

뇌신경재활

게시일시 및 장소 : 10 월 18 일(금) 13:15-18:00 Room G(3F)

질의응답 일시 및 장소 : 10 월 18 일(금) 15:45-16:30 Room G(3F)

## **P 2-59**

### **CT-based cervical muscle/fat volume as a prognostic factor in post-stroke patients: A pilot study**

Yangsean Choi<sup>2</sup>, Dong-Jae Shin<sup>1\*</sup>, Yongjun Jang<sup>1†</sup>, Kyung Eun Nam<sup>1</sup>

The Catholic University of Korea Seoul St. Mary`s Hospital , Department of Rehabilitation Medicine<sup>1</sup>, The Catholic University of Korea Seoul St. Mary`s Hospital , Department of Radiology<sup>2</sup>

#### **Background**

Sarcopenia, defined as loss of skeletal muscle mass and strength, can occur earlier after an acute illness such as stroke. Our previous studies revealed that whereas DEXA failed to adequately reflect functional outcome during the follow-up period in subacute stroke patients, sarcopenia, defined by nonhemiplegic grip strength(nGS), correlated to poor functional motor outcome in acute stroke patients. However, there is no consensus on the ideal assessment method that can reflect sarcopenia objectively in stroke patient yet. Previous studies on several types of brain cancer have revealed the potential use of neuroimaging techniques in assessing sarcopenia objectively and correlating it with frailty and adverse prognosis. Since brain CT is one of the most widely evaluated imaging tools at the baseline of stroke onset, we sought to develop a method to reproducibly quantify sarcopenia using the CT based muscle and fat volume.

#### **Objective**

This study aimed to investigate the association between muscle/fat volume at the odontoid process level and sarcopenia, measured by nGS. We hypothesized that sarcopenic patients also show decreased CT based cervical muscle/fat composition and that these neuroimaging markers can serve as a surrogate marker of poor post-stroke functional outcome.

#### **Method**

CT scans of 69 hemiplegic first-ever stroke patients were collected (Table 1). Baseline volume/density of muscle and fat were measured at the level of cervical spine within two weeks from the onset of stroke using 3D Slicer software. The odontoid process defined selection of axial slices. The threshold of segmentations for muscle/fat was designated according to the reference values from previous studies (Figure 1). Anthropometric measures, laboratory nutritional, and functional parameters were collected from medical records and compared to the CT-based cervical muscle/fat volume.

## Results

Decreased CT based muscle and fat volume were measured in the sarcopenic patient( $p=0.033$ ). CT based fat volume at the odontoid process level, measure within two weeks from the onset, inversely correlated with the nGS at two weeks post-stroke. Although it was statistically insignificant( $p=0.053$ ), a positive correlation was observed between muscle volume and nGS at two weeks post-stroke. Interestingly, a statistically significant positive correlation was found between CT based cervical muscle volume and MBI at six months post-stroke ( $p=0.001$ ) (Figure 2). In univariate linear regression analyses, both nGS and CT based cervical muscle volume were independent predictors of poor functional recovery( $mRS>3$ ) at six months post-stroke.

## Conclusion

CT based muscle/fat volume at the odontoid process level could be a valuable marker in diagnosing sarcopenia and predicting poststroke functional outcome. Validation with a larger sample size is needed to evaluate its potential use.

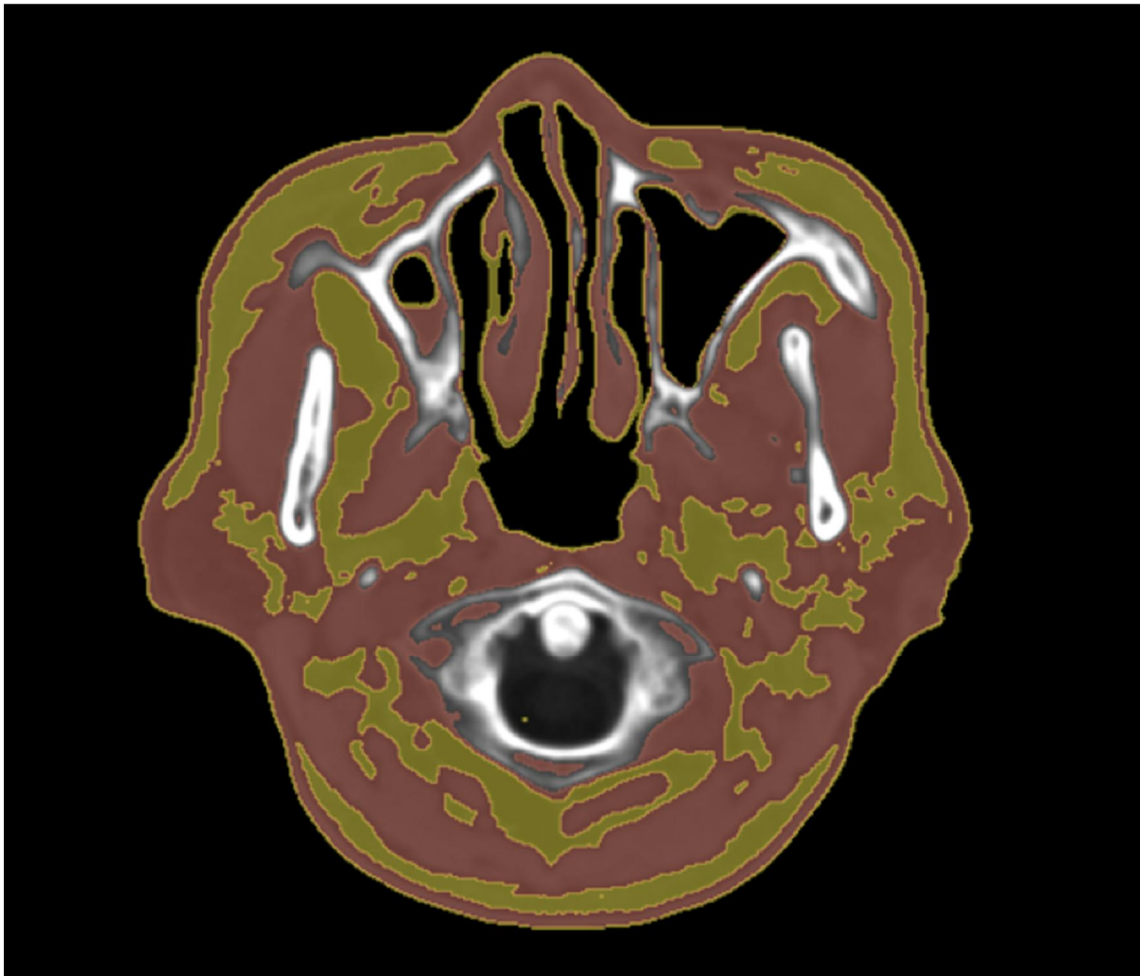


Figure. 1 Example slice of measurement of CT-based fat(yellow) and muscle(brown) mass at the level of odontoid process using 3D Slicer.

Table. 1 Demographics and clinical characteristics of the subjects

<b>Demographics</b>	
Sex(M:F) n	(39 : 30)
Age(mean±SD)	63.3±13.4
BMI(mean±SD)	23.05±3.45
<b>Stroke etiology (n)</b>	
Hemorrhagic	44
Ischemic	25
<i>hemiplegic side</i>	
Right	28
Left	41
<b>Laboratory parameter (mean±SD)</b>	
protein	6.63±0.62
albumin	3.94±0.49
<b>Functional parameter (mean±SD)</b>	
<i>Modified Barthel Index</i>	
Baseline	40.25±31.40
Discharge	61.77±32.08
<i>Berg Balance Scale</i>	
Baseline	18.85±21.37
Discharge	36.18±21.02
<i>Grip Strength</i>	
Baseline	18.85±8.56
Discharge	22.00±10.25

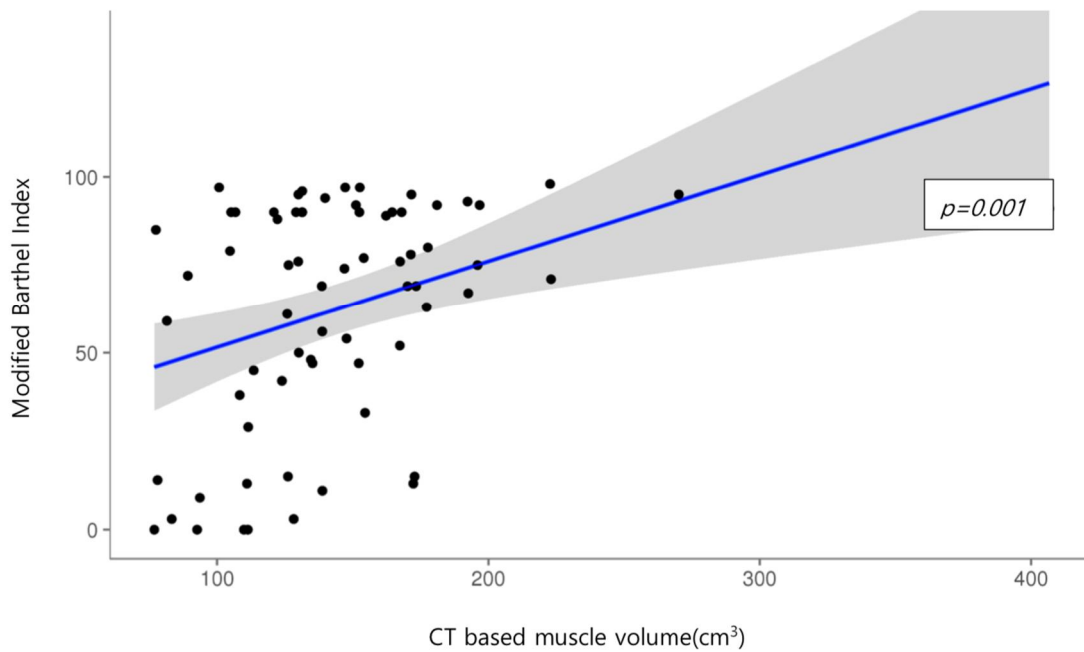


Figure. 2 Correlation plot of initial CT-based muscle volume(cm<sup>3</sup>) at odontoid process level and Modified Barthel Index at 6 months post-stroke onset