

Clinical Validity of Changes of the Pharyngeal Width at Rest in Dysphagic Patients with Stroke

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Introduction

Dysphagia in ischemic or hemorrhagic stroke patients is a critical condition which can be caused by weakness of pharyngeal constrictor muscles that increases the risk of aspiration, leading to serious pneumonia. The pharyngeal width at rest affected by tensivity of pharyngeal constrictor muscles could be a significant index for difficulty swallowing by our previous studies. The present study aimed to create a new tool for evaluating if there is alleviation or deterioration in dysphagia, using lateral neck x-ray, video fluoroscopic swallowing study (VFSS) and well known dysphagia scales (Penetration Aspiration scale, PAS; Dysphagia Outcome and Severity Scale, DOSS) in order to analyze the changes of the pharyngeal width at rest in chronologic sequence in dysphagic patients with stroke.

Methods

We conducted lateral cervical spine x-rays from 22 patients with ischemic or hemorrhagic stroke. A video fluoroscopic swallowing study was performed and the PAS and the DOSS were determined as the estimation of the current state of dysphagia. The patients had the first VFSS in the acute stage within 30 days after the stroke and had the follow-up studies without time limits when each patient visited the outpatient clinics. Before the studies, one physician verified age, gender, height, weight and neck circumference at each study. Pharyngeal diameter at rest was defined as an average value of the 2 lengths measured at the middle of the second and third cervical vertebral bodies using a lateral neck radiograph and was named "JOSCYL Width" which was a combination of the first letters of the developer's surnames. We made comparisons between the Results from the first VFSS and the follow-up VFSSs and then analyzed the correlation between the changes of the JOSCYL Width and the changes of the PAS and the DOSS over time, using Pearson correlation coefficient as a statistic tool.

Results

The ages of the patients in every case ranged between 40 and 81 years old (mean age of 63.9 ± 13.9 years). The uphill linear correlation between the changes of the JOSCYL Width and the PAS values existed significantly for the stroke group ($r = 0.511$, $p < 0.05$). The changes of the DOSS scores had significant downhill linear correlation with the ones of the JOSCYL Width ($r = -0.435$, $p < 0.05$).

Conclusion

As the JOSCYL Width changed in a positive or negative direction, the PAS scores changed in the same direction and the DOSS scores changed in the opposite way accordingly in this study. The JOSCYL Width well reflected the current condition at each dysphagic patient with stroke and could be a useful tool to evaluate whether alleviation or aggravation of dysphagia occurred following stroke. We need to examine more patients with dysphagia to see if strong correlations exist between this index and the PAS & DOSS values.