SUPPLEMENTARY MATERIAL

MANAGEMENT OF EXTRACRANIAL CAROTID ARTERY STENOSIS DURING ENDOVASCULAR TREATMENT FOR ACUTE ISCHEMIC STROKE: RESULTS FROM THE MR CLEAN REGISTRY

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Table S1. Predictors for good functional outcome

	Good functional outcome[a]					
Predictor	**Yes (n=179)**	**No (n=227)**	**OR**	**95% CI**	**aOR**	**95% CI**
CAS during EVT	75/179 (41.9)	83/227 (36.6)	1.32	0.88-1.98	0.90	0.50-1.62
Age - y	69 (61-75)	75 (66-81)	0.95	0.93-0.97	0.94	0.91-0.97
Male	131/179 (74)	139/227 (62)	1.69	1.10-2.59	1.17	0.66-2.07
Medical history						
Atrial fibrillation	13/177 (7.3)	41/226 (18.1)	0.36	0.19-0.69	0.41	0.13-1.26
Hypercholesterolemia	58/172 (33.7)	69/218 (31.7)	1.14	0.74-1.76	1.52	0.82-2.83
Myocardial infarction	21/177 (11.9)	31/224 (13.8)	0.78	0.43-1.43	0.97	0.42-2.23
Current smoker	59/143 (41.3)	65/166 (39.2)	1.19	0.75-1.90	0.71	0.38-1.31
Current medication use						
Antiplatelet	46/176 (26.1)	71/224 (31.7)	0.73	0.46-1.14	0.61	0.31-1.21
Coumarin	14/179 (7.8)	27/225 (12.0)	0.60	0.30-1.16	1.19	0.37-3.89
NIHSS score at baseline	14 (9-17)	17 (14-20)	0.89	0.86-0.93	0.89	0.84-0.94
ASPECTS	9 (8-10)	8 (7-10)	1.17	1.05-1.31	1.22	1.03-1.44
Collateral filling						
Absent collaterals	2/170 (1.2)	20/219 (9.1)	0.09	0.02-0.47	0.20	0.04-1.12
<50% of occluded territory	51/170 (30.0)	90/219 (41.1)	0.44	0.25-0.78	0.70	0.33-1.48
50-99% of occluded territory	78/170 (45.9)	77/219 (35.2)	0.84	0.49-1.44	1.27	0.64-2.54
100% of occluded territory	39/170 (22.9)	32/219 (14.6)	-	-	-	-
Intravenous thrombolysis	156/177 (88.1)	184/226 (81.4)	1.68	0.97-2.93	0.95	0.44-2.08
PTA during EVT	55/177 (31.1)	67/226 (29.6)	1.04	0.68-1.60	1.27	0.67-2.38
Time from onset to recanalization - minutes	244 (189-297)	270 (228-335)	0.995	0.992-0.997	0.994	0.990-0.997

Data are presented as *n* (%). The data in this table are partly based on the dataset before imputation (number of patients). For some variables, the denominators are smaller than the number of patients included due to missing data. (a)OR, (adjusted) odds ratio; ASPECTS, Alberta Stroke Program Early CT Score; CAS, carotid artery stenting; CI, confidence interval; EVT, endovascular treatment; NIHSS, National Institutes of Health Stroke; PTA, percutaneous transluminal angioplasty.

[a]Good functional outcome was defined as a modified Rankin Scale score of ≤2 at 90 days after endovascular treatment.

Table S2. Secondary endpoints for patients treated with intravenous thrombolysis

Endpoint	EVT with CAS (n=150)	EVT without CAS (n=214)	OR	95% CI	aOR[a]	95% CI
Good functional outcome[b]	71/140 (50.7)	85/200 (42.5)	1.45	0.94-2.23	1.07	0.58-2.00
Successful intracranial reperfusion[c]	87/145 (60.0)	128/206 (62.1)	0.90	0.58-1.39	0.76	0.43-1.33
New clot in different vascular territory[d]	13/137 (9.5)	11/191 (5.8)	1.81	0.80-4.12	3.05	1.03-9.06
Symptomatic intracranial hemorrhage[e]	7/150 (4.7)	16/214 (7.5)	0.61	0.24-1.51	0.92	0.27-2.18
Recurrent ischemic stroke[f]	3/150 (2.0)	2/214 (0.9)	2.17	0.36-13.13	[g]	
Any serious adverse event[h]	61/150 (40.7)	81/214 (37.9)	1.11	0.72-1.69	1.18	0.68-2.04

Data are presented as *n* (%). The data in this table are partly based on the dataset before imputation (number of patients). For some variables, the denominators are smaller than the number of patients included due to missing data. (a)OR, (adjusted) odds ratio; CAS, carotid artery stenting; CI, confidence interval; EVT, endovascular treatment.

[a]Results were adjusted for age, sex, a medical history of atrial fibrillation, hypercholesterolemia and myocardial infarction, smoking, antiplatelet use, coumarin use, National Institutes of Health Stroke Scale score at baseline, Alberta Stroke Program Early CT Score, collateral score, time from onset to recanalization and percutaneous transluminal angioplasty during endovascular treatment.

[b]Good functional outcome was defined as an modified Rankin Scale score of ≤2 at 90 days after endovascular treatment.

[c]Successful intracranial reperfusion was defined as extended Thrombolysis In Cerebral Infarction score of ≥2B.

[d]New clot in a different vascular territory was defined as a remaining proximal intracranial occlusion on last digital subtraction angiography run that did not match the thrombus locations scored on baseline computed tomography angiography, and had changed either from one territory to another or from a distal occlusion location to a more proximal location.

[e]An intracranial hemorrhage was considered to be symptomatic if patients died or deteriorated neurologically (a decline of at least 4 points on the National Institutes of Health Stroke Scale) and the hemorrhage was related to the clinical deterioration (according to the Heidelberg criteria).

[f]Recurrent ischemic stroke was defined as a new ischemic stroke that was confirmed on imaging, led to corresponding neurological deficits or resulted in death.

[g]Adjusted odds ratio could not be reliably determined due to the limited number of observations of recurrent ischemic stroke.

[h]Any serious adverse event was defined as any untoward medical occurrence or effect causing mortality, a life-threatening situation, prolonged hospitalization or persistent significant disability.

Table S3. Predictors for successful intracranial reperfusion

	Successful intracranial reperfusion[a]					
Predictor	**Yes (n=265)**	**No (n=155)**	**OR**	**95% CI**	**aOR**	**95% CI**
CAS during EVT	101/265 (38.1)	63/155 (40.6)	0.91	0.60-1.36	0.73	0.43-1.23
Age - y	71 (63-78)	70 (64-78)	1.00	0.98-1.02	0.999	0.97-1.03
Male	184/265 (70)	93/155 (60)	1.50	0.99-2.27	1.22	0.73-2.04
Medical history						
Atrial fibrillation	32/263 (12.2)	22/153 (14.4)	0.81	0.45-1.43	0.58	0.23-1.50
Hypercholesterolemia	87/255 (34.1)	46/148 (31.1)	1.12	0.73-1.73	1.07	0.60-1.90
Myocardial infarction	34/260 (13.1)	22/153 (14.4)	0.90	0.51-1.62	0.69	0.32-1.48
Current smoker	84/199 (42.2)	46/119 (38.7)	1.10	0.69-1.75	1.01	0.59-1.72
Current medication use						
Antiplatelet	84/262 (32.1)	39/151 (25.8)	1.35	0.87-2.09	1.34	0.70-2.55
Coumarin	27/264 (10.2)	14/153 (9.2)	1.16	0.59-2.27	1.63	0.57-4.66
NIHSS score at baseline	16 (12-19)	16 (12-19)	1.01	0.97-1.04	1.00	0.96-1.04
ASPECTS	8 (7-10)	9 (7-10)	0.97	0.87-1.08	0.97	0.84-1.11
Collateral filling						
Absent collaterals	11/257 (4.3)	14/147 (9.5)	0.55	0.21-1.41	0.75	0.24-2.39
<50% of occluded territory	98/257 (38.1)	43/147 (29.3)	1.57	0.88-2.79	1.51	0.76-3.01
50-99% of occluded territory	105/257 (40.9)	60/147 (40.8)	1.24	0.69-2.24	1.59	0.82-3.08
100% of occluded territory	43/257 (16.7)	30/147 (20.4)	-	-	-	-
Intravenous thrombolysis	215/263 (81.7)	136/154 (88.3)	0.60	0.33-1.08	0.42	0.19-0.93
PTA during EVT	84/264 (31.8)	37/155 (23.9)	1.53	0.96-2.42	1.31	0.74-2.32
Time from onset to recanalization - minutes	258 (205-313)	270 (221-336)	0.997	0.995-1.000	0.996	0.993-0.999

Data are presented as *n* (%). The data in this table are partly based on the dataset before imputation (number of patients). For some variables, the denominators are smaller than the number of patients included due to missing data. (a)OR, (adjusted) odds ratio; ASPECTS, Alberta Stroke Program Early CT Score; CAS, carotid artery stenting; CI, confidence interval; EVT, endovascular treatment; NIHSS, National Institutes of Health Stroke; PTA, percutaneous transluminal angioplasty.

[a]Successful intracranial reperfusion was defined as extended Thrombolysis In Cerebral Infarction score of ≥2B.

Table S4. Predictors for new clot in a different vascular territory

	New clot in a different vascular territory[a]					
Predictor	**Yes (n=27)**	**No (n=368)**	**OR**	**95% CI**	**aOR**	**95% CI**
CAS during EVT	14/27 (51.9)	140/368 (38.0)	1.81	0.84-3.92	2.96	1.07-8.21
Age – y	72 (64-77)	71 (64-78)	1.00	0.96-1.04	1.00	0.94-1.07
Male	20/27 (75)	241/368 (66)	1.50	0.63-3.58	1.91	0.67-5.46
Medical history						
Atrial fibrillation	4/27 (14.8)	50/365 (13.7)	1.16	0.38-3.50	1.54	0.29-8.33
Hypercholesterolemia	9/26 (34.6)	116/355 (32.7)	1.04	0.46-2.37	0.87	0.30-2.52
Myocardial infarction	6/27 (22.2)	49/363 (13.5)	1.74	0.68-4.49	5.03	1.32-19.11
Current smoker	6/23 (26.1)	116/278 (41.7)	0.50	0.20-1.28	0.51	0.16-1.58
Current medication use						
Antiplatelet	7/27 (25.9)	106/361 (29.4)	0.86	0.34-2.19	0.34	0.07-1.58
Coumarin	3/27 (11.1)	38/365 (10.4)	1.10	0.31-3.81	1.07	0.16-7.34
NIHSS score at baseline	16 (11-18)	16 (12-19)	0.99	0.92-1.05	0.98	0.90-1.06
ASPECTS	8 (7-10)	9 (7-10)	0.96	0.78-1.19	0.85	0.66-1.10
Collateral filling						
Absent collaterals	3/27 (11.1)	20/353 (5.7)	2.16	0.47-9.99	2.53	0.39-16.44
<50% of occluded territory	11/27 (40.7)	127/353 (36.0)	1.02	0.35-2.96	0.69	0.18-2.72
50-99% of occluded territory	8/27 (29.6)	142/353 (40.2)	0.70	0.23-2.12	0.46	0.13-1.61
100% of occluded territory	5/27 (18.5)	64/353 (18.1)	-	-	-	-
Intravenous thrombolysis	24/27 (88.9)	304/365 (83.3)	1.69	0.49-5.75	1.77	0.40-7.92
PTA during EVT	10/27 (37.0)	109/367 (29.7)	1.37	0.61-3.04	0.78	0.26-2.35
Time from onset to recanalization - minutes	313 (274-358)	260 (209-322)	1.01	1.00-1.01	1.01	1.00-1.02

Data are presented as n (%). The data in this table are partly based on the dataset before imputation (number of patients). For some variables, the denominators are smaller than the number of patients included due to missing data. (a)OR, (adjusted) odds ratio; ASPECTS, Alberta Stroke Program Early CT Score; CAS, carotid artery stenting; CI, confidence interval; EVT, endovascular treatment; NIHSS, National Institutes of Health Stroke; PTA, percutaneous transluminal angioplasty.

[a]New clot in a different vascular territory was defined as a remaining proximal intracranial occlusion on last digital subtraction angiography run that did not match the thrombus locations scored on baseline computed tomography angiography, and had changed either from one territory to another or from a distal occlusion location to a more proximal location.

Table S5. Predictors for symptomatic intracranial hemorrhage

	Symptomatic intracranial hemorrhage[a]					
Predictor	**Yes (n=28)**	**No (n=405)**	**OR**	**95% CI**	**aOR**	**95% CI**
CAS during EVT	8/28 (28.6)	161/405 (39.8)	0.61	0.26-1.41	0.73	0.23-2.37
Age - y	71 (66-82)	71 (64-78)	1.03	0.99-1.07	1.04	0.99-1.10
Male	13/28 (47)	273/405 (68)	0.42	0.19-0.91	0.40	0.15-1.09
Medical history						
Atrial fibrillation	5/27 (18.5)	51/402 (12.7)	1.50	0.55-4.13	2.79	0.60-13.06
Hypercholesterolemia	5/25 (20.0)	130/391 (33.2)	0.50	0.18-1.34	0.20	0.04-0.98
Myocardial infarction	4/27 (14.8)	52/399 (13.0)	1.12	0.37-3.35	1.39	0.31-6.35
Current smoker	6/20 (30.0)	128/310 (41.3)	0.61	0.23-1.63	1.17	0.37-3.71
Current medication use						
Antiplatelet	9/28 (32.1)	116/398 (29.1)	1.15	0.50-2.61	1.37	0.37-5.05
Coumarin	3/28 (10.7)	39/402 (9.7)	1.11	0.32-3.84	0.60	0.08-4.27
NIHSS score at baseline	15 (13-18)	16 (12-19)	1.01	0.95-1.08	1.02	0.94-1.10
ASPECTS	8 (7-10)	8 (7-10)	1.00	0.81-1.24	1.07	0.81-1.42
Collateral filling						
Absent collaterals	2/28 (7.1)	23/388 (5.9)	1.59	0.27-9.22	2.40	0.25-23.40
<50% of occluded territory	13/28 (46.4)	134/388 (34.5)	1.74	0.55-5.52	2.83	0.53-15.22
50-99% of occluded territory	9/28 (32.1)	158/388 (40.7)	1.04	0.31-3.47	1.69	0.30-9.50
100% of occluded territory	4/28 (14.3)	73/388 (18.8)	-	-	-	-
Intravenous thrombolysis	23/28 (82.1)	341/402 (84.8)	0.83	0.30-2.25	1.55	0.34-7.11
PTA during EVT	8/28 (28.6)	120/402 (29.9)	0.95	0.41-2.21	0.71	0.20-2.47
Time from onset to recanalization - minutes	272 (234-338)	259 (211-325)	1.00	1.00-1.01	1.00	1.00-1.01

Data are presented as *n* (%). The data in this table are partly based on the dataset before imputation (number of patients). For some variables, the denominators are smaller than the number of patients included due to missing data. (a)OR, (adjusted) odds ratio; ASPECTS, Alberta Stroke Program Early CT Score; CAS, carotid artery stenting; CI, confidence interval; EVT, endovascular treatment; NIHSS, National Institutes of Health Stroke; PTA, percutaneous transluminal angioplasty.

[a]An intracranial hemorrhage was considered to be symptomatic if patients died or deteriorated neurologically (a decline of at least 4 points on the National Institutes of Health Stroke Scale) and the hemorrhage was related to the clinical deterioration (according to the Heidelberg criteria).

Table S6. Predictors for recurrent ischemic stroke

	Recurrent ischemic stroke[a]			
Predictor	**Yes (n=5)**	**No (n=428)**	**OR**	**95% CI**
CAS during EVT	3/5 (60.0)	166/428 (38.8)	2.37	0.39-14.32
Age – y	77 (64-81)	71 (64-78)	1.03	0.94-1.12
Male	4/5 (80)	282/428 (66)	2.07	0.23-18.70
Medical history				
Atrial fibrillation	1/5 (20.0)	55/424 (13.0)	1.69	0.19-15.37
Hypercholesterolemia	0/5 (0)	135/411 (32.8)	[b]	
Myocardial infarction	0/5 (0)	56/421 (13.3)	[b]	
Current smoker	1/4 (25.0)	133/326 (40.8)	0.48	0.05-4.70
Current medication use				
Antiplatelet	0/5 (0)	125/421 (29.7)	[b]	
Coumarin	1/5 (20.0)	41/425 (9.6)	2.32	0.25-21.27
NIHSS score at baseline	17 (7-23)	16 (12-19)	0.99	0.86-1.15
ASPECTS	8 (7-10)	8 (7-10)	0.98	0.61-1.58
Collateral filling				
Absent collaterals	0/4 (0)	25/412 (6.1)	[b]	
<50% of occluded territory	0/4 (0)	147/412 (35.7)	[b]	
50-99% of occluded territory	3/4 (75.0)	164/412 (39.8)	1.28	0.13-13.05
100% of occluded territory	1/4 (25.0)	76/412 (18.4)	-	-
Intravenous thrombolysis	0/5 (0)	359/425 (84.5)	[b]	
PTA during EVT	1/5 (20.0)	127/425 (29.9)	0.59	0.08-4.26
Time from onset to recanalization - minutes	296 (207-364)	259 (212-325)	1.00	0.99-1.01

Data are presented as *n* (%). The data in this table are partly based on the dataset before imputation (number of patients). For some variables, the denominators are smaller than the number of patients included due to missing data. OR, odds ratio; ASPECTS, Alberta Stroke Program Early CT Score; CAS, carotid artery stenting; CI, confidence interval; EVT, endovascular treatment; NIHSS, National Institutes of Health Stroke; PTA, percutaneous transluminal angioplasty.
[a]Recurrent ischemic stroke defined as a new ischemic stroke that was confirmed on imaging, led to corresponding neurological deficits or resulted in death.
[b]Odds ratio could not be reliably determined due to the limited number of observations in one of the categories.

Table S7. Predictors for any serious adverse event

	Any serious adverse event[a]					
Predictor	**Yes (n=171)**	**No (n=262)**	**OR**	**95% CI**	**aOR**	**95% CI**
CAS during EVT	72/171 (42.1)	97/262 (37.0)	1.24	0.83-1.83	1.27	0.76-2.11
Age – y	74 (65-81)	70 (63-77)	1.03	1.01-1.05	1.03	1.01-1.06
Male	110/171 (65)	176/262 (68)	0.88	0.59-1.32	1.25	0.75-2.09
Medical history						
Atrial fibrillation	25/168 (14.9)	31/261 (11.9)	1.29	0.73-2.27	1.05	0.42-2.62
Hypercholesterolemia	55/163 (33.7)	80/253 (31.6)	1.10	0.71-1.66	1.08	0.62-1.90
Myocardial infarction	19/167 (11.4)	37/259 (14.3)	0.79	0.44-1.42	0.74	0.35-1.60
Current smoker	50/129 (38.8)	84/201 (41.8)	0.88	0.56-1.39	1.14	0.68-1.93
Current medication use						
Antiplatelet	50/166 (30.1)	75/260 (28.8)	1.05	0.69-1.61	1.14	0.62-2.12
Coumarin	18/168 (10.7)	24/262 (9.2)	1.21	0.64-2.30	0.98	0.36-2.68
NIHSS score at baseline	16 (13-19)	15 (11-19)	1.04	1.00-1.07	1.04	0.99-1.08
ASPECTS	8 (7-9)	9 (7-10)	0.91	0.82-1.01	0.90	0.79-1.03
Collateral filling						
Absent collaterals	15/165 (9.1)	10/251 (4.0)	2.53	1.01-6.36	1.94	0.62-6.04
<50% of occluded territory	61/165 (37.0)	86/251 (34.3)	1.21	0.67-2.19	1.35	0.67-2.75
50-99% of occluded territory	61/165 (37.0)	106/251 (42.2)	1.04	0.59-1.82	1.02	0.53-1.95
100% of occluded territory	28/165 (17.0)	49/251 (19.5)	-	-	-	-
Intravenous thrombolysis	142/170 (83.5)	222/260 (85.4)	0.88	0.52-1.50	1.10	0.55-2.21
PTA during EVT	47/169 (27.8)	81/261 (31.0)	0.84	0.55-1.29	0.64	0.37-1.11
Time from onset to recanalization - minutes	275 (220-346)	250 (204-305)	1.00	1.00-1.01	1.00	1.00-1.01

Data are presented as *n* (%). The data in this table are partly based on the dataset before imputation (number of patients). For some variables, the denominators are smaller than the number of patients included due to missing data. (a)OR, (adjusted) odds ratio; ASPECTS, Alberta Stroke Program Early CT Score; CAS, carotid artery stenting; CI, confidence interval; EVT, endovascular treatment; NIHSS, National Institutes of Health Stroke; PTA, percutaneous transluminal angioplasty.

[a]Any serious adverse event was defined as any untoward medical occurrence or effect causing mortality, a life-threatening situation, prolonged hospitalization or persistent significant disability.

Table S8. Predictors for good functional outcome after endovascular treatment with CAS

	Good functional outcome[a]					
Predictor	**Yes (n=75)**	**No (n=83)**	**OR**	**95% CI**	**aOR**	**95% CI**
CAS first approach	55/75 (73.3)	60/82 (73.2)	1.05	0.52-2.12	1.03	0.48-2.22
Age - y	67 (60-74)	67 (60-74)	0.95	0.91-0.98	0.94	0.91-0.98
Male	57/75 (76)	57/83 (69)	1.36	0.68-2.72	1.69	0.79-3.62
NIHSS score at baseline	15 (10-18)	16 (14-19)	0.93	0.88-0.99	0.93	0.87-1.01
Collateral filling						
Absent collaterals	0/69 (0)	2/81 (2.5)	[b]	[b]	[b]	[b]
<50% of occluded territory	17/69 (24.6)	30/81 (37.0)	0.43	0.18-1.03	0.45	0.17-1.18
50-99% of occluded territory	33/69 (47.8)	33/81 (40.7)	0.85	0.39-1.88	0.91	0.39-2.17
100% of occluded territory	19/69 (27.5)	16/81 (19.8)	-	-	-	-

Data are presented as *n* (%). The data in this table are partly based on the dataset before imputation (number of patients). For some variables, the denominators are smaller than the number of patients included due to missing data. (a)OR, (adjusted) odds ratio; CAS, carotid artery stenting; CI, confidence interval; NIHSS, National Institutes of Health Stroke.

[a]Good functional outcome was defined as a modified Rankin Scale score of ≤2 at 90 days after endovascular treatment.

[b]The (adjusted) odds ratio and 95% confidence could not be determined for the first category of collateral filling (absent collaterals) due to the limited number of observations.

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