GlideRite? DLT Stylet May Alter the Shape of Bronchial Lumen of Double Lumen Endobronchial Tube

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Article ID: WMC001766  
Article Type: Case Report  
Submitted on: 15-Mar-2011, 08:57:57 PM GMT  
Published on: 16-Mar-2011, 10:22:59 PM GMT  
Article URL: http://www.webmedcentral.com/article_view/1766  
Subject Categories: ANAESTHESIA  
Keywords: GlideRite DLT Stylet, Double Lumen Endobronchial Tube  
How to cite the article: Gupta D, Kable T, Dudley R, Young J, Patel P, Rusin K. GlideRite? DLT Stylet May Alter the Shape of Bronchial Lumen of Double Lumen Endobronchial Tube. WebmedCentral ANAESTHESIA 2011;2(3):WMC001766  
Source(s) of Funding: None  
Competing Interests: None
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Abstract

Background: Glidescope guided double lumen endobronchial tube (DLT) placement in the difficult airway warranted the need for dedicated rigid stylet development.

Methods: Verathon Inc. Bothell WA recently introduced the GlideRite® DLT Stylet for DLT placement in difficult airway. We used it in a patient with difficult airway scheduled for thoracotomy.

Results: We observed in-vivo and re-tested in-vitro that the GlideRite® DLT Stylet use may distort the distal end of DLT's bronchial lumen that may increase the peak airway pressures with the possibility of pressure injury to the bronchial wall and may not allow adequate lobar ventilation through the bronchial lumen.

Conclusion: Our team's limited experience with the GlideRite® DLT Stylet suggests that: (a) it will not be advisable to use the GlideRite® DLT Stylet without the tracheal lumen positioning pin, (b) if possible, the distal end of the GlideRite® DLT Stylet should not be far advanced into the distal end of the bronchial lumen to minimize the alteration of the distal end of the bronchial lumen, (c) if high peak airway pressures persists, the DLT should be exchanged with a new DLT, and (d) it remains to be seen how this minimal alteration of the distal bronchial lumen interferes with much more challenging correct placement of the right sided DLT.

Introduction

Glidescope® guided double lumen endobronchial tube (DLT) placement warranted the need for dedicated rigid stylet development. Verathon Inc. Bothell WA recently introduced the GlideRite® DLT Stylet with this goal. We hereby report our observation that its use may distort the distal end of DLT's bronchial lumen that may increase the peak airway pressures with the possibility of pressure injury to the bronchial wall and may not allow adequate lobar ventilation through the bronchial lumen.

Case Report(s)

In a patient undergoing right thoracotomy for the right upper lobe resection secondary to the right upper lobe lung cancer, the GlideRite® DLT Stylet for aiding DLT placement in the anticipated difficult airway was used per the manufacturer's instructional brochure [1]. When fiberoptic bronchoscopy was performed through the bronchial lumen, the bronchial tip was partially opposing the medial side wall of the left main bronchus with only a small opening into the left main bronchus to negotiate the bronchoscope. As the case progressed and left-sided one lung ventilation was initiated, the peak airway pressures rose to 40 mmHg with plateau pressures of 26 mmHg. This was thought to be due to the partial apposition of the left main bronchus to the distal end of bronchial lumen of DLT. It was decided to not exchange the DLT with a new one as pressure control ventilation kept the peak airway pressures under 32 mmHg with no change in plateau pressure. The rest of the perioperative period was uneventful.

Discussion

To understand the ventilation issues encountered by our team with the use of the GlideRite® DLT Stylet, we decided to test this stylet in a larynx, airway and carina manikin. The following conclusions were made: compared to the malleable stylet provided with the DLT, the GlideRite® DLT Stylet advances further in the distal bronchial lumen of the DLT (Figure 1) that increase the curvature of distal bronchial lumen of DLT by six degrees medially (23 degrees angle to tracheal axis) compared to the DLT pre-formed on the malleable stylet (29 degrees angle to tracheal axis) (Figure 2). When the tracheal lumen positioning pin of GlideRite® DLT Stylet is not accommodated at all, the curvature of distal bronchial lumen of DLT increases by 10 degrees laterally (39 degrees angle to tracheal axis). This mild but clinically appreciable alteration of the distal bronchial lumen by the GlideRite® DLT
Stylet can be avoided with fiberoptic bronchoscope assisted DLT placement across the vocal cords under the direct vision of the Glidescope®. However, the short length (60 cm) of the fiberscope interferes with fiberoptic bronchoscope assisted DLT placement because the length of the DLT is 41 cm and front teeth to carina distance is usually at least 20 cm [2]; and these distances do not allow direct placement of the fiberoptic bronchoscope in the main bronchus before initiation of the threading of the DLT on the bronchoscope. Direct placement of the fiberoptic bronchoscope in the main bronchus is essential to avoid the intra-tracheal bronchoscope getting entangled between the advancing DLT’s bronchial lumen and the tracheal wall. This entanglement increases the strain on the bronchoscope and may damage the fiberscope. The solution may be a longer bronchoscope (at least 70 cm in length) that can overcome its limitation for DLT placement.

Conclusion

In summary, our team’s limited experience with the GlideRite® DLT Stylet suggests that: (a) it will not be advisable to use the GlideRite® DLT Stylet without the tracheal lumen positioning pin, (b) if possible, the distal end of the GlideRite® DLT Stylet should not be far advanced into the distal end of the bronchial lumen to minimize the alteration of the distal end of the bronchial lumen, (c) if high peak airway pressures persists, the DLT should be exchanged to avoid high pressure exposure to the bronchial wall, and (d) it remains to be seen how this minimal alteration of the distal bronchial lumen interferes with much more challenging correct placement of the right sided DLT.

Acknowledgement(s)

The authors are sincerely thankful to Fred Schneider, CRNA, and Chica Kuzumi MD, Department of Anesthesiology, Veterans’ Medical Center, Detroit for their scientific insights, suggestions and discussions regarding the fiberoptic bronchoscope assisted DLT placement in difficult airway.

References

Illustrations

Illustration 1

Figure 1 GlideRite® DLT Stylet far advanced in the bronchial lumen of DLT in comparison with Malleable DLT Stylet

Illustration 2

Figure 2 Degrees of Bronchial Lumen Distortion with GlideRite® DLT Stylet: A schematic representation in comparison to angles at the carina
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