

Supplementary Material

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Table 1. Average CBF in ml/100 g/min in all vascular territories at all time points (0 min – baseline, 5 min, 15 min and 25 min) for all subjects and examinations. Contralateral vascular territories in patients with unilateral moyamoya disease are annotated in bold.

#		ACA _{Left}				ACA _{Right}				MCA _{Left}				MCA _{Right}				PCA _{Left}				PCA _{Right}			
		Min	0	5	15	25	0	5	15	25	0	5	15	25	0	5	15	25	0	5	15	25	0	5	15
1	Post-op MRI	45	62	65	65	56	79	82	80	49	64	65	67	58	75	75	79	45	58	61	58	53	68	70	67
	Post-op MRI	39	65	63	59	51	82	82	70	43	71	67	60	46	77	73	64	32	59	59	48	39	69	69	55
	Post-op MRI	34	38	41	51	44	49	53	67	33	36	40	50	39	45	48	59	22	27	29	38	35	38	41	53
2	Post-op MRI	27	31	30	31	26	33	31	32	29	32	31	32	27	32	31	32	27	32	31	31	26	32	30	30
	Post-op MRI	27	29	31	29	26	33	33	32	28	31	32	31	28	32	33	32	-	-	-	-	-	-	-	-
	Post-op MRI	29	34	33	32	25	31	29	29	31	36	34	34	23	29	28	28	26	29	29	29	23	28	27	27
3	Post-op MRI	27	43	46	42	31	45	43	42	28	40	42	39	31	41	45	42	25	46	44	41	24	44	42	40
	Post-op MRI	31	45	40	39	34	46	44	44	29	41	38	38	30	42	37	39	26	43	37	37	26	41	36	34
	Post-op MRI	28	39	42	42	33	44	47	44	28	40	43	40	28	39	42	41	25	43	44	39	24	39	39	36
4	Pre-op MRI	29	43	42	39	27	37	38	35	30	38	40	39	28	34	35	35	21	32	31	29	21	31	30	29
	Post-op MRI	25	40	37	37	26	40	37	37	29	42	40	40	29	42	40	40	32	48	40	42	30	45	36	40
	Post-op MRI	34	53	51	48	33	48	47	44	38	54	54	50	35	45	47	43	27	44	43	37	26	42	41	36
5	Pre-op MRI	37	58	58	54	34	63	60	55	45	66	69	64	43	55	57	55	28	48	46	42	28	50	46	42
	Post-op MRI	45	64	58	60	34	64	57	56	53	70	67	66	50	64	63	60	38	55	50	48	25	47	45	42
6	Pre-op MRI	47	64	66	72	43	65	60	65	54	74	74	77	52	71	70	73	44	63	61	71	37	53	51	60
	Pre-op MRI	52	73	70	68	46	69	62	66	62	88	84	85	59	85	77	78	43	67	66	67	38	59	52	56
	Post-op MRI	52	74	75	78	47	70	70	73	60	87	88	93	60	88	89	92	47	70	68	73	39	62	61	63
	Pre-op MRI	36	64	58	60	34	63	60	55	41	71	70	64	42	75	74	67	-	-	-	-	28	50	46	42

7	Pre-op MRI	34	68	61	59	34	64	57	56	41	75	69	65	42	78	73	70	-	-	-	-	25	47	45	42
8	Pre-op MRI	27	45	41	42	28	46	43	42	28	46	43	42	30	48	44	44	24	39	37	35	25	40	37	36
9	Pre-op MRI	47	56	72	70	48	66	62	60	49	62	69	67	51	66	71	71	51	73	83	80	51	69	77	78
10	Post-op MRI	50	79	83	79	48	72	76	74	49	75	78	76	47	76	79	75	37	62	60	55	33	58	56	51
	Post-op MRI	34	52	54	52	32	48	50	51	35	51	53	54	35	52	54	54	31	49	48	46	22	36	36	36
11	Pre-op MRI	42	52	53	54	45	58	53	59	47	61	53	62	45	57	53	57	34	46	45	48	41	55	49	54

ACA, anterior cerebral artery; MCA, middle cerebral artery; MRI, magnetic resonance imaging; PCA, posterior cerebral artery

Table 2. Average CVR in percentage in affected and unaffected vascular regions at all time points (5 min, 15 min and 25 min) for all subjects and examinations. Contralateral vascular territories in patients with unilateral moyamoya disease are annotated in bold.

#		ACA _{Left}			ACA _{Right}			MCA _{Left}			MCA _{Right}			PCA _{Left}			PCA _{Right}		
		Min	5	15	25	5	15	25	5	15	25	5	15	25	5	15	25	5	15
1	Post-op MRI	37	44	42	40	45	43	29	32	37	28	30	36	28	35	28	29	34	28
	Post-op MRI	64	59	50	60	61	37	65	56	41	68	59	38	85	85	51	76	76	41
	Post-op MRI	10	21	50	13	22	53	7	19	49	18	25	54	22	33	75	10	17	53
2	Post-op MRI	13	11	13	26	18	23	10	7	10	17	16	19	19	14	15	25	19	18
	Post-op MRI	8	14	10	24	25	22	11	14	11	16	17	14	-	-	-	-	-	-
	Post-op MRI	14	11	10	23	16	14	14	10	8	25	22	21	12	13	13	22	19	18
3	Post-op MRI	58	67	54	46	40	37	42	50	41	29	42	34	82	77	63	81	71	64
	Post-op MRI	48	32	28	33	27	27	43	30	30	41	27	30	63	42	41	54	35	28
	Post-op MRI	37	49	49	35	43	33	41	52	40	41	51	48	77	80	60	66	66	55
4	Pre-op MRI	50	44	36	37	42	31	28	34	30	20	25	23	54	46	40	52	45	40
	Post-op MRI	62	48	48	53	44	42	44	37	37	43	36	37	48	23	29	48	18	31
	Post-op MRI	55	47	40	43	43	31	41	43	32	28	33	22	60	58	36	61	55	35
5	Pre-op MRI	56	56	45	44	45	37	47	53	43	29	33	28	71	66	52	59	45	35
	Post-op MRI	42	29	34	35	30	29	31	26	23	28	25	20	46	33	28	44	31	26
6	Pre-op MRI	37	41	53	49	39	50	37	38	43	37	35	42	43	40	61	46	40	64
	Pre-op MRI	39	34	30	48	34	42	41	35	36	45	31	33	57	54	59	56	39	48
	Post-op MRI	43	45	51	48	49	55	46	48	56	48	49	53	49	44	56	58	54	60
	Pre-op MRI	86	78	66	85	74	62	75	71	57	76	74	59	-	-	-	76	61	49

7	Pre-op MRI	98	78	72	89	69	65	85	69	60	85	74	65	-	-	-	86	78	68
8	Pre-op MRI	65	52	53	63	53	50	63	53	50	62	48	48	62	53	45	60	48	43
9	Pre-op MRI	19	52	48	39	30	27	26	40	36	28	39	38	43	63	56	36	52	53
10	Post-op MRI	57	64	57	51	59	54	53	58	54	62	69	60	68	64	49	75	68	55
	Post-op MRI	55	61	55	48	56	59	47	52	55	50	55	56	57	52	47	61	63	60
11	Pre-op MRI	25	27	28	31	18	33	31	14	33	24	17	25	36	32	42	34	19	31

ACA, anterior cerebral artery; MCA, middle cerebral artery; MRI, magnetic resonance imaging

Table 3. Compilation of cerebrovascular reserve (CVR) results from other investigations in patients with affected hemispheres, patients with unaffected hemispheres and normal subjects. Mean CVR (%) and standard deviation (SD) are included when available. Standard error was re-calculated to standard deviation by multiplying with the square root of the number of subjects. Coefficient of variation (CoV) was calculated by dividing SD with mean CVR. Imaging methods include positron emission tomography (PET), arterial spin labelling (ASL) with different post-label delays (PLD), single-photon emission computed tomography (SPECT). Measurement time point after acetazolamide administration is included in min. Type I is classified as normal CBF and CVR, type II normal CBF and reduced CVR and type III reduced CBF and CVR. Values from the current study are annotated in bold.

	Study	Mean	SD	CoV	Method	Comment
Patients Affected Hemispheres	Federau 2017	36	52	144%	ASL 15 min	Moderate Stenosis
	Federau 2017	24	52	217%	ASL 15 min	Severe Stenosis
	Hu 2017	25	30	121%	ASL 10–15 min	
	Ni 2017	21	38	181%	ASL 10–15 min	
	Noguchi 2015	31	40	131%	SPECT 20 min	
	Noguchi 2011	36	44	123%	SPECT 20 min	
	Bokkers 2010	36	14	40%	ASL 15 min	
	Uchihashi 2010	32	24	76%	SPECT 10 min	
	Uchihashi 2010	32	31	98%	ASL 10 min	
	Kuroda 2001	-4	5	89%	SPECT 15 min	Type III
	Kuroda 2001	5	2	44%	SPECT 15 min	Type II
	Kuroda 2001	19	4	21%	SPECT 15 min	Type I
	Detre 1999	35	-	-	ASL 15 min	
	Kuwabara 1995	31	23	75%	PET 20 min	
	Kuwabara 1995	24	22	95%	PET 5 min	
	Current study	39	17	43%	ASL 5, 15, 25 min	
Patients Unaffected Hemisphere	Federau 2017	45	45	100%	ASL 15 min	
	Ni 2017	41	26	63%	ASL 10-15 min	
	Bokkers 2010	57	19	33%	ASL 15 min	
	Bokkers 2010	45	17	38%	ASL 15 min	
	Uchihashi 2010	36	23	66%	SPECT 10 min	
	Uchihashi 2010	38	28	73%	ASL 10 min	
	Detre 1999	40	-	-	ASL 15 min	
	Kuwabara 1995	40	22	55%	PET 20 min	
	Kuwabara 1995	38	20	52%	PET 5 min	
	Current study	49	18	38%	ASL 5, 15, 25 min	
	Kuttner 2021	31	29	94%	PET 15-30 min	
	Vaclavu 2020	67	20	30%	ASL 10 min	
	Zhao 2020	63	13	21%	ASL 10 min	
	Vaclavu 2019	70	32	47%	ASL 10 min	

Normal Subjects	Inoue 2013	31	8	25%	ASL Dynamic	PLD 1525 ms
	Inoue 2013	46	10	22%	ASL Dynamic	PLD 2525 ms
	Bokkers 2010	70	22	31%	ASL 15 min	Basilar Artery
	Bokkers 2010	48	14	29%	ASL 15 min	ICA
	Kuroda 2006	30	8	27%	SPECT 15 min	
	Endo 2006	35	10	29%	SPECT	
	Yen 2002	38	24	65%	ASL 12 min	
	Ogasawara 2001	28	4	16%	PET 10 min	
	Kuroda 2001	20	5	26%	SPECT 15 min	
	Okazawa 2001	34	-	-	SPECT	

ACA, anterior cerebral artery; ASL, arterial spin labelling; CoV, coefficient of variation; ICA, internal carotid artery; MCA, middle cerebral artery; PCA, posterior cerebral artery; PET, position emission tomography; PLD, post-label delay; SD, standard deviation; SPECT, single-photon emission tomography;

