**Automaticfor age-related pathological periventricular white matter changes (WMC)
using k-means clustering and morphological features
on T2-weighted and proton density (PD) MR images**

조익환[1], 송인찬[2], 오정수[3], 장기현[2], 정동석[1]

[1]Department of Electronic Engineering, College of Engineering, Inha University,

[2]Department of Radiology, Seoul National University Hospital,

[3]Interdisciplinary Program of Biomedical Engineering, Seoul National University

목적 : Age-related WMCs frequently appear in older subjects and are known to be associated with cognitive impairment and brain pathologies such as Alzheimer's disease and stroke. However, it is difficult to detect WMC correctly by using only intensity-based clustering scheme because the intensity levels of WMC are similar to those of gray matter(GM). In this paper, we aimed to develop a fast and accurate scheme to detect and segment periventricular WMCs by using both k-means clustering method and morphological features.

대상 및 방법 : MR imaging was captured with a 1.5T unit using the quadrature head coil. Contiguous transverse dual PD and T2 - weighted images were obtained using the FSE sequence. Our proposed scheme consisted of three steps. First, the skull of brain was removed from PD images using multi-seeds region-growing method. The intracranial brain mask image from PD was applied to T2 image. Second, cerebrospinal fluid (CSF), GM and white matter (WM) were segmented from T2 image and PD image respectively using the same k-means clustering method. Finally, periventricular WMCs were obtained using morphological features such that WMCs were adjacent to ventricle and had an intensity level similar to GM. We evaluated the performance of our algorithm for the segmentation of WMCs in some older subjects.

결과 : Our results showed that periventricular WMCs were well segmented by using both morphologicalfeatures and k-means clustering method, not by using only k-means clustering method.

결론 : Our fast and accurate segmentation scheme for periventricular WMCs may be useful for their detection in age-related brain pathology.