

XII. Head MRI Measurements

MRI was performed on a 1.5T Toshiba instrument (VISART). The scanning protocol included a series of axial T1-(TR500, TE15) and T2-weighted(TR4000, TE120) scans angled parallel to the anterior-posterior commissure line .

[1\) Periventricular hyperintensity](#)

Divided into 4 classes according to Appendix 1.

[2\) Ventricular dilatation](#)

Divided into 4 classes according to Appendix 2.

[3\) Brain atrophy](#)

Divide into 4 classes according to Appendix 3.

[4\) Cerebrovascular disease](#)

Cerebral infarction

Border zone
Include cerebral cortex
White matter
Basal ganglia, thalamus, internal capsule, midbrain, pons, medulla oblongata
Cerebellar white matter, cerebellar cortex

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 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

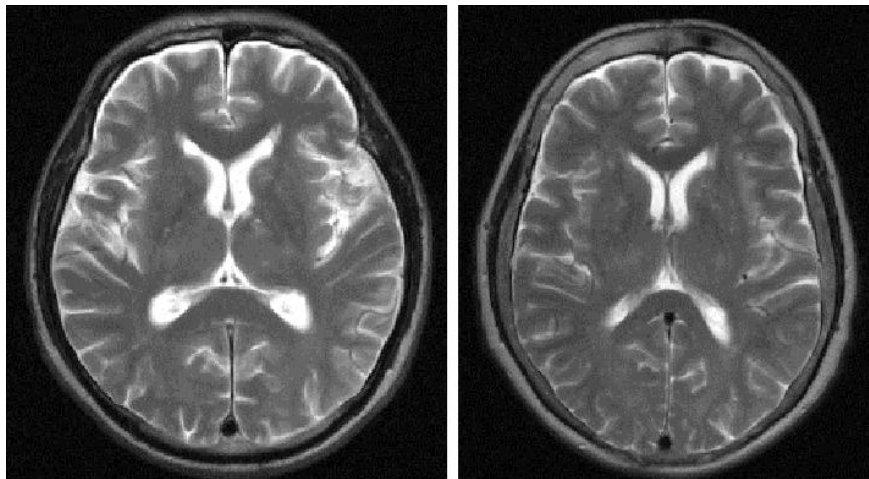
Cerebrovascular diseases were defined as all of cerebral infarction and cerebral hemorrhage.

References

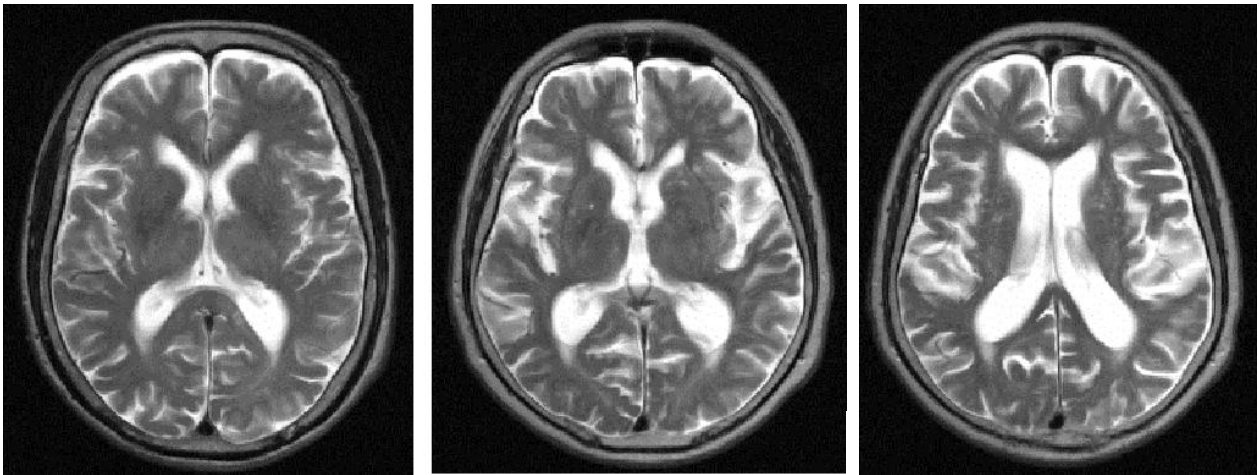
Stroke 1994 vol25, p318-327
Naika 1997 vol79 (4)
Nihon naika gakkaiishi 1997 vol86
Medicina 1994 vol31 (8)

Appendix 1: Periventricular hyperintensity

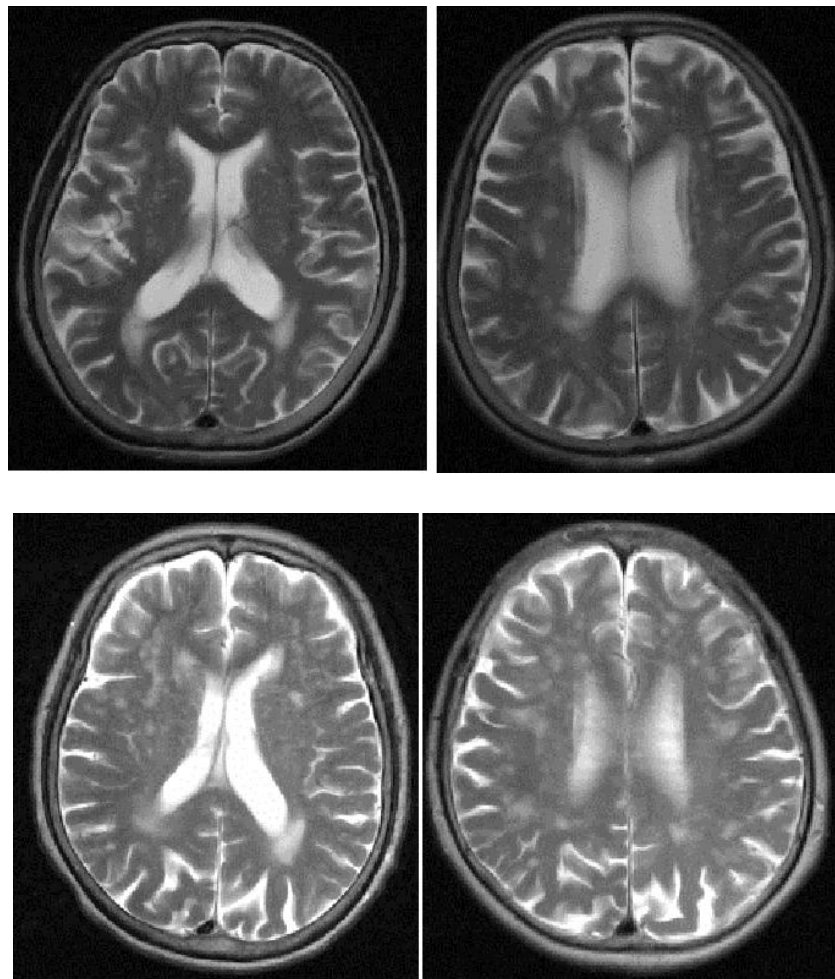
I. None: None or minimal periventricular signal hyperintensities in the form of caps only in the anterior horn of lateral ventricles.



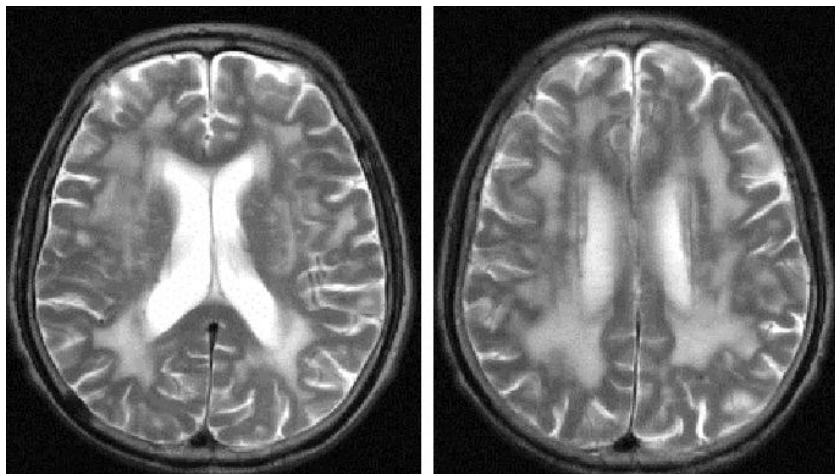
II. Mild: Caps in both anterior and posterior horns of lateral ventricles.



III. Moderate: Multifocal periventricular hyperintense punctuate lesions.

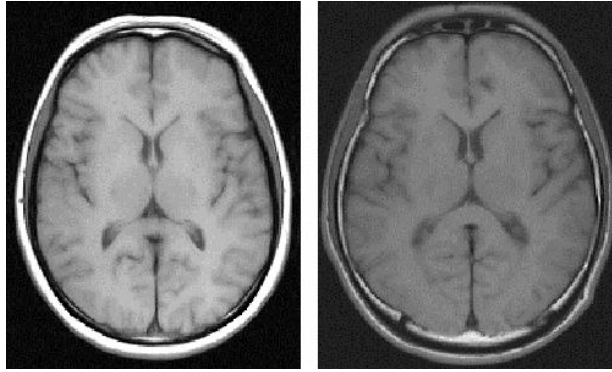


IV. Severe: Multiple high signal intensity area that reached confluency in the periventricular region and white matter.



Appendix 2: Ventricular dilatation

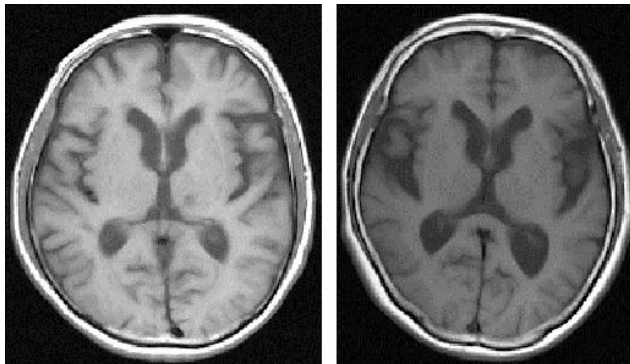
I. None



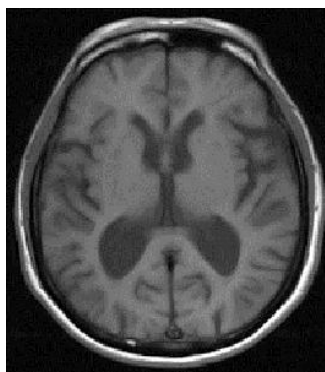
II. Mild



III. Moderate

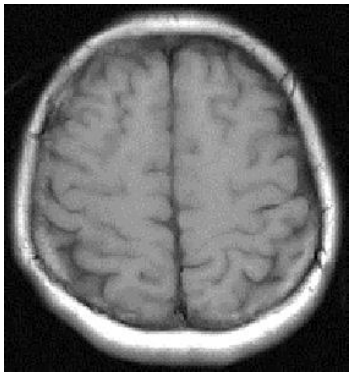


IV. Severe

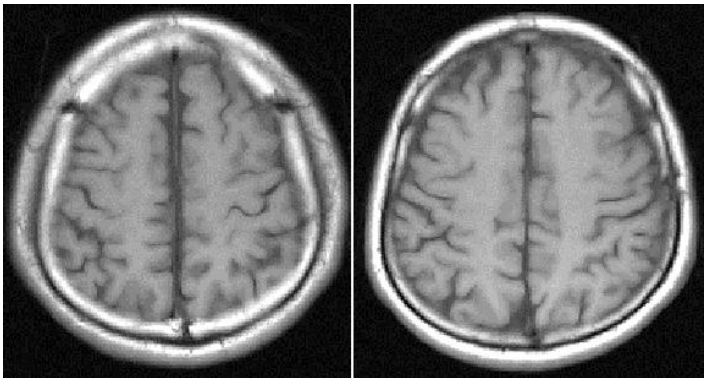


Appendix 3: Brain atrophy

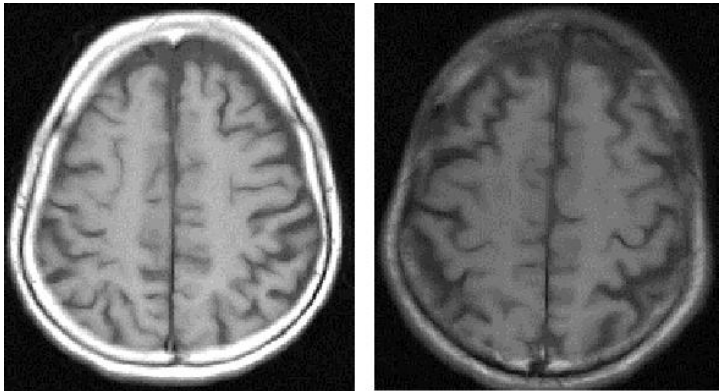
I. None



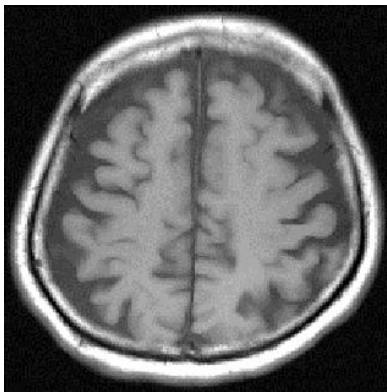
II. Mild



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	%
Not recorded	Male	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

	Female	1	0.4	0	0.0	0	0.0	0	0.0	1	4.5	2	0.2
	Total	1	0.2	0	0.0	0	0.0	0	0.0	1	2.6	2	0.1
None	Male	258	96.6	252	87.2	167	59.4	71	26.8	3	18.8	751	67.2
	Female	244	94.2	242	86.7	157	59.0	82	31.8	3	13.6	728	67.2
	Total	502	95.4	494	87.0	324	59.2	153	29.3	6	15.8	1479	67.2
Mild	Male	8	3.0	29	10.0	72	25.6	90	34.0	4	25.0	203	18.2
	Female	11	4.2	30	10.8	67	25.2	81	31.4	9	40.9	198	18.3
	Total	19	3.6	59	10.4	139	25.4	171	32.7	13	34.2	401	18.2
Moderate	Male	1	0.4	8	2.8	36	12.8	92	34.7	7	43.8	144	12.9
	Female	3	1.2	7	2.5	40	15.0	84	32.6	7	31.8	141	13.0
	Total	4	0.8	15	2.6	76	13.9	176	33.7	14	36.8	285	12.9
Severe	Male	0	0.0	0	0.0	6	2.1	12	4.5	2	12.5	20	1.8
	Female	0	0.0	0	0.0	2	0.8	11	4.3	2	9.1	15	1.4
	Total	0	0.0	0	0.0	8	1.5	23	4.4	4	10.5	35	1.6

2) Ventricular dilatation

Ventricular dilatation

		40–49yr		50–59yr		60–69yr		70–79yr		80yr–		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
None	Male	201	75.3	183	63.3	98	34.9	24	9.1	0	0.0	506	45.3
	Female	230	88.8	222	79.6	144	54.1	62	24.0	2	9.1	660	60.9
	Total	431	81.9	405	71.3	242	44.2	86	16.4	2	5.3	1166	53.0
Mild	Male	61	22.8	103	35.6	163	58.0	146	55.1	7	43.8	480	42.9
	Female	29	11.2	54	19.4	112	42.1	151	58.5	12	54.5	358	33.0
	Total	90	17.1	157	27.6	275	50.3	297	56.8	19	50.0	838	38.1
Moderate	Male	5	1.9	3	1.0	19	6.8	85	32.1	7	43.8	119	10.6
	Female	0	0.0	2	0.7	10	3.8	44	17.1	7	31.8	63	5.8
	Total	5	1.0	5	0.9	29	5.3	129	24.7	14	36.8	182	8.3
Severe	Male	0	0.0	0	0.0	1	0.4	10	3.8	2	12.5	13	1.2
	Female	0	0.0	1	0.4	0	0.0	1	0.4	1	4.5	3	0.3
	Total	0	0.0	1	0.2	1	0.2	11	2.1	3	7.9	16	0.7

3) Brain atrophy

Brain atrophy

		40–49yr		50–59yr		60–69yr		70–79yr		80yr –		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
None	Male	231	86.5	208	72.0	147	52.3	49	18.5	0	0	635	56.8
	Female	253	97.7	247	88.5	192	72.2	114	44.2	7	31.8	813	75.0
	Total	484	92.0	455	80.1	339	62.0	163	31.2	7	18.4	1448	65.8
Mild	Male	36	13.5	81	28.0	130	46.3	189	71.3	15	93.8	451	40.3
	Female	6	2.3	32	11.5	73	27.4	138	53.5	11	50.0	260	24.0
	Total	42	8.0	113	19.9	203	37.1	327	62.5	26	68.4	711	32.3
Moderate	Male	0	0.0	0	0.0	4	1.4	27	10.2	1	6.3	32	2.9
	Female	0	0.0	0	0.0	1	0.4	6	2.3	4	18.2	11	1.0
	Total	0	0.0	0	0.0	5	0.9	33	6.3	5	13.2	43	2.0
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

4) Cerebrovascular disease (CVD)

Lacuna infarction

		40 – 49yr		50 – 59yr		60 – 69yr		70 – 79yr		80yr –		Total	
		N	%	N	%	N	%	N	%	N	%	N	%

None	Male	262	98.1	276	95.5	235	83.6	181	68.3	10	62.5	964	86.2
	Female	256	98.8	269	96.4	239	89.8	208	80.6	17	77.3	989	91.2
	Total	518	98.5	545	96.0	474	86.7	389	74.4	27	71.1	1953	88.7
Single lacuna	Male	5	1.9	7	2.4	29	10.3	43	16.2	3	18.8	87	7.8
	Female	3	1.2	8	2.9	19	7.1	34	13.2	4	18.2	68	6.3
	Total	8	1.5	15	2.6	48	8.8	77	14.7	7	18.4	155	7.0
Multiple lacuna	Male	0	0.0	6	2.1	17	6.0	41	15.5	3	18.8	67	6.0
	Female	0	0.0	2	0.7	8	3.0	16	6.2	1	4.5	27	2.5
	Total	0	0.0	8	1.4	25	4.6	57	10.9	4	10.5	94	4.3

Cerebral embolism

		40 – 49yr		50 – 59yr		60 – 69yr		70 – 79yr		80yr –		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
Embolism (–)	Male	267	100.0	288	99.7	278	98.9	258	97.4	16	100.0	1107	99.0
	Female	257	99.2	279	100.0	265	99.6	250	96.9	21	95.5	1072	98.9
	Total	524	99.6	567	99.8	543	99.3	508	97.1	37	97.4	2179	99.0
Embolism (+)	Male	0	0.0	1	0.3	3	1.1	7	2.6	0	0.0	11	1.0
	Female	2	0.8	0	0.0	1	0.4	8	3.1	1	4.5	12	1.1
	Total	2	0.4	1	0.2	4	0.7	15	2.9	1	2.6	23	1.0

Cerebral thrombosis

		40 – 49yr		50 – 59yr		60 – 69yr		70 – 79yr		80yr –		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
Thrombosis (–)	Male	267	100.0	288	99.7	278	98.9	240	90.6	12	75.0	1085	97.0
	Female	255	98.5	277	99.3	262	98.5	243	94.2	22	100.0	1059	97.7
	Total	522	99.2	565	99.5	540	98.7	483	92.4	34	89.5	2144	97.4
Thrombosis (+)	Male	0	0.0	1	0.3	3	1.1	25	9.4	4	25.0	33	3.0
	Female	4	1.5	2	0.7	4	1.5	15	5.8	0	0.0	25	2.3
	Total	4	0.8	3	0.5	7	1.3	40	7.6	4	10.5	58	2.6

Cerebral hemorrhage

		40 – 49yr		50 – 59yr		60 – 69yr		70 – 79yr		80yr –		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
Hemorrhage (–)	Male	267	100.0	288	99.7	280	99.6	261	98.5	16	100.0	1112	99.5
	Female	259	100.0	278	99.6	266	100.0	258	100.0	22	100.0	1083	99.9
	Total	526	100.0	566	99.6	546	99.8	519	99.2	38	100.0	2195	99.7
Hemorrhage (+)	Male	0	0.0	1	0.3	1	0.4	4	1.5	0	0.0	6	0.5
	Female	0	0.0	1	0.4	0	0.0	0	0.0	0	0.0	1	0.1
	Total	0	0.0	2	0.4	1	0.2	4	0.8	0	0.0	7	0.3

Cerebrovascular disease (CVD)

		40 – 49yr		50 – 59yr		60 – 69yr		70 – 79yr		80yr –		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
CVD (–)	Male	262	98.1	275	95.2	232	82.6	165	62.3	7	43.8	941	84.2
	Female	252	97.3	267	95.7	235	88.3	191	74.0	16	72.7	961	88.7
	Total	514	97.7	542	95.4	467	85.4	356	68.1	23	60.5	1902	86.4
CVD (+)	Male	5	1.9	14	4.8	49	17.4	100	37.7	9	56.3	177	15.8
	Female	7	2.7	12	4.3	31	11.7	67	26.0	6	27.3	123	11.3
	Total	12	2.3	26	4.6	80	14.6	167	31.9	15	39.5	300	13.6