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Difficult intubation in critical patient: how can we manage it? a case report

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Abstract: Difficult airway management represents a challenge. Guidelines recommend choosing the airway technique based on physicians' skills, equipment, available devices and context.
A man with acute respiratory failure needed an emergent intubation. He was obese with Mallampati score 4, Cormack-Lehane grading 4, macroglossia, reduced mouth opening, stocky and wide neck, and deviated laryngotracheal axis due to expanding neck hematoma. After endotracheal intubation failure, the anesthetist placed a second-generation laryngeal mask airway and started ventilation. In the next step, definite airway was provided by an endotracheal tube placed through the mask under flexible fiberscope vision.
Supraglottic airway devices are recommended in cases of unanticipated difficult intubation after endotracheal intubation failure. They are used to ensure satisfactory oxygenation and occasionally to guide the endotracheal tube. Fiberscope is useful to ensure vision of larynx and trachea in these scenarios. This is a unique case of emergency and difficult airway management using this combined approach.

Keywords: Airway Management; Bronchoscopes; Emergency Treatment Laryngeal Masks

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1. Introduction

Difficult airway management represents a challenge to anyone who manages the airway. In 2022, the American society of anesthesiologists stated recommendations in case of unanticipated difficult airway management. First, choose the airway technique based on physicians' skills, equipment, device availability, and context. Second, they combine techniques of intubation to achieve the satisfactory result (1). Indeed, several case reports and retrospective observational studies demonstrated variable effectiveness of individual devices, e.g., rigid laryngoscope, videolaryngoscope, supraglottic airway devices (SAD) (2-4). According to the 2015 guidelines of the difficult airway society (DAS), in case of unanticipated difficult intubation, the second-generation SAD represents the "plan B" after a failed intubation with rigid laryngoscope (5). Once placed and effective oxygenation is established, a tracheal intubation can be performed where feasible in terms of patient's clinical condition, context, and physicians' skills. In these circumstances, a blind technique (6) or flexible fiberoptic fiberoscope (FFS) guided technique (7) could be performed. The second technique shows higher first attempt success rate but technically more demanding.
For the first time, we reported a case of an emergency airway management where a second generation supraglottic device was used as a support tool for tracheal intubation under fiberoptic vision.

2. Case presentation

A 53-years-old man with chronic kidney disease presented to the hospital with an acute respiratory failure. The patient suffered from hypothyroidism, diabetes insipidus, obesity (body mass index (BMI)> 35 kg/m^2), and a recent episode of transient ischemic attack (TIA) (about one month before). In addition, he had reported two previous surgeries (ventriculoperitoneal shunt) due to hydrocephalus and resection of craniopharyngioma resulting in right eye blindness (when he was seven). On admission to hospital, his blood tests showed white blood cell (WBC) 22.3 x 10^3/µL, hemoglobin (Hb) 8.2 g/dL, hematocrit (HCT) 25.1%, platelets 148 x 10^3/µL. The patient was hospitalized with the diagnosis of volume overload due to kidney failure. Under guidance of ultrasonography, a double lumen venous catheter for hemodialysis was placed in right internal jugular vein (IJV). Shortly after the procedure, the patient developed a massive hematoma on the right side of the neck followed by acute respiratory failure. Once the anesthesiologist arrived at nephrology unit, he evaluated the patient: Mallampati score of 4, Cormack and Lehane grading of 4, macroglossia, reduced mouth opening,

Figure 1 Second generation supraglottic airway device (i-gel)

Figure 2 The endotracheal tube is attached to laryngeal mask (A); the patient is ventilated with the bag (B)

stocky and wide neck, and deviation of the laryngo-tracheal axis due to the hematoma. His vital signs were significant for heart rate of 102 bpm, blood pressure of 90/50 mmHg, and oxygen saturation (SpO2) of 76% with 15 L/min of O2 via facemask. Due to the emergency condition the anesthesiologist first tried to ventilate the patient with the bag and face mask but was unsuccessful. Then, he tried to intubate with the rigid laryngoscope in awake intubation process but failed (cannot intubate, cannot oxygenate – CICO). In the end, he placed a second-generation laryngeal mask airway (LMA) (Figure 1) and started ventilating the patient with the bag. Fortunately, this led to a SpO2 of 100%.

In view of the patient's adverse anatomical and clinical conditions (i.e., collapse of the airway), to provide a definite airway, a 5.5 mm endotracheal tube (ET) was placed through the laryngeal mask. The correct position of the ET was confirmed by FFS (Figure 2). On the consultation, given the physical features of the patient and the high risk of bleeding, the otorhinolaryngology service advised against a surgical tracheotomy.

After attaching the ET tube to the laryngeal mask, the patient underwent angio-computed tomography (CT) to exclude lesion of the IJV and then was transferred to intensive care unit (ICU). During his hospitalization in ICU, the patient underwent mechanical ventilation. After two days in ICU, once the risk of bleeding and widespread edema of the upper airways had reduced, the SAD and ET were replaced with a larger ET (7.5mm). One day later, the patient was extubated, and transferred to inpatient unit.

3. Discussion

The management of the airway is sometimes a critical task for anyone who manages the airway. Thus, several guidelines and algorithms have been established to help the emergency physicians to respond with immediacy and effectiveness to these crisis situations (1,5,8). In particular, the DAS recommends using SAD after failed endotracheal intubation to ensure oxygenation. Then, once oxygenated, an attempt for endotracheal intubation can be performed (5). According to the DAS, the ideal features of SAD are correct placement at first attempt, high oropharyngeal seal pressure, separation of airways from digestive tract and possibility of tracheal intubation through FFS (5). The second-generation LMA provides these features in comparison to first-generation SAD. An older alternative could be the intubating laryngeal mask airway (ILMA) that ensures a blind endotracheal intubation. However, ILMA is more rigid, bulky, and related to high risk of airway injury (5).

Therefore, due to the anatomy and edema of the upper airways of our patient, ILMA was not a good option.

Following these guidelines, in our case, dealing with an unanticipated difficult airway management, in critical situation, after endotracheal intubation failure, the anesthetist has provided satisfactory ventilation by SAD and then, under FFS vision, he positioned the ET through the SAD. Only few papers report this technique. McAleavey et al. (9) describe this two-step intubation technique in a case of anticipated difficult airway management for elective surgery. On the contrary, in our case, the anesthetist performed the technique in emergency and in unfavorable conditions in an unanticipated difficult intubation. The review by Wong et al. (10) suggests a similar technique: an introducer (e.g., gum elastic bougie) is passed through the SAD and used as guidewire for ET. However, if anesthetist can use fiberoptic, it is more useful than introducer like bougie. This is due to the fact that it allows us to visualize larynx and trachea and to perform a safer endotracheal intubation, avoiding possible injuries. It is not often possible to remove SAD and to place ET in many scenarios (e.g., obesity, reduced extension of the neck, macroglossia). In this situation, the FFS can be used as guidewire for ET through second generation SAD, ensuring the vision of the glottic space and the trachea during the procedure. Obviously, the anesthetist should have the skills to use the FFS in distorted upper airways.

4. Conclusion

In cases of unanticipated difficult airway management, the guidelines suggest different possible techniques and algorithms. In these cases, the primary goal is the patient's oxygenation and survival. The second goal is to obtain the patient's ventilation as soon as possible with less attempts as possible to avoid injuries during the procedure.

We provided a case of emergency difficult intubation, who was oxygenated with SAD and then intubated by passing the ET through the laryngeal mask.

5. Declarations

5.1. Acknowledgement

None.

5.2. Authors' contribution

All authors contributed equally to the study.

5.3. Conflict of interest

None.

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