

: T2, FLAIR  
 1  
 2 3  
 T2 , FLAIR  
 15  
 T2 , FLAIR  
 T1  
 가  
 15 T2 , FLAIR  
 11 (73%), 가  
 13 (87%)  
 T1 9 (60%) 가 12 (80%)  
 , 6 (40%)  
 11 (73%)  
 4 cm . 14 (93%) 13 (87%)  
 가  
 : T2 , FLAIR 가  
 (87%)  
 12 (80%)  
 T2 FLAIR  
 가  
 (CT) 가 CT  
 (MRI) (1-5). , CT , FLAIR MRI, T2 ,  
 MRI 가 (2, 6, 7).  
 MRI (ring-en-  
 hancement) T1  
 T2 (2,10).  
 가 T1 T2  
 1996 6 1998 5  
 15  
 13 (87%) 가  
 1 (7%)  
 1 74 39 11 : 4  
 5 1.5 Tesla  
 (Magnetom vision, Siemens, Erlangen, Germany)  
 6 1.5T (MRT-200, Toshiba, Tokyo, Japan) , 4

1  
 2  
 3  
 1999 3 17 1999 10 14  
 9

1.5T (Signa; GE medical system, Milwaukee, WI)  
 . 6-7 mm 2-3 mm  
 MR T1 (400-  
 600/12-20msec, TR/TE) , T2 (2500-  
 3800/80-100msec, TR/TE) , 11 2.8  
 (2200-2500/20-30) , 5 가 10 (67%),  
 25msec, TR/TE) FLAIR(8000/ 가 3 (20%)  
 DTPA(Magnevist, Schering, Germany, 1mmol/kg) Gadolinium-  
 T1 1-3) T2 12 (80%)  
 MRI T2 , FLAIR (Fig. 3B),  
 , , FLAIR  
 , (Fig. 1).  
 T1 T2  
 , (Fig. 3C).  
 가 T1 15 9 (60%)  
 (Fig. 1A) 6 (40%)  
 11 (73%), 1 (7%),  
 1 ,  
 1  
 (corticomedullary junction)  
 (solitary) 12  
 3 (20%)  
 (Fig. 2)  
 T2 ,  
 FLAIR 15 11 (73%)  
 (27%)  
 (Fig. 1-3), 4  
 가 (80%)  
 (Fig. 1- (multilobulated)  
 가 13 (87%)

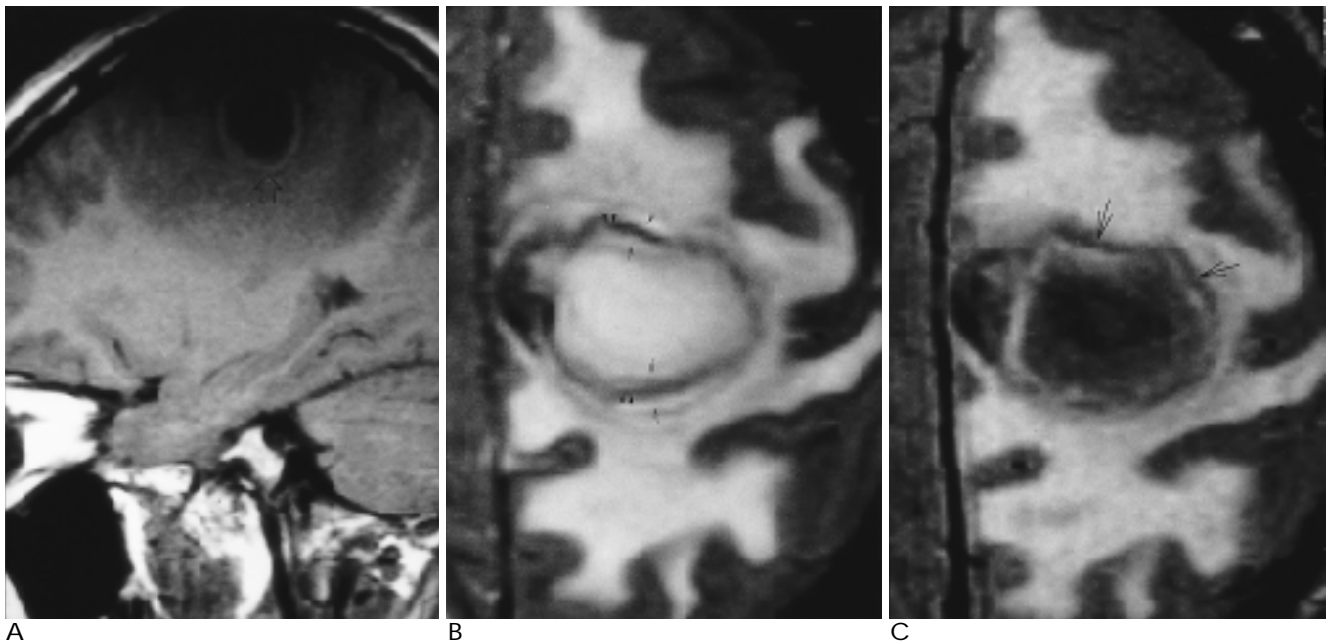


Fig. 1. Layering of high and low signal intensity within the abscess wall in a 16-year-old woman with brain abscess  
 A. T1-weighted sagittal image shows slightly high signal intensity of the abscess wall at left frontal lobe (arrow), surrounded by massive edema.  
 B. T2-weighted axial image shows dark signal intensity within the abscess wall (arrowheads). High signal intensity layers (small arrows) are seen inside and outside of the dark signal intensity within the abscess wall.  
 C. FLAIR axial image also shows alternating mixed signal intensity layers with middle layer of dark signal intensity (arrow).

2cm 7cm

T1

(Fig. 3) 14 (93%)  
(amorphous)

4cm

1 (7%)

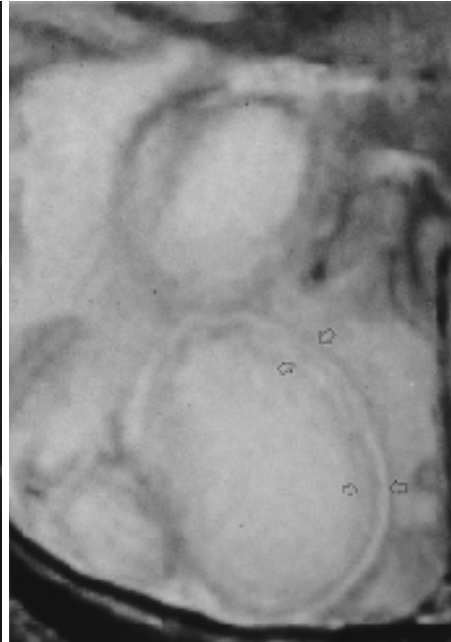
13 (87%)

가  
가

2 (13%)  
.



A

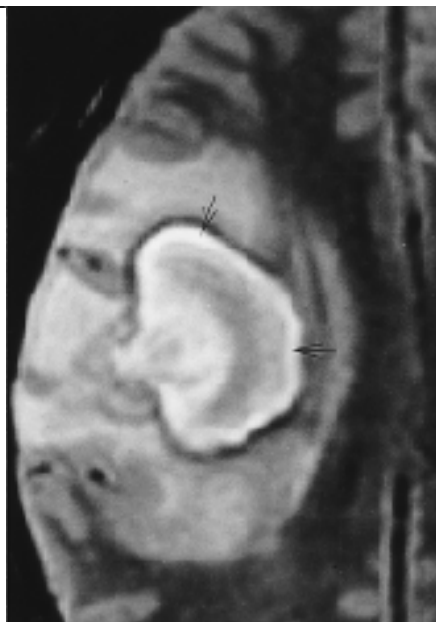


B

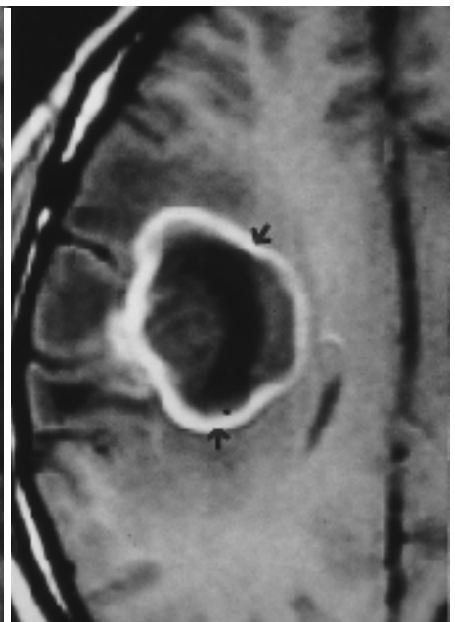
Fig. 2. Multiple layers within the lobulating abscess wall at right parieto-occipital lobe in a 38-year-old man. A, B. T2-weighted(a), and proton-density weighted(b) axial images show alternating multiple layers of the abscess wall(open arrow).



A



B



C

Fig. 3. High intensity rim between the low intensity abscess wall and outer portion of central necrotic portion in right frontal lobe abscess in a 54-year-old man.

A. T2-weighted axial image shows high signal intensity rim(large arrow) between central necrotic portion and the abscess wall of dark signal intensity(arrow head). This high signal intensity rim is faintly distinct from central necrotic portion.

B. Proton-density weighted axial image shows more definite high intensity rim(large arrow) inside of the abscess wall of low intensity rim.

C. Post-contrast T1-weighted image shows dense ring enhancement of the abscess wall(black arrow). A part or entire portion of the high intensity inside of the low intensity wall might be not enhanced.

70%

(14-17)

CT MRI

가 , (15)

(acute cerebritis stage), (late cerebritis stage)

가 가 MRI

T2 , FLAIR

4-5 CT 가

MRI T1 , T2 가 13 (87%), 12 (80%)

FLAIR (pus fluid)

2-3 가 T1 FLAIR

(collagen capsule) (liquified)

(2-5,8-10).

15 14 (93%) MRI T1

T2 가 (macrophage) (oxygen free radical) (susceptibility effect) T2 (15)

9 (60%) T2 15 T1 6 (40%) mosiderin T2 가

(macrophage) (oxygen free radical) (susceptibility effect) T2 FLAIR 가

(11-13). (15) he- junction) (2,3,18), 가

mosiderin 15 11 (73%) 가 14 (93%)

3 (granulation tissue layer), (collagen layer), (glial layer)

가 T1 MRI 가

T2 가

T2 T1 gliosis T2

(2). Haimes (10) T1

, T2  
 FLAIR T2 가  
 가 (87%), 80%  
 가  
 MRI

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 CT :  
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## Signal Intensity of the Wall of Brain Abscess on MRI : Emphasis on T2-, Proton Density-weighted and FLAIR Image<sup>1</sup>

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**Purpose :** To evaluate the characteristic magnetic resonance imaging(MRI) findings of the wall of brain abscess, focusing on the signal intensity of T2-, proton density-weighted and FLAIR images.

**Materials and Methods :** MR images of 15 cases of brain abscess all proven by surgical pathology, were retrospectively reviewed. The wall of each abscess was evaluated in terms of the presence or absence of dark signal intensity and layering, overall signal intensity of the abscess wall, and signal intensity of its innermost layer, including the border zone, as seen on T2-, proton density-weighted, and FLAIR images. The location of the abscess, extent of surrounding edema, and the presence of ring enhancement were also evaluated.

**Results :** On the three types of image, dark signal intensity within an abscess wall was noted in 11 cases (73%). Layers of alternating high and low signal intensity of abscess wall were noted in 13 cases (87%). A rim of iso- or high intensity(relative to the central necrotic portion) between the abscess wall of low-intensity rim and the outer part of the necrotic portion was seen on all three image types in 12 cases (80%). The signal intensity of abscess wall, as seen on T1-weighted images, was slightly high in nine cases (60%) and iso-intense in six (40%). In 11 cases (73%), brain abscesses were located at the corticomedullary junction. The average diameter of abscesses was 4 cm, and ring enhancement of the abscess wall was noted in 14 cases (93%). Thirteen cases (87%) showed moderate to severe brain edema.

**Conclusion :** Layering of alternating high and low signal intensity of abscess wall(87%) and an iso- or high signal intensity rim between the low intensity rim of the abscess wall and outer necrotic portion(80%) were seen on T2-, proton density-weighted and FLAIR images. These MRI findings may be helpful in the diagnosis of brain abscess.

**Index words :** Brain, MRI  
Brain, abscess

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