

Predictive value of pharyngeal width at rest (JOSCYL Width) for aspiration after stroke

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Introduction

Assessment of aspiration in stroke patients is important. The weakness of pharyngeal muscle contraction increases the risk of aspiration. The pharyngeal width at rest decided by the tone and strength of pharyngeal muscle might be an indicator of aspiration in stroke patients. The aim of this study was to develop a new assist tool for predicting aspiration based on the pharyngeal width at rest in stroke patients with aspiration symptom.

Methods

Lateral neck roentgenograms were obtained from 270 patients complaining of dysphagia after stroke (age: 67.9 ± 12.1 years, stroke stage (acute/chronic): 92/178, and 35 healthy and age-matched controls (age: 65.5 ± 3.1 years). Stroke stage was defined as acute stroke within thirty days, and those who were over thirty days as chronic stroke group. The pharyngeal widths were measured at the middle level of the second and third cervical vertebral bodies using lateral neck roentgenogram. We named the average of two pharyngeal widths as JOSCYL width that is a combination of the first letters of the authors' surnames. A video fluoroscopic swallowing study (VFSS) was performed and the Penetration-Aspiration Scale (PAS) and the Dysphagia Outcome and Severity Scale (DOSS) were determined by two physiatrists. Pharyngeal widths were compared between patients and controls and correlations between the pharyngeal widths and the scores of PAS and DOSS were examined in patients (1st, in whole stroke group; 2nd, in stroke stage). To determine the optimal cutoff points for predicting aspiration, a receiver operating characteristic (ROC) curve analysis was performed on pharyngeal width. All statistical significances were defined as CI > 95% and p value < 0.05.

Results

The JOSCYL Widths of the whole stroke group (17.8 ± 6.2 mm; $p < 0.001$), acute stroke group (17.6 ± 5.9 mm; $p = 0.033$), and chronic stroke group (17.8 ± 6.4 mm; $p = 0.011$) were larger than those of the control group (14.6 ± 4.3 mm). Correlations were confirmed between the JOSCYL Widths and the dysphagia scales in whole stroke group (with PAS: $p = 0.006$; with DOSS: $p = 0.007$), in acute stroke group (with PAS: $p = 0.168$; with DOSS: $p = 0.575$), and in chronic stroke group (with PAS: $p = 0.019$; with DOSS: $p = 0.006$). The correlation between the JOSCYL Width and the severity of dysphagia (PAS and DOSS) was statistical significant for the whole stroke group and the chronic stroke group ($p < 0.05$).

The optimal cutoffs for predicting aspiration were 17.8 mm, 17.5 mm, and 17.8 mm in the whole stroke group, acute stroke group, and chronic stroke group, respectively.

Conclusion

The JOSCYL Width is a new assist indicator for predicting aspiration in stroke patients that is precise and easy to use. Approximately, 18 mm was thought of as a cutoff point of pharyngeal width for post-stroke aspiration. The JOSCYL Width could be an easy and useful indicator for predicting aspiration.