

# Clinical Benefits of Visualization of Airway Anatomy and Manipulation of the Endotracheal Tube Cuff With the GlideScope in the Morbidly Obese Patient During Tracheotomy

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*Inadvertent deflation of the endotracheal tube cuff during a tracheotomy can complicate the surgical procedure, especially in a morbidly obese patient. Also, the anesthesia provider may lose control of the airway, with the inability to reintubate in case of airway edema, airway secretions, or airway fire. The use of the GlideScope video laryngoscope (Verathon Inc, Bothell, Washington)*

*in the morbidly obese patient undergoing a tracheotomy has clinical benefits. This device allowed the visualization of the airway anatomy in 2 patients and the manipulation of the punctured endotracheal tube cuff in one case.*

**Keywords:** Difficult airway, GlideScope, morbidly obese, tracheotomy.

A tracheotomy is a surgical procedure performed for the long-term maintenance of respiratory therapy. The securing of the airway with a tracheotomy is commonly performed without adverse events.<sup>1</sup> However, morbidly obese patients have an increased risk of intraoperative complications with a tracheotomy procedure.<sup>2</sup>

A morbidly obese patient's neck circumference is increased and the thyromental distance is decreased, which complicates anatomical positioning of the tracheotomy site by the surgeon. This increased adipose tissue in the neck may cause the surgeon to have difficulty exposing the trachea, inserting the tracheotomy tube, and controlling bleeding. During a tracheotomy, the distorted anatomical structuring and decreased fraction of inspired oxygen may further complicate the decreased oxygen perfusion state that exists in the morbidly obese patient.

Additionally, the anesthesia provider may be unable to visualize retraction of the endotracheal tube cuff in a morbidly obese patient because of airway anatomy, secretions, and edema. In this situation, the visualized placement is often confirmed by the surgeon through the surgical site and by conventional direct laryngoscopy. However, the direct laryngoscopy technique often hinders the surgical field or makes it difficult to visualize placement of the endotracheal tube cuff.

Also, the airway management of a morbidly obese patient may become complicated after deflation of the endotracheal tube cuff. The anesthesia provider may lose control of the airway, with the inability to reintubate if there is airway edema, airway secretions, or airway fire. Therefore, we created a technique that may assist in the delivery of anesthesia care during a tracheotomy in the

morbidly obese patient. This article explains the clinical benefits of using the GlideScope video laryngoscope (Verathon Inc, Bothell, Washington) during tracheotomy in 2 morbidly obese patients.

## Case Reports

• *Case 1.* A 60-year-old man was scheduled for a tracheotomy because of ventilator-dependent respiratory failure. He was previously intubated for many weeks in the intensive care unit (ICU). This patient was morbidly obese, weighing 258 kg and having a height of 177 cm.

The patient was brought to the operating room and positioned on the bed with a shoulder roll. General anesthesia was used, with all standard monitors applied.

This technique begins by confirming visualization of the airway anatomy with the GlideScope. Next, the GlideScope is turned off and maintained in the oral cavity. The surgical site is then prepared by the operating room team, and the surgeon is informed of the use of the GlideScope. After the surgeon requests the retraction of the endotracheal tube cuff, the GlideScope is turned on again to visualize the retraction. While the endotracheal tube is retracted, complete visualization of the cuff between the vocal cords is maintained. Finally, the tracheotomy tube is inserted, and the patient proceeds through surgery.

In this case, the surgeon punctured the endotracheal tube cuff while dissecting the isthmus of the thyroid. The patient's coexisting pulmonary status was critical, with elevated positive end-expiratory pressure at 18 cm H<sub>2</sub>O. The GlideScope enabled us to manipulate the endotracheal tube cuff within the airway. The endotracheal tube cuff was inflated while the endotracheal tube was turned

and retracted. This technique enabled the leaking endotracheal tube cuff to seal itself at the puncture site in the trachea. Therefore, the need to replace the endotracheal tube was prevented, and the patient completed the surgery without further incident.

• *Case 2.* A 46-year-old man was scheduled for a laparoscopic jejunostomy tube insertion and tracheotomy after being intubated for many weeks in the ICU. This patient was morbidly obese, with a weight of 155 kg and height of 172 cm. The patient was brought to the operating room and positioned on the bed with a shoulder roll. General anesthesia was given, and all standard monitors were applied. The technique was performed as described for case 1.

## Discussion

When a morbidly obese patient presents for a surgical tracheotomy, the anesthesia practitioner must develop multiple techniques for managing a difficult airway. Plans for securing the airway in case of inadvertent deflation of the endotracheal tube cuff or extubation may include use of fast-track laryngeal mask airway (LMA), fiberoptics, or an advanced airway management technique. Anesthesia providers commonly use the advanced airway management technique that has been successful with their previous tracheotomies.

In this article we described the successful use of the GlideScope video laryngoscope for assistance in visualizing the endotracheal tube cuff within the airway of 2 morbidly obese patients. We avoided the known potential complications of extubation during retraction as well as

cuff rupture requiring tube exchange during a tracheotomy. Our belief was that these complications were deterred with the use of the GlideScope. In fact, the GlideScope simplified the technique of retracting the endotracheal tube cuff because direct visualization was possible.

As the incidence of obesity escalates, the need to manage a difficult airway is likely to become more common. There is a potential loss of airway control during tracheotomy among morbidly obese patients. Therefore, anesthesia providers must explore advanced airway equipment and technological advancements and adapt them to their practice. From our perspective, GlideScope-assisted tracheotomy in the morbidly obese patient may provide for a safe surgical and anesthesia experience.

## REFERENCES

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## ACKNOWLEDGMENT

The authors have no financial interest in GlideScope.