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PATHCHRAPORN SAENGRUANG-ORN : CONTRAST OPTIMIZATION OF FLUID-ATTENUATED INVERSION RECOVERY (FLAIR) PULSE SEQUENCE IN MRI. THESIS ADVISOR : PAIRASH SAIVIROONPORN,Ph.D., KITIMA THAMMARAK, M.D., KAMOLWAN CHOEGMEECHOKE, M.D.,
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Fast fluid-attenuated inversion recovery (FLAIR) pulse sequence, is a powerful method for detecting intracranial lesions especially those located near ventricles. This method generates a T_2 -weighted image nulling the cerebrospinal fluid (CSF), thus creating a distinct image of the lesion. The purpose of this study was to determine the optimal TI values of fast FLAIR technique in order to suppress signal CSF so as to obtain a good periventricular image.

Seventeen patients (age 40-86 years), were sampled for this investigation on the basis of their periventricular lesions appearing as bright images by both fast FLAIR and T_2 -weighted fast spin echo (FSE) imaging techniques. A total of 41 lesions were examined by the magnetic resonance imaging (MRI) unit for brain investigation (1.5 Tesla imager). T_2 -weighted FSE image was the standard of reference. The patients were scanned by fast FLAIR pulse sequencing of varying TI (2000, 2100, 2200, 2300, and 2400 msec). Signal intensity (SI) values for CSF, white matter (WM) and the lesion were averaged from data acquired from 5 images and subsequently used for determining signal to noise ratio (SNR), contrast to noise ratio (CNR), and contrast ratio (CR).

The fast FLAIR with TI 2100 msec was found to yield minimal SNR_{CSF} , maximal $CNR_{lesion,CSF}$ and maximal $CR_{lesion,CSF}$. Statistically, the $CNR_{lesion,CSF}$ and $CR_{lesion,CSF}$ were superior to those obtained from T_2 -weighted FSE imaging (p-value < 0.0005). When the comparison was made between the lesion and WM, $CNR_{lesion,WM}$ and $CR_{lesion,WM}$ were at maximum TI of 2400 msec. However, the $CNR_{lesion,WM}$ image was less distinct than those obtained by the standard approach (p-value < 0.005). In conclusion TI of 2100 msec is the optimal value for fast FLAIR imaging of the periventricular lesions.