (Wuscope) <sup>[9]</sup> or the Rigid fibreoptic laryngoscopes<sup>[11]</sup> may be used.

If the patient has a recognized difficult airway, awake intubation with fibreoptic bronchoscopy can be attempted with Univent tube, DLT or with SLT.<sup>[2]</sup>

The case we have described above presented as an unanticipated difficult airway which required both separation and isolation of lungs. This could have been easily achieved with the help of a fibreoptic bronchoscope, the various bronchial blockers or the advancement of the SLT in the

right main bronchus. While the fibre optic bronchoscope was not available, the latter could have resulted in the ventilation of only the right middle and lower lobes and would have resulted in soiling of the right lung during extubation.

Villalonga et al have reported a case describing the use of 6mm bronchoscope for left endobronchial SLT and then using a Cook Airway Exchanger to guide a No. 39Fr left DLT through the bronchus.<sup>[12]</sup>

Airway exchange catheters are thin long hollow tubes which are depth marked, commercially available in a variety of sizes. They can be adapted for insufflation of O<sub>2</sub>, monitoring of ETCO<sub>2</sub> and jet ventilation.

In the Hartford Hospital database of 358 cases, there was a significant risk of hypoxemia (36%), airway injury and a lost airway with the use of airway exchangers. On the other hand, few patients were salvaged with advanced airway devices (LMA, Combitube and FOB), while 3% required emergency surgical airway.<sup>[13]</sup>

Arai et al have similarly described intubation with a double lumen tube in patients with difficult airway using endoscope mask, fibreoptic bronchoscope and a tracheal tube guide.<sup>[14]</sup>

Laplace et al have also described lung separation after re-intubation with an airway exchange catheter to place a DLT in patient with multiple trauma presenting with massive haemoptysis.<sup>[15]</sup>

Our experience was unique due to the fact that we used the airway exchange catheter to place the DLT in the trachea after which the catheter was removed and the stylet reinserted to guide the bronchial lumen of the DLT in the left bronchus.

It might be argued that reinserting and guiding the DLT with the stylet is traumatic to the tracheobronchial tree, Liberman et al concluded that retaining the stylet for the entire intubation procedure allows for a more rapid, accurate placement of the DLT without increasing the incidence of tracheo bronchial mucosa injury.<sup>[16]</sup>

Our experience prompts us to recommend it as an alternative method for DLT placement where direct visual aids and/or bronchial blockers are not available where separation and isolation of lungs is a pre requisite.

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