Figure S1. Study Flowchart

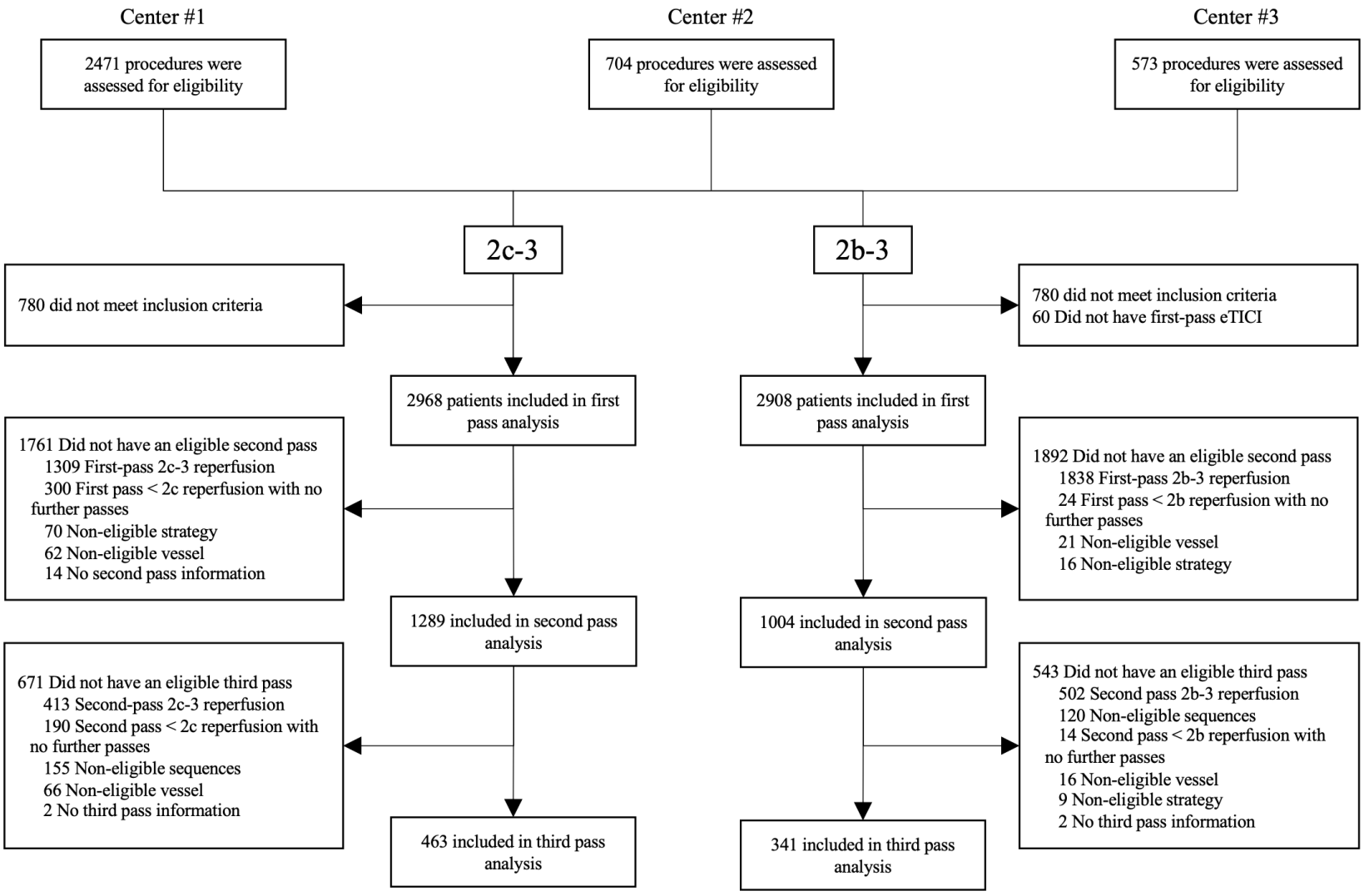
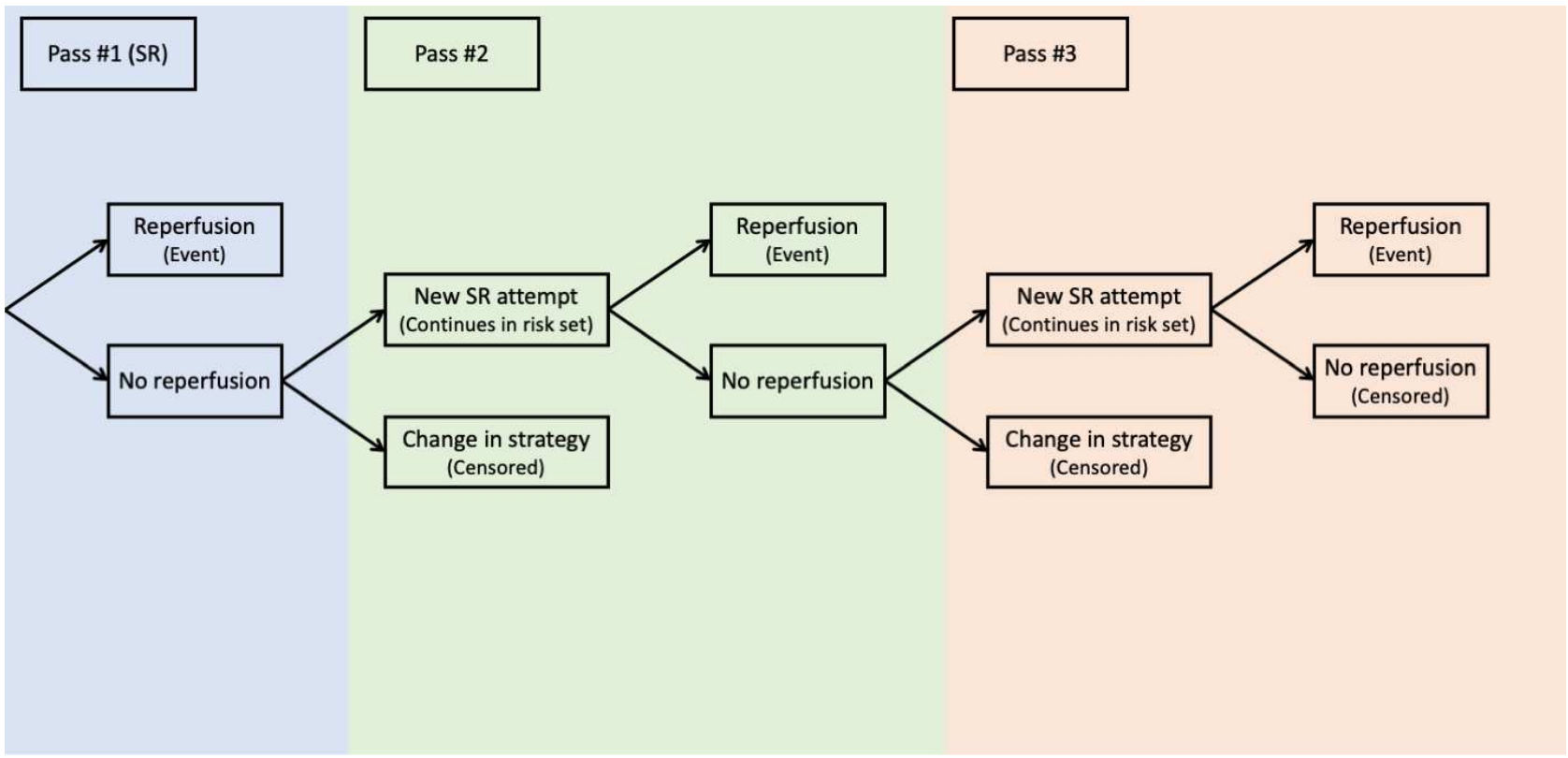
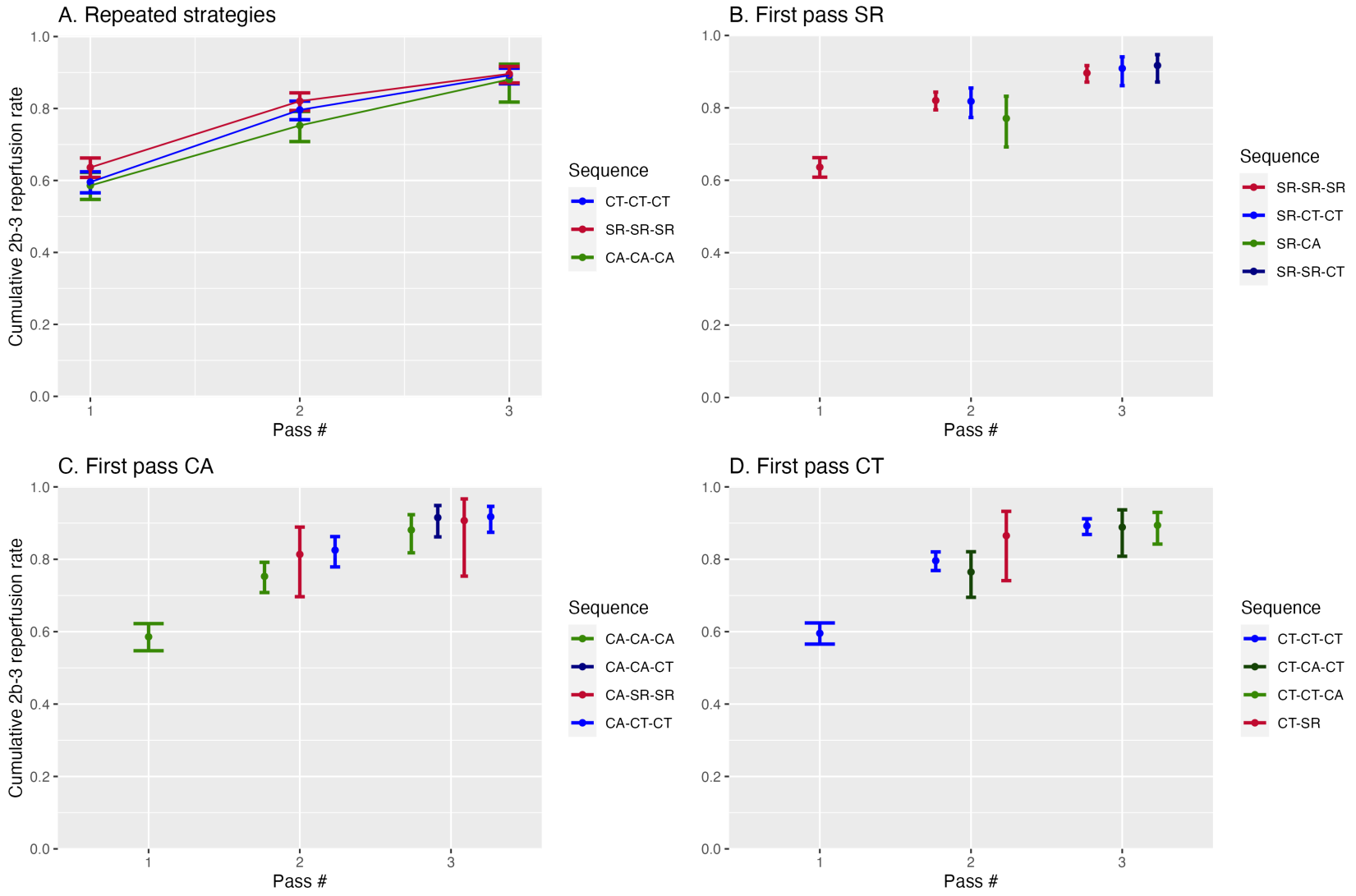


Figure S2. Flowchart for cumulative full reperfusion incidence estimates (using stent-retriever as an example for first line approach).



Legend: When estimating the cumulative incidence of reperfusion for sequences of techniques, i.e., SR/SR/SR, all participants with the first stent-retriever pass were considered regardless of strategies in further passes. If reperfusion was achieved, an event was considered. If reperfusion was not achieved leading to a subsequent change in strategy or no other attempt, the participant was censored. If reperfusion was not achieved but a new attempt with the same strategy was performed, the participant remained in the group at risk. The same principle applies to CA and CT, as well as when techniques changed during the procedural course. Because an individual can participate in more than one sequence (e.g., an individual with SR/SR/SR would be considered in SR/SR/SR and SR/SR/CA analysis for cumulative incidences of reperfusion), which would artificially narrow the standard errors for comparisons, the cumulative reperfusion rates over time were not directly compared across groups that begun with the same strategy. SR: Stent-retriever.

Figure S3. Cumulative incidences of eTICI 2b-3 according to reperfusion strategies



Cumulative incidences of 2b-3 reperfusion and 95% CIs: SR 89.6% (87.1% - 91.7%); CA 88.1% (81.8% - 92.3%); CT 89.2% (86.9% - 91.2%)

aHR (95%CI): 1.1 (1.0 – 1.3), p = 0.087 for SR vs. CA; 1.1 (1.0 – 1.2), p = 0.239 for CT vs. SR; 1.2 (1.0 - 1.4), p = 0.009 for CT vs. CA.

aHR: adjusted hazard ratio; SR: Stent-retriever; CA: Contact Aspiration; CT: Combined technique.

Figure S4. First-line strategies over time

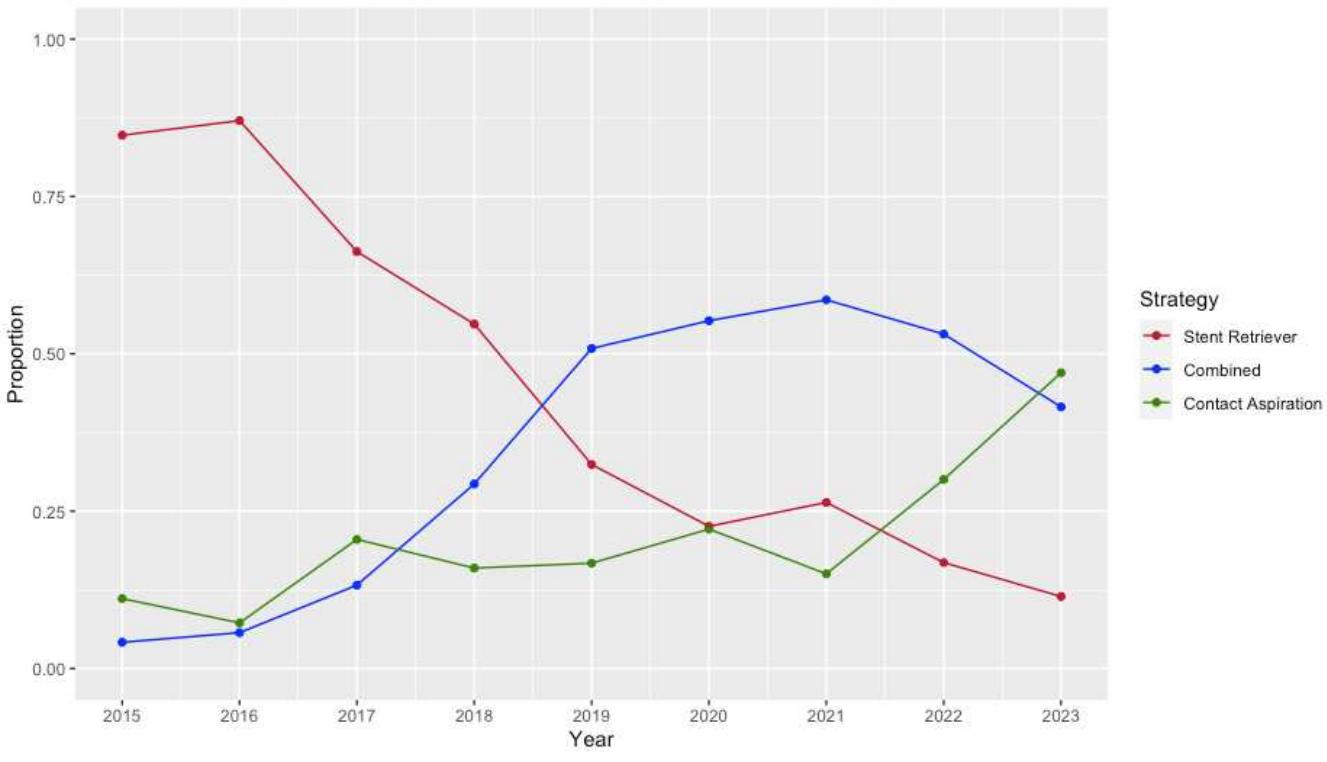


Table S1. Descriptive analysis

		First attempt strategy		
Characteristic	**Overall**, N = 2,968[1]	**Stent Retriever**, N = 1,220[1]	**Contact Aspiration**, N = 664[1]	**Combined**, N = 1,084[1]
Age	66 [56 - 77]	65 [55 - 76]	64 [53 - 74]	70 [59 - 80]
Male	1,535 (52%)	623 (51%)	380 (57%)	532 (49%)
Occlusion location				
M1	1,638 (55%)	665 (55%)	357 (54%)	616 (57%)
M2	617 (21%)	292 (24%)	97 (15%)	228 (21%)
ICA T	403 (14%)	176 (14%)	76 (11%)	151 (14%)
Basilar	231 (7.8%)	51 (4.2%)	114 (17%)	66 (6.1%)
ICA Petrous or Cavernous	79 (2.7%)	36 (3.0%)	20 (3.0%)	23 (2.1%)
ASPECTS	8 [7 - 10]	8 [7 - 10]	8 [7 - 10]	8 [7 - 10]
NIHSS	16 [11 - 21]	16 [12 - 21]	17 [11 - 22]	16 [11 - 21]
IV tPA	1,067 (36%)	436 (36%)	240 (37%)	391 (36%)
LKN-Puncture time (min)	383 [224 - 745]	392 [224 - 731]	372 [210 - 752]	390 [231 - 765]
Procedural time (min)	47 [30 - 76]	49 [32 - 75]	39 [25 - 62]	50 [32 - 82]
Balloon guide catheter use	1852 (66%)	969 (85%)	268 (46%)	615 (57%)
General Anesthesia	1,115 (38%)	371 (31%)	342 (52%)	402 (37%)
First pass eTICI				
0	56 (1.9%)	20 (1.6%)	17 (2.6%)	19 (1.8%)
1	14 (0.5%)	5 (0.4%)	3 (0.5%)	6 (0.6%)
2a	61 (2.1%)	25 (2.1%)	16 (2.4%)	20 (1.8%)
2b50	167 (5.6%)	74 (6.1%)	45 (6.8%)	48 (4.4%)
2b67	626 (21%)	252 (21%)	109 (16%)	265 (24%)
2c	371 (13%)	146 (12%)	92 (14%)	133 (12%)
3	1667 (56%)	694 (57%)	380 (57%)	593 (55%)

[1]Median [IQR]; n (%)

Table S2. Demographic characteristics, occlusion sites and reperfusion rates in the second pass according to technique and first pass strategy **for the eTICI2c-3 cohort.**

First Pass	**Stent Retriever**			**Contact Aspiration**			**Combined**		
Second pass	**Stent Retriever**, N = 370[1]	**Contact Aspiration**, N = 34[1]	**Combined**, N = 92[1]	**Stent Retriever**, N = 26[1]	**Contact Aspiration**, N = 160[1]	**Combined**, N = 126[1]	**Stent Retriever**, N = 23[1]	**Contact Aspiration**, N = 49[1]	**Combined**, N = 409[1]
Age	66 (56 – 77)	70 (60 – 79)	66 (57 – 80)	64 (57 – 68)	61 (48 – 72)	63 (54 – 72)	65 (52 – 74)	64 (57 – 74)	70 (60 – 79)
Male	189 (51%)	17 (50%)	45 (49%)	18 (69%)	90 (56%)	79 (63%)	15 (65%)	24 (49%)	201 (50%)
Occlusion location									
MCA M1	189 (51%)	12 (35%)	44 (48%)	13 (50%)	74 (46%)	58 (46%)	11 (48%)	21 (43%)	188 (46%)
MCA M2	110 (30%)	14 (41%)	32 (35%)	6 (23%)	38 (24%)	34 (27%)	9 (39%)	22 (45%)	145 (36%)
Intracranial ICA	51 (14%)	7 (21%)	15 (16%)	4 (15%)	32 (20%)	18 (14%)	2 (8.7%)	4 (8.2%)	57 (14%)
Basilar	17 (4.6%)	1 (2.9%)	0 (0%)	3 (12%)	16 (10%)	15 (12%)	1 (4.3%)	2 (4.1%)	18 (4.4%)
ASPECTS	8 (7 – 10)	8 (7 – 10)	8 (7 – 10)	9 (7 – 10)	8 (7 – 9)	8 (7 – 9)	8 (6 – 9)	8 (7 – 9)	8 (7 – 9)
NIHSS	17 (12 – 21)	18 (14 – 23)	16 (12 – 23)	19 (16 – 23)	18 (12 – 22)	17 (11 – 22)	16 (14 – 22)	17 (14 – 21)	17 (11 – 21)
LKW-Puncture time (min)	397 (227 – 766)	310 (190 – 959)	425 (223 – 777)	422 (285 – 551)	349 (203 – 696)	479 (227 – 861)	560 (203 – 1101)	356 (189 – 650)	377 (230 – 743)
Procedural time (min)	71 (52 – 107)	70 (47 – 116)	66 (52 – 99)	47 (35 – 84)	55 (40 – 74)	56 (40 – 81)	73 (54 – 110)	87 (72 – 111)	68 (49 – 104)
Balloon guide catheter	265 (78%)	29 (91%)	83 (90%)	10 (56%)	61 (46%)	72 (59%)	19 (83%)	30 (61%)	179 (44%)
IV tPA	132 (36%)	11 (32%)	25 (27%)	10 (38%)	63 (40%)	39 (31%)	7 (30%)	15 (31%)	149 (37%)
General Anesthesia	151 (41%)	6 (19%)	13 (14%)	16 (62%)	92 (58%)	57 (46%)	4 (17%)	8 (17%)	195 (48%)
eTICI 2c/3	129 (35%)	9 (26%)	34 (37%)	10 (38%)	45 (28%)	51 (40%)	11 (48%)	9 (18%)	115 (28%)

[1]Median (IQR); n (%)

Table S3. Descriptive analysis of second pass patients according to first and second pass techniques for the eTICI2b-3 cohort.

First Pass	**Stent Retriever**			**Contact Aspiration**			**Combined**		
Second Pass →	**Stent Retriever**, N = 259[1]	**Contact Aspiration**, N = 23[1]	**Combined**, N = 84[1]	**Stent Retriever**, N = 15[1]	**Contact Aspiration**, N = 125[1]	**Combined**, N = 101[1]	**Stent Retriever**, N = 17[1]	**Contact Aspiration**, N = 41[1]	**Combined**, N = 339[1]
Age	68 [58 - 77]	75 [62 - 81]	66 [57 - 80]	60 [55 - 65]	61 [49 - 73]	63 [54 - 72]	65 [55 - 68]	64 [60 - 74]	71 [62 - 81]
Male	131 (51%)	10 (43%)	40 (48%)	10 (67%)	75 (60%)	64 (63%)	11 (65%)	19 (46%)	162 (48%)
Occlusion location									
MCA M1	139 (54%)	8 (35%)	40 (49%)	8 (53%)	53 (42%)	53 (52%)	10 (59%)	19 (46%)	162 (48%)
MCA M2	69 (27%)	9 (39%)	27 (33%)	2 (13%)	29 (23%)	22 (22%)	5 (29%)	16 (39%)	114 (34%)
Intracranial ICA	41 (16%)	6 (26%)	14 (17%)	3 (20%)	29 (23%)	14 (14%)	2 (12%)	4 (9.8%)	48 (14%)
Basilar	9 (3.5%)	0 (0%)	0 (0%)	2 (13%)	14 (11%)	12 (12%)	0 (0%)	2 (4.9%)	15 (4.4%)
ASPECTS	8 [7 - 10]	8 [7 - 10]	8 [7 - 10]	9 [7 - 10]	9 [7 - 10]	8 [7 - 9]	8 [6 - 9]	8 [7 - 9]	8 [7 - 10]
NIHSS	17 [13 - 22]	18 [14 - 23]	16 [11 - 23]	22 [19 - 25]	17 [12 - 22]	18 [11 - 23]	16 [14 - 18]	18 [15 - 21]	17 [11 - 21]
LKW-Puncture time	395 [240 - 775]	529 [203 - 1080]	413 [223 - 730]	409 [343 - 518]	379 [214 - 788]	441 [222 - 795]	693 [329 - 1019]	356 [187 - 650]	364 [230 - 728]
Procedural time (min)	74 [50 - 108]	78 [50 - 126]	69 [52 - 99]	56 [37 - 76]	55 [42 - 75]	58 [40 - 84]	73 [55 - 117]	88 [74 - 113]	70 [49 - 106]
Balloon guide catheter	192 (82%)	20 (95%)	76 (90%)	6 (67%)	49 (49%)	57 (58%)	15 (88%)	24 (59%)	132 (39%)
IV tPA	90 (35%)	6 (26%)	24 (29%)	4 (27%)	47 (38%)	31 (31%)	5 (29%)	11 (27%)	125 (37%)
General Anesthesia	93 (36%)	4 (18%)	12 (14%)	9 (60%)	68 (55%)	44 (44%)	2 (12%)	5 (13%)	164 (49%)
eTICI 2b+	137 (53%)	7 (30%)	43 (51%)	11 (73%)	50 (40%)	60 (59%)	11 (65%)	16 (39%)	167 (49%)

[1]Median [IQR]; n (%)

Table S4. Sequences and reperfusion rates in the third pass according to techniques (**2c-3 cohort)**

Two first passes	**Stent Retriever, Stent Retriever**			**Contact Aspiration, Contact Aspiration**			**Combined, Combined**		
Third pass	**Combined**, N = 25[1]	**Stent Retriever**, N = 122[1]	**Contact Aspiration**, N = 19[1]	**Combined**, N = 42[1]	**Stent Retriever**, N = 12[1]	**Contact Aspiration**, N = 35[1]	**Combined**, N = 168[1]	**Stent Retriever**, N = 8[1]	**Contact Aspiration**, N = 32[1]
Age	72 [61 - 80]	68 [57 - 77]	70 [58 - 78]	57 [46 - 72]	59 [49 - 64]	61 [50 - 77]	72 [62 - 81]	76 [71 - 78]	75 [61 - 83]
Male	13 (52%)	57 (47%)	8 (42%)	28 (67%)	9 (75%)	18 (51%)	88 (53%)	3 (38%)	14 (44%)
Occlusion location									
MCA M1	16 (64%)	69 (57%)	9 (47%)	15 (36%)	8 (67%)	11 (31%)	73 (43%)	2 (25%)	18 (56%)
MCA M2	1 (4.0%)	31 (25%)	7 (37%)	9 (21%)	4 (33%)	12 (34%)	63 (38%)	5 (63%)	9 (28%)
Intracranial ICA	7 (28%)	14 (11%)	2 (11%)	10 (24%)	0 (0%)	9 (26%)	24 (14%)	1 (13%)	5 (16%)
Basilar	1 (4.0%)	8 (6.6%)	1 (5.3%)	8 (19%)	0 (0%)	3 (8.6%)	8 (4.8%)	0 (0%)	0 (0%)
ASPECTS	8 [7 - 9]	8 [7 - 10]	9 [8 - 10]	8 [7 - 9]	8 [8 - 9]	8 [6 - 9]	8 [7 - 10]	8 [8 - 8]	8 [7 - 10]
NIHSS	19 [14 - 22]	17 [13 - 21]	18 [13 - 21]	18 [13 - 22]	11 [9 - 17]	19 [16 - 26]	17 [11 - 21]	19 [14 - 21]	19 [14 - 23]
LKW-Puncture time (min)	681 [353 - 902]	307 [148 - 586]	462 [258 - 646]	385 [212 - 742]	257 [182 - 744]	300 [169 - 564]	322 [213 - 644]	627 [237 - 1062]	402 [225 - 854]
Procedural time (min)	83 [66 - 126]	107 [78 - 141]	92 [72 - 127]	62 [49 - 87]	69 [60 - 93]	54 [45 - 69]	83 [58 - 130]	63 [55 - 102]	89 [71 - 122]
Balloon guide catheter	22 (88%)	65 (63%)	16 (84%)	20 (49%)	3 (43%)	15 (52%)	53 (32%)	7 (88%)	23 (72%)
IV tPA	3 (12%)	49 (40%)	5 (26%)	14 (33%)	4 (33%)	16 (46%)	78 (47%)	2 (25%)	8 (25%)
General Anesthesia	5 (20%)	66 (55%)	3 (16%)	22 (55%)	10 (83%)	18 (51%)	104 (62%)	1 (13%)	10 (31%)
eTICI 2c/3	11 (44%)	25 (20%)	3 (16%)	19 (45%)	4 (33%)	11 (31%)	50 (30%)	3 (38%)	6 (19%)

[1]Median [IQR]; n (%)

Table S5. (Sequences and reperfusion rates in the third pass according to techniques **(2b+ cohort)**

Two first passes	**Stent Retriever, Stent Retriever**			**Contact Aspiration, Contact Aspiration**			**Combined, Combined**		
Third pass	**Combined**, N = 18[1]	**Stent Retriever**, N = 75[1]	**Contact Aspiration**, N = 13[1]	**Combined**, N = 33[1]	**Stent Retriever**, N = 11[1]	**Contact Aspiration**, N = 25[1]	**Combined**, N = 139[1]	**Stent Retriever**, N = 5[1]	**Contact Aspiration**, N = 22[1]
Age	71 [60 - 80]	68 [57 - 75]	70 [56 - 74]	55 [47 - 73]	54 [49 - 60]	61 [48 - 74]	74 [64 - 82]	76 [73 - 84]	77 [61 - 84]
Male	11 (61%)	36 (48%)	5 (38%)	24 (73%)	8 (73%)	14 (56%)	70 (51%)	1 (20%)	11 (50%)
Occlusion location									
M1	9 (50%)	45 (60%)	6 (46%)	13 (39%)	8 (73%)	8 (32%)	76 (55%)	1 (20%)	13 (59%)
ICA T	7 (39%)	13 (17%)	1 (7.7%)	7 (21%)	1 (9.1%)	9 (36%)	31 (22%)	1 (20%)	5 (23%)
M2	2 (11%)	11 (15%)	6 (46%)	5 (15%)	2 (18%)	5 (20%)	22 (16%)	2 (40%)	4 (18%)
Basilar	0 (0%)	4 (5.3%)	0 (0%)	7 (21%)	0 (0%)	2 (8.0%)	9 (6.5%)	0 (0%)	0 (0%)
ICA Petrous or Cavernous	0 (0%)	2 (2.7%)	0 (0%)	1 (3.0%)	0 (0%)	1 (4.0%)	1 (0.7%)	1 (20%)	0 (0%)
ASPECTS	8 [7 - 9]	8 [6 - 10]	10 [7 - 10]	8 [7 - 9]	8 [8 - 10]	9 [6 - 10]	8 [7 - 10]	8 [8 - 8]	7 [7 - 10]
NIHSS	19 [14 - 22]	17 [13 - 22]	17 [10 - 20]	18 [12 - 22]	11 [9 - 18]	18 [15 - 21]	16 [11 - 21]	19 [18 - 21]	19 [14 - 21]
LKW-Puncture time (min)	646 [366 - 879]	380 [210 - 710]	542 [389 - 734]	559 [272 - 814]	268 [216 - 816]	456 [169 - 612]	326 [218 - 667]	827 [426 - 947]	492 [287 - 874]
Procedural time (min)	83 [59 - 134]	112 [94 - 144]	108 [91 - 127]	61 [47 - 85]	67 [58 - 93]	60 [45 – 78]	84 [60 – 124]	55 [55 – 90]	88 [68 – 129]
Balloon guide catheter	15 (83%)	42 (69%)	12 (92%)	16 (50%)	4 (57%)	10 (50%)	34 (24%)	5 (100%)	15 (68%)
IV tPA	4 (22%)	28 (37%)	4 (31%)	10 (30%)	3 (27%)	10 (40%)	69 (50%)	1 (20%)	6 (27%)
General Anesthesia	2 (11%)	34 (46%)	1 (7.7%)	17 (55%)	8 (73%)	11 (44%)	91 (66%)	0 (0%)	7 (32%)
eTICI 2b-3	10 (56%)	32 (43%)	5 (38%)	23 (70%)	8 (73%)	12 (48%)	66 (47%)	4 (80%)	10 (45%)

[1]Median [IQR]; n (%)

Table S6. First pass strategies according to site

	Overall, N = 2968[1]	**Site 1**, N = 1989[1] 2015-2023	**Site 2**, N = 468[1] 2018-2023	**Site 3**, N = 511[1] 2019-2023	**p-value**[2]
First pass strategy					**<0.001**
Stent Retriever	1222 (41.2%)	929 (46.7%)	6 (1.3%)	287 (56.2%)	
Contact Aspiration	664 (22.4%)	392 (19.7%)	96 (20.5%)	176 (34.4%)	
Combined	1082 (36.5%)	668 (33.6%)	366 (78.2%)	48 (9.4%)	

[1]n (%)

[2]Pearson's Chi-squared test

Table S7. Aspiration catheter inner diameters for first second pass techniques

	Contact Aspiration[1]	**Combined**[1]	**p-value**[2]
First pass	N = 668	N = 1083	
Inner diameter (mm)	0.070 (0.068 – 0.071)	0.070 (0.068 – 0.071)	< 0.001
Second pass	N = 246	N = 632	
Inner diameter (mm)	0.070 (0.060 – 0.071)	0.070 (0.068 – 0.071)	0.588

[1]Median (IQR)

[2]Wilcoxon rank sum test

Table S8. Binary logistic regression model for mRS 0-2 according to first and second pass techniques

	Stent-Retriever		**Contact Aspiration**		**Combined Technique**	
Characteristic[1]	**OR (95% CI)**[2]	**p-value**	**OR (95% CI)**[2]	**p-value**	**OR (95% CI)**[2]	**p-value**
Second pass strategy						
Stent Retriever	—		0.9 (0.1, 4.2)	0.912	1.3 (0.3, 4.4)	0.690
Aspiration Catheter	0.6 (0.2, 1.7)	0.367	—		0.6 (0.2, 1.6)	0.353
Combined	0.9 (0.5, 1.8)	0.849	1.5 (0.7, 3.3)	0.315	—	

[1]Models adjusted for age, occlusion location, previous pass eTICI and center.

[2]OR = Odds Ratio, CI = Confidence Interval

Table S9. Modified Rankin Scale at day 90 according to change in technique following one failed pass

2c-3 Cohort															
First Pass	**Stent Retriever**					**Contact Aspiration**					**Combined**				
Second Pass	**SR**, N = 370[1]	**CA**, N = 34[1]	**CT**, N = 92[1]	**Missing**	**p-value**[2]	**SR**, N = 26[1]	**CA**, N = 160[1]	**CT**, N = 126[1]	**Missing**	**p-value**[2]	**SR**, N = 23[1]	**CA**, N = 49[1]	**CT**, N = 409[1]	**Missing**	**p-value**[3]
mRS	4 (2 – 7)	5 (3 – 7)	5 (2 – 6)	109	0.504	5 (3 – 6)	4 (3 – 7)	4 (2 – 7)	90	0.927	4 (2 – 5)	5 (4 – 7)	5 (3 – 7)	83	0.237
mRS (LOCF)	4 (1 – 5)	4 (2 – 6)	4 (1 – 5)	23	0.694	4 (2 – 5)	3 (2 – 5)	3 (2 – 5)	25	0.945	3 (1 – 4)	4 (2 – 6)	4 (2 – 6)	8	0.261
mRS missing	76 (21%)	11 (32%)	22 (24%)	0	0.249	8 (31%)	47 (29%)	35 (28%)	0	0.933	4 (17%)	8 (16%)	71 (17%)	0	>0.999
2b-3 Cohort															
First pass	**Stent Retriever**					**Contact Aspiration**					**Combined**				
Second Pass	**SR**, N = 259[1]	**CA**, N = 23[1]	**CT**, N = 84[1]	**Missing**	**p-value**[2]	**SR**, N = 15[1]	**CA**, N = 125[1]	**CT**, N = 101[1]	**Missing**	**p-value**[3]	**SR**, N = 17[1]	**CA**, N = 41[1]	**CT**, N = 339[1]	**Missing**	**p-value**[3]
mRS	5 (2 – 7)	6 (3 – 7)	4 (2 – 6)	83	0.384	4 (3 – 7)	4 (2 – 7)	5 (3 – 7)	71	0.733	4 (2 – 5)	5 (4 – 7)	5 (3 – 7)	70	0.239
mRS (LOCF)	4 (2 – 5)	4 (3 – 6)	4 (1 – 5)	20	0.425	4 (2 – 6)	4 (2 – 5)	4 (2 – 5)	20	0.901	3 (1 – 4)	4 (3 – 6)	4 (2 – 6)	8	0.234
mRS missing	54 (21%)	9 (39%)	20 (24%)	0	0.128	5 (33%)	37 (30%)	29 (29%)	0	0.923	3 (18%)	7 (17%)	60 (18%)	0	>0.999

[1]Median (IQR); n (%)

[2]Kruskal-Wallis rank sum test; Pearson's Chi-squared test

[3]Kruskal-Wallis rank sum test; Fisher's exact test

mRS: Modified Rankin Scale; LOCF: Last Observation Carried Forward

Table S10. Complications according to first and second pass strategies

	Stent Retriever				Contact Aspiration				Combined			
Second Pass →	**Stent Retriever** N = 370[1]	**Contact Aspiration** N = 34[1]	**Combined** N = 92[1]	**p-value**[2]	**Stent Retriever** N = 26[1]	**Contact Aspiration** N = 160[1]	**Combined** N = 126[1]	**p-value**[2]	**Stent Retriever** N = 23[1]	**Contact Aspiration** N = 49[1]	**Combined** N = 409[1]	**p-value**[2]
Subarachnoid hemorrhage	55 (15.7%)	3 (9.4%)	12 (13.2%)	0.632	1 (4.3%)	21 (14.1%)	21 (16.9%)	0.318	3 (13.0%)	6 (12.5%)	68 (16.7%)	0.827
Parenchymal hematoma				0.447				0.791				>0.999
Absent	339 (96.0%)	32 (100.0%)	87 (95.6%)		24 (100.0%)	138 (92.6%)	112 (90.3%)		22 (95.7%)	44 (91.7%)	372 (91.4%)	
PH-1	10 (2.8%)	0 (0.0%)	1 (1.1%)		0 (0.0%)	6 (4.0%)	7 (5.6%)		1 (4.3%)	3 (6.3%)	25 (6.1%)	
PH-2	4 (1.1%)	0 (0.0%)	3 (3.3%)		0 (0.0%)	5 (3.4%)	5 (4.0%)		0 (0.0%)	1 (2.1%)	10 (2.5%)	

[1]n (%)

[2]Pearson's Chi-squared test; Fisher's exact test