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Introduction

- Patients with stroke often complain dysphagia.
- The surface laryngeal electromyography(EMG) can measure various values of swallowing related muscles, and this can be used as a non-invasive and non-radioactive method for screening dysphagia.
- Previous studies have attempted to determine whether laterality exists among patients with stroke.
- The aim of this study was to investigate whether there is laterality of laryngeal muscle weakness according to the hemiplegic direction and the location of stroke by using surface laryngeal EMG.

Subjects and methods

Subjects

- 72 stroke patient with dysphagia
- Performed surface laryngeal EMG

Methods

- 10 electrodes were placed over anterior neck based on the hyoid bone (0,0)
: These electrodes were placed as intervals of 2cm each
- The peak amplitude(AMP) are recorded by surface laryngeal EMG while swallowing in 10 electrodes of anterior neck.
- Right side laryngeal muscle
measured as the sum of amplitude of (-2,1), (-2,0), (-1,1) and (-1,0).
- Left side laryngeal muscle
measured as the sum of amplitude of (2,1), (2,0), (1,1) and (1,0).
- Statistical analysis
 - Independent two sample t-test
: Evaluated whether there was a significant laterality of weakness in values of surface laryngeal EMG between right and left laryngeal muscle according to the hemiplegic direction and the location of stroke.



Figure 1. Location of electrodes over anterior neck.
The electrodes were placed on 2cm upper side as (0,1), 2cm right side as (-1,0) and (-2,0), and 2cm left side as (1,0) and (2,0) of the hyoid bone.

Figure 1. Right and left laryngeal muscle
Right side laryngeal muscle was measured as the sum of amplitude of (-2,1), (-2,0), (-1,1) and (-1,0). Left side laryngeal muscle was measured as the sum of amplitude of (2,1), (2,0), (1,1) and (1,0)

Results

Table 1. Comparison between right and left laryngeal muscle in right side stroke (Left hemiplegia)(n = 32)

		N	Mean	SD
Laryngeal muscle	Right	32	1829,15	617,15
	Left	32	1916,43	617,45

* P-value = 0.574

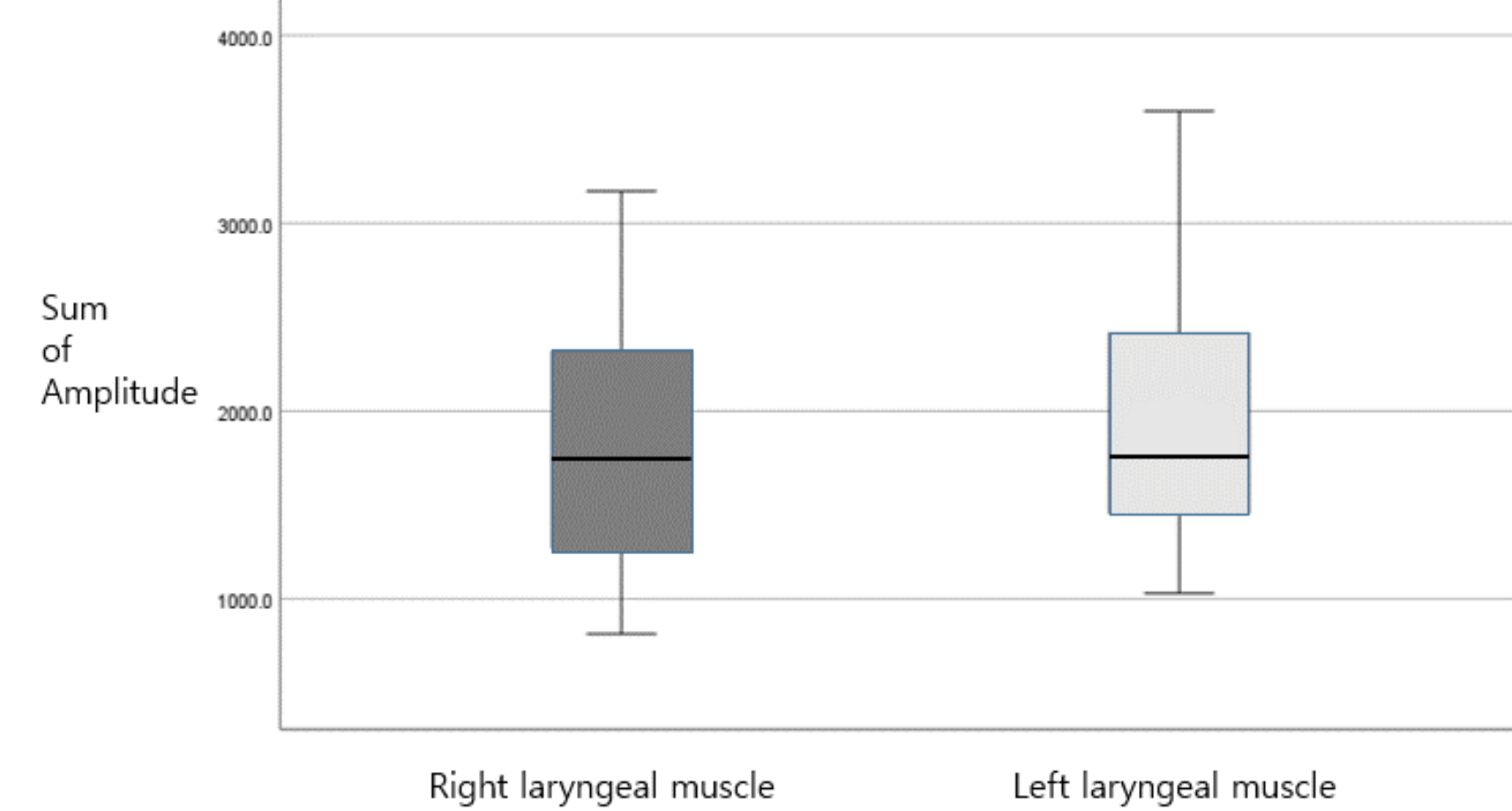
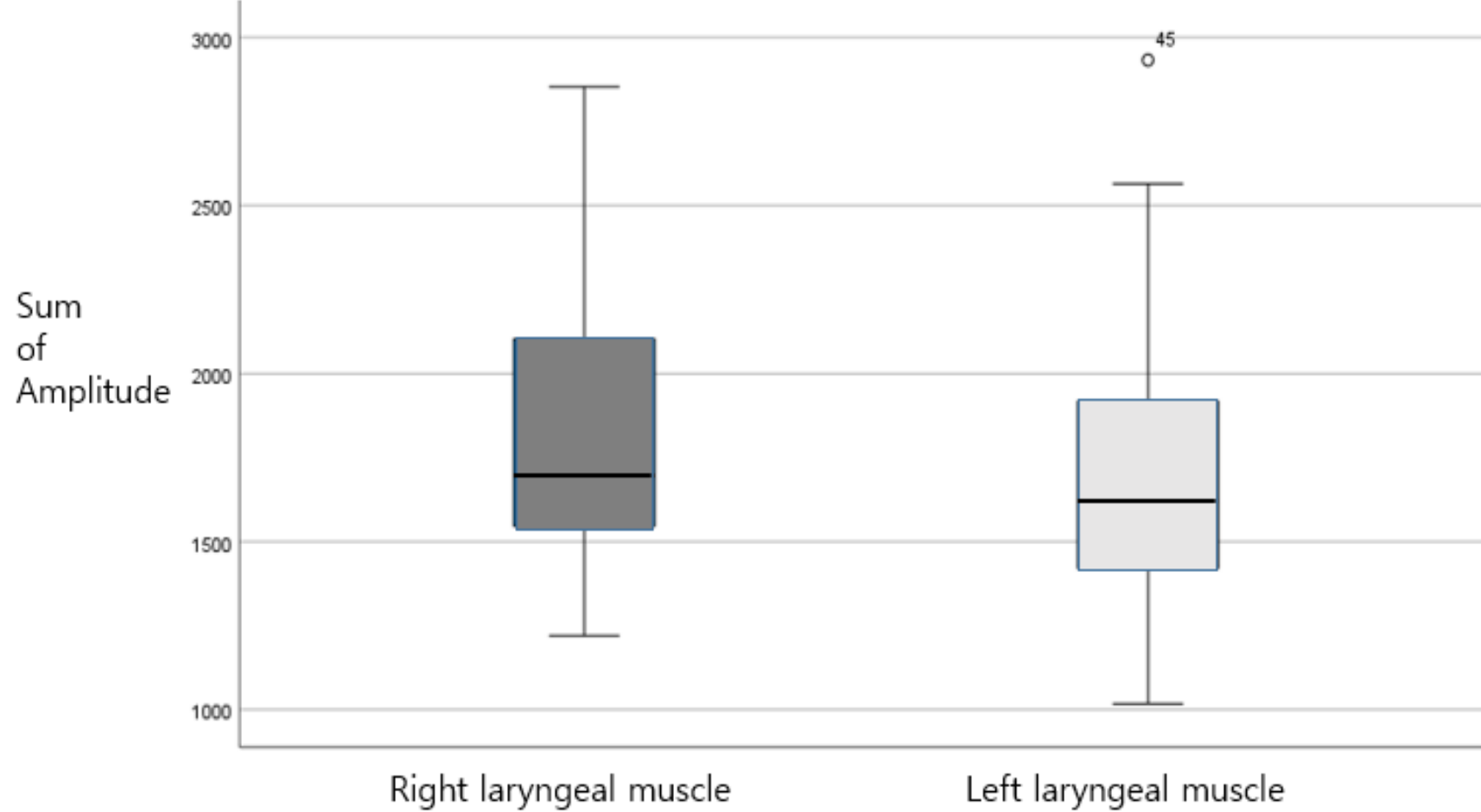


Table 2. Comparison between right and left laryngeal muscle in left side stroke (Right hemiplegia)(n = 40)

		N	Mean	SD
Laryngeal muscle	Right	40	1841,28	441,41
	Left	40	1673,83	427,57

* P-value = 0.089



There was no laterality of laryngeal muscle weakness to the direction of hemiplegia.(Table 1,2)

Table 3. Comparison between right and left laryngeal muscle in right medullary infarction (n = 6)

		N	Mean	SD
Laryngeal muscle	Right	6	1665	538,86
	Left	6	2424,5	715,1

* P-value <0.05

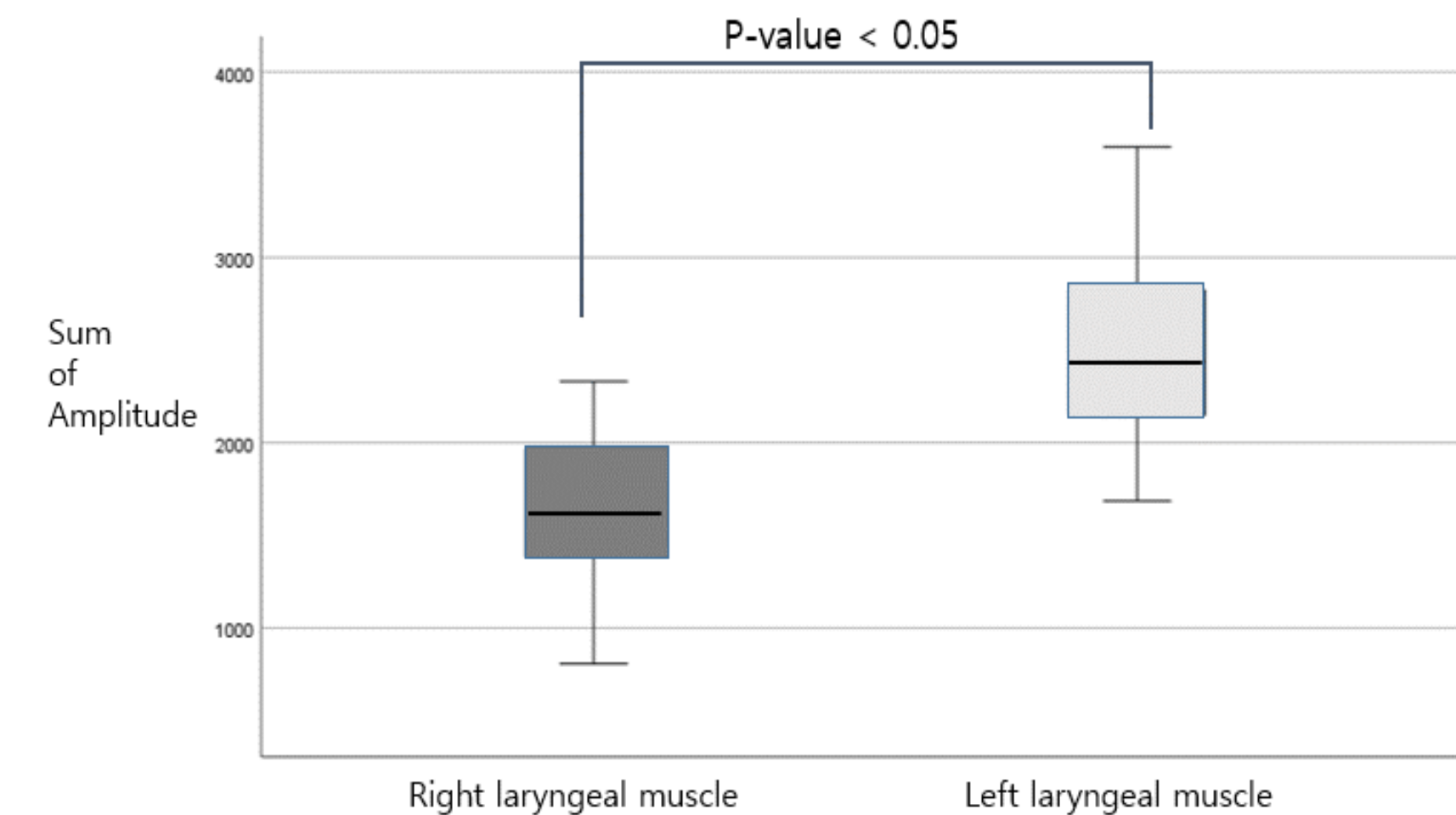
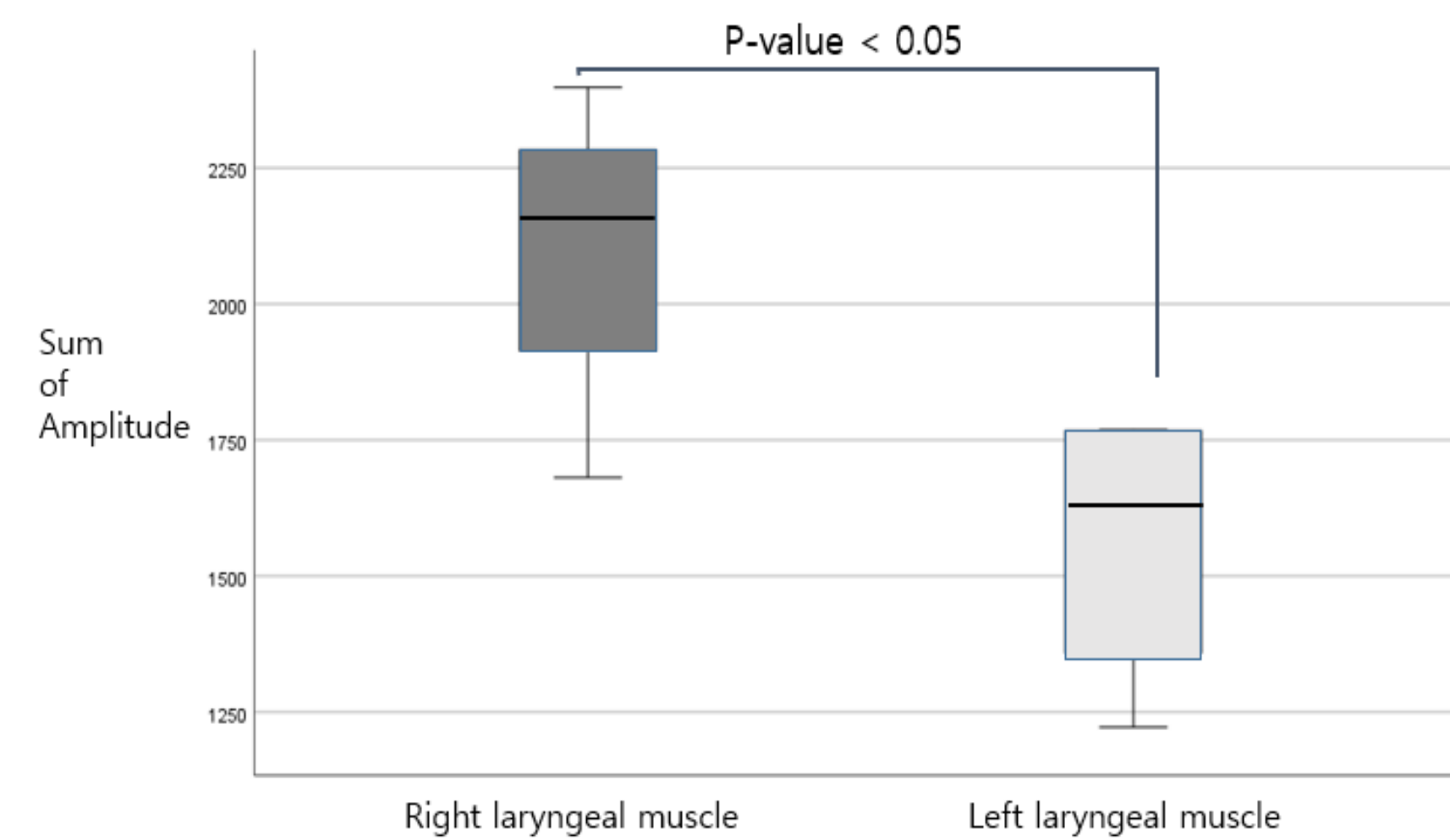


Table 4. Comparison between right and left laryngeal muscle in left medullary infarction (n = 4)

		N	Mean	SD
Laryngeal muscle	Right	4	2098,5	300,64
	Left	4	1562,75	260,52

* P-value <0.05



There was laterality of laryngeal muscle weakness in medullary infarction patient.
There was laterality of laryngeal muscle weakness to ipsilateral site of medullary infarction.
(p value>0.05) (Table 3,4)

Conclusion

- The direction of hemiplegia was not related to the laterality of laryngeal muscle weakness.
- Laterality of laryngeal muscle weakness to ipsilateral side was observed in medullary infarction.
- These results suggest compensatory techniques such as head tilt and head rotation can improve swallowing laterality in patient with medullary infarction.
- More studies for swallowing laterality on stroke patients will be needed due to small sample size.