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Correlation between finger breadth test and ultrasonographic evaluation of swallowing

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Introduction

Dysphagia is a common complication after stroke, with an incidence ranging from 8.1% to 45%. The suprahyoid muscle is related to the movement of the hyoid–throat complex and plays an important role in swallowing, and the hyoid–larynx approximation is an important parameter of swallowing. Clinically finger breadth test is commonly used to evaluate laryngeal elevation, but it is dependent on the subjectivity of the inspector. Ultrasonography has been used to evaluate the swallowing process since the late 1970s, but it has not been applied widely in stroke patients because videofluoroscopic swallowing study is the gold standard evaluation. Several disadvantages such as using modified barium and exposure to X-rays have been reported for the videofluoroscopic swallowing study. The purpose of this study was to investigate the correlation between finger breadth test and ultrasonographic evaluation of swallowing in patients with dysphagia.

Methods

The recruited patients had been undergoing inpatient treatment after a stroke at the Department of Rehabilitation Medicine of a university hospital. To measure the laryngeal elevation, the second and third fingers of the evaluator were placed on the patient's hyoid bone and thyroid cartilage. The hyoid–larynx approximation during swallowing was assessed with the curved transducer placed on the throat midline longitudinally. The resting distance between the upper pole of the thyroid cartilage and the hyoid bone was measured before swallowing, and the shortest distance was evaluated during swallowing saliva three times at 1-minute intervals. The hyoid–larynx approximation distance was obtained by subtracting the shortest distance from the resting distance, and the ratio of hyoid–larynx approximation was calculated by dividing the approximation distance by the resting distance.

Results

In total, 10 subjects were recruited. Spearman's correlation test was used to determine the association between finger breadth test and ultrasonographic evaluation of dysphagia patients. A strong positive correlation was found between finger breadth and ultrasonographic evaluation (Spearman's rho=0.67, $P<0.05$; Table).

Table. Spearman correlation between finger breadth and ultrasonographic evaluations.

	Mean±SD	Spearman's ρ	P value
Finger breadth	1.45±0.44		
Approximation distance	1.41±0.66	0.674	0.033
Approximation ratio	0.40±0.14	0.674	0.033

Conclusion

Ultrasonography is more accessible, faster, and less expensive compared with the videofluoroscopic swallowing study. There was a positive correlation between finger breadth and approximation distance and ratio, indicating ultrasonography could be applied complementarily in assessing the swallowing process of dysphagia patients. Further studies recruiting more patients are needed.