

1

2

가  
 : (n=22 ;  
 : 45  
 [n=9], [n=3], [n=4], [n=4], [2]), (n=18,  
 (n=5), (off set pulse) 600 Hz  
 T2  
 (MTR: magnetization transfer ratio)  
 : 22 ± 5%,  
 26 ± 4%, 19 ± 2%  
 (p>0.05).  
 : 가

(1)  
 (2).  
 가 T2  
 (apparent diffusion coefficient map: ADC map)  
 (3).  
 (magnetization transfer imaging tech-  
 nique) (off-resonance radiofre-  
 quency saturation pulse)

45  
 13 77 55  
 25 , 20 . 22  
 8 , 5 , 3 ,  
 3 ,  
 1  
 가

(4, 5).  
 (magnetization transfer ratio)

5  
 1.5T (Signa, GE  
 Medical System, Milwaukee, Wisconsin, U.S.A.)

가  
 (6-21).

(off set pulse) 600 Hz radiofrequency  
 T2 (TR/TE: 3800/98msec,  
 thickness/gap: 7mm/0, matrix size: 256 × 256, ETL: 15, FOV:  
 20 × 20cm, NEX: 2)

10  
 (magnetization transfer ratio :  
 1999 1 27 1999 7 15  
 665

MTR)  $SI_o - SI_{MT} / SI_o$

$SI_o$   
 $SI_{MT}$

one - way ANOVA test

(Fig. 1)

$26 \pm 4\%$  (mean  $\pm$  standard deviation) 가

$19 \pm 2\%$  가

(Table 1).

(Fig. 2)

$26 \pm 4\%$ ,

$22 \pm 5\%$ ,

$21 \pm$

$4\%$ ,

$17 \pm 4\%$ ,

$34\%$ ,

$15\%$

$22$

$\pm 5\%$

( $p > 0.05$ ).

Table 1. Magnetization Transfer Ratios of Brain Edema in 45 patients

Brain Edema (n= 45)	MTR(mean $\pm$ SD)
Vasogenic edema (n= 22)	$22 \pm 5$
Tumor (n= 9)	$24 \pm 4$
Contusion (n= 3)	$17 \pm 4$
Hemangioma (n= 4)	$26 \pm 4$
Hemorrhage (n= 4)	$21 \pm 5$
Others (n= 2)	$19 \pm 6$
Cytotoxic edema (n= 18)	$26 \pm 4$
Interstitial edema (n= 5)	$19 \pm 2$

SD: standard deviation

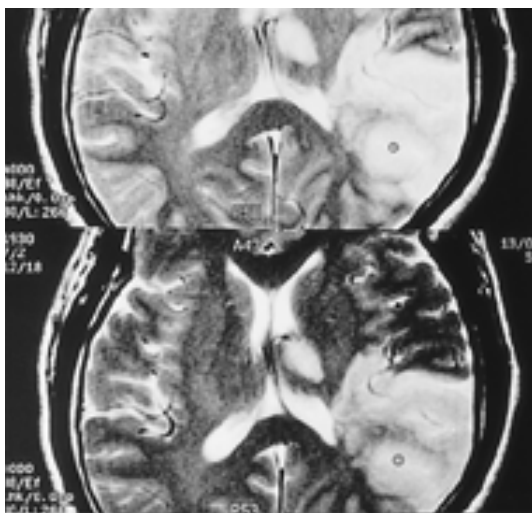


Fig. 1. Measurement of the magnetization transfer ratio in the acute infarction of the left middle cerebral artery territory. MTRs of infarction sites of temporal lobe and thalamus were 20% and 18%, respectively. Upper: T2-weighted image without MT, Lower: T2-weighted image with MT

22).

가 (1,  
(blood brain barrier)

(osmotic gradient) 가

(23)

(oxidative phosphorylation)  
pump

Na

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Na/K

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Ebisu (3)

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(apparent diffusion coefficient, ADC)

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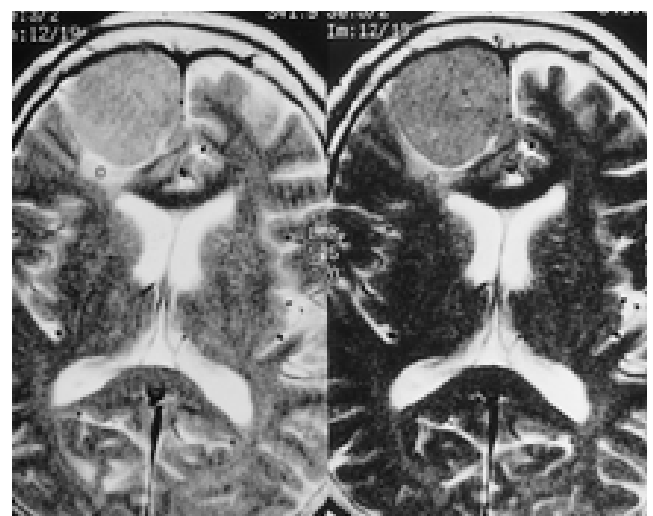


Fig. 2. The magnetization transfer ratio of vasogenic edema surrounding the meningioma was 21%. Left: T2-weighted image without MT, Right: T2-weighted image with MT

Schwartz (25)

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T2

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(4, 5).

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가 (7-9)

(10-14)

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(10-21).

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(myeline)가

(4, 16),

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## Comparison of Magnetization Transfer Ratios of Various Cerebral Edemas<sup>1</sup>

Chang Keun Lee, M.D., Myung Kwan Lim, M.D., Choong Kun Ha, M.D.<sup>2</sup>, Young Kook Cho, M.D.,  
Hyung Jin Kim, M.D., Sung Tae Kim, M.D., Chul Soo Ok, M.D.,  
Eul Hye Seok, M.D., Chang Hae Suh, M.D.

<sup>1</sup>Department of Radiology, Inha University College of Medicine

<sup>2</sup>Department of Neurology, Inha University College of Medicine

**Purpose:** To compare magnetization transfer ratios (MTR) among various cerebral edemas with different pathophysiologic processes.

**Materials and Methods:** Cerebral edemas seen on MR images in 45 patients were classified as one of three types: vasogenic (n= 22; tumor[n= 9], contusion[n= 3], hemangioma[n= 4], hemorrhage[n= 4], others[2]); cytotoxic (n= 18; all acute infarction), and interstitial edema (n= 5). In all cases, both T2-weighted images with and without magnetization transfer were obtained using off-set pulses of 600Hz. MTRs in each cerebral edema were measured and compared.

**Results:** The mean MTRs of vasogenic edema, cytotoxic edema and interstitial edema were  $22 \pm 5\%$ ,  $26 \pm 4\%$  and  $19 \pm 2\%$ , respectively. There was no statistically significant difference among the three types ( $p > 0.05$ ).

**Conclusion:** Mean MTR was highest in cytotoxic edema and lowest in interstitial edema, but the differences were not significant.

**Index words :** Magnetic resonance (MR), magnetization transfer contrast  
Brain, edema  
Brain, MR

Address reprint requests to : Myung Kwan Lim, M.D., Department of Radiology, Inha University Hospital  
#7-206 3rd St., Shinheung-dong, Choong-Ku, Incheon, 400-103, Korea.  
Tel. 82-32-890-2769 Fax. 82-32-890-2743