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 :
 116 (18)
 :
 116
 가 113 (97.4%), 95 (82.8%), T1 가 13 (11.2%), T2 가 50 (43.1%)
 T1 T2 가 10 (8.6%)
 20 (n=10), (n=10), (n=8),
 T2 가(n=2), (n=2) 가(n=8)
 (n=4)
 : 가 T2 가
 , ,
 ,
 (mesial temporal sclerosis)
 (hippocampal sclerosis)
 가 , , ,
 60 - 75% (1). 가 (10).
 가
 T2 가 Papez (9,
 (Papez circuit) (extrahippocampal 11 - 13).
 limbic system) 가
 , 가
 (anterior temporal lobe
 cortex), (amygdala), (parahippocampal
 gyrus) (collateral white matter)
 , (2 - 9). 1994 7 15 1999 7 14 5
 , 가 733 , ,
 .
 116 (64 , 52 , 16 - 72 , 31
)
 2000 1 17 2000 5 4 .
 891

1.5T (Signa, GE medical system, Milwaukee, Wisconsin, U.S.A.) T1 (TR/TE, 500msec/12 - 20msec), T2 (TR/TE, 4000msec/120msec), (proton density) (TR/TE, 4000msec/15 - 20msec), FLAIR(fluid attenuated inversion recovery) (TR/TE, 10,000msec/120 - 140msec) 3D - FGR(three-dimensional fast gradient recalled echo) 3D - IR(inversion recovery)

(T2 가, T1) (fornix), (mammillary body), (anterior thalamic nuclei) (cingulate gyrus) (limbic system), (amygdala), (contralateral cerebellar hemisphere) (extrahippocampal structure)

18 Engel (14). Table 1 116 112 64 , 48 , 4 (3.4%) . 116 113 (97.4%) . 95 (82.8%) (Figs. 1A, 2, 4A), 53 (45.7%) , T1 가 13 (11.2%) , T2 가(Figs. 1B, 2, 4A)가 50 (43.1%)

T1 T2 가 10 (8.6%) 20 (17.2%) 10 (8.6%), (Fig. 2) 8 (6.9%), (Fig. 4B) T2 3) 10 (8.6%), (Fig. 4B) T2 가가 2 (1.7%), 2 (1.7%) T2 가(Fig. 4A)가 8 (6.9%) , (cerebral hemiatrophy) 4 (3.4%) 1 5

Engel Class I(seizure free, with or without auras:) 10 (55.6%), Engel Class II(rare seizures (2/year): 가 1 2)가 5 (27.8%), Engel Class III(worthwhile improvement (>90% decrease in seizure frequency): 가 90%) 가 2 (11.1%), Engel Class IV(no worthwhile improvement

Table 1. MR Imaging Findings of Mesial Temporal Sclerosis(n = 116)

Finding	No. of case(%)
Hippocampus abnormalities	113(97.4%)
Changes in signal intensity	53(45.7%)
Decreased T1-weighted signal intensity	13(11.2%)
Increased T2-weighted signal intensity	50(43.1%)
Morphological changes	96(82.8%)
Decreased volume	95(81.9%)
Disruption of the internal hippocampal structure	13(11.2%)
Extrahippocapal abnormalities	20(17.2%)
Atrophy of fornix	100 (8.6%)
Atrophy of mammillary body	8 (6.9%)
Increased signal intensity or atrophy of Anterior thalamic nucleus	2 (1.7%)
Atrophy of cingulate gyrus	2 (1.7%)
Cerebral hemiatrophy	4 (3.4%)
Increased signal intensity of anterior temporal lobe cortex	8 (6.9%)
Increased signal intensity or atrophy of amygdala	10 (8.6%)
Atrophy of contralateral cerebellar hemisphere	0 (0%)

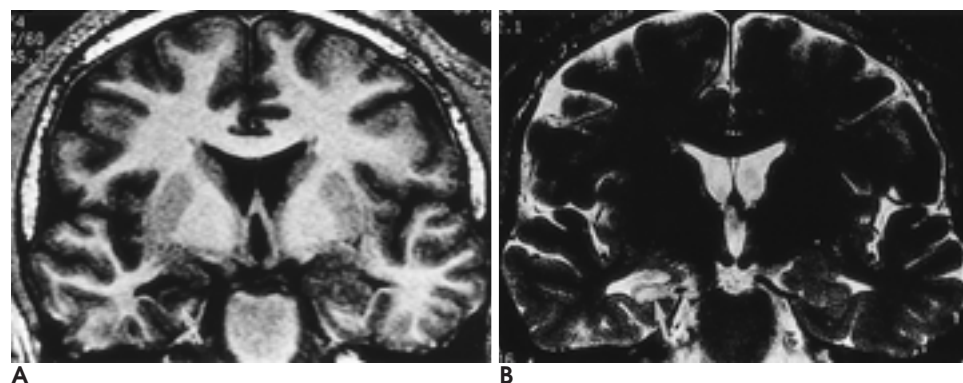


Fig. 1. Coronal T1-weighted fast gradient recalled echo MR image through anterior hippocampus (A) shows volume loss and distortion of internal architecture on the right hippocampus (arrow). Coronal T2-weighted fast spin-echo MR image (B) shows increased signal intensity of the right hippocampus (arrow).

(<90% decrease in seizure frequency):

90%)가 1 (5.6%) (14).

가

T2

가

가

T2

(8, 20).

가

8%

(21),

70 - 90%

70 - 80%

가가

가

(6, 22, 23).

T2

가

(15).

가

가

(MR volumetry)

T2 Relaxometry가

(concordant lateralization)가

(MRS ; magnetic resonance spectroscopy)

97%

(nonlateralization)

N - acetylaspartate

(24).

42%,

(discordant lateralization)

33%

Margerison

Corsellis(1966)가

(16).

1(Cornu Ammonis 1: CA1) (Hilum)(CA3 (17).

CA4) (neuronal loss)

(gliosis)

CA2 (Dentate gyrus)

22

20

(50%),

(60%),

(65%)

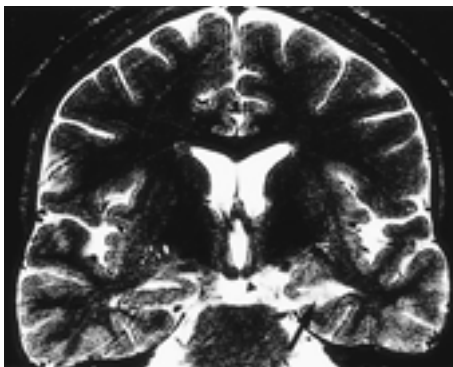
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(17).

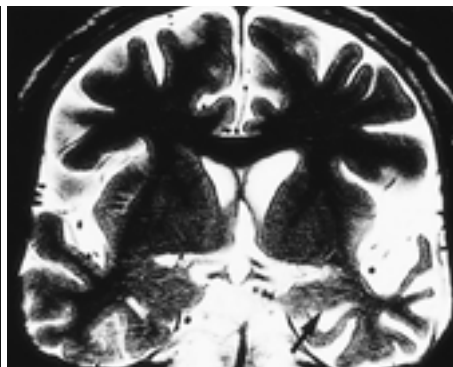
(17 - 19).

1937

Papez



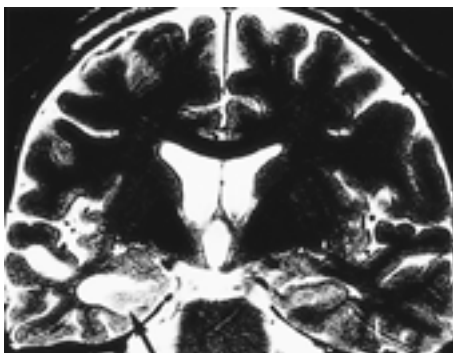
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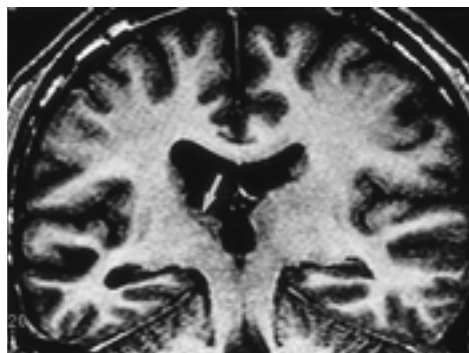
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Fig. 2. Coronal T2-weighted fast spin-echo MR image through the anterior hippocampus shows increased signal intensity and atrophy of the left hippocampus, indicative left mesial temporal sclerosis (arrow). The volume of the left mammillary body is decreased, indicative of left mammillary body atrophy (arrow head).

Fig. 3. Coronal T2-weighted fast spin-echo MR image shows atrophy of the left amygdala (arrow). Dilatation of temporal horn of left lateral ventricle is seen.



A



B

Fig. 4. Coronal T2-weighted fast spin-echo MR image (A) shows increased signal intensity and atrophy of the right hippocampus (arrow). Passive dilatation of temporal horn of right lateral ventricle is found. Cortical thinning and high signal intensity in right temporal lobe and parahippocampal gyrus are noted. Coronal T1-weighted fast gradient recalled echo MR image (B) shows decreased volume of the right thalamus (arrow).

. Papez (hippocampal formation),

(25). (mammillothalamic tract) (thalamocingulate fibers)

(26). 가 Papez Maclean (27).

가 , Papez 가 (28). Chan 42 Papez 23 (55%), 11 (26%)

Papez 1 , 가가 16 (28). 116 10 , 8 2 가

가 Papez 가 (28). 가

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MR Imaging Findings of Patients with Mesial Temporal Sclerosis¹

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Purpose: To evaluate the MR imaging findings of patients with mesial temporal sclerosis.

Materials and Methods: We retrospectively reviewed the MR imaging findings of 116 patients diagnosed by MRI as suffering from mesial temporal sclerosis. In 18 of these, the condition was also histologically proven.

Results: Among the 116 patients, volume loss of the hippocampus was found in 95 (81.9%) and signal changes of the hippocampus in 53 (45.7%). Decreased signal intensity in the hippocampus on T1-weighted images was found in 13 (11.2%) and increased signal on T2-weighted images in 50 (43.1%). Signal abnormality in the hippocampus on both T1- and T2-weighted images was found in ten, and associated extrahippocampal abnormalities, as follows, in 20 (17.2%): atrophy of the fornix (n = 10), atrophy of the mammillary body (n = 8), atrophy of the amygdala (n = 10), atrophy or increased T2 signal intensity of the anterior thalamic nuclei (n = 2), atrophy of the cingulate gyrus (n = 2), atrophy or increased signal intensity of the anterior temporal lobe (n = 8), and cerebral hemiatrophy (n = 4).

Conclusion: A high T2 signal and atrophy of the hippocampus are the most common and important MRI findings of mesial temporal sclerosis. Other abnormal findings, if any, which may be found in extrahippocampal structures such as the fornix, mammillary body and temporal lobe, should, however, also be carefully observed.

Index words : Brain, diseases
Brain, MR
Epilepsy

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