

심폐재활

게시일시 및 장소 : 10 월 19 일(토) 08:30-12:30 Room G(3F)

질의응답 일시 및 장소 : 10 월 19 일(토) 11:00-11:30 Room G(3F)

## **P 3-112**

### **A new vocalization method during ventilator use in tracheostomized patients: Above cuff ventilation**

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#### **Introduction**

Tracheostomy is performed for securing the stable respiration and for protecting the airway. Continuous cuff inflation makes most of the exhaled air to be excreted through the tracheal tube, so the amount of air passing through the vocal cords is significantly reduced. These patients usually suffer from the frustration or anxiety due to the communication issue. There has been 'above cuff vocalization' which supply oxygen via subglottic suction catheter to pass the vocal cord for vocalization. However, this method is not physiologic since the flow continues through whole respiratory phases. Thus, we designed a new technique named 'above cuff ventilation'.

#### **Case**

A 35-year-old male diagnosed with spinal muscular atrophy at the age of 1, who has been using non-invasive positive ventilation via full-face mask was admitted for respiratory distress. He was tracheostomized in part of the management for aspiration pneumonia and septic shock, and invasive positive ventilation was applied. After the active lung lesion was resolved, the ventilator was set to assist-controlled mode with 400 mL of tidal volume (TV), 12/min of respiration rate, inspiration : expiration = 1:2, and with no positive end expiratory pressure. The peak inspiratory pressure (PIP) was checked between 13-15 cmH<sub>2</sub>O. Due to the inflated non-fenestrated tracheal tube he could not phonate. Therapy Outcome Measure for Voice Impairment scale (TOMS) score was 0 (Table 1). The patient was provided the informed consent and agreed to participate in this trial (approved by IRB, YUMC, 3-2019-0111). As a preparation step, the secretion which remained in the above-cuff space, the main circuit, the subglottic suction catheter was cleared out. The subglottic suction catheter was then connected to the tip of the connector as Figure 1. The airflow from the ventilator passed through the main circuit, connector, subglottic suction catheter, above cuff space, vocal cord, and mouth, sequentially. Via this new air route, he could phonate without deflating the tracheal tube, and the TOMS score was improved to 2 with

400 mL of TV. However, due to the decreased inflow to the lung, the PIP was slightly decreased to 11-13 cmH<sub>2</sub>O, and he reported minimal respiratory discomfort. Therefore, we increased the TV to 450 mL, and the TOMS score improved to 3, and the PIP was restored to 13-15 cmH<sub>2</sub>O without respiratory discomfort. When tried with TV of 500 mL, the PIP elevated to 20 cmH<sub>2</sub>O, and TOMS score remained to 3 (Table 2). In that, the caregiver was educated to apply 'above cuff ventilation' with 450 mL of TV. No aspiration event or any other adverse event was occurred during and for the day after the trial.

### Conclusion

This is a new vocalizing method for the patient with inflated non-fenestrated tracheal tube to protect the airway from the aspiration event. This method does not need no additional flow other than airflow from the ventilator, so that the patient or the caregiver can simply apply.

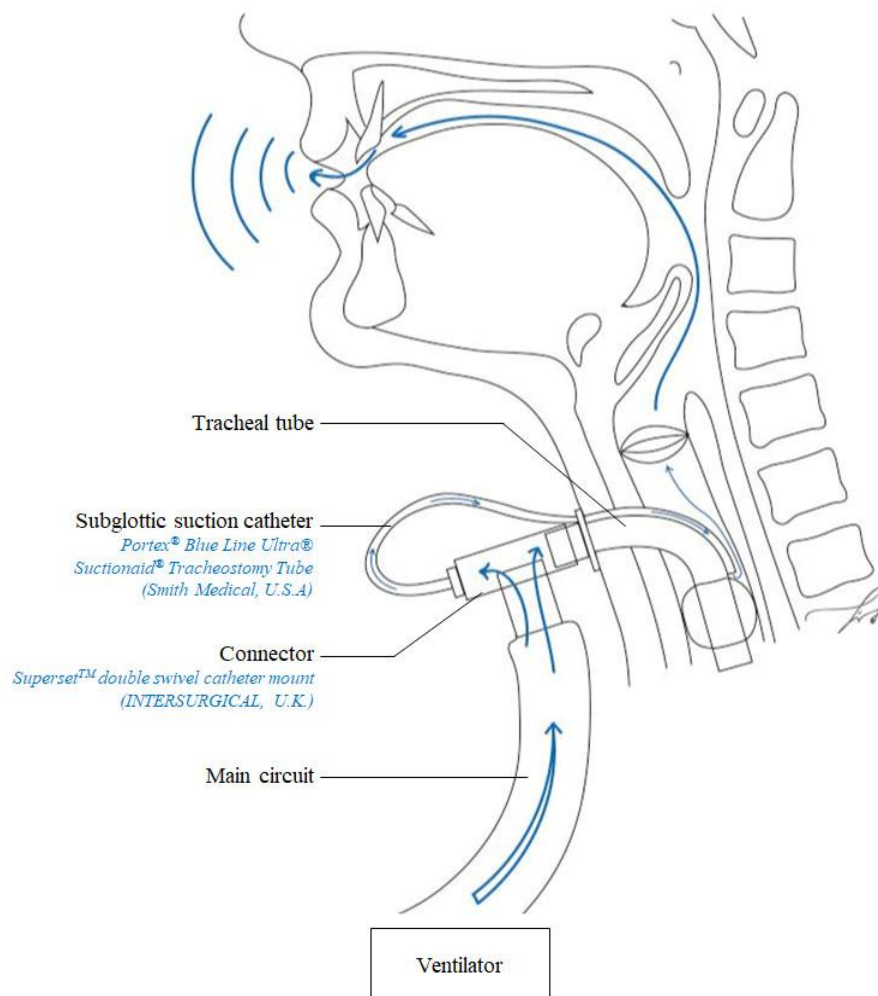


Figure 1. Above cuff ventilation.

Table 1. Therapy Outcome Measure for Voice Impairment scale.

Score	Description
0	Severe persistent aphonia : Unable to phonate. Does not phonate
1	Consistent dysphonia : Occasional phonation. May be dysphonic with aphonic episodes
2	Moderate dysphonia : Can phonate but frequent episodes of marked vocal impairment occurring
3	Moderate/mild dysphonia : Less frequent episodes of dysphonia (e.g. occurs some time each day/or slight persistent 'huskiness')
4	Mild dysphonia : Occasional episodes of dysphonia occurring
5	No dysphonia : Appropriate modal voice consistently used

Table 2. A clinical case of 'above cuff ventilation'.

Trial No.	Baseline	#1	#2	#3
TV (mL)	400	400	450	500
RR (/min)	12	12	12	12
PIP (cmH <sub>2</sub> O)	13-15	11-13	13-15	20
Above cuff ventilation	(-)	(+)	(+)	(+)
TOMS score	0	2	3	3
Respiratory Discomfort	No discomfort	Minimal discomfort	No discomfort	Minimal discomfort