

Supplemental material to influence of time to achieve target systolic blood pressure on outcome after intracerebral hemorrhage: the blood pressure in acute stroke collaboration (BASC)

Wang et al.

Table S1 Design characteristics of eligible studies that provided individual patient data

Table S2 Baseline characteristics by the time in achieving target SBP and maintain until 24 hours

Table S3 Baseline characteristics by the time from symptom onset to achieve target SBP and maintain until 24 hours

Figure S1 Flow chart of included patients

SUPPLEMENTAL TABLE 1 Design characteristics of eligible studies that provided individual patient data

Study (N=16)	Design	Phase	Sites (N)	ICH (N=6221)	SBP inclusion (mmHg)	Time window (hours)	Intervention	Length of treatment (days)	BP readings in the first 24 hours
ICH only									
ATACH-II ¹⁰	PROBE	III	109	1000	>180	<3	Nicardipine iv vs placebo	1	15M, 30M,45M, and then hourly until 24 hours
ICH ADAPT ¹¹	PROBE	Iib	3	75	>150	<24	Target SBP <150 vs <180 mmHg	1	Continuously monitored
Gupta 2018 ¹²	PRO (not blind endpoint)	N/A	3	118	N/A	<72	Treat if MAP >=115 vs >=130	3	None
INTERACT1 ¹³	PROBE	Iic	44	404	150-220	<6	Target SBP <140 vs <180 mmHg	7	15M, 30M,45M, 60M and then every 6 hours until 24 hours
INTERACT2 ¹⁴	PROBE	III	170	2829	150-220	<6	Target SBP <140 vs <180 mmHg	1	15M, 30M,45M, 60M and then every 6 hours until 24 hours
Koch 2008 ¹⁵	PROBE	N/A	1	42	MAP >110	<8	Target MAP<110 vs 110-130	2	None
Mixed stroke									
CHHIPS ¹⁶	DBPC	III	6	25	>160	<36	Labetalol 50mg po/im or lisinopril po/sl 5mg vs placebo	14	None

Study (N=16)	Design	Phase	Sites (N)	ICH (N=6221)	SBP inclusion (mmHg)	Time window (hours)	Intervention	Length of treatment (days)	BP readings in the first 24 hours
CHASE ¹⁷	PROBE	N/A	26	242	150-220	<72	10-15% reduction in SBP vs <180	7	None
ENOS (GTN) ¹⁸	SBBE	III	168	629	140-220	<48	GTN 5mg td vs none	7	1 hour and 24 hours
GTN-1 ¹⁹	DBPC	IIa	1	4	N/A	<120	GTN 5mg td vs placebo	12	None
GTN-2 ²⁰	SBBE	IIb	1	5	100-230	<72	GTN 10mg vs 5mg td vs none	10	2 and 24 hours
SCAST ²¹	DBPC	III	146	274	>140	<30	Candesartan po vs placebo	7	None
VENUS ²²	DBPC	III	?	35	130-220	<6	Nimodipine 120mg po vs placebo	10	None
Pre-hospital									
FAST-MAG ²³	DBPC	III	45	387	N/A	<2	Magnesium * iv vs placebo	1	15M, 1, 4, 8, 12, 16, 20, and 24 hours
RIGHT-1 ²⁴	SBBE	IIa	1	6	>140	<4	GTN 5mg td vs none	7	2 and 24 hours
RIGHT-2 ²⁵	DBPC	III	54	145	>120	<4	GTN 5mg td vs sham	4	None

PROBE denotes prospective randomized open-label blinded-endpoint; DBPC, double-blind placebo-controlled; SBBE, single blind blinded endpoint, MAP, mean arterial pressure; SBP, systolic blood pressure; iv, intravenous; po, oral; sl, sublingual; td, transdermal; im: intramuscular; GTN, glyceryl trinitrate; ICH, intracerebral haemorrhage; mRS, modified Rankin Scale; NIHSS, National Institutes for Health Stroke Scale score

SUPPLEMENTAL TABLE 2. Baseline characteristics by the time in achieving target SBP and maintain until 24 hours

Characteristics	Time in achieving target SBP and maintain until 24 hours							p
	≤1 (n=105)	1-6 (n=357)	6-12 (n=233)	12-18 (n=320)	18-24 (n=765)	Other times (n=1632)	Not achieved (n=2349)	
Age (yr)	62.1 (12.6)	61.4 (12.5)	63.4 (12.5)	63.8 (12.8)	65.0 (13.5)	63.9 (12.7)	64.2 (13.2)	0.001
Sex (% female)	44/ 105 (41.9)	122/ 357 (34.2)	94/ 233 (40.3)	127/ 320 (39.7)	277/ 765 (36.2)	640/1632 (39.2)	816/2349 (34.7)	0.04
Geographical region ¹								<0.001
America	20/ 105 (19.0)	64/ 357 (17.9)	52/ 233 (22.3)	31/ 320 (9.7)	68/ 765 (8.9)	314/ 1632 (19.2)	475/ 2349 (20.2)	
Asia	71/ 105 (67.6)	258/ 357 (72.3)	137/ 233 (58.8)	219/ 320 (68.4)	468/ 765 (61.2)	970/1632 (59.4)	1226/2349 (52.2)	
Europe	14/ 105 (13.3)	35/ 357 (9.8)	44/ 233 (18.9)	70/ 320 (21.9)	229/ 765 (29.9)	348/1632 (21.3)	648/2349 (27.6)	
SBP at randomization (mmHg)	164.2 (15.8)	177.5 (20.4)	175.5 (21.0)	173.6 (18.6)	174.7 (19.4)	175.6 (20.1)	180.9 (20.5)	<0.001
DBP at randomization (mmHg)	95.8 (13.3)	99.1 (13.3)	99.5 (13.4)	98.9 (16.7)	99.2 (15.2)	99.4 (15.6)	101.1 (16.3)	0.004
NIHSS score	9 (6-14)	10 (6-16)	10 (5-15)	11 (6-15)	11 (7-16)	11 (6-16)	12 (8-17)	<0.001
GCS score	15.0 (14.0 - 15.0)	15.0 (12.0 - 15.0)	15.0 (13.0 - 15.0)	14.0 (13.0 - 15.0)	14.0 (13.0 - 15.0)	14.0 (13.0 - 15.0)	15.0 (13.0 - 15.0)	0.26
History of hypertension	74/ 103 (71.8)	275/ 352 (78.1)	169/ 230 (73.5)	233/ 317 (73.5)	535/ 761 (70.3)	1216/1629 (74.6)	1696/2307 (73.5)	0.17
History of diabetes mellitus	18/ 104 (17.3)	44/ 354 (12.4)	33/ 227 (14.5)	35/ 315 (11.1)	91/ 756 (12.0)	207/1593 (13.0)	304/2281 (13.3)	0.66
History of stroke	19/ 105 (18.1)	42/ 354 (11.9)	41/ 231 (17.7)	59/ 320 (18.4)	124/ 759 (16.3)	310/1622 (19.1)	367/2294 (16.0)	0.027
History of ischemic heart disease	19/ 105 (18.1)	48/ 355 (13.5)	35/ 229 (15.3)	35/ 316 (11.1)	64/ 751 (8.5)	145/1585 (9.1)	194/2245 (8.6)	<0.001
Current use of antihypertensive drugs	49/ 104 (47.1)	167/ 355 (47.0)	105/ 232 (45.3)	137/ 318 (43.1)	347/ 758 (45.8)	685/1490 (46.0)	879/2030 (43.3)	0.63
Current use of antiplatelet drugs	3/ 61 (4.9)	12/ 181 (6.6)	17/ 124 (13.7)	17/ 236 (7.2)	63/ 546 (11.5)	114/1162 (9.8)	109/1122 (9.7)	0.15
Current use of anticoagulant drugs	0	3/ 181 (1.7)	5/ 124 (4.0)	7/ 235 (3.0)	26/ 546 (4.8)	31/1162 (2.7)	34/1119 (3.0)	0.16
Hematoma volume (mL)	10.3 (5.8 - 18.1)	10.9 (5.3 - 20.1)	9.9 (4.6 - 19.5)	10.0 (5.2 - 16.7)	9.9 (4.8 - 17.6)	11.1 (5.7 - 21.0)	10.4 (5.0 - 20.2)	0.03
Hematoma location								0.003

Lobar	9/ 86 (10.5)	28/ 304 (9.2)	26/ 201 (12.9)	29/ 261 (11.1)	77/ 537 (14.3)	175/1180 (14.8)	159/1276 (12.5)	
Basal ganglia/deep	77/ 86 (89.5)	261/ 304 (85.9)	172/ 201 (85.6)	221/ 261 (84.7)	434/ 537 (80.8)	926/1180 (78.5)	1030/1276 (80.7)	
Infratentorial/posterior fossa	0	15/ 304 (4.9)	3/ 201 (1.5)	11/ 261 (4.2)	26/ 537 (4.8)	79/1180 (6.7)	87/1276 (6.8)	
Intraventricular hemorrhage	25/ 97 (25.8)	97/ 339 (28.6)	54/ 222 (24.3)	73/ 303 (24.1)	196/ 700 (28.0)	438/1530 (28.6)	683/2091 (32.7)	0.004
Time from ICH onset to randomization (hr)	3.7 (2.8 - 4.3)	3.5 (2.6 - 4.3)	3.4 (2.5 - 4.3)	3.5 (2.6 - 4.5)	3.8 (2.8 - 5.0)	3.5 (2.5 - 4.7)	3.8 (2.4 - 5.9)	<0.001
DNAR	2/ 105 (1.9)	11/ 341 (3.2)	6/ 224 (2.7)	9/ 302 (3.0)	49/ 634 (7.7)	63/1362 (4.6)	102/1395 (7.3)	<0.001
Intubation	11/ 105 (10.5)	31/ 357 (8.7)	19/ 231 (8.2)	22/ 317 (6.9)	57/ 668 (8.5)	119/1422 (8.4)	116/1526 (7.6)	0.89
Neurosurgery	7/ 105 (6.7)	19/ 357 (5.3)	10/ 231 (4.3)	17/ 317 (5.4)	36/ 668 (5.4)	89/1422 (6.3)	82/1524 (5.4)	0.88

Data are numbers (%), mean (standard deviation), or median (IQR)

GCS denotes Glasgow coma scale; NIHSS National, Institute of Health Stroke Scale; SBP, systolic blood pressure; ICH, intracerebral hemorrhage; DNAR, do not attempt resuscitation order

¹ Geographical region denotes the country in which they were treated

SUPPLEMENTAL TABLE 3: Baseline characteristics by the time from symptom onset to achieve target SBP and maintain until 24 hours

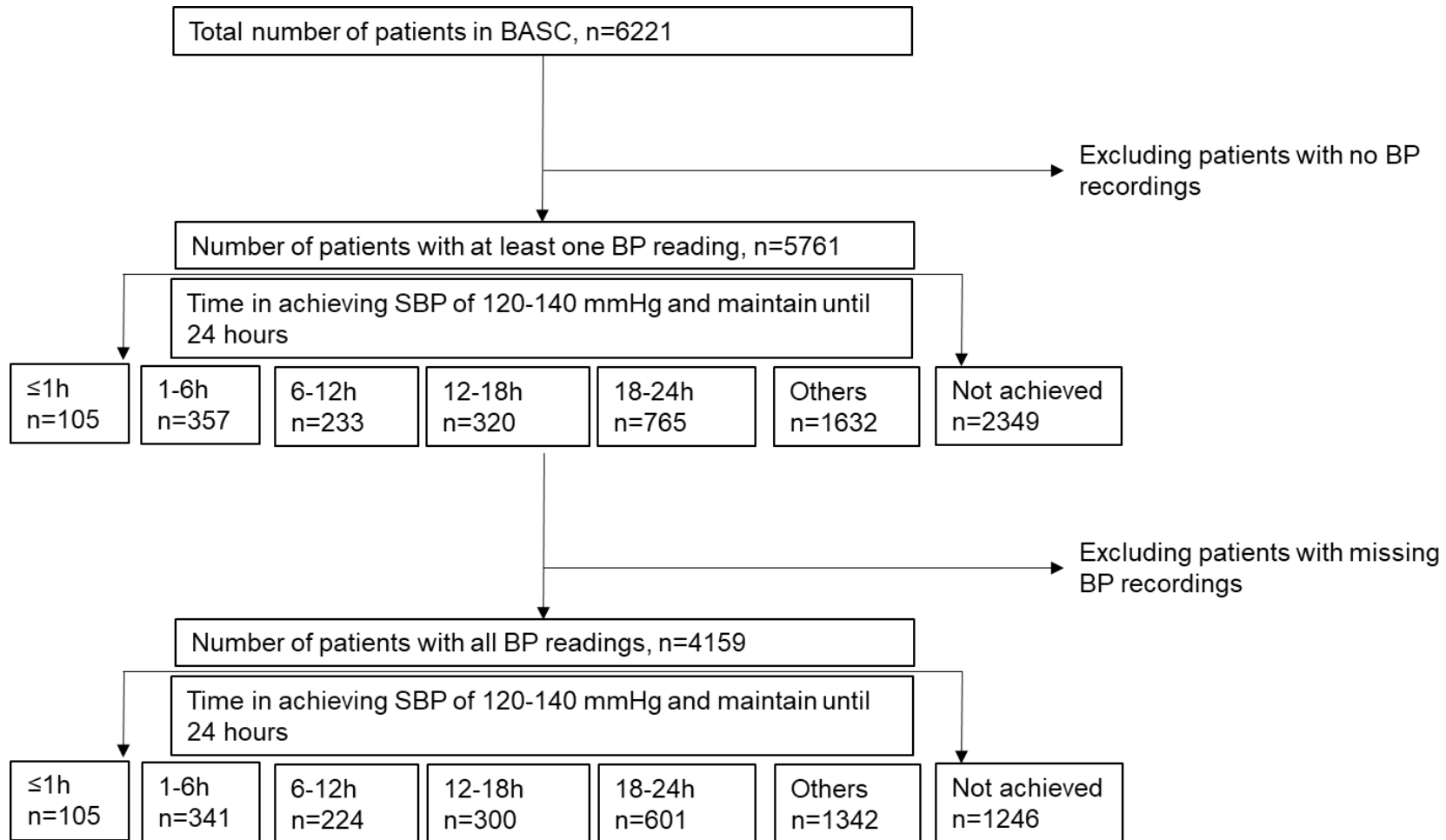
Characteristics	time from symptom onset to achieve target SBP, hours					p
	≤25.767	25.768 – 27.750	27.750-29.039	29.040-30.553	30.560-170	
Age (yr)	63.0 (12.7)	64.5 (13.6)	63.0 (13.0)	63.6 (13.0)	65.5 (12.6)	<.0001
Sex (% female)	434/1146 (37.9)	436/1149 (37.9)	400/1142 (35.0)	438/1146 (38.2)	394/1146 (34.4)	0.1577
Geographical region ¹						
America	246/ 1146 (21.5)	389/ 1149 (33.9)	154/ 1142 (13.5)	133/ 1146 (11.6)	100/ 1146 (8.7)	<.0001
Asia	696/ 1146 (60.7)	512/ 1149 (44.6)	749/ 1142 (65.6)	794/ 1146 (69.3)	598/ 1146 (52.2)	
Europe	204/1146 (17.8)	248/1149 (21.6)	239/1142 (20.9)	219/1146 (19.1)	448/1146 (39.1)	
SBP at randomization (mmHg)	174.1 (20.9)	178.5 (21.9)	180.2 (19.9)	179.2 (19.0)	174.9 (19.0)	<.0001
DBP at randomization (mmHg)	98.3 (15.9)	101.9 (16.4)	102.3 (15.4)	101.6 (15.1)	96.0 (14.9)	<.0001
NIHSS score	11.0 (6.0 - 16.0)	13.0 (8.0 - 18.0)	11.0 (6.0 - 16.0)	11.0 (6.0 - 16.0)	12.0 (7.6 - 16.2)	<.0001
GCS score	15.0 (13.0 - 15.0)	15.0 (13.0 - 15.0)	14.0 (13.0 - 15.0)	14.0 (13.0 - 15.0)	14.0 (12.0 - 15.0)	<.0001
History of hypertension	840/1133 (74.1)	869/1143 (76.0)	843/1135 (74.3)	837/1141 (73.4)	808/1145 (70.6)	0.0528
History of diabetes mellitus	151/1134 (13.3)	163/1138 (14.3)	142/1126 (12.6)	141/1130 (12.5)	135/1100 (12.3)	0.5922
History of stroke	172/1140 (15.1)	191/1133 (16.9)	210/1133 (18.5)	214/1141 (18.8)	175/1136 (15.4)	0.0516
History of ischemic heart disease	152/1138 (13.4)	118/1125 (10.5)	104/1119 (9.3)	79/1130 (7.0)	86/1072 (8.0)	<.0001
Current use of antihypertensive drugs	476/1059 (44.9)	380/ 830 (45.8)	512/1125 (45.5)	530/1138 (46.6)	471/1135 (41.5)	0.1351
Current use of antiplatelet drugs	54/ 642 (8.4)	76/ 623 (12.2)	80/ 859 (9.3)	80/ 916 (8.7)	45/ 392 (11.5)	0.0866
Current use of anticoagulant drugs	20/ 641 (3.1)	27/ 621 (4.3)	21/ 859 (2.4)	25/ 915 (2.7)	13/ 392 (3.3)	0.2943
Hematoma volume (mL)	10.6 (5.3 - 20.3)	11.7 (6.1 - 22.7)	10.6 (5.4 - 18.8)	10.6 (5.4 - 20.0)	8.7 (3.9 - 16.6)	<.0001

Hematoma location						<.0001
Lobar	101/ 894 (11.3)	82/ 692 (11.8)	121/ 923 (13.1)	134/ 903 (14.8)	65/ 433 (15.0)	
Basal ganglia/deep	766/ 894 (85.7)	578/ 692 (83.5)	754/ 923 (81.7)	708/ 903 (78.4)	315/ 433 (72.7)	
Infratentorial/posterior fossa	27/ 894 (3.0)	32/ 692 (4.6)	48/ 923 (5.2)	61/ 903 (6.8)	53/ 433 (12.2)	
Intraventricular hemorrhage	297/1091 (27.2)	355/1104 (32.2)	293/1075 (27.3)	324/1060 (30.6)	297/ 950 (31.3)	0.0269
Time from ICH onset to randomization (hr)	3.2 (2.1 - 4.2)	1.9 (1.0 - 2.6)	3.1 (2.7 - 3.8)	4.3 (3.8 - 4.9)	16.8 (5.8 - 29.5)	<.0001
DNAR	49/1034 (4.7)	80/ 808 (9.9)	51/1078 (4.7)	44/1093 (4.0)	18/ 350 (5.1)	<.0001
Intubation	93/1064 (8.7)	81/ 838 (9.7)	72/1108 (6.5)	85/1109 (7.7)	44/ 507 (8.7)	0.1044
Neurosurgery	56/1064 (5.3)	69/ 836 (8.3)	53/1108 (4.8)	63/1109 (5.7)	19/ 507 (3.7)	0.003

Data are numbers (%), mean (standard deviation), or median (IQR)

GCS denotes Glasgow coma scale; NIHSS National, Institute of Health Stroke Scale; SBP, systolic blood pressure; ICH, intracerebral hemorrhage; DNAR, do not attempt resuscitation order

¹ Geographical region denotes the country in which they were treated



Supplementary Figure 1 Flow chart of included patients