

CASE REPORT

“Cannot Intubate_Cannot Ventilate” Emergency: Airway Management of Difficult Airway in a Patient; A Case Report

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The present study reports a 42 years old male patient with modular thyroid cancer. The patient became candidate for direct laryngoscopy (DL) in order to observe the condition of the lesion in the trachea and probable biopsy, and subsequent surgery. After a few moments, it was observed that the patient cannot be ventilated. Immediately, the patient was tried to be intubated but was not successful and thus, quick track was put for the patient rapidly and he was connected to the jet ventilation machine. But after a short time, suddenly the patient got bradycardia and respiratory interruption and drop in saturation that the patient underwent CPR operation which continued for 30 seconds which resulted finally in the patient's heart rate reaching 100 and spontaneous breathing began. After auscultation of lungs, bilateral pneumothorax was diagnosed that according to previous studies, is probably a complication resulting from trans tracheal jet ventilation (TTJV). This complication was resolved through needle aspiration. After 4 hours, the surgery was over and the patient, with stable vital signs and spontaneous breathing, was sent to the intensive care unit.

In some previous studies, the researchers have suggested using open surgical technique in order to reduce the complications resulting from cannot intubate, cannot ventilate (CICV), and the present study also supports this suggestion and recommends it to other anesthesiologists when facing CICV situation, in order to reduce the complications resulting from jet ventilation and its subsequent damages.

Keywords: Airway emergency; Jet ventilation; CICV; Airway management

Direct difficult laryngoscopy occurs in 1.5-8.5% of cases of general anesthesia, and failure of intubation occurs in 0.13-0.3% of cases [1]. It should be noted that in one out of every five thousand cases of anesthesia, not only there isn't the possibility of tracheal intubation, but also ventilation of the patient is impossible. The “Cannot Intubate _ cannot Ventilate” situation (CICV), although it is rare but it is life threatening [2]. The problems with establishing an appropriate airway, such as hypoxia or aspiration, are among the main causes of death due to anesthesia complications in hospital [3]. Investigating difficult airway management indicates that there is little information about the priority of anesthesiologists for airway infra-glottic techniques in dealing with CICV situation [4-5]. Trans-tracheal Jet Ventilation (TTJV) is a definition of oxygen under pressure through narrow cricothyroidotomy cannula [6]. The ASA Association has published guidelines for difficult airway for more than three decades, which include TTJV as an option during a CICV emergency [7-9].

Also, some studies have shown the failure and barotrauma resulting from using TTJV [10-11].

The present study reports a case of a patient with a CICV emergency situation with tracheal stenosis where TTJV has been used as a therapeutic intervention.

Case Description

The patient is a 42 years old man with modular thyroid cancer since 8 years ago, who has been subjected to right and left thyroid lobectomy in 2009 two times; and three times in 2011 and 2012, he has undergone surgery with suspicion of local recurrence of the tumor, and some involved parts such as a part of cricoid and esophagus has been removed and radical cervical dissection has been performed. Last month, the patient was referred to this center with dysphagia and odynophagia and shortness of breath, and being suspected of tumor recurrence, he underwent imaging, which displayed the lesion at the left of trachea (Figure 1).

On the day of referral, the patient underwent DL to observe the condition of the lesion in the trachea and probable biopsy.

The patient has no history of other diseases (PMH); also he uses levothyroxine daily.

At 15:15 the patient is brought to the operating room and is put under monitoring of NIBP/ECK/POM. A pink peripheral venous catheter with number 20 is installed for him. The vital signs at the beginning of entrance of the patient were as below:

BP: 123.82, PR: 70, RR: 17, O2 Sat: %95, T: 37°C

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Also the results of the patient’s initial tests were as follows (Table 1).

Figure 1- CT scan of the patient’s chest which shows the trachea under the pressure effect of the metastatic mass



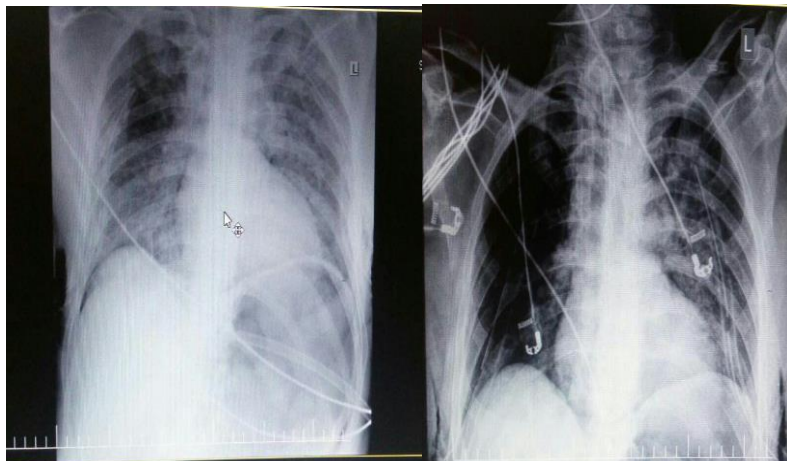
Table 1- The results of the initial patient’s tests when entering the operating room

Hb	15 g/dl	Na	138 meq/l	Cr	11 mg/dl
Plt	196×103 µl	K	4.5 meq/l	INR	1.07 s
FBS	88 mg/dl	PT	13.5 s		
PTT	30 s	BUN	9 mg/dl		

Then the patient underwent general anesthesia (GA). In premedication, 100µg fentanyl and 60mg lidocaine were used. Also, in anesthesia induction, sevoflurane gas 2% and 100 mg propofol and 100 mg succinylcholine were used. After a few moments, it was observed that the patient is not being ventilated and his saturation is dropping. Immediately, the patient was tried to be intubated but was not successful and thus, quick track was put for the patient rapidly was ventilated via TTJV. At this time, the patient’s breathing became spontaneous and his saturation was improved to 90 to 93%. Then we put two green IVs and two gray IVs. Also

arterial line and catheter were fixed for the patient. After that, the surgeon performed tracheostomy for the patient and tube number 5.5 with a cuff was placed for the patient and 100µg of fentanyl was given. Then track was put for the patient and he was connected to ventilator and a capnograph. But suddenly the patient suffered from bradycardia and respiratory interruption and drop in saturation and CPR operation started which was continued for 30 seconds and 3 doses of epinephrine and 3 doses of atropine were used; finally the patient’s heart rate reached 100 and his spontaneous breathing started and saturation reached 70%. After that, the patient was manually ventilated and auscultation of lungs showed bilateral reduction of sounds and thus, by diagnosis of pneumothorax, needle aspiration was done and about 30 ml air was brought out which led to the patient’s hemodynamic stability. Then, two-sided chest tube was inserted which was functional, but still the patient’s saturation was fluctuating between 75 and 80% and it was not improved; so portable CXR was performed, in which evidences of lung edema were observed. Therefore, 100 mg Lasix (during 15 to 30 minutes) was injected for the patient and establishment of diuresis recovered his respiratory state and saturation reached 94% (Figure 2).

Figure 2- Image of the patient’s chest during the operation after acute pulmonary edema; left side: before the operation; right side: after the treatment



After 4 hours, the surgery was completed and the patient being tracked and with GCS 9+T and normal size and bilateral reactive pupils, with stable vital signs and spontaneous respiration was delivered to the intensive care unit.

Also, at the end of the operation, ABG was requested for the patient for 3 times that its results are as follows (Table 2).

Table 2- The results of the patient's ABG in 3 times at the end of the operation

	17:41 PM	18:19 PM	19:45 PM
PH	7.13	7.30	7.34
PCO2	62	58	44
PO2	243	44	55
HCO3	21	29	24
O2 Sat	99	74	86
BE	-9.1	1.8	-1.3
BB	38	48	45
BE Ecf	-7.3	2.9	-0.9

Discussion

Establishing a reliable airway is one of the most important tasks of an anesthesiologist. Therefore, special attention should be paid to training and learning of various ways of dealing with difficult airway. Occurrence of problems in airway management can lead to life-threatening adverse effects such as hypoxia and aspiration.

In short, in the present study, a CICV scenario and the treatment experience of a patient with tracheal stenosis problem due to thyroid cancer are reported. Prevention of CICV is much better than trying to cure it. Preoperative assessment, although it does not take much time, but it can detect patients who have difficult intubation, and thus, this causes that the anesthesiologist will be prepared for critical situations, and during the induction will have available the equipment necessary to confront emergency conditions. Studies also have shown that CICV, although it is rare, but it can occur even in case of presence of advanced airway devices [12]. Also, what is important when dealing with this situation is the attempt to reduce the serious complications after induction of anesthesia, including focusing on preserving oxygenation and preventing repeated intubation of trachea.

The results of a study show that most of the respiratory complications in anesthesia occur due to inability of intubation of trachea, interstitial intubation, or inadequate ventilation. In a number of other studies, it has been shown that the prevalence of cases where there is no possibility of ventilation and intubation of trachea (CICV), is one out of every 5,000 cases of anesthesia (1/5000). In such an emergency situation, the following actions can be done [13]: using of laryngeal mask of airway (LMA), using of Combitube, using of jet ventilation through trachea (TTJV), tracheostomy.

Regarding the studied case, immediately after saturation dropping and loss of ventilation, the patient was connected to jet ventilation machine and it was observed that his saturation was improved after a few moments. However,

some studies have shown that using of TTJV can be accompanied with problems such as barotrauma. In a review study, 23 studies describing 90 CICV procedures showed that in 29 cases (32%) of patients, after using of TTJV, barotrauma has occurred [14-15]. In 9 other studies describing 42 procedures of TTJV, 7% barotrauma has been reported [16-19]. Patel has conducted the largest study about the cases related to TTJV. During 53 months (1994-1998), he has examined 352 cases of tracheal intubation, among which 8%, due to CICV emergency based on protocol, after unsuccessful intubation (2 times or more) or non-preservation of saturation higher than 90% by face masks, TTJV has been used. In this study, 4 persons (14%) out of 29 patients faced barotrauma [20].

In the present study, although after using TTJV, the patient's oxygenation was maintained, but after that, the patient suffered from cardiopulmonary bypass resulting from pneumothorax barotrauma. Generally, it is more than two decades that TTJV is recommended as a savior procedure in CICV situation [8-9]. Guidelines of difficult airway association in 2015, based on the probability of increasing success, both for narrow techniques and wide-bore-cannula, in order to reduce the complications resulting from CICV, has recommended open surgical technique [14]; that the present study also in order for reducing the complications resulted from jet ventilation and its subsequent damages, supports this suggestion and recommends it to other anesthesiologists when facing CICV situation.

At the end, observing the practical and functional points is another important issue that is very important in success of the work, and of course, having much experience increases the skill and ability of an anesthesiologist for successful intubation and establishment of ventilation in any situation.

Conclusion

At the end, observing the practical and functional points is another important issue that is very important in success of the work, and of course, having much experience increases the skill and ability of an anesthesiologist for successful intubation and establishment of ventilation in any situation.

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