

SUPPLEMENTAL MATERIAL

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Table I. Association of hemodynamic variables with functional outcome by institution						
University of Iowa						
Likelihood of a shift towards worse outcome on discharge mRS						
Variables	OR	95% CI	p Value	aOR	95% CI	p Value
ΔMAP, per 10-mmHg	1.20	1.06-1.37	0.006	1.14	1.00-1.30	0.056
aMAP, per 300-mmHg*min	1.15	1.07-1.25	<0.001	1.11	1.03-1.20	0.005
Likelihood of a shift towards worse outcome on 90-day mRS						
Variables	OR	95% CI	p Value	aOR	95% CI	p Value
ΔMAP, per 10-mmHg	1.22	1.08-1.39	0.002	1.17	1.02-1.32	0.020
aMAP, per 300-mmHg*min	1.18	1.09-1.28	<0.001	1.15	1.06-1.25	<0.001
Yale-New Haven Hospital						
Likelihood of a shift towards worse outcome on discharge mRS						
Variables	OR	95% CI	p Value	aOR	95% CI	p Value
ΔMAP, per 10-mmHg	1.18	1.07-1.31	0.001	1.15	1.03-1.27	0.012
aMAP, per 300-mmHg*min	1.09	1.04-1.15	<0.001	1.07	1.02-1.13	0.004
Likelihood of a shift towards worse outcome on 90-day mRS						
Variables	OR	95% CI	p Value	aOR	95% CI	p Value
ΔMAP, per 10-mmHg	1.22	1.07-1.40	0.003	1.24	1.07-1.43	0.003
aMAP, per 300-mmHg*min	1.12	1.04-1.20	0.002	1.15	1.05-1.25	0.001

Table I: Association of hemodynamic variables with functional outcome by institution. aOR, adjusted odds ratio (adjusted for age, NIHSS and TICI score); OR, odds ratio; MAP, mean arterial pressure; mRS, modified Rankin scale; ΔMAP, difference between baseline and lowest MAP during endovascular thrombectomy; aMAP, area between baseline and intraprocedural MAP; SBP, systolic blood pressure; ΔSBP, difference between baseline and lowest SBP during endovascular thrombectomy; aSBP, area between baseline and intraprocedural SBP.

Table II. Hemodynamic variables and site of occlusion						
		ICA/tICA	M1 MCA	M2 MCA	Tandem	p-value
Total patients	390					
Baseline SBP, mmHg ± SD	149 ± 26	151 ± 26	147 ± 25	156 ± 30	152 ± 23	0.066

Baseline MAP, mmHg ± SD	106 ± 19	104 ± 17	104 ± 20	110 ± 18	107 ± 16	0.208
Mean minimum SBP, mmHg ± SD	113 ± 26	105 ± 25	114 ± 26	115 ± 26	111 ± 27	0.153
Mean minimum MAP, mmHg ± SD	80 ± 18	73 ± 17	80 ± 17	83 ± 17	79 ± 18	0.020
Mean maximum SBP, mmHg ± SD	186 ± 31	184 ± 30	184 ± 30	186 ± 32	193 ± 34	0.277
Mean maximum MAP, mmHg ± SD	132 ± 23	129 ± 19	130 ± 22	134 ± 27	137 ± 24	0.138
Mean procedural SBP, mmHg ± SD	144 ± 19	143 ± 24	144 ± 18	145 ± 18	145 ± 22	0.939
Mean procedural MAP, mmHg ± SD	100 ± 13	101 ± 16	100 ± 13	102 ± 12	101 ± 14	0.764
Patients with intra- procedural blood pressure reduction below admission, n (%)	339 (87)					
Mean SBP reduction, mmHg ± SD	44 ± 29	51 ± 35	40 ± 27	49 ± 31	46 ± 28	0.053
Mean MAP reduction, mmHg ± SD	31 ± 20	35 ± 22	29 ± 20	33 ± 21	31 ± 19	0.401

Mean percent SBP reduction, %	28 ± 16	31 ± 18	26 ± 15	28 ± 15	29 ± 16	0.104
Mean percent MAP reduction, %	27 ± 16	32 ± 19	26 ± 16	29 ± 15	28 ± 16	0.257
Mean ΔSBP, mmHg ± SD	37 ± 34	46 ± 38	33 ± 32	41 ± 36	41 ± 32	0.035
Mean ΔMAP, mmHg ± SD	26 ± 23	31 ± 25	24 ± 23	26 ± 25	28 ± 21	0.177
Mean percent ΔSBP, %	23 ± 20	28 ± 21	20 ± 20	24 ± 20	26 ± 20	0.065
Mean percent ΔMAP, %	22 ± 20	28 ± 21	21 ± 20	21 ± 20	25 ± 18	0.103
SBP hypotensive area, mm Hg-min	592 (118-1968)	2045 ± 3026	1219 ± 1766	1909 ± 3321	1591 ± 1559	0.041
MAP hypotensive area, mm Hg-min	409 (58-1431)	1338 ± 1884	955 ± 1520	1210 ± 2107	1124 ± 1185	0.433

Table II: Hemodynamic variables and site of occlusion. MAP, mean arterial pressure; ΔMAP, difference between baseline and lowest MAP during endovascular thrombectomy; aMAP, area between baseline and intraprocedural MAP; SBP, systolic blood pressure; ΔSBP, difference between baseline and lowest SBP during endovascular thrombectomy; aSBP, area between baseline and intraprocedural SBP.

Table III. Likelihood of a shift towards worse outcome on 90-day mRS						
Variables	OR	95% CI	p Value	aOR	95% CI	p Value
ΔMAP, per 10 mmHg	1.21	1.08-1.35	0.001	1.19	1.03-1.38	0.015
ΔSBP, per 10 mmHg	1.16	1.08-1.26	<0.001	1.15	1.06-1.26	0.002
aMAP, per 300 mmHg*min	1.14	1.06-1.23	<0.001	1.15	1.06-1.24	0.001
aSBP, per 300 mmHg*min	1.12	1.05-1.19	<0.001	1.09	1.03-1.14	0.002

Table III: Association of hemodynamic variables with functional outcome for the subpopulation of reperfused patients (TICI 2B or 3). OR, odds ratio; aOR, adjusted OR (adjusted for age, ASPECT score, baseline blood pressure, admission NIHSS, TICI score, and time-to-reperfusion); mRS, modified Rankin scale; MAP, mean arterial pressure; ΔMAP, difference between baseline and lowest MAP during endovascular thrombectomy; aMAP, area between baseline and intraprocedural MAP; SBP, systolic blood pressure; ΔSBP, difference between baseline and lowest SBP during endovascular thrombectomy; aSBP, area between baseline and intraprocedural SBP.

Table IV. Association of hemodynamic variables with functional outcome after adjusting for initial core volume (CBF<30%)

Likelihood of a shift towards worse outcome on discharge mRS				
Variables	aOR	95% CI	p Value	
ΔMAP, per 10-mmHg	1.24	1.04-1.48	0.015	
ΔSBP, per 10-mmHg	1.17	1.05-1.31	0.006	
aMAP, per 300-mmHg*min	1.14	1.03-1.25	0.011	
aSBP, per 300-mmHg*min	1.08	1.01-1.15	0.019	
Likelihood of a shift towards worse outcome on 90-day mRS				
Variables	aOR	95% CI	p Value	
ΔMAP, per 10-mmHg	1.29	1.09-1.54	0.003	
ΔSBP, per 10-mmHg	1.20	1.07-1.35	0.002	
aMAP, per 300-mmHg*min	1.17	1.05-1.30	0.003	
aSBP, per 300-mmHg*min	1.12	1.04-1.20	0.002	
Relationship with final infarct volume (mL)				
	unadjusted B	p-value	adjusted B	Adjusted p-value
ΔMAP, per 10-mmHg	5.5	0.003	4.1	0.035
ΔSBP, per 10-mmHg	3.5	0.006	2.4	0.049
aMAP, per 300-mmHg*min	2.5	0.005	1.2	0.276
aSBP, per 300-mmHg*min	1.9	0.003	0.8	0.331
Relationship with infarct growth (mL)				
ΔMAP, per 10-mmHg	4.5	0.038	4.1	0.036
ΔSBP, per 10-mmHg	3	0.033	2.4	0.057
aMAP, per 300-mmHg*min	2.7	0.033	1.3	0.261
aSBP, per 300-mmHg*min	1.83	0.024	0.8	0.337

Table IV: Association of hemodynamic variables with functional outcome after adjusting for initial core volume (CBF<30%). aOR, adjusted odds ratio (adjusted for age, core infarct volume (CBF<30%), baseline blood pressure, admission NIHSS, TICI score, and time-to-reperfusion); MAP, mean arterial pressure; mRS, modified Rankin scale; ΔMAP, difference between baseline and lowest MAP during endovascular thrombectomy; aMAP, area between baseline and intraprocedural MAP, SBP, systolic blood pressure; ΔSBP, difference between baseline and lowest SBP during endovascular thrombectomy; aSBP, area between baseline and intraprocedural SBP; final infarct volume analysis was adjusted for age, core infarct volume (CBF<30%), site of vessel occlusion, admission NIHSS, and TICI score.; infarct growth analysis was adjusted for age, site of vessel occlusion, admission NIHSS, and TICI score.

Table V. Baseline Patient Characteristics by Institution

	Yale – New Haven Hospital	University of Iowa	p-value
Total patients	390	237 (61)	153 (39)
Age, mean \pm SD	71 \pm 14	72 \pm 14	69 \pm 15
Gender, F (%)	219 (56)	137 (58)	82 (54)
Race, n (%)			0.000
White	326 (84)	181 (76)	145 (95)
Black or African American	37 (9)	33 (14)	4 (3)
Asian	4 (1)	4 (2)	0 (0)
Other	20 (5)	16 (7)	4 (3)
Medical History*, n (%)			
Hypertension	238 (61)	161 (68)	77 (50)
Coronary artery disease/myocardial infarction	73 (19)	47 (20)	26 (17)
Hyperlipidemia	143 (37)	101 (43)	42 (28)
Chronic heart failure	45 (12)	32 (14)	13 (9)
Atrial fibrillation	137 (35)	88 (37)	49 (32)
Diabetes mellitus	83 (21)	52 (22)	31 (20)
Past ischemic stroke	41 (11)	24 (10)	17 (11)
Current/past smoker	93 (24)	75 (32)	18 (12)
Occlusion on CTA*, n (%)			0.036
ICA/tICA	81 (18)	44 (19)	37 (24)
ACA	7 (2)	7 (3)	0 (0)
M1 MCA	282 (63)	161 (68)	121 (79)
M2 MCA	79 (18)	60 (25)	19 (12)
Admission NIHSS, mean \pm SD	17 \pm 6	17 \pm 6	16 \pm 6
Admission MAP, mean \pm SD	105 \pm 18	106 \pm 19	104 \pm 17
ASPECTS, median (IQR)	9 (7-10)	9 (7-10)	8 (7-10)
Core infarct volume, median (IQR)	6.5 (0-25.8)	0 (0-20)	12 (0-29)
Treated with tPA, n (%)	227 (58)	122 (52)	105 (69)
Mean onset to bolus time, minutes \pm SD	138 \pm 74	140 \pm 83	135 \pm 60
Mean onset to admission, minutes \pm SD	304 \pm 291	303 \pm 290	297 \pm 276
Mean onset to EVT, minutes \pm SD	404 \pm 345	393 \pm 325	409 \pm 337
Mean onset to reperfusion, minutes \pm SD	463 \pm 266	464 \pm 278	460 \pm 249
TICI, n (%)			0.000
0	60 (15)	49 (20)	11 (7)
1	8 (2)	5 (2)	3 (2)
2A	34 (9)	14 (6)	20 (13)
2B	160 (41)	99 (42)	61 (40)
3	120 (31)	63 (27)	57 (37)

Table V: Baseline patient characteristics by institution. SD, standard deviation; F, female; CTA, computed tomography angiography; ICA, internal carotid artery; tICA, terminal internal carotid artery; ACA, anterior cerebral artery; MCA, middle cerebral artery; MAP, mean arterial pressure; EVT, endovascular thrombectomy.

Table VI. Hemodynamic variables and anesthesia								
Hemodynamic variables by type of anesthesia								
			General Anesthesia	Monitored Anesthesia Care	p-value			
Total patients		390	140	250				
Mean Δ SBP, mmHg \pm SD		37 \pm 34	49 \pm 29	30 \pm 34	<0.001			
Mean Δ MAP, mmHg \pm SD		26 \pm 23	35 \pm 20	20 \pm 23	<0.001			
SBP hypotensive area, mmHg*min		592 (118-1968)	1101 (402-2654)	371 (44-1699)	<0.001			
MAP hypotensive area, mmHg*min		409 (58-1431)	984 (227-1968)	225 (20-1057)	<0.001			
Association of hemodynamic variables with functional outcome by type of anesthesia								
Monitored Anesthesia Care								
Likelihood of a shift towards worse outcome on discharge mRS								
Variables	OR	95% CI	p Value	aOR	95% CI	p Value		
Δ MAP, per 10-mmHg	1.12	1.01-1.23	0.023	1.06	0.96-1.17	0.279		
aMAP, per 300-mmHg*min	1.08	1.02-1.13	0.004	1.05	1.00-1.11	0.061		
Likelihood of a shift towards worse outcome on 90-day mRS								
Variables	OR	95% CI	p Value	aOR	95% CI	p Value		
Δ MAP, per 10-mmHg	1.20	1.07-1.34	0.002	1.16	1.04-1.31	0.011		
aMAP, per 300-mmHg*min	1.14	1.06-1.23	<0.001	1.13	1.04-1.22	0.003		
General Anesthesia								
Likelihood of a shift towards worse outcome on discharge mRS								
Variables	OR	95% CI	p Value	aOR	95% CI	p Value		
Δ MAP, per 10-mmHg	1.31	1.11-1.53	0.001	1.22	1.04-1.44	0.017		
aMAP, per 300-mmHg*min	1.15	1.07-1.23	<0.001	1.12	1.04-1.20	0.004		
Likelihood of a shift towards worse outcome on 90-day mRS								
Variables	OR	95% CI	p Value	aOR	95% CI	p Value		
Δ MAP, per 10-mmHg	1.24	1.05-1.46	0.013	1.13	0.95-1.35	0.154		
aMAP, per 300-mmHg*min	1.14	1.06-1.23	0.001	1.11	1.02-1.21	0.015		

Table VI: Hemodynamic variables and anesthesia. OR, odds ratio; aOR, adjusted odds ratio (adjusted for age, admission NIHSS, and TICI score); MAP, mean arterial pressure; SBP,

systolic blood pressure; mRS, modified Rankin scale; ΔMAP, difference between baseline and lowest MAP during endovascular thrombectomy; aMAP, area between baseline and intraprocedural MAP, ΔSBP, difference between baseline and lowest SBP during endovascular thrombectomy; aSBP, area between baseline and intraprocedural SBP.

Table VII. Association of hemodynamic variables with functional outcome for procedural blood pressure baseline						
Likelihood of a shift towards worse outcome on discharge mRS						
Variables	OR	95% CI	p Value	aOR	95% CI	p Value
ΔMAP_proc, per 10-mmHg	1.15	1.07-1.25	<0.001	1.07	0.98-1.18	0.133
ΔSBP_proc, per 10-mmHg	1.11	1.05-1.18	<0.001	1.07	1.00-1.14	0.040
aMAP_proc, per 300-mmHg*min	1.08	1.04-1.11	<0.001	1.04	1.00-1.09	0.033
aSBP_proc, per 300-mmHg*min	1.05	1.03-1.07	<0.001	1.03	1.00-1.05	0.050
Likelihood of a shift towards worse outcome on 90-day mRS						
Variables	OR	95% CI	p Value	aOR	95% CI	p Value
ΔMAP_proc, per 10-mmHg	1.13	1.04-1.24	0.005	1.06	0.95-1.18	0.253
ΔSBP_proc, per 10-mmHg	1.10	1.04-1.17	0.001	1.07	1.00-1.15	0.054
aMAP_proc, per 300-mmHg*min	1.08	1.04-1.12	<0.001	1.06	1.01-1.11	0.014
aSBP_proc, per 300-mmHg*min	1.06	1.03-1.09	<0.001	1.05	1.02-1.08	0.003

Table VII: Association of hemodynamic variables with functional outcome for procedural baseline. OR, odds ratio; aOR, adjusted odds ratio (adjusted for age, ASPECTS, baseline blood pressure, admission NIHSS, TICI score, and time-to-reperfusion); MAP, mean arterial pressure; mRS, modified Rankin scale; ΔMAP_proc, difference between baseline BP at arrival in the angiosuite and lowest MAP during endovascular thrombectomy; aMAP_proc, area between baseline BP at arrival in the angiosuite and intraprocedural MAP; SBP, systolic blood pressure; ΔSBP_proc, difference between baseline BP at arrival in the angiosuite and lowest SBP during endovascular thrombectomy; aSBP_proc, area between baseline BP at arrival in the angiosuite and intraprocedural SBP.

Table VIII. Hemodynamic variables for different blood pressure baselines

	Admission	Procedural	p-value
Total patients	390	390	
Mean Baseline MAP, mmHg \pm SD	106 \pm 19	114 \pm 21	<0.001
Mean Baseline SBP, mmHg \pm SD	149 \pm 26	161 \pm 31	<0.001
Mean Δ SBP, mmHg \pm SD	37 \pm 34	48 \pm 34	<0.001
Mean Δ MAP, mmHg \pm SD	26 \pm 23	35 \pm 23	<0.001
SBP hypotensive area, mmHg*min	592 (118-1968)	1132 (371-2786)	<0.001
MAP hypotensive area, mmHg*min	409 (58-1431)	784 (276-2090)	<0.001

Table VIII: Comparison of hemodynamic variables using admission and pre-procedural blood pressure baseline. Δ MAP, difference between baseline and lowest MAP during endovascular thrombectomy; aMAP, area between baseline and intraprocedural MAP; SBP, systolic blood pressure; Δ SBP, difference between baseline and lowest SBP during endovascular thrombectomy; aSBP, area between baseline and intraprocedural SBP.

Table IX. Comparison of patients with and without 3-month follow-up

	Patients with 3-month follow-up	Patients without 3-month follow-up	p-value
Total patients	294	96	
Age, mean \pm SD	72 \pm 14	70 \pm 15	0.310
Gender, F (%)	164 (56)	55 (57)	0.796
Race, n (%)			<0.001
White	264 (90)	62 (65)	
Black or African American	15 (5)	22 (23)	
Asian	4 (1)	0 (0)	
Other	11 (4)	9 (9)	
Medical History*, n (%)			
Hypertension	176 (60)	62 (65)	0.410
Coronary artery disease/myocardial infarction	53 (18)	20 (21)	0.541
Hyperlipidemia	109 (37)	34 (35)	0.770
Chronic heart failure	33 (11)	12 (13)	0.734
Atrial fibrillation	105 (36)	32 (33)	0.671
Diabetes mellitus	62 (21)	21 (22)	0.870
Past ischemic stroke	33 (11)	8 (8)	0.423
Current/past smoker	63 (21)	30 (31)	0.050
Occlusion on CTA*, n (%)			0.015
ICA/tICA	69 (23)	12 (13)	
ACA	6 (2)	1(1)	
M1 MCA	219 (74)	63 (66)	
M2 MCA	48 (16)	31 (32)	
Admission NIHSS, mean \pm SD	17 \pm 6	17 \pm 6	0.817
Admission MAP, mean \pm SD	105 \pm 18	107 \pm 19	0.369

ASPECTS, median (IQR)	8.5 (7-10)	9 (7-10)	0.433
Treated with tPA, n (%)	176 (60)	51 (53)	0.245
Mean onset to bolus time, minutes ± SD	142± 80	126± 50	0.364
Mean onset to admission, minutes ± SD	302 ± 288	297 ± 274	0.533
Mean onset to EVT, minutes ± SD	403 ± 338	389 ± 305	0.302
Mean onset to reperfusion, minutes ± SD	460 ± 262	471 ± 282	0.883
TICI, n (%)			0.112
0	39 (13)	21 (22)	
1	7 (2)	1 (1)	
2A	30 (10)	4 (4)	
2B	121 (41)	39 (41)	
3	93 (32)	27 (28)	

Table IX: Comparison of patients with and without 90-day follow-up. SD, standard deviation; F, female; CTA, computed tomography angiography; ICA, internal carotid artery; tICA, terminal internal carotid artery; ACA, anterior cerebral artery; MCA, middle cerebral artery; MAP, mean arterial pressure; EVT, endovascular thrombectomy.

Table X. Hemodynamic variables and associations by BP measurement type			
	A-line	BP Cuff	p-value
Total patients	390	236	154
Mean ΔSBP, mmHg±SD	37±34	41±34	30±32
Mean ΔMAP, mmHg±SD	26±23	29±23	20±23
SBP hypotensive area, mmHg*min	592 (118-1968)	575 (143-1932)	672 (56-2162)
MAP hypotensive area, mmHg*min	409 (58-1431)	413 (87-1505)	374 (34-1398)

Arterial Line

Likelihood of a shift towards worse outcome on discharge mRS

Variables	OR	95% CI	p Value	aOR	95% CI	p Value
ΔMAP, per 10-mmHg	1.24	1.12-1.38	<0.001	1.27	1.08-1.5	0.004
ΔSBP, per 10-mmHg	1.19	1.11-1.28	<0.001	1.16	1.04-1.29	0.006
aMAP, per 300-mmHg*min	1.16	1.09-1.23	<0.001	1.13	1.03-1.23	0.007
aSBP, per 300-mmHg*min	1.12	1.07-1.17	<0.001	1.07	1-1.14	0.048

Likelihood of a shift towards worse outcome on 90-day mRS

Variables	OR	95% CI	p Value	aOR	95% CI	p Value
ΔMAP, per 10-mmHg	1.28	1.14-1.43	<0.001	1.32	1.11-1.55	0.001

Δ SBP, per 10-mmHg	1.21	1.12-1.31	<0.001	1.19	1.07-1.33	0.002
aMAP, per 300-mmHg*min	1.18	1.10-1.26	<0.001	1.15	1.04-1.27	0.006
aSBP, per 300-mmHg*min	1.13	1.08-1.20	<0.001	1.1	1.02-1.18	0.019
Non-Invasive Blood Pressure Cuff						
Likelihood of a shift towards worse outcome on discharge mRS						
Variables	OR	95% CI	p Value	aOR	95% CI	p Value
Δ MAP, per 10-mmHg	1.16	1.03-1.32	0.018	1.12	0.92-1.37	0.273
Δ SBP, per 10-mmHg	1.14	1.04-1.25	0.005	1.09	0.95-1.26	0.199
aMAP, per 300-mmHg*min	1.07	1.01-1.13	0.022	1	0.99-1.35	0.075
aSBP, per 300-mmHg*min	1.05	1.01-1.10	0.009	1	0.99-1	0.091
Likelihood of a shift towards worse outcome on 90-day mRS						
Variables	OR	95% CI	p Value	aOR	95% CI	p Value
Δ MAP, per 10-mmHg	1.23	1.04-1.44	0.014	1.31	1-1.7	0.047
Δ SBP, per 10-mmHg	1.18	1.05-1.32	0.007	1.19	0.99-1.42	0.065
aMAP, per 300-mmHg*min	1.10	1.01-1.20	0.025	1.13	0.99-1.3	0.069
aSBP, per 300-mmHg*min	1.06	1.00-1.11	0.041	1.06	0.98-1.14	0.174

Table X. Hemodynamic variables and associations by BP measurement type. aOR, adjusted odds ratio (adjusted for age, ASPECTS, baseline blood pressure, admission NIHSS, TICI score, and time-to-reperfusion); OR, odds ratio; MAP, mean arterial pressure; mRS, modified Rankin scale; Δ MAP, difference between baseline and lowest MAP during endovascular thrombectomy; aMAP, area between baseline and intraprocedural MAP; SBP, systolic blood pressure; Δ SBP, difference between baseline and lowest SBP during endovascular thrombectomy; aSBP, area between baseline and intraprocedural SBP.