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New Approach to Orogastric Tube Placement in the Intensive Care Unit and the Emergency Department

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Abstract

Context: Oral endotracheal intubation is commonly used for management of acute respiratory failure in the intensive care unit or emergency department. Placement of an orogastric tube (OGT) usually follows endotracheal intubation. It is often performed blindly by nursing staff and is verified by a combination of several procedures, including radiography, which is the gold standard.

Aims: To determine practicality and potential benefits of OGT placement under visualization with a glidescope, for real-time confirmation of OGT placement.

Settings and Design: A prospective registry of endotracheal intubations and video glidescope OGT placement was created for the period of January to July 2017 for all intubations by the author and author's assistant at a community hospital.

Methods and Material: The OGT was inserted by the physician or physician assistant immediately after successful endotracheal intubation using glidescope for visualization. Chest radiography was used to confirm placement of both medical devices. We recorded time intervals, number of individuals involved in placement of the OGT, attempts performed and complications observed.

Statistical Analysis Used: None.

Results: Time between endotracheal intubation and OGT placement with glidescope was <5 minutes, except in two patients. Sixteen patients underwent OGT placement; only one radiograph per patient was performed for confirmation of both endotracheal tube and OGT placement. There were no complications.

Conclusions: OGT placement with a glidescope was prompt and safe. This technique provides real-time confirmation of correct OGT placement, and may save critical nursing time. Our approach minimized utilization of chest radiography, thereby reducing radiation exposure and hospital cost.

Keywords: Glidescope; Orogastric tube; Endotracheal intubation

Key Messages

Orogastric gastric tube insertion under visualization using a glidescope was safe and provided an additional advantage of being a unique method for real time confirmation of correct placement of OGT, utilized less resources, and reduced radiation exposure.

Introduction

Oral endotracheal intubation and mechanical ventilation is a reliable therapeutic intervention for critically ill adults with acute respiratory failure.

Indications for mechanical ventilation include clinical or laboratory signs indicating that the patient cannot maintain a patent airway, that oxygenation are inadequate despite noninvasive oxygen support, and/or that ventilation is inadequate. The clinical scenarios are vast and range from lung pathology to neurologic disorders, as well as major metabolic disorders [1-3].

After oral endotracheal intubation and initiation of mechanical ventilation, an orogastric tube (OGT) or nasogastric tube must be placed to infuse nutrition, medications, oral contrast for diagnostic studies, and/or to perform gastric suction for decompression of fluid, blood or air, if indicated. OGT placement is usually performed for intubated patients by the nursing staff in the emergency department or the intensive care unit (ICU) [4].

OGT placement is customarily performed in a blind fashion by the nursing staff. There are many risks associated with blind placement of gastric tubes [5]. Oropharyngeal bleeding or trauma is common, especially in patients with coagulopathy. Misplacement into the trachea also can occur. This can cause lung injury. It is also possible, albeit rare, for an OGT to travel intracranially, especially in patients with traumatic defects. There are other disadvantages to the current practice of OGT placement. For instance, a difficult OGT placement

may require an excessive amount of time, and often times, multiple members of the nursing staff [6]. This may delay initiation of therapy.

Methods to verify proper placement of a gastric tube are numerous and have variable sensitivities. Simple epigastric and left upper quadrant auscultation alone is not sufficient to verify proper placement of the tube. Orogastric tube aspirate and pH testing, assessment of the visual characteristics of the aspirate, and carbon dioxide monitoring also are used. The accuracy of the above techniques is variable and increases when multiple verification techniques are combined. An abdominal radiograph, which is considered the gold standard method to confirm correct placement, is an added cost to the care of the intubated patient and leads to additional radiation exposure [7-10].

This study aimed to explore the practicality and advantages of immediate OGT placement under video visualization using a glidescope by the physician or physician assistant after successful oral endotracheal intubation.

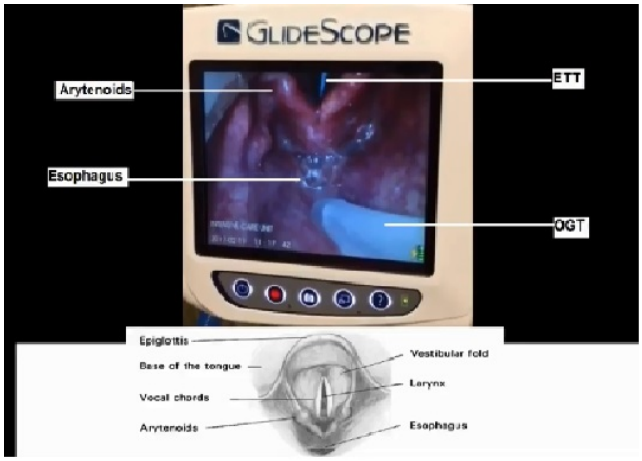

Figure 1: Glidescope view of the posterior hypopharynx with orogastric tube and endotracheal tube at 12 o'clock.

Subjects and Methods

Data collection for this study was performed from January 11, 2017 to July 14, 2017 at the ICU and emergency department in a community hospital. ICU and emergency department nursing staff refer to the process described here as "the Dr. Rifai protocol." This is because it provides them with convenience and expedited care when placing an OGT immediately after successful endotracheal intubation.

After successful endotracheal intubation and securing the endotracheal tube (Mallinckrodt Pharmaceuticals, St. Louis, USA) [11], fulfillment of four criteria was required prior to OGT placement using the glidescope (Verathon Medical ULC, Burnaby, Canada): 1) oxygenation saturation levels above 90%; 2) observation and palpation of chest rise with auscultation in the bilateral axillary areas; 3) appropriate color change of the colorimetric end-tidal carbon dioxide detection device [12]; and 4) the absence of sounds with auscultation and the absence of movement and distention in the epigastric area (Figure 1) [13,14].

If these four criteria were met, the glidescope was reinserted and the endotracheal tube was visualized and swept under the blade (Verathon Medical ULC, Burnaby, Canada) of the glidescope. The esophageal orifice was then exposed and the orogastric tube (Bard Medical Division, Covington, USA) was advanced posterior to the larynx at the midline [15,16].

Spontaneous swallowing movements were sometimes observed in patients who were not paralyzed before intubation or in those recovering from a paralytic agent. The OGT was advanced to the predetermined length or until gastric contents appeared in the OGT. Air was then injected into the OGT while auscultating the epigastric area to confirm that the tube was located in the stomach.

A chest radiograph for endotracheal tube placement was also used to evaluate the OGT. This single chest radiograph was used to confirm both endotracheal tube placement and OGT position. After intubation and OGT placement using "the Dr. Rifai protocol," the provider completed the form depicted in Figure 2.

SURVEY on Post-Intubation Orogastric Tube Placement

***This form is to be completed by the health care worker who placed or assisted in placement of an orogastric tube (OGT) following intubation.

Demographics

Date of Procedure: _____ Location: _____ Patient Study ID#: _____
Patient Account # _____ Patient Initials: _____
Patient Sex: M F Patient Age: _____ BMI _____

Endotracheal Tube Placement Checklist

☐ Chest Rise ☐ Color Change Appropriate
☐ Saturation >90% ☐ Equal Breath Sounds
☐ Comfort of Clinician that tube has been placed adequately

Orogastric Tube Placement Survey

Select method of OGT placement
☐ Blindly (conventional method)
☐ Direct visualization (w/ GlideScope) Blade Size ___ Tube Size ___

Was a paralytic for intubation uses? ☐ YES ☐ NO

How long did it take from intubation to initiation of OGT placement? _____

Was there blood present in the oropharynx prior to OGT placement? ☐ YES ☐ NO
Was there blood present in the oropharynx after OGT placement? ☐ YES ☐ NO

Number of attempts to place OGT? _____

How many people were involved in OGT placement? _____

Approximately how long did placement take from initiation to end? _____

How was placement of OGT confirmed? ☐ Direct Visualization ☐ Hearing ☐ Confirmatory X-Ray

Was an x-ray performed to confirm endotracheal tube placement prior to OGT placement? ☐ Yes ☐ No

List any complications encountered during OGT placement:
☐ Misplacement in lungs ☐ Injury to oropharynx
☐ Vomiting ☐ Other: _____

Your Name: _____ Credentials: _____

Signature: _____

Please return this form to the ICU clerk after completion*
Thank You!!

Figure 2: Initial survey and questionnaire regarding data collection for each patient.

Results

Patients characteristics

A total of 16 patients participated in the study (male=7, female=9; age range=47-83 years; BMI range=20.7-63.6). All patient received Etomidate followed by Succinylcholine for sedation except the patients who are already sedated. We used a glidescope blade size 3 or 4 and an endotracheal tube size 7.5 or 8 (Table 1).

Study results

We observed that the time between completion of oral endotracheal intubation and initiation of OGT placement was less than 5 minutes, except in patient 12, in whom the procedure took 24 hours (we needed clearance from the gastrointestinal services because of esophageal varices), and patient 14, who required a central line before OGT placement because of hemodynamic instability and the need for a large IV access.

Patient 3, patient 8, and patient 12 had blood in the oropharynx after OGT placement, but they also had blood prior to OGT placement. There was no trauma leading to bleeding in our patients.

One patient, patient 1, needed both the physician and physician assistant to place the OGT, whereas the 15 consecutive patients had the OGT placed by only one provider, the provider performing the endotracheal intubation. The intubation was performed by a physician assistant; however, when the attempt to place an OGT failed, the physician was required to place the OGT. This failed attempt in the first patient may be associated with the learning curve with regard to the procedure adopted in this study.

There was no need for a separate chest radiograph to confirm the OGT placement except for patient 12, who already underwent chest radiography 24 hours prior to confirm the endotracheal intubation. Only one chest radiograph was required for confirmation of the correct position of both endotracheal tube and OGT. There were no additional complications observed.

Patient	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Time from intubation to initiation of OGT placement	3 min	3 min	3 min	3 min	3 min	1 min	1 min	1 min	2 min	1 min	1 min	24 hr	1 min	30 min	5 min	2 min
Blood present in the oropharynx prior to OGT placement	No	No	Yes	No	No	No	No	Yes	No	No	No	Yes	No	No	No	No
Blood present in the oropharynx after OGT placement	No	No	Yes	No	No	No	No	Yes	No	No	No	Yes	No	No	No	No
Number of attempts to place OGT	2	2	1	1	1	1	1	1	1	2	1	1	2	1	1	1
Number of personnel involved	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Time from initiation to completion of OGT	5 min	1 min	1 min	1 min	30 sec	1 min	1 min	1 min	15 sec	1 min	1 min	1 min	1 min	1 min	90 sec	1 min
CXR to confirm ETT placement prior to OGT placement	No	No	No	No	No	No	No	No	No	No	No	Yes	No	No	No	No
Additional complications	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None

Table 1: Details and characteristics for each of the 16 patients' intubations.

Discussion

Oral endotracheal intubation using the glidescope has become more popular for oral intubation in emergency departments and the ICU, especially for difficult airways [11]. OGT placement immediately after intubation by providers performing endotracheal intubation is safe and provides real-time additional OGT placement verification by direct visualization [15]. It also reduces the time between oral endotracheal intubation and OGT placement. The procedure was performed in a short period and needed few staff members, potentially reducing complications, and negating the need for additional radiograph and radiation exposure.

We hope that this study leads to larger studies in multiple centers with different providers and protocols. This would allow further testing of our technique. The use of this technique may change the approach used in critical care medicine for placement of OGT and lead to the addition of the skill of OGT placement to the skill set of the physician

similar to the nursing staff. Limited studies have been published regarding the role of the physician and OGT placement at the time of intubation, which is considered a core skill for emergency department and ICU nurses. In our study, there was a very short learning curve for OGT placement, and the physician and physician assistant were able to master this skill quickly.

Video visualization and verification of the OGT passing through the hypopharyngeal esophagus reliably provides additional confirmation of accurate OGT placement. It is the first and only method that is real-time and proactive. Because of the ease and convenience of this method, safety and practicality, it should be explored further on a larger scale at larger academic centers. This technique should be used more frequently by physicians performing intubations as a proactive technique for real-time confirmation of accurate OGT placement. It may reduce complications, save time for the nursing staff, and reduce radiation exposure and cost.

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