

Predictive value of pharyngeal width at rest (JOSCYL Width) for aspiration in elderly people

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Introduction

Dysphagia in elderly people without brain disorder is mostly due to weakness of pharyngeal muscle contraction. The pharyngeal width determined by the strength of pharyngeal constrictor muscle might be an indicator of aspiration. In this study, we used a simple non-invasive technique to characterize the anatomical changes associated with pharyngeal weakness. Lateral neck roentgenogram, video fluoroscopic swallowing study (VFSS) and dysphagia scales (Penetration Aspiration scale, PAS; Dysphagia Outcome and Severity Scale, DOSS) were used and we determined if the average of pharyngeal width (named as JOSCYL Width) has a value of the index indicating the possibility of aspiration.

Methods

Lateral cervical spine x-rays at rest were obtained from 40 participants aged 65 and over suffering from swallowing difficulty without brain disorder and 33 healthy volunteers aged 65 and over with no swallowing difficulty. Before examination, one physician evaluated age, gender, body mass index (BMI) and neck circumference of the participants. Two physicians measured the pharyngeal width on the lateral cervical spine x-ray. JOSCYL width was defined as the mean value of two pharyngeal widths measured at mid-oropharynx (A) and lower oropharynx (B) (figure 1). A video fluoroscopic swallowing study (VFSS) was performed and the Penetration-Aspiration scale (PAS) and the Dysphagia Outcome and Severity Scale (DOSS) were determined as Objective parameters of dysphagia. Independent t-test and chi-square test were used for analyzing demographic data. The correlation between the JOSCYL width and the scores of PAS and DOSS was analyzed in the participants with swallowing difficulty and control group using Spearman correlation analysis. A receiver operating characteristic (ROC) was performed on JOSCYL width.

Results

The ages of dysphagia group ranged between 65 and 91 years old (with a mean age of 78.15 ± 7.1 years) and control group ranged between 66 and 92 years old (with a mean age of 77.84 ± 9.1 years). Through Independent t-test and chi square test, age, gender and neck circumference between both groups was not statistically significant. The JOSCYL Widths of the dysphagia group (17.8 ± 5.5 mm) was larger than those of the control group (14.7 ± 3.7 mm; $p < 0.05$). The correlation between the JOSCYL Width and the severity of dysphagia was significant for dysphagia group ($p < 0.05$). The optimal cutoffs for predicting aspiration were 19.04 mm in the dysphagia group.

Conclusion

The JOSCYL Width was wider in elderly people with swallowing difficulty than healthy elderly people and well correlated with the severity of dysphagia. Compared to the current dysphagia assessment tools, the JOSCYL width is easy and precise tools to predict dysphagia. So, it can be a new indicator for predicting aspiration in elderly with swallowing difficulty

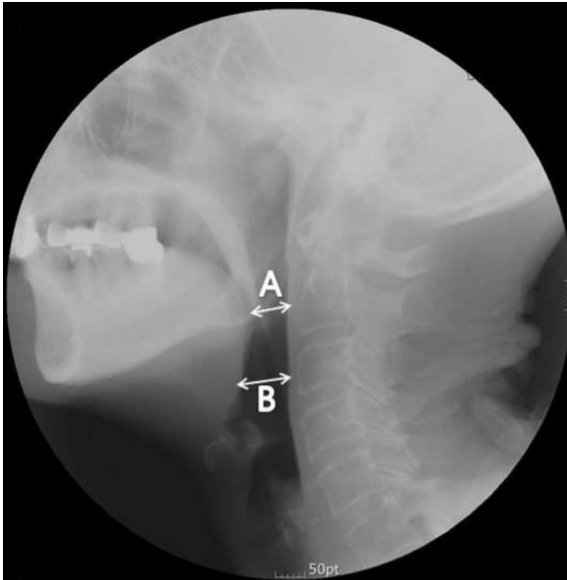


Fig 1. Pharyngeal widths measured at mid-oropharynx (A) and lower oropharynx (B)