

VI. Head MRI Measurements

MRI measurements were performed on a 3T SIEMENS instrument (MAGNETOM Trio, A Tim System).

[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](#)

Divided 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 infarction was defined as all of lacuna infarction, cerebral 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

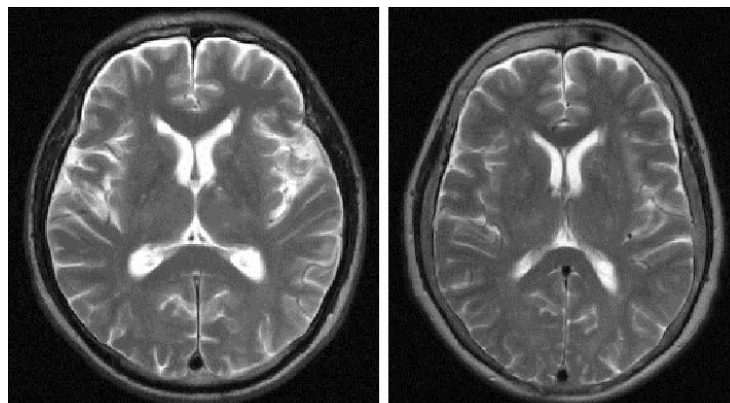
Naika 1997 vol79 (4)

Nihon Naika Gakkai Zasshi 1997 vol. 86

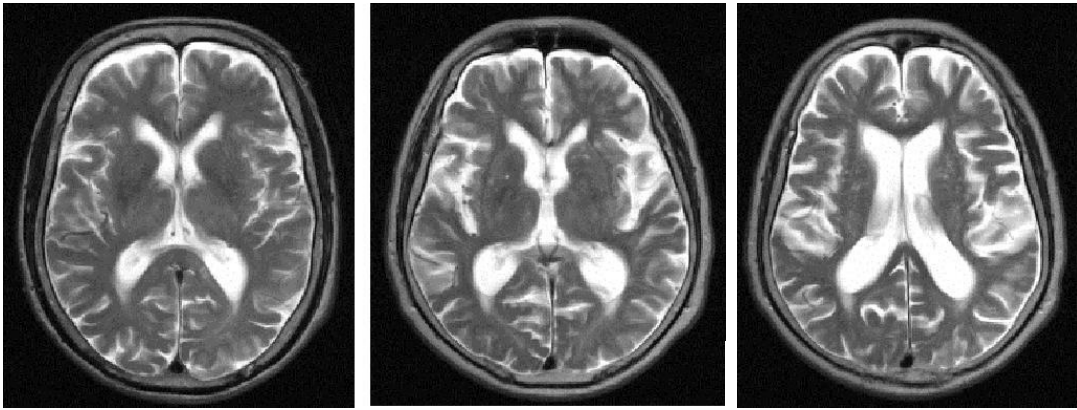
Medicina 1994 vol31 (8)

Appendix 1: Periventricular hyperintensity

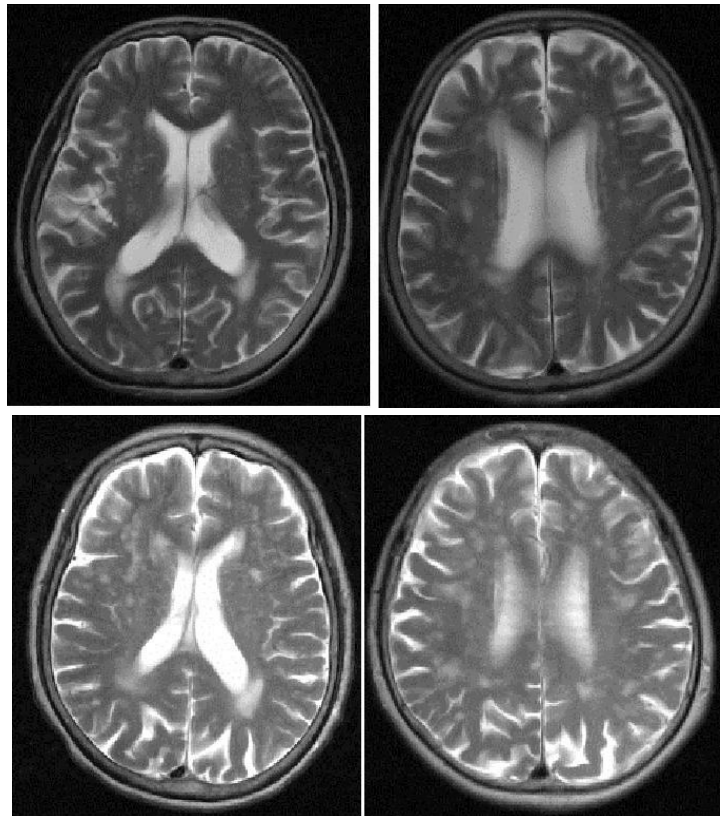
I. None : None or minimal periventricular signal hyperintensities in the form of caps only in the anterior horn of lateral ventricles.



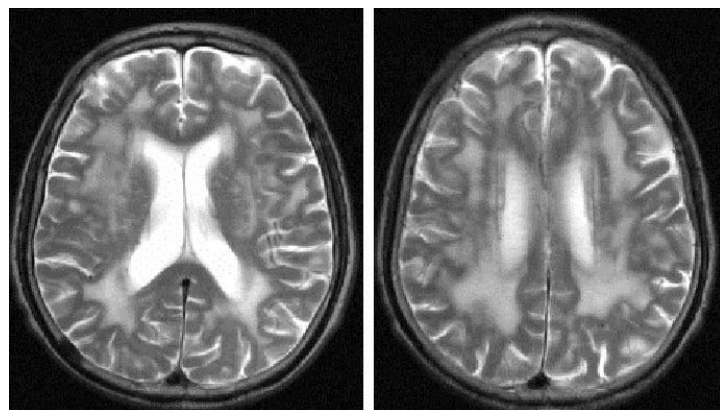
II. Mild : Caps in both anterior and posterior horns of lateral ventricles.



III. Moderate : Multifocal periventricular hyperintense punctuate lesions.

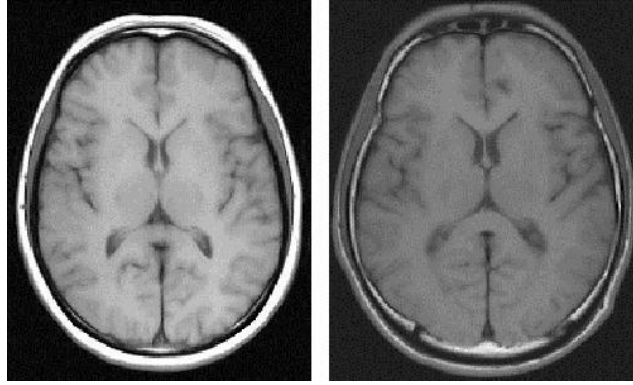


IV. Severe : Multiple high signal intensity area that reached confluency in the periventricular region and white matter.

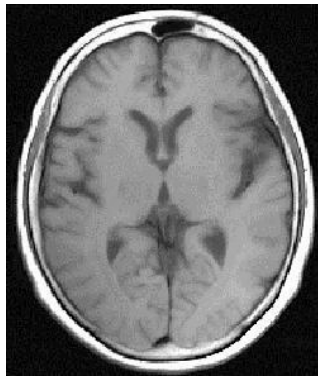


Appendix 2: Ventricular dilatation

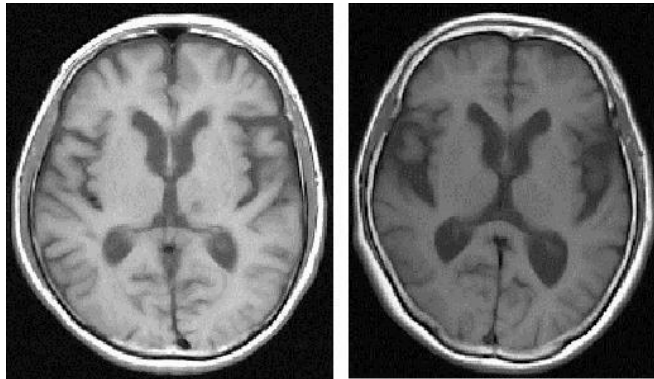
I. None



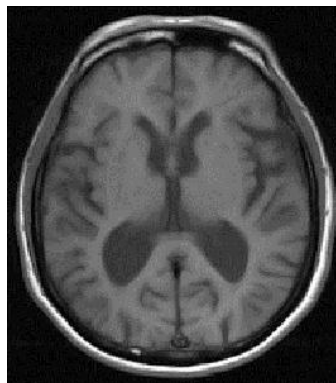
II. Mild



III. Moderate

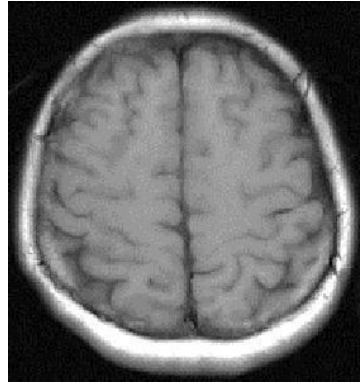


IV. Severe

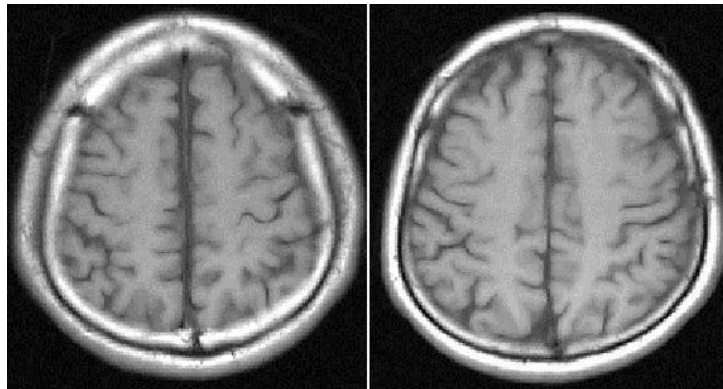


Appendix 3: Brain atrophy

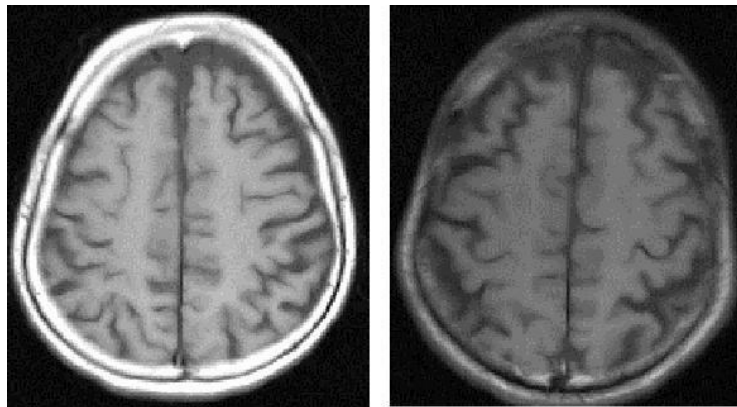
I. None



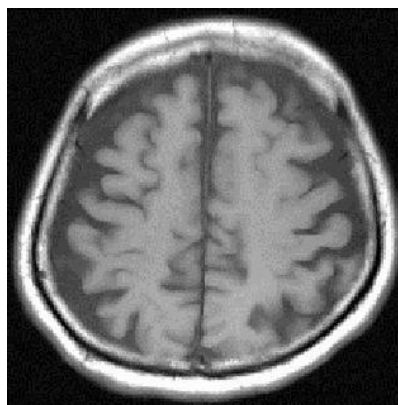
II. Mild



III. Moderate



IV. Severe



1) Periventricular hyperintensity (PVH)

Periventricular hyperintensity (PVH)

		50-59yr		60-69yr		70-79yr		80yr-		Total	
		N	%	N	%	N	%	N	%	N	%
None	Male	170	78.7	103	41.0	27	11.5	2	1.6	302	36.6
	Female	221	86.3	135	53.8	36	18.3	4	3.3	396	47.9
	Total	391	82.8	238	47.4	63	14.6	6	2.4	698	42.3
Mild	Male	46	21.3	132	52.6	164	69.8	51	41.5	393	47.6
	Female	34	13.3	107	42.6	120	60.9	58	47.5	319	38.6
	Total	80	16.9	239	47.6	284	65.7	109	44.5	712	43.1
Moderate	Male	0	0.0	16	6.4	41	17.4	67	54.5	124	15.0
	Female	1	0.4	8	3.2	41	20.8	59	48.4	109	13.2
	Total	1	0.2	24	4.8	82	19.0	126	51.4	233	14.1
Severe	Male	0	0.0	0	0.0	3	1.3	3	2.4	6	0.7
	Female	0	0.0	1	0.4	0	0.0	1	0.8	2	0.2
	Total	0	0.0	1	0.2	3	0.7	4	1.6	8	0.5

2) Ventricular dilatation

Ventricular dilatation

		50-59yr		60-69yr		70-79yr		80yr-		Total	
		N	%	N	%	N	%	N	%	N	%
None	Male	179	82.9	165	65.7	80	34.0	12	9.8	436	52.8
	Female	240	93.8	211	84.1	116	58.9	31	25.4	598	72.4
	Total	419	88.8	376	74.9	196	45.4	43	17.6	1034	62.6
Mild	Male	36	16.7	83	33.1	144	61.3	70	56.9	333	40.4
	Female	16	6.3	39	15.5	76	38.6	74	60.7	205	24.8
	Total	52	11.0	122	24.3	220	50.9	144	58.8	538	32.6
Moderate	Male	1	0.5	3	1.2	11	4.7	40	32.5	55	6.7
	Female	0	0.0	1	0.4	5	2.5	17	13.9	23	2.8
	Total	1	0.2	4	0.8	16	3.7	57	23.3	78	4.7
Severe	Male	0	0.0	0	0.0	0	0.0	1	0.8	1	0.1
	Female	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	0.4	1	0.1

Ventricular dilatation (anterior horn)

		50-59yr		60-69yr		70-79yr		80yr-		Total	
		N	%	N	%	N	%	N	%	N	%
None	Male	212	98.1	225	89.6	159	67.7	41	33.3	637	77.2
	Female	256	100.0	248	98.8	168	85.3	74	60.7	746	90.3
	Total	468	99.2	473	94.2	327	75.7	115	46.9	1383	83.8
Mild	Male	4	1.9	26	10.4	73	31.1	72	58.5	175	21.2
	Female	0	0.0	3	1.2	29	14.7	44	36.1	76	9.2
	Total	4	0.8	29	5.8	102	23.6	116	47.3	251	15.2
Moderate	Male	0	0.0	0	0.0	3	1.3	10	8.1	13	1.6
	Female	0	0.0	0	0.0	0	0.0	4	3.3	4	0.5
	Total	0	0.0	0	0.0	3	0.7	14	5.7	17	1.0
Severe	Male	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
	Total	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

Ventricular dilatation (posterior horn)

		50-59yr		60-69yr		70-79yr		80yr-		Total	
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		N	%	N	%	N	%	N	%	N	%
None	Male	180	83.3	166	66.1	80	34.0	12	9.8	438	53.1
	Female	240	93.8	211	84.1	116	58.9	31	25.4	598	72.4
	Total	420	89.0	377	75.1	196	45.4	43	17.6	1036	62.7
Mild	Male	35	16.2	82	32.7	145	61.7	70	56.9	332	40.2
	Female	16	6.3	39	15.5	76	38.6	75	61.5	206	24.9
	Total	51	10.8	121	24.1	221	51.2	145	59.2	538	32.6
Moderate	Male	1	0.5	3	1.2	10	4.3	40	32.5	54	6.5
	Female	0	0.0	1	0.4	5	2.5	16	13.1	22	2.7
	Total	1	0.2	4	0.8	15	3.5	56	22.9	76	4.6
Severe	Male	0	0.0	0	0.0	0	0.0	1	0.8	1	0.1
	Female	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	0.4	1	0.1

3) Brain atrophy

Brain atrophy

		50-59yr		60-69yr		70-79yr		80yr-		Total	
		N	%	N	%	N	%	N	%	N	%
None	Male	182	84.3	163	64.9	74	31.5	7	5.7	426	51.6
	Female	246	96.1	219	87.3	112	56.9	24	19.7	601	72.8
	Total	428	90.7	382	76.1	186	43.1	31	12.7	1027	62.2
Mild	Male	34	15.7	87	34.7	146	62.1	78	63.4	345	41.8
	Female	10	3.9	32	12.7	82	41.6	86	70.5	210	25.4
	Total	44	9.3	119	23.7	228	52.8	164	66.9	555	33.6
Moderate	Male	0	0.0	1	0.4	15	6.4	36	29.3	52	6.3
	Female	0	0.0	0	0.0	2	1.0	11	9.0	13	1.6
	Total	0	0.0	1	0.2	17	3.9	47	19.2	65	3.9
Severe	Male	0	0.0	0	0.0	0	0.0	2	1.6	2	0.2
	Female	0	0.0	0	0.0	1	0.5	1	0.8	2	0.2
	Total	0	0.0	0	0.0	1	0.2	3	1.2	4	0.2

Brain atrophy (frontal lobe)

		50-59yr		60-69yr		70-79yr		80yr-		Total	
		N	%	N	%	N	%	N	%	N	%
None	Male	200	92.6	216	86.1	132	56.2	28	22.8	576	69.8
	Female	251	98.0	237	94.4	157	79.7	63	51.6	708	85.7
	Total	451	95.6	453	90.2	289	66.9	91	37.1	1284	77.8
Mild	Male	16	7.4	35	13.9	94	40.0	78	63.4	223	27.0
	Female	5	2.0	14	5.6	38	19.3	56	45.9	113	13.7
	Total	21	4.4	49	9.8	132	30.6	134	54.7	336	20.4
Moderate	Male	0	0.0	0	0.0	9	3.8	15	12.2	24	2.9
	Female	0	0.0	0	0.0	1	0.5	3	2.5	4	0.5
	Total	0	0.0	0	0.0	10	2.3	18	7.3	28	1.7
Severe	Male	0	0.0	0	0.0	0	0.0	2	1.6	2	0.2
	Female	0	0.0	0	0.0	1	0.5	0	0.0	1	0.1
	Total	0	0.0	0	0.0	1	0.2	2	0.8	3	0.2

Brain atrophy (temporal lobe)

		50-59yr		60-69yr		70-79yr		80yr-		Total	
		N	%	N	%	N	%	N	%	N	%
None	Male	190	88.0	173	68.9	82	34.9	12	9.8	457	55.4
	Female	250	97.7	224	89.2	122	61.9	27	22.1	623	75.4

	Total	440	93.2	397	79.1	204	47.2	39	15.9	1080	65.4
Mild	Male	26	12.0	77	30.7	142	60.4	76	61.8	321	38.9
	Female	6	2.3	27	10.8	73	37.1	84	68.9	190	23.0
	Total	32	6.8	104	20.7	215	49.8	160	65.3	511	31.0
Moderate	Male	0	0.0	1	0.4	11	4.7	35	28.5	47	5.7
	Female	0	0.0	0	0.0	2	1.0	10	8.2	12	1.5
	Total	0	0.0	1	0.2	13	3.0	45	18.4	59	3.6
Severe	Male	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	1	0.8	1	0.1
	Total	0	0.0	0	0.0	0	0.0	1	0.4	1	0.1

4) Cerebrovascular disease (CVD)

Lacuna infarction

		50-59yr		60-69yr		70-79yr		80yr-		Total	
		N	%	N	%	N	%	N	%	N	%
Lacuna (-)	Male	205	94.9	192	76.5	122	51.9	36	29.3	555	67.3
	Female	250	97.7	221	88.0	135	68.5	60	49.2	666	80.6
	Total	455	96.4	413	82.3	257	59.5	96	39.2	1221	74.0
Lacuna (+)	Male	11	5.1	59	23.5	113	48.1	87	70.7	270	32.7
	Female	6	2.3	30	12.0	62	31.5	62	50.8	160	19.4
	Total	17	3.6	89	17.7	175	40.5	149	60.8	430	26.0

Cerebral embolism

		50-59yr		60-69yr		70-79yr		80yr-		Total	
		N	%	N	%	N	%	N	%	N	%
Embolism (-)	Male	214	99.1	250	99.6	227	96.6	113	91.9	804	97.5
	Female	255	99.6	248	98.8	191	97.0	115	94.3	809	97.9
	Total	469	99.4	498	99.2	418	96.8	228	93.1	1613	97.7
Embolism (+)	Male	2	0.9	1	0.4	8	3.4	10	8.1	21	2.5
	Female	1	0.4	3	1.2	6	3.0	7	5.7	17	2.1
	Total	3	0.6	4	0.8	14	3.2	17	6.9	38	2.3

Cerebral thrombosis

		50-59yr		60-69yr		70-79yr		80yr-		Total	
		N	%	N	%	N	%	N	%	N	%
Thrombosis (-)	Male	211	97.7	250	99.6	233	99.1	119	96.7	813	98.5
	Female	255	99.6	248	98.8	195	99.0	121	99.2	819	99.2
	Total	466	98.7	498	99.2	428	99.1	240	98.0	1632	98.8
Thrombosis (+)	Male	5	2.3	1	0.4	2	0.9	4	3.3	12	1.5
	Female	1	0.4	3	1.2	2	1.0	1	0.8	7	0.8
	Total	6	1.3	4	0.8	4	0.9	5	2.0	19	1.2

Cerebral infarction

		50-59yr		60-69yr		70-79yr		80yr-		Total	
		N	%	N	%	N	%	N	%	N	%
Infarction (-)	Male	199	92.1	190	75.7	117	49.8	36	29.3	542	65.7
	Female	249	97.3	215	85.7	131	66.5	57	46.7	652	78.9
	Total	448	94.9	405	80.7	248	57.4	93	38.0	1194	72.3
Infarction (+)	Male	17	7.9	61	24.3	118	50.2	87	70.7	283	34.3
	Female	7	2.7	36	14.3	66	33.5	65	53.3	174	21.1
	Total	24	5.1	97	19.3	184	42.6	152	62.0	457	27.7

Cerebral hemorrhage

		50-59yr		60-69yr		70-79yr		80yr-		Total	
		N	%	N	%	N	%	N	%	N	%
Hemorrhage (-)	Male	216	100.0	248	98.8	235	100.0	122	99.2	821	99.5
	Female	256	100.0	249	99.2	196	99.5	120	98.4	821	99.4
	Total	472	100.0	497	99.0	431	99.8	242	98.8	1642	99.5
Hemorrhage (+)	Male	0	0.0	3	1.2	0	0.0	1	0.8	4	0.5
	Female	0	0.0	2	0.8	1	0.5	2	1.6	5	0.6
	Total	0	0.0	5	1.0	1	0.2	3	1.2	9	0.5

Cerebrovascular diseases

		50-59yr		60-69yr		70-79yr		80yr-		Total	
		N	%	N	%	N	%	N	%	N	%
CVD (-)	Male	199	92.1	189	75.3	117	49.8	35	28.5	540	65.5
	Female	249	97.3	215	85.7	131	66.5	55	45.1	650	78.7
	Total	448	94.9	404	80.5	248	57.4	90	36.7	1190	72.1
CVD (+)	Male	17	7.9	62	24.7	118	50.2	88	71.5	285	34.5
	Female	7	2.7	36	14.3	66	33.5	67	54.9	176	21.3
	Total	24	5.1	98	19.5	184	42.6	155	63.3	461	27.9