

심폐재활

발표일시 및 장소 : 10 월 26 일(금) 14:05-14:15 Room D(5F)

## OP3-1-6

### Successful application of noninvasive ventilators in patients with forced vital capacity below 10%

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#### Introduction

Reduced forced vital capacity (FVC) is one of the risk factors for respiratory complications in patients with restrictive lung disease such as neuromuscular disease (NMD), motor neuron disease (MND) and spinal cord injury (SCI) et cetera. Generally, patients with myopathy are recommended to apply the noninvasive ventilator (NIV) when the FVC is 45-55% of the predicted value (FVCpred) and when the FVCpred is less than 50% in the MND patients. If these periods are missed, tracheostomy may be required, which may lead to a decrease in the patient's overall qualities of lives (QOL) such as increased secretion, infection risk, and limitation of vocalization and swallowing. However, if adequate respiratory support is consistently achieved, NIV can be applied without tracheostomy even under FVCpred 10%. We aim to report cases of successful application of NIV instead of improper tracheostomy.

#### Method

We evaluated a total 945 of patients who were hospitalized and applied noninvasive ventilator successfully between March 1, 2000 and March 31, 2018. 110 patients who became successful correction of abnormal ventilatory status through application of NIV with under 10% of FVCpred were included in this report. The medical charts were retrospectively reviewed for pulmonary functions such as FVC, peak cough flow (PCF), maximal inspiratory pressure (MIP) and maximal expiratory pressure (MEP). Furthermore, we analyzed ventilation status and gas analysis via arterial blood gas analysis (ABGA) with continuous electric monitoring of transcutaneous blood gas.

#### Results

Among the 110 patients, there were 6 patients with SCI, 24 with ALS, 51 with DMD, 2 with congenital myopathy, 19 with other myopathies, 1 with myotonia, 3 with spinal

muscular atrophy (SMA) and patients with the other disease were 4. All the patients were divided into 3 groups. Group 1, who refused NIV application until development of hypoventilation symptoms or whose FVC decreased abruptly, included 26 patients who were followed up through outpatient clinic regularly before NIV application due to, group 2 was composed of 47 patients who were lost their follow-up until NIV application or already symptomatic or hypercapnic at 1st visit. The 37 patients divided into group 3 were transferred from another hospital or department or received inadequate treatment before NIV application. All 6 patients with SCI were successfully decannulated in our hospital after tracheostomy in another hospital. The 8 intubated patients transferred from other hospitals to our institution were extubated successfully. Although ALS is a progressive disease and the duration of NIV is not so long, ALS patients used NIV for at least 3 months to 2 years.

### **Conclusion**

Suitable supported respiration has preventive effect for deterioration of respiratory function. As a result, even if FVCpred is less than 10%, proper respiratory support followed by NIV may postpone the tracheostomy surgery.

Table 1. Clinical assessments and characteristics.

	<b>n=110</b>
<b>Age, years</b>	31.4±17.9
<b>Male, n</b>	81
<b>ABGA, %</b>	
pCO <sub>2</sub>	48.8±15.5
SaO <sub>2</sub>	95.9±5.2
<b>Non-invasive EtCO<sub>2</sub> monitoring during sleep</b>	
On admission maximum, mmHg	54.1±12.0
On admission mean, mmHg	45.5±10.3
On discharge maximum, mmHg	42.4±5.9
On discharge mean, mmHg	34.7±6.2
<b>Pulmonary function test</b>	
FVCpred at sitting position, %	7.6±5.1
FVCpred at supine position, %	5.9±3.8
MIC, mL	969.7±440.2
PCF, L/min	58.4±82.3
MIP at sitting position, %	14.0±10.2
MIP at supine position, %	13.7±10.9
MEP at sitting position, %	10.7±8.4
MEP at supine position, %	11.1±9.2

Variables are expressed as mean±SD(Standard deviation).

EtCO<sub>2</sub>: End tidal carbon dioxide; pCO<sub>2</sub>: Partial pressure of carbon dioxide;

SaO<sub>2</sub>: Oxygen Saturation; MIC: Maximan inspiratory capacity

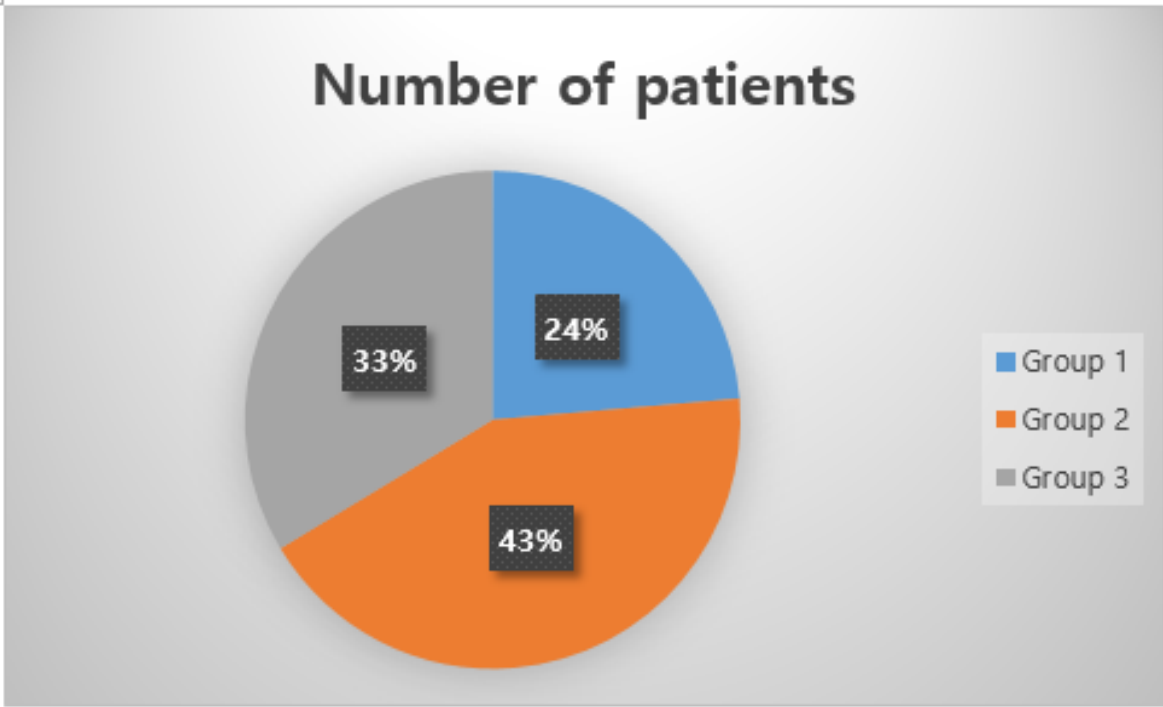


Figure 1. Patient proportions by groups.