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Relationship between Swallowing parameter and Pulmonary Function in Stroke Patients

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Objective

Many stroke patients have difficulty in protecting airway, which affects swallowing and coughing. Conventional treatments such as bolus modification, airway protective maneuvers, and pharmacological interventions, as well as other treatments such as expiratory muscle strength training, thermal-tactile stimulation, electrical stimulation have been used to manage dysphagia in patients. However, the long-term effects have yet to be verified. Previous studies have suggested that there is a correlation between the pulmonary function and dysphagia, but the specific relationship is not well understood. This study aimed at identifying the relationship between the pulmonary function tests and the elements of swallowing function in stroke patients with dysphagia.

Subject & Method

Total 36 patients with stroke, diagnosed with dysphagia, and who admitted to the clinic of the Department of Rehabilitation Medicine from June 2017 to October 2017 were recruited. They all underwent pulmonary function tests and VFSS simultaneously. Pulmonary function tests included vital capacity (VC) using %, which calculated from measured vital capacity divided by age-related prediction value, and peak cough flow (PCF). Swallowing parameters including Videofluoroscopic dysphagia scale (VDS) were evaluated by Videofluoroscopic swallowing study (VFSS) and diet types at admission and at discharge were evaluated. The relationship between dysphagia scales and pulmonary function tests was analyzed using ANOVA, T-test, and Pearson's correlation.

Results

The Results showed statistically significant tendency of correlations between VC(%) and diet type at first, between VC(%) and diet type at discharge, and between PCF and diet type at first (Table 1.). Comparison of the VFSS subgroups revealed significant differences in VC(%) among those assigned to groups based on posterior food propelling, elevation of larynx, and existence of aspiration. Also, it revealed significant differences in PCF among those assigned to groups based on cricopharyngeal dysfunction (Figure 1). The correlation analysis of VC(%) and VDS scores with liquids showed a moderately significant correlation ($r = -0.367$, $p = 0.016$, Figure 2)

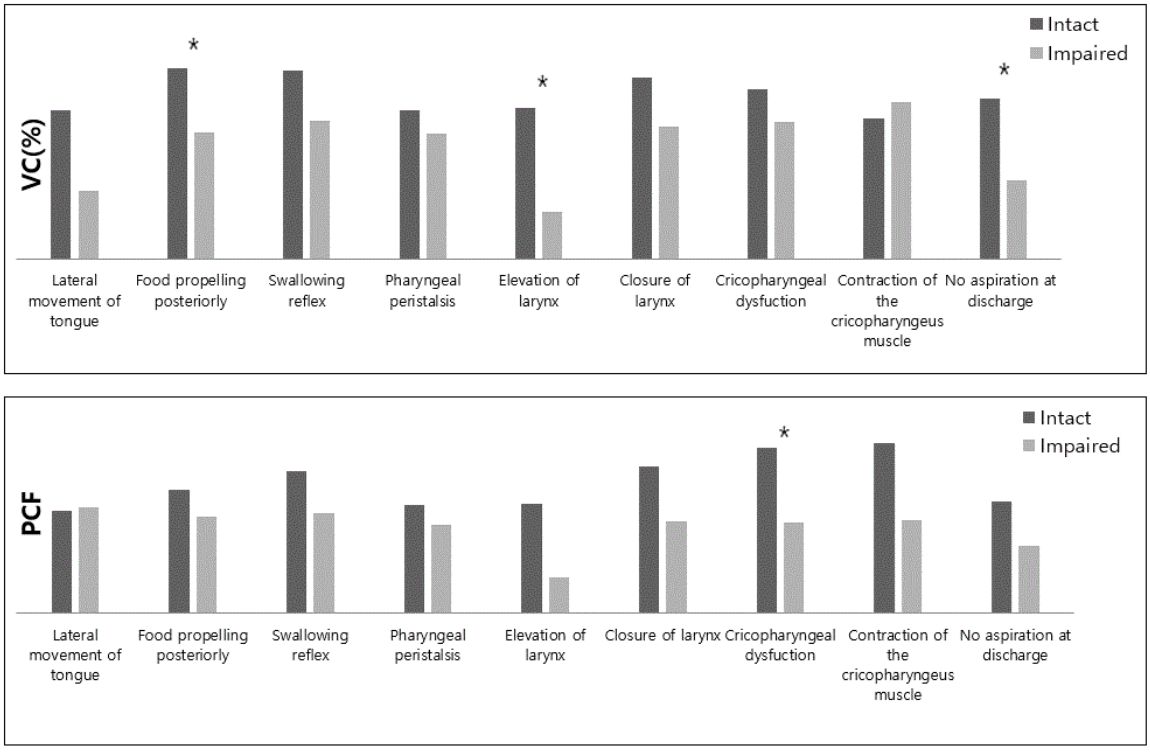
Conclusion

In this study, there were relationships between pulmonary function and some critical parameters of clinical dysphagia scales. Therefore, the clinical importance of pulmonary function test in Stroke patients with dysphagia should be emphasized. Overall, there is a need for large-scale, well-designed, prospective studies in order to correlate pulmonary function with swallowing-related elements, as well as determine the short- and long-term effects of pulmonary rehabilitation on dysphagia.

Table 1. Comparison of VC(%) and PCF in Diet subgroups

	Diet level (Initial)	Diet level (discharge)
VC (%)	0.001 *	0.017 *
PCF	0.002 *	0.092

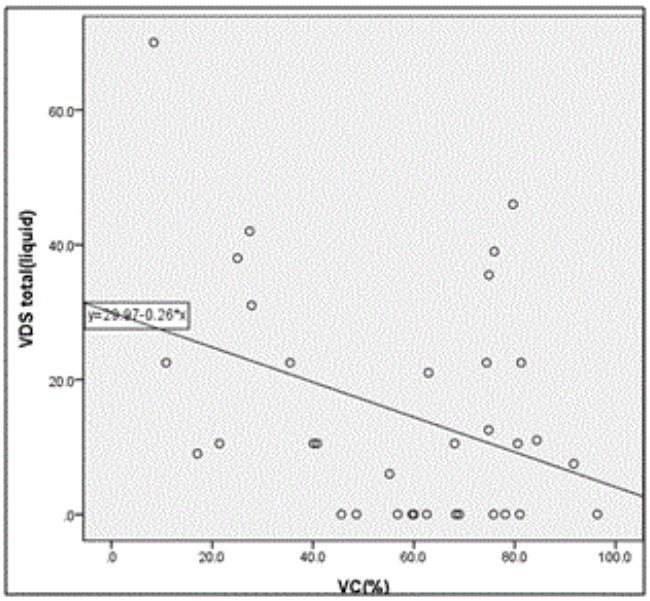
*P<0.05 by one-way analysis of variances among groups



VC, vital capacity; PCF, peak cough flow; VFSS, Videofluoroscopic swallowing study;

*p<0.05 by independent t-test

Figure 1. Comparison of pulmonary function in VFSS subgroups with liquid consistencies



VDS, Videofluoroscopic Dysphagia Scale; VC, vital capacity

Figure 2. Correlation of VDS total score (liquid) with VC(%)