

XII. Head MRI Measurements

MRI was performed on a 3.0T SIEMENS instrument (MAGNETOM Trio, A Tim System).

1) Periventricular hyperintensity

Divide into 4 classes according to Appendix 1.

2) Ventricular dilatation

Divided into 4 classes according to Appendix 2.

3) Brain atrophy

Divided into 4 classes according to Appendix 3.

4) Cerebrovascular disease

Cerebral infarction

Decided as following,

Lacuna infarction : The lesions of white matter, basal ganglia, thalamus, internal capsule, midbrain, pons, medulla oblongata and whose size are larger than or equal to 3mm and smaller than or equal to 15mm.

Cerebral embolism : Include cerebral or cerebellar cortex, and which is not border zone infarction.

Cerebral thrombosis : Other than above.

Cerebral infarction was defined as all of lacuna infarction, embolism and thrombosis.

Cerebral hemorrhage

On T2 weighted image(WI), hyperintensity inside the lesion and no signal around the lesion. Or on T2WI no signal slit lesion.

Cerebrovascular diseases

Cerebrovascular diseases were defined as all of cerebral infarction and cerebral hemorrhage.

References

Stroke 1994 vol25, p318-327

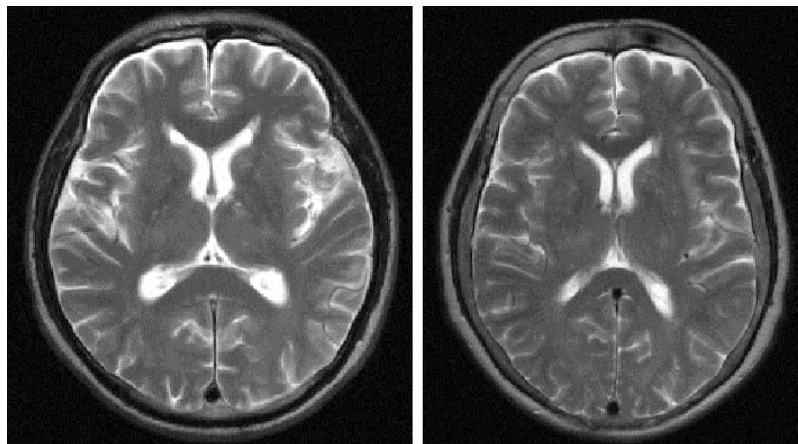
Naika 1997 vol79 (4)

Nihon Naika Gakkai Zasshi 1997 vol. 86

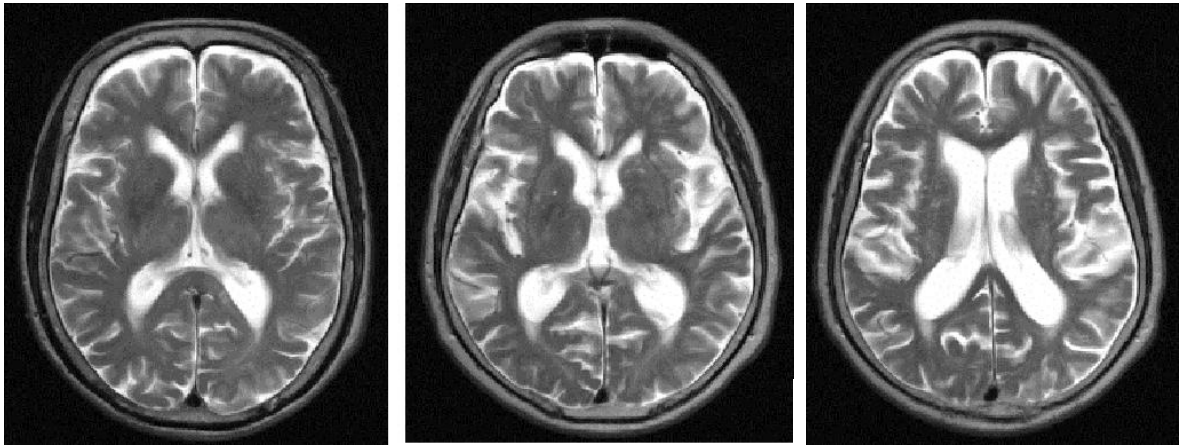
Medicina 1994 vol31 (8)

Appendix 1: Periventricular hyperintensity

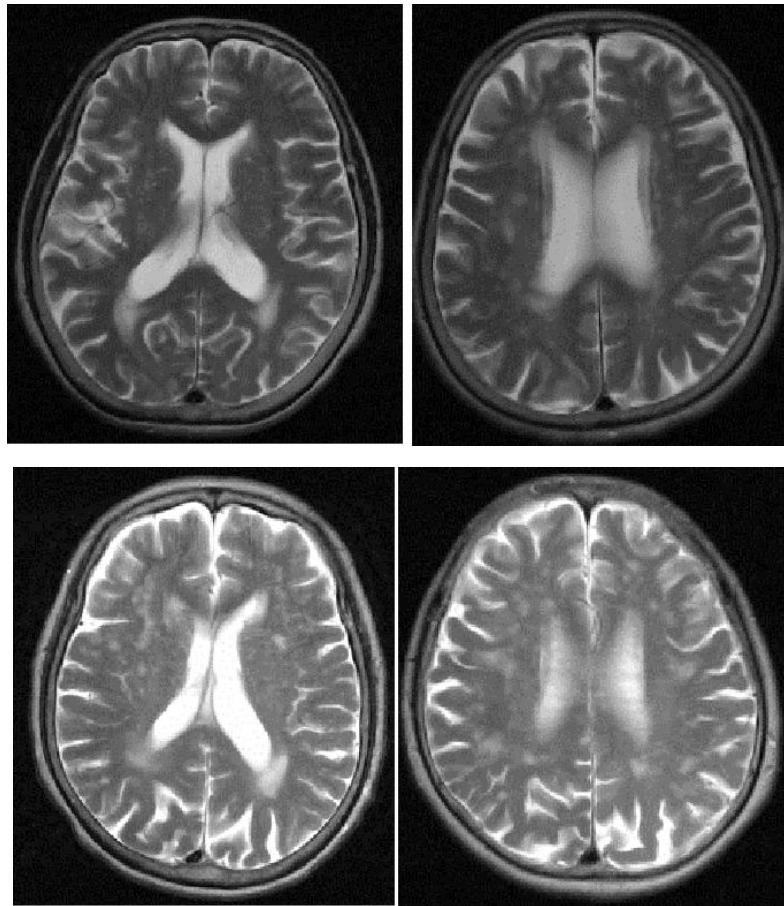
I. None: None or minimal periventricular signal hyperintensities in the form of caps only in the anterior horn of lateral ventricles.



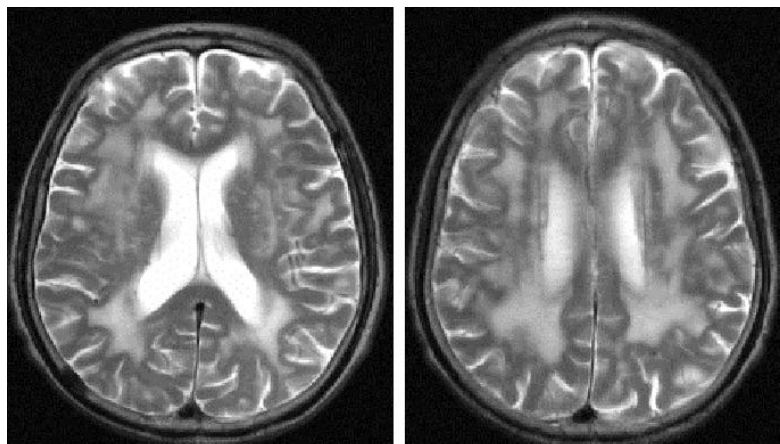
II. Mild: Caps in both anterior and posterior horns of lateral ventricles.



III. Moderate: Multifocal periventricular hyperintense punctuate lesions.

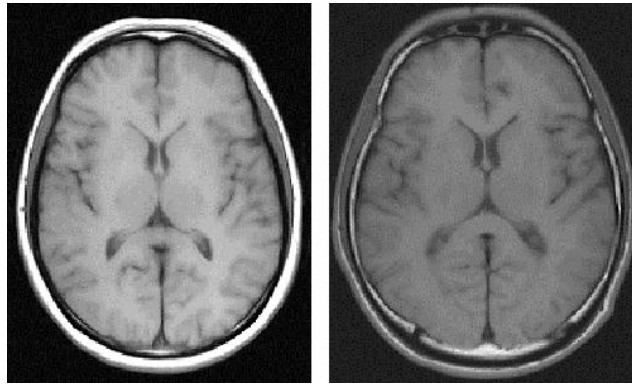


IV. Severe: Multiple high signal intensity area that reached confluency in the periventricular region and white matter.

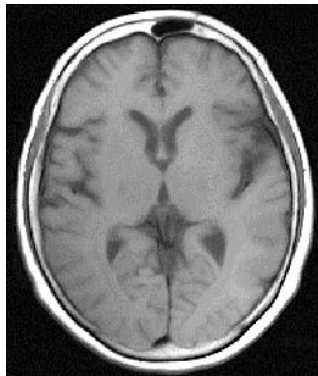


Appendix 2: Ventricular dilatation

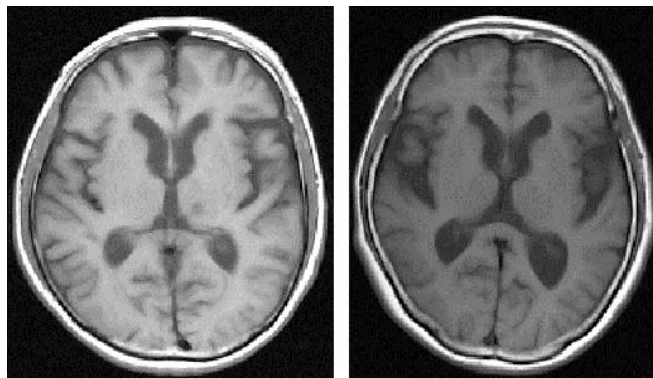
I. None



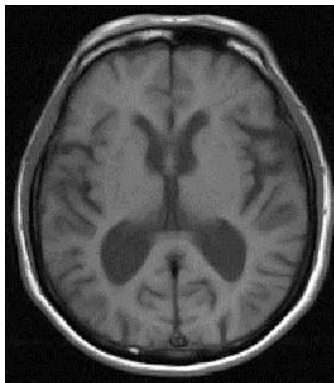
II. Mild



III. Moderate

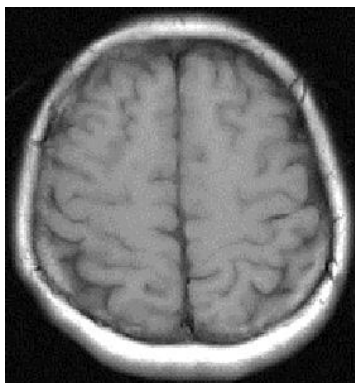


IV. Severe

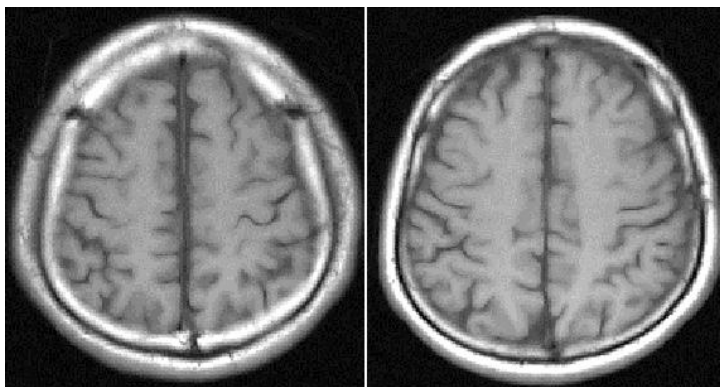


Appendix 3: Brain atrophy

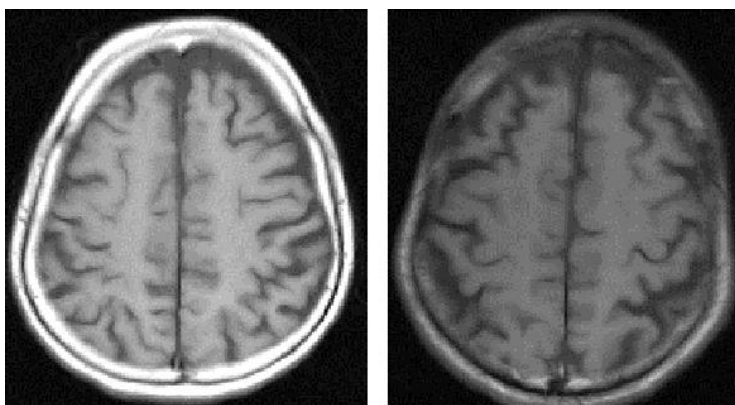
I. None



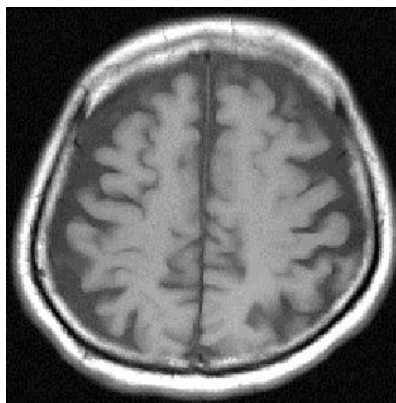
II. Mild



III. Moderate



IV. Severe



1) Periventricular hyperintensity (PVH)

Periventricular hyperintensity (PVH)

		40-49yr		50-59yr		60-69yr		70-79yr		80yr -		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
None	Male	261	97.8	227	88.7	169	61.7	73	30.0	3	3.3	733	64.8

	Female	269	98.5	239	93.0	173	67.8	82	34.0	7	6.9	770	68.3
	Total	530	98.1	466	90.8	342	64.7	155	32.0	10	5.2	1503	66.6
Mild	Male	6	2.2	29	11.3	96	35.0	136	56.0	43	47.3	310	27.4
	Female	4	1.5	16	6.2	78	30.6	127	52.7	55	54.5	280	24.8
	Total	10	1.9	45	8.8	174	32.9	263	54.3	98	51.0	590	26.1
Moderate	Male	0	0.0	0	0.0	9	3.3	32	13.2	43	47.3	84	7.4
	Female	0	0.0	2	0.8	4	1.6	31	12.9	35	34.7	72	6.4
	Total	0	0.0	2	0.4	13	2.5	63	13.0	78	40.6	156	6.9
Severe	Male	0	0.0	0	0.0	0	0.0	2	0.8	2	2.2	4	0.4
	Female	0	0.0	0	0.0	0	0.0	1	0.4	4	4.0	5	0.4
	Total	0	0.0	0	0.0	0	0.0	3	0.6	6	3.1	9	0.4

2) Ventricular dilatation

Ventricular dilatation

		40-49yr		50-59yr		60-69yr		70-79yr		80yr -		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
None	Male	235	88.0	190	74.2	151	55.1	57	23.5	5	5.5	638	56.4
	Female	257	94.1	229	89.1	192	75.3	115	47.7	16	15.8	809	71.8
	Total	492	91.1	419	81.7	343	64.8	172	35.5	21	10.9	1447	64.1
Mild	Male	30	11.2	66	25.8	115	42.0	148	60.9	50	54.9	409	36.2
	Female	16	5.9	27	10.5	60	23.5	116	48.1	62	61.4	281	24.9
	Total	46	8.5	93	18.1	175	33.1	264	54.5	112	58.3	690	30.6
Moderate	Male	2	0.7	0	0.0	8	2.9	38	15.6	35	38.5	83	7.3
	Female	0	0.0	1	0.4	2	0.8	10	4.1	22	21.8	35	3.1
	Total	2	0.4	1	0.2	10	1.9	48	9.9	57	29.7	118	5.2
Severe	Male	0	0.0	0	0.0	0	0.0	0	0.0	1	1.1	1	0.1
	Female	0	0.0	0	0.0	1	0.4	0	0.0	1	1.0	2	0.2
	Total	0	0.0	0	0.0	1	0.2	0	0.0	2	1.0	3	0.1

Ventricular dilatation (anterior horn)

		40-49yr		50-59yr		60-69yr		70-79yr		80yr -		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
None	Male	262	98.1	244	95.3	227	82.8	125	51.4	15	16.5	873	77.2
	Female	273	100.0	253	98.4	241	94.5	186	77.2	45	44.6	998	88.6
	Total	535	99.1	497	96.9	468	88.5	311	64.3	60	31.3	1871	82.9
Mild	Male	5	1.9	12	4.7	45	16.4	111	45.7	68	74.7	241	21.3
	Female	0	0.0	4	1.6	12	4.7	54	22.4	51	50.5	121	10.7
	Total	5	0.9	16	3.1	57	10.8	165	34.1	119	62.0	362	16.0
Moderate	Male	0	0.0	0	0.0	2	0.7	7	2.9	8	8.8	17	1.5
	Female	0	0.0	0	0.0	2	0.8	1	0.4	5	5.0	8	0.7
	Total	0	0.0	0	0.0	4	0.8	8	1.7	13	6.8	25	1.1
Severe	Male	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Female	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Total	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

Ventricular dilatation (posterior horn)

		40-49yr		50-59yr		60-69yr		70-79yr		80yr -		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
None	Male	235	88.0	191	74.6	153	55.8	60	24.7	6	6.6	645	57.0
	Female	257	94.1	229	89.1	192	75.3	116	48.1	16	15.8	810	71.9
	Total	492	91.1	420	81.9	345	65.2	176	36.4	22	11.5	1455	64.4
Mild	Male	30	11.2	65	25.4	114	41.6	145	59.7	50	54.9	404	35.7

	Female	16	5.9	27	10.5	61	23.9	115	47.7	63	62.4	282	25.0
	Total	46	8.5	92	17.9	175	33.1	260	53.7	113	58.9	686	30.4
Moderate	Male	2	0.7	0	0.0	7	2.6	38	15.6	34	37.4	81	7.2
	Female	0	0.0	1	0.4	1	0.4	10	4.1	21	20.8	33	2.9
	Total	2	0.4	1	0.2	8	1.5	48	9.9	55	28.6	114	5.0
Severe	Male	0	0.0	0	0.0	0	0.0	0	0.0	1	1.1	1	0.1
	Female	0	0.0	0	0.0	1	0.4	0	0.0	1	1.0	2	0.2
	Total	0	0.0	0	0.0	1	0.2	0	0.0	2	1.0	3	0.1

3) Brain atrophy

Brain atrophy

		40-49yr		50-59yr		60-69yr		70-79yr		80yr -		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
None	Male	259	97.0	236	92.2	207	75.5	77	31.7	7	7.7	786	69.5
	Female	271	99.3	253	98.4	231	90.6	134	55.6	21	20.8	910	80.7
	Total	530	98.1	489	95.3	438	82.8	211	43.6	28	14.6	1696	75.1
Mild	Male	8	3.0	20	7.8	65	23.7	141	58.0	57	62.6	291	25.7
	Female	2	0.7	4	1.6	22	8.6	104	43.2	74	73.3	206	18.3
	Total	10	1.9	24	4.7	87	16.4	245	50.6	131	68.2	497	22.0
Moderate	Male	0	0.0	0	0.0	2	0.7	24	9.9	25	27.5	51	4.5
	Female	0	0.0	0	0.0	2	0.8	3	1.2	6	5.9	11	1.0
	Total	0	0.0	0	0.0	4	0.8	27	5.6	31	16.1	62	2.7
Severe	Male	0	0.0	0	0.0	0	0.0	1	0.4	2	2.2	3	0.3
	Female	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Total	0	0.0	0	0.0	0	0.0	1	0.2	2	1.0	3	0.1

Brain atrophy (frontal lobe)

		40-49yr		50-59yr		60-69yr		70-79yr		80yr -		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
None	Male	261	97.8	240	93.8	230	83.9	130	53.5	21	23.1	882	78.0
	Female	272	99.6	254	98.8	239	93.7	183	75.9	55	54.5	1003	89.0
	Total	533	98.7	494	96.3	469	88.7	313	64.7	76	39.6	1885	83.5
Mild	Male	6	2.2	16	6.3	44	16.1	101	41.6	51	56.0	218	19.3
	Female	1	0.4	3	1.2	15	5.9	56	23.2	43	42.6	118	10.5
	Total	7	1.3	19	3.7	59	11.2	157	32.4	94	49.0	336	14.9
Moderate	Male	0	0.0	0	0.0	0	0.0	11	4.5	17	18.7	28	2.5
	Female	0	0.0	0	0.0	1	0.4	2	0.8	3	3.0	6	0.5
	Total	0	0.0	0	0.0	1	0.2	13	2.7	20	10.4	34	1.5
Severe	Male	0	0.0	0	0.0	0	0.0	1	0.4	2	2.2	3	0.3
	Female	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Total	0	0.0	0	0.0	0	0.0	1	0.2	2	1.0	3	0.1

Brain atrophy (temporal lobe)

		40-49yr		50-59yr		60-69yr		70-79yr		80yr -		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
None	Male	265	99.3	249	97.3	230	83.9	93	38.3	7	7.7	844	74.6
	Female	272	99.6	255	99.2	243	95.3	150	62.2	25	24.8	945	83.9
	Total	537	99.4	504	98.2	473	89.4	243	50.2	32	16.7	1789	79.2
Mild	Male	2	0.7	7	2.7	42	15.3	129	53.1	64	70.3	244	21.6
	Female	1	0.4	2	0.8	10	3.9	89	36.9	73	72.3	175	15.5
	Total	3	0.6	9	1.8	52	9.8	218	45.0	137	71.4	419	18.6

Hemorrhage (-)	Male	267	100.0	256	100.0	273	99.6	241	99.2	90	98.9	1127	99.6
	Female	273	100.0	256	99.6	252	98.8	241	100.0	100	99.0	1122	99.6
	Total	540	100.0	512	99.8	525	99.2	482	99.6	190	99.0	2249	99.6
Hemorrhage (+)	Male	0	0.0	0	0.0	1	0.4	2	0.8	1	1.1	4	0.4
	Female	0	0.0	1	0.4	3	1.2	0	0.0	1	1.0	5	0.4
	Total	0	0.0	1	0.2	4	0.8	2	0.4	2	1.0	9	0.4

Cerebrovascular diseases (CVD)

		40-49yr		50-59yr		60-69yr		70-79yr		80yr -		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
CVD (-)	Male	257	96.3	229	89.5	203	74.1	93	38.3	16	17.6	798	70.6
	Female	271	99.3	246	95.7	204	80.0	139	57.7	30	29.7	890	79.0
	Total	528	97.8	475	92.6	407	76.9	232	47.9	46	24.0	1688	74.8
CVD (+)	Male	10	3.7	27	10.5	71	25.9	150	61.7	75	82.4	333	29.4
	Female	2	0.7	11	4.3	51	20.0	102	42.3	71	70.3	237	21.0
	Total	12	2.2	38	7.4	122	23.1	252	52.1	146	76.0	570	25.2