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Endotracheal Intubation Using a Video Laryngoscope in Patients Expected to Present Difficult Airway Management

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ABSTRACT

When surgery is scheduled under general anesthesia in patients with anticipated difficult airway, anesthesiologists consider various methods for safe anesthesia management. It is highly variable and will depend on several factors including the patient's current status and vital signs. Algorithms for the management of difficult airways are already known is American Society of Anesthesiology and the Difficult Airway Society. However, even problems that occurred at the same stage may not be solved in the same way depending on the situation. Therefore, it is important to simulate possible situations in advance and to manage patients by preparing various options. In this case series, we report airway management using video laryngoscopy in three patients with respiratory tract masses causing dyspnea.

Keywords: Airway management, endotracheal intubation, general anesthesia, laryngoscopy, respiratory tract disease.

INTRODUCTION

Effective preparation for difficult airway management requires professional skills in airway protection and is dedicated to monitoring the patient's vital signs. Therefore, when performing surgery on patients expected to present difficult airway, the anesthesiologist and surgeon should sufficiently discuss the patient's condition before surgery [1-3]. In addition, all necessary equipment should be readily available in the work area before initiating airway management, and basic patient-monitoring devices should be attached to assess vital signs before performing the procedure. The equipment includes classic laryngoscope blades with

handles and video laryngoscopes [4]. These cases involve various video laryngoscopes, depending on the patient's condition.

CASE PRESENTATION

Case 1

The patient was a 49-year-old male with hypertension, height 167.7 cm, weight 69.4 kg. One year prior, during a otolaryngology clinic, a mass was found in the vallecular area, and the patient was observed during an outpatient clinic. As the outpatient visits continued, the mass grew larger, and the patient was admitted for surgical treatment of the lesions. Preoperative laryngoscopy revealed difficulty in vocal cord exposure due to a large vallecular cyst (Fig. 1). Anesthesia was induced by the intravenous administration of thiopental 250 mg and rocuronium 60 mg. There were no specific findings in the manual ventilation, and endotracheal intubation was performed using a Glidescope® with an inner diameter (ID) of 7.5 mm tube, without any difficulty. The surgical findings revealed a large cyst with a stalk in the left vallecular area. The cyst contents were suctioned to reduce volume, and the stalk was separated and removed.

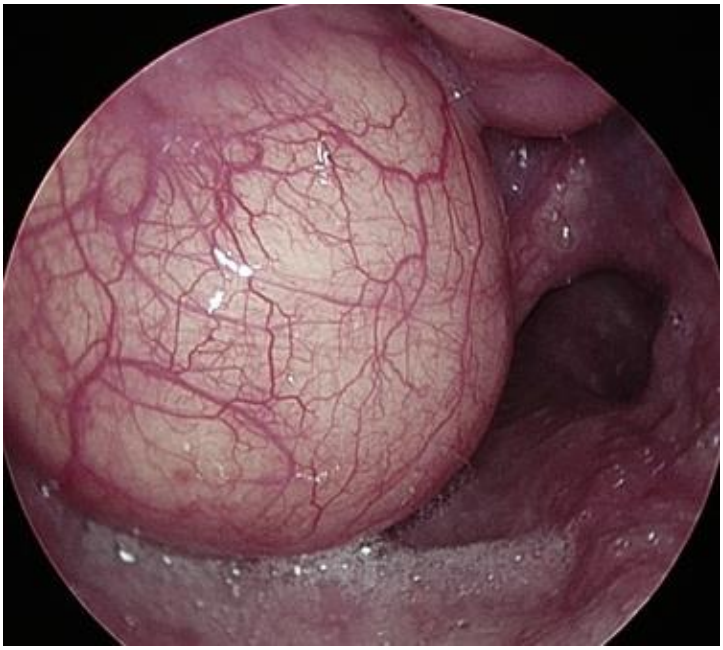

Figure 1: A left vallecular cyst 24 x 16 X 24 mm is observed through a laryngoscope.

Case 2

The patient was an 82-year-old woman (height, 152 cm and weight, 52.5 kg) who visited the otolaryngology outpatient clinic with persistent hoarseness, sputum, and voice loss for approximately a year. According to the guardian, the clinical symptoms had progressed to the point where the patient had difficulty communicating because of the low volume of her voice. Underlying diseases included hypertension, myocardial infarction, and left middle cerebral artery infarction with vascular dementia. As a result of the examination, a huge mass extending from the upper to lower vocal cords was confirmed (Fig. 2), and the patient was referred to a pre-anesthesia consultation for laryngomicrosurgery under the suspicion of glottis cancer. After discussing with the surgeon, we determined that the mass was a type of papilloma with some degree of mobility.

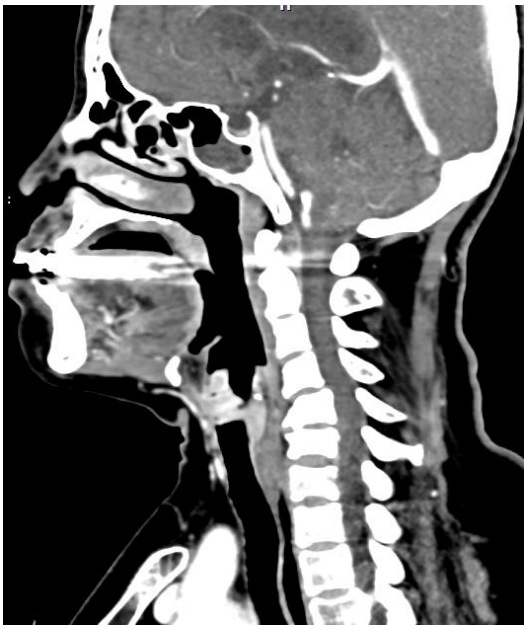

Figure 2: Neck computed tomography coronal view shows an enhancing sessile 2.5 cm mass at supra-subglottic larynx attached to right true vocal cord and a 7.0 mm left thyroid nodule.

On the day of surgery, endotracheal tubes of various sizes, a bronchoscope to enable awake intubation, and medications were prepared, and the patient was pre-oxygenated under vital sign monitoring. To induce anesthesia, 150 mg of thiopental was administered intravenously and gentle positive pressure ventilation was performed. Fortunately, no check valve effect, which had been a possible concern, was observed, and bidirectional ventilation was possible for both inhalation and exhalation. After confirming that the airway was secured, 50 mg of rocuronium, a neuromuscular blocking agent, was administered intravenously. After 3minutes, endotracheal intubation was performed using a reinforced tube ID 6.0 mm with a Glidescope®. When the larynx was slightly lifted with the scope, the narrow gap in the glottis was opened. When the mass was pushed with the tube, the space between the gaps was secured, and intubation was performed without difficulty (Fig. 3). Pathological examination of the tissue obtained from surgery confirmed squamous cell carcinoma.

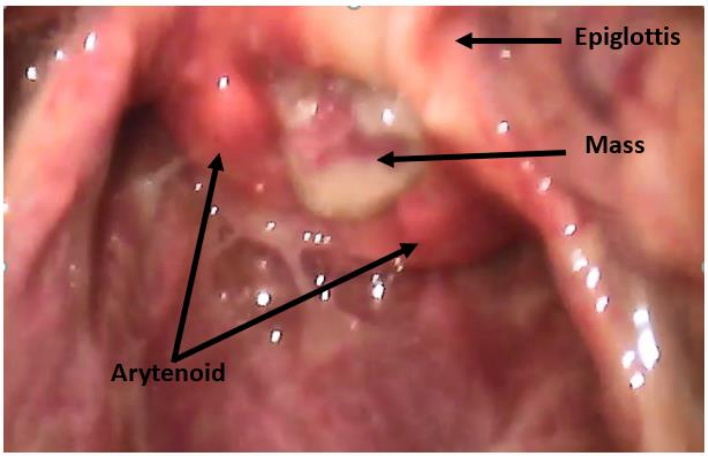

Figure 3: View obtained when the epiglottis is lifted with a Glidescope®. A papilloma-like mass attached to the vocal cord is seen blocking the tracheal inlet.

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Case 3

The patient was a 66-year-old male with a height of 164 cm and weight of 52.9 kg, who was diagnosed with hypertension and was taking medication based on past medical history. The patient was diagnosed with type 2 diabetes mellitus after hospitalization. He said that he felt a lump in his neck about a month and a half ago and that it gradually grew larger over time. For the past two weeks, he had difficulty swallowing saliva and in eating, thus, he had been consuming only liquid food. At the time of admission, there was a hard, palpable mass of approximately longitudinal-diameter 7 cm in the center of the right neck. Tenderness was present in the area, but there were no symptoms of fever or dyspnea. And the vital signs were 103/58 mmHg, pulse 55, 20 breaths per min, 37.7 ℃ body temperature, and 95% oxygen saturation under room air state. After admission, right thyroid and lateral lymph node core needle biopsies were performed, and preparation for surgery was initiated while conducting a positron emission tomography scan. During the weekend, the patient complained of shortness of breath, difficulty sleeping, and difficulty drinking water. A neck computed tomography scan was performed again, and due to the progression of tumor invasion, an emergency surgery was performed to secure the airway (Fig. 4).

Figure 4: Neck computed tomography sagittal view shows a 45 x 55 x 69 mm ill-defined mass lesion in the right thyroid, indicating anterior strap muscle and right tracheal invasion. Multiple necrotic retropharyngeal necrotic lymph node enlargement is seen in the levels I, II, IV, and V of the right subclavicular area.

The surgery was planned as a thyroidectomy and tracheostomy to secure the airway, and anesthesia was administered with the patient set to undergo tracheostomy immediately if intubation will be failed. Anesthesia was induced by intravenous injection of 1% propofol 80 mg, and manual ventilation was confirmed. Afterwards, propofol 20 mg and rocuronium 60 mg were additionally administered. The first endotracheal intubation was attempted using a

Glidescope® but failed because of the mass effect of solid cancer cells in the oral cavity, making it difficult to approach and secure a view of the tracheal inlet. The second attempt was successful, using a reinforced tube ID 6.0 mm with a McGrath blade size of 3. After surgery, the patient refused active treatment, including chemotherapy, and was transferred to a hospice ward, where the cancer pain was continuously controlled.

DISCUSSION

Difficult airway management is critical to ensure patient safety. Even with a skilled provider, it is important to address the difficulties and failures that may occur during facemask ventilation, endotracheal intubation, supraglottic airway insertion, invasive airway procedures, or extubation [4]. At this time, the patient can be safely managed only by checking the patient in advance for difficulties expected at each stage, comprehensively simulating oxygenation, patient positioning, sedation, and administration of local medications, various endotracheal intubation methods, and possible conversion methods in case of endotracheal intubation failure, and then preparing alternatives before proceeding with anesthesia.

In situations in which a difficult airway is anticipated, starting with patient evaluation, the healthcare provider performing airway management is responsible for selecting appropriate strategies and techniques [5]. Alternatives to difficult intubation include video-assisted laryngoscopy, alternative laryngoscope blades, combined techniques, supraglottic airway intubation, flexible bronchoscopy, introducers, lighting stylets, and lighting wands. During intubation, up to three attempts are allowed. Additional attempts should be made to introduce variations by repositioning the patients, using a video laryngoscope, changing the blade, or externally manipulating the larynx [5-7]. The role of a skilled assistant, who can provide reassurance at this stage, is also important.

Fortunately, in these cases, the airway was secured without any major problems during the mask ventilation stage, allowing a safe time to proceed to the next step. Additionally, various available options, including several types of video laryngoscopes and flexible bronchoscopes of various sizes, have been helpful in patient management. This preparation was possible because the surgeons had provided detailed information about the patients in advance.

As the equipment and personnel that can be prepared vary depending on the given environment, it would be safe to welcome patients with as many options as possible. Before initiating airway management, it is important to provide a sufficient explanation and share the algorithm with the patients and healthcare providers. Open communication helps them understand the plan and actively participate in the process.

References

[1] Apfelbaum JL, Hagberg CA, Connis RT, Abdelmalak BB, Agarkar M, Dutton RP, et al. 2022 American Society of Anesthesiologists Practice Guidelines for management of the difficult airway. Anesthesiology. 2022;136:31–81. doi: 10.1097/ALN.0000000000004002.

[2] Ahmad I, El-Boghdadly K, Bhagrath R, Hodzovic I, McNarry AF, Mir F, et al. Difficult airway society guidelines for awake tracheal intubation (ATI) in adults. Anaesthesia. 2020;75:509–28. doi: 10.1111/anae.14904.

URL: http://dx.doi.org/10.14738/bjhr.1203.18752.

[3] Frerk C, Mitchell VS, McNarry AF, Mendonca C, Bhagrath R, Patel A, et al. Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults. Br J Anaesth. 2015;115:827–48. doi: 10.1093/bja/aev371.

[4] Jung H. A comprehensive review of difficult airway management strategies for patient safety. Anesth Pain Med (Seoul). 2023 Oct;18(4):331-339. doi: 10.17085/apm.23123. Epub 2023 Oct 31. PMID: 37919917; PMCID: PMC10635845.

[5] Niven AS, Doerschug KC. Techniques for the difficult airway. Curr Opin Crit Care. 2013;19:9–15. doi: 10.1097/MCC.0b013e32835c6014.

[6] Kheterpal S, Han R, Tremper KK, Shanks A, Tait AR, O'Reilly M, et al. Incidence and predictors of difficult and impossible mask ventilation. Anesthesiology. 2006;105:885–91. doi: 10.1097/00000542-200611000-00007.

[7] Levitan RM, Heitz JW, Sweeney M, Cooper RM. The complexities of tracheal intubation with direct laryngoscopy and alternative intubation devices. Ann Emerg Med. 2011;57:240–7. doi: 10.1016/j.annemergmed.2010.05.035.