

SUPPLEMENTAL DATA

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Supplemental Methods

Inter-rater agreement

Inter-rater agreement for the evaluation of expansion markers was calculated using Gwet's AC₁ coefficient. This coefficient was chosen because it is more resistant to kappa paradoxes, which can occur when EMs have skewed distributions. Agreement estimates and confidence intervals were calculated using the *irrCAC* R package.

The Gwet's AC₁ coefficients were interpreted according to Landis and Koch guidelines: ≤ 0.20 , slight agreement; 0.21–0.40, fair agreement; 0.41–0.60, moderate agreement; 0.61–0.80, substantial agreement; and ≥ 0.81 , almost perfect agreement.

Predictive accuracy

Confidence intervals were calculated using the methods described in the *epiR::epitest* R library.¹ This includes the calculation of exact binomial confidence intervals.

A Fagan nomogram was generated to evaluate the shift in pre- and post-test probability for the EM with the highest positive likelihood ratio (source code: <https://github.com/achekroud/nomogrammer>) (Supplemental Figure 3).

Multivariable analyses

We explored the potential incremental value of any EM found to be associated with rHE after adjustment for established predictors of hematoma expansion. To this end, we first computed the empirical ROC curves and corresponding AUCs for the reduced and full models using the *pROC* package². Given potential limitations associated with the latter approach³, we also evaluated the risk reclassification provided by the addition of the EM to the reduced model. The continuous Net Reclassification Improvement (NRI) index was calculated using the *nricens* package, including NRIs for events and non-events^{4,5}. These metrics indicate the net proportion of events assigned to a higher risk (NRI_{events}) and the net proportion of nonevents assigned to a lower risk ($NRI_{\text{non-events}}$), regardless of the magnitude of risk change.⁶ The NRI combines the latter two metrics ($NRI_{\text{events}} + NRI_{\text{non-events}}$). The Integrated Discrimination Improvement is a related metric that assesses the difference in discrimination slopes between the reduced and full models.^{6,7} The latter metric was computed using the *Hmisc* package.⁸ Confidence intervals for NRI metrics and IDI were obtained using 1000 bootstrap replicates, as recommended.^{9,10}

Supplemental Results

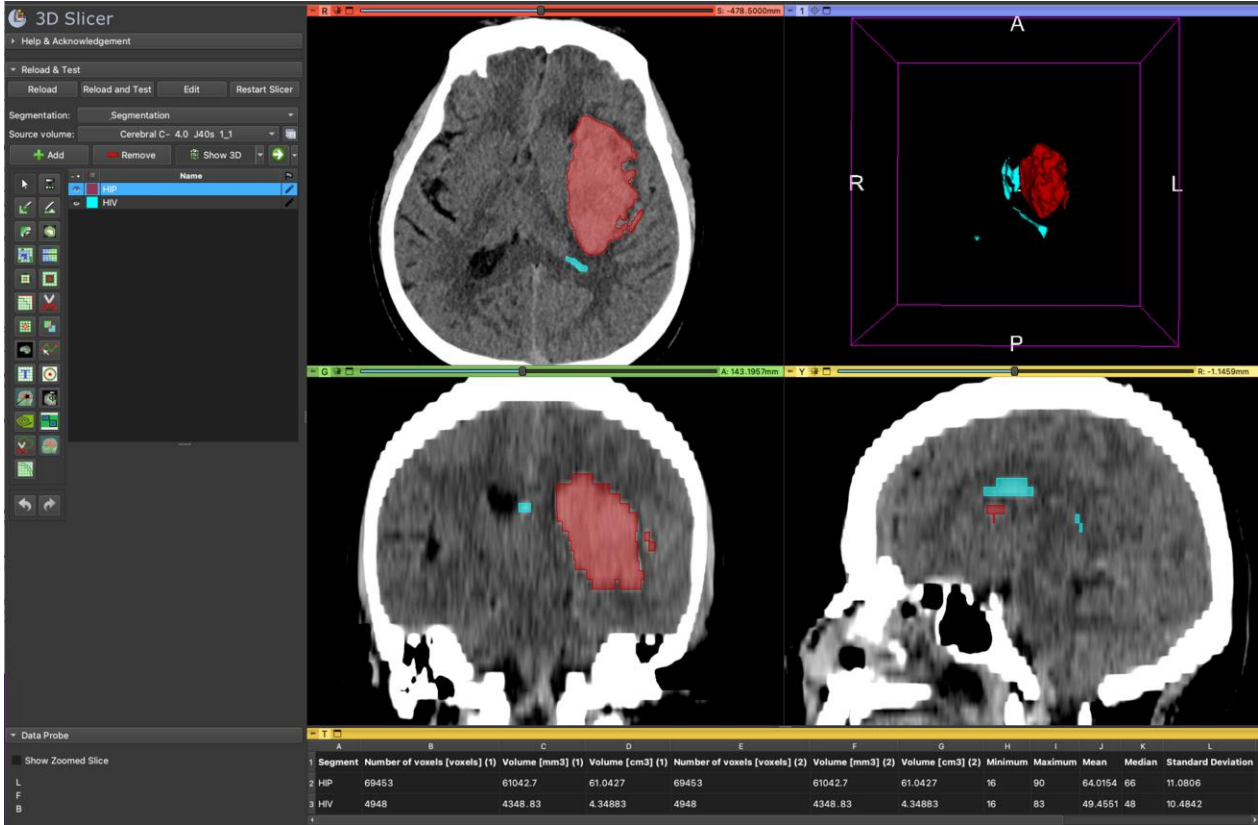
Interobserver agreement

Inter-observer agreement was substantial to almost perfect for most EMs except for Barras density (reader 1 vs 2) and Barras shape (reader 1 vs 3) for which estimates were in the moderate agreement range (**Supplemental Table S1**).

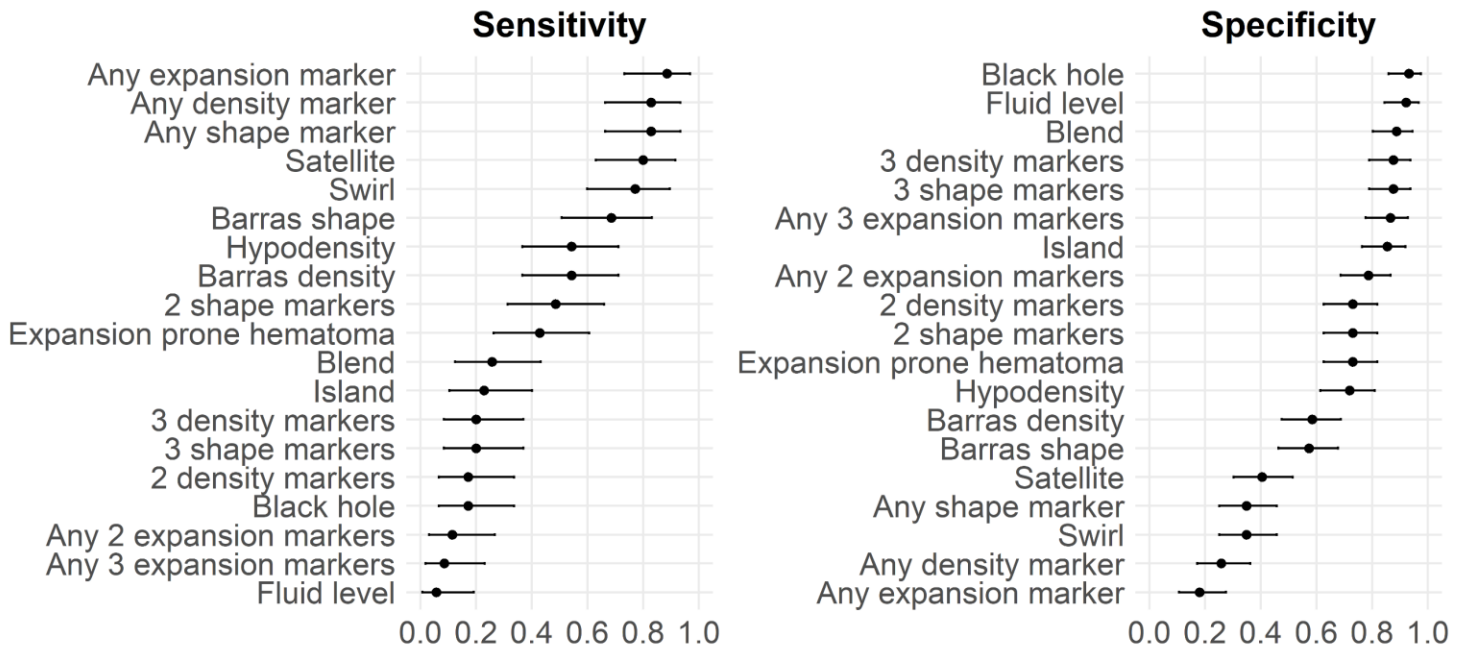
Predictive performance of NCCT-EMs

The discrimination was not significantly improved by the addition of the black hole marker (AUC 0.70 (95% CI: 0.61-0.80) for the reduced model vs 0.71 (95% CI: 0.61-0.80) for the full model (**Supplemental Figure 4**). The risk reclassification for patients with expansion vs no expansion is illustrated in **Supplemental Figure 5**. The overall NRI was 0.24 (95% CI: -0.05-0.55), the NRI_{events} 0.49 (95% CI: -0.71 – 0.22) and the $NRI_{\text{non-events}}$ 0.73 (95% CI 0.56-0.86). This indicates that the model was only able to show significant reclassification in patients without rHE. The Integrated Discrimination Improvement IDI was not significantly different from zero at 0.03 (95% CI: -0.003-0.07).

Supplemental Figures

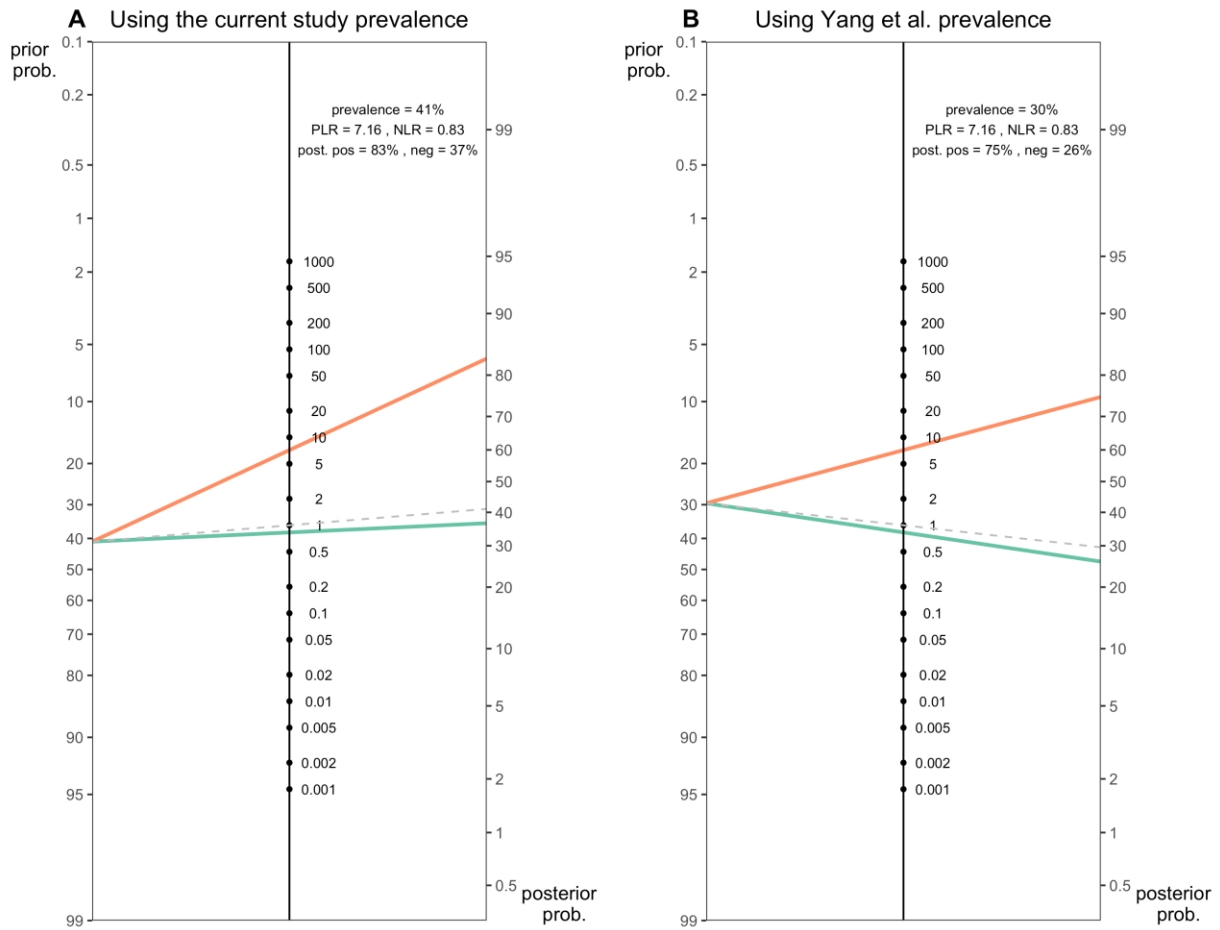


Supplemental Figure 1: Intracerebral and intraventricular hematoma segmentation using 3D Slicer

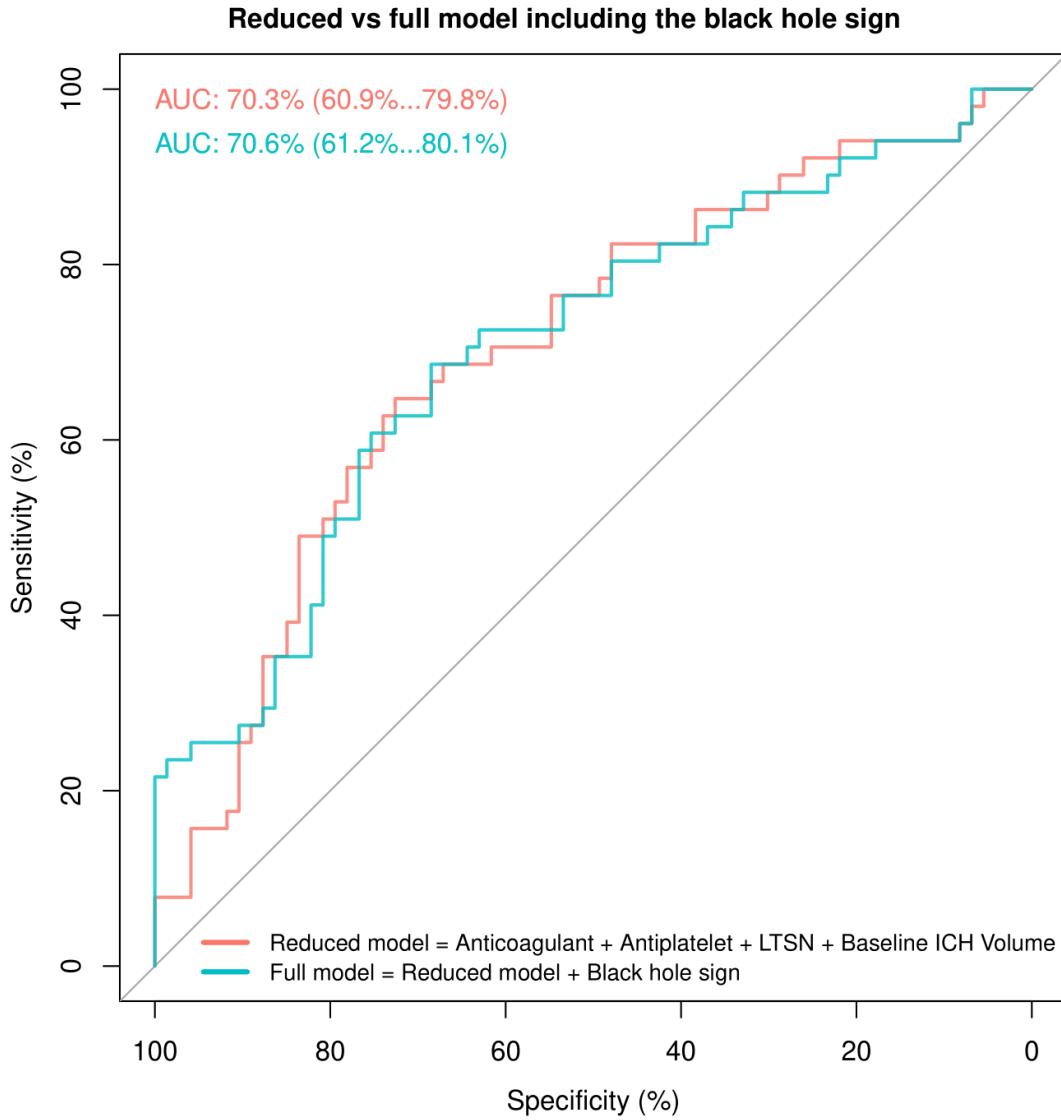


Supplemental Figure 2: Sensitivity and specificity of expansion markers for standard hematoma expansion (sHE) either isolated or in combination, ordered in decreasing values

Black hole sign rHE prediction

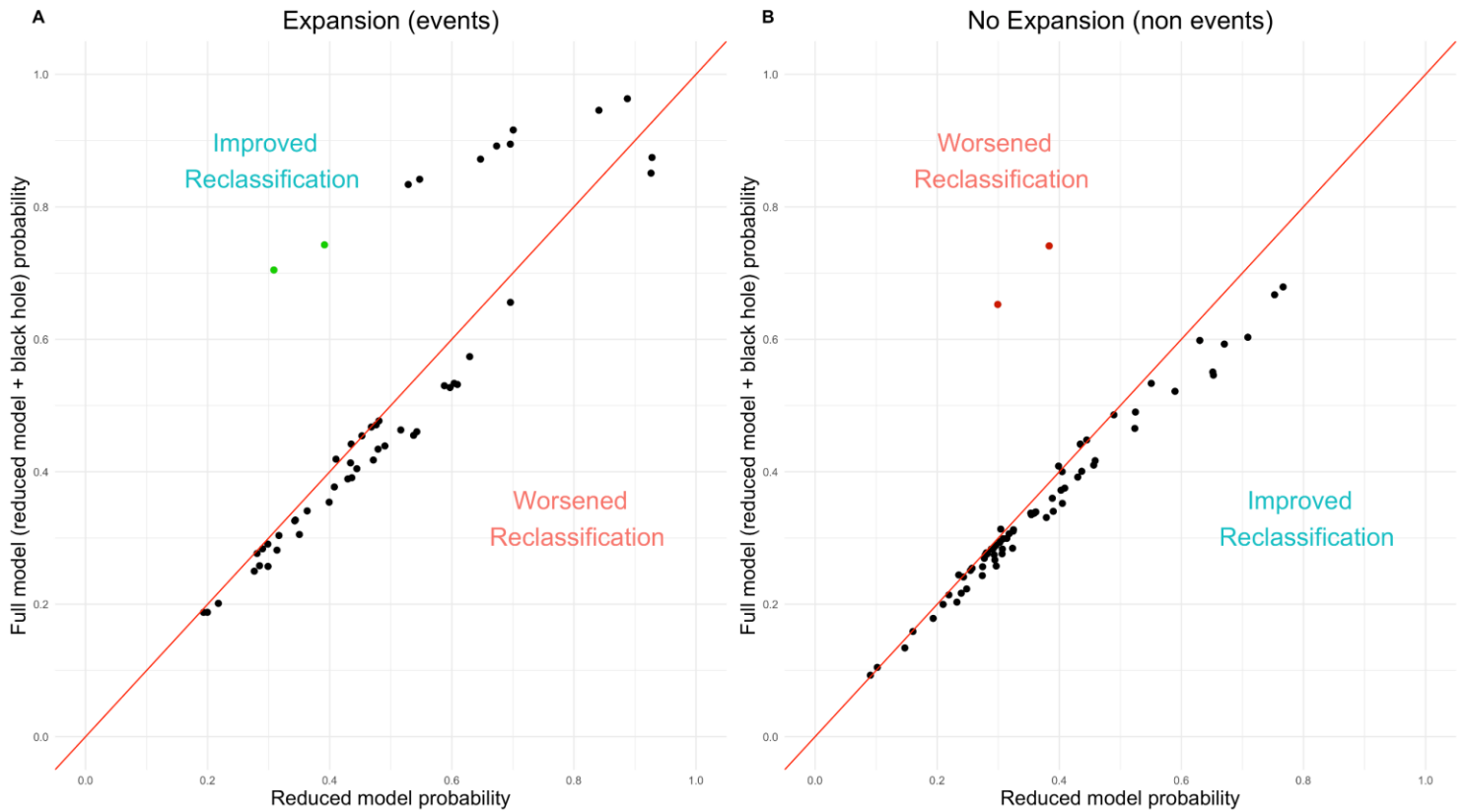


Supplemental Figure 3: Fagan nomogram illustrating the pre and post-test probabilities of revised hematoma expansion (rHE) if the black hole marker is positive (green-blue) or negative (red). The dashed line indicates a likelihood ratio of 1 (null line)



Supplemental Figure 4: ROC curves for the reduced model (anticoagulant, antiplatelet, baseline ICH volume and time from last seen normal to baseline imaging) and the full model, revealing overall minor changes in discrimination

Risk reclassification



Supplemental Figure 5: Continuous NRI scatter plots comparing the predicted probabilities from the reduced model (anticoagulant + antiplatelet + baseline ICH volume + time from last seen normal to baseline imaging, x axis) to the full model (reduced model + black hole, y axis). A shift above or below the identity line in red indicates an improved or worsened reclassification respectively for patients with expansion and the opposite for patients without expansion. Green dots in A indicate that two patients with rHE had appropriate risk reclassification from a probability of rHE < 50 % in the reduced model to > 50 % in the full model. Contrarily, the red dots in B indicate that two patients without rHE had inappropriate reclassification from a risk of rHE < 50 % in the reduced model to > 50 % in the full model.

Supplemental Table S1: Inter-rater agreement (Gwet's AC₁)

Marker	Reader 1 vs 2	Reader 1 vs 3
Barras density	0.57 (0.36-0.79)	0.78 (0.62-0.94)
Swirl	0.70 (0.52-0.88)	0.72 (0.54-0.89)
Hypodensity	0.71 (0.52-0.89)	0.74 (0.57-0.91)
Black hole	0.96 (0.91-1.0)	0.74 (0.58-0.90)
Blend	0.91 (0.82-1.0)	0.83 (0.70-0.95)
Fluid level	0.85 (0.72-0.96)	0.91 (0.83-0.99)
Barras shape	0.80 (0.65-0.96)	0.59 (0.38-0.79)
Island	1.0 (NA*)	0.94 (0.86-1.0)
Satellite	0.85 (0.72-0.98)	0.81 (0.67-0.95)
*Due to perfect agreement, a confidence interval could not be calculated		

Supplemental Table S2: Baseline characteristics of the study population, comparing patients with or without revised hematoma expansion

Characteristics	rHE n=51	No rHE n=73	p-value
Age (mean±SD)	74±12	69±14	0.04
Women (n, %)	24 (47)	30 (41)	0.63
Medical History			
Hypertension (n, %)	45 (88)	51 (70)	0.03
Dyslipidemia (n, %)	26 (51)	26 (36)	0.13
Diabetes (n, %)	14 (28)	12 (16)	0.21
Atrial fibrillation (n, %)	11 (22)	10 (14)	0.36
Coronary artery disease (n, %)	7 (14)	15 (21)	0.46
Previous ischemic stroke (n, %)	5 (10)	16 (22)	0.13
Previous ICH (n, %)	9 (18)	7 (10)	0.30
Major neurocognitive disorder (n, %)	11 (22)	14 (19)	0.92
Active smoking (n, %)	6 (12)	7 (10)	0.93
Antiplatelets (n, %)	15 (29)	19 (26)	0.83
Anticoagulant (n, %)	13 (25)	13 (18)	0.42
Current Stroke Event			
Systolic BP (mean±SD)	177±37	181±39	0.53
Diastolic BP (mean±SD)	89±22	95±20	0.11
Platelets (10 ⁹ /L, mean±SD)	192±69	243±91	< 0.01
Glasgow coma scale (median, IQR)	14 (12-15)	15 (13-15)	0.03
Initial Neuroimaging			
LTSN to initial head CT (minutes, median, IQR)	100 (75-181)	111 (80-350)	0.04
Hematoma location			
Supratentorial deep (n, %)	26 (51)	45 (62)	0.24
Supratentorial superficial (n, %)	21 (41)	20 (27)	0.11
Infratentorial (n, %)	4 (8)	8 (11)	0.76
ICH volume (mL, median, IQR)	32 (11-47)	12 (4-25)	< 0.01
IVH volume (mL, median, IQR)	0 (0-2)	0 (0-2)	0.60
Any IVH (n, %)	21 (41)	27 (37)	0.78
ICH + IVH volume (mL, median, IQR)	34 (14-49)	15 (5-29)	< 0.01
Follow-up Neuroimaging			
ICH volume (mL, median, IQR)	43 (14-66)	11 (4-27)	< 0.01
IVH volume (mL, median, IQR)	3 (0-6)	0 (0-1)	0.03
ICH + IVH volume (mL, median, IQR)	49 (22-75)	13 (5-30)	< 0.01
Initial to follow-up head CT (hours, median, IQR)	16 (14-32)	17 (12-27)	0.58
Abbreviations: BP - blood pressure, ICH - intracerebral hemorrhage, IVH - intraventricular hemorrhage, LTSN - last time seen normal, RHE - revised hematoma expansion.			

Supplemental Table S3: Predictive accuracy of expansion markers for revised hematoma expansion

	Prevalence	Sensitivity	Specificity	PPV	NPV	PLR	NLR	Accuracy	Diagnostic OR
Density markers									
Barras density	0.45 (0.37-0.54)	0.55 (0.40-0.69)	0.62 (0.50-0.73)	0.50 (0.36-0.64)	0.66 (0.54-0.77)	1.43 (0.98-2.10)	0.73 (0.51-1.04)	0.59 (0.50-0.68)	1.96 (0.95-4.04)
Swirl	0.69 (0.60-0.76)	0.76 (0.63-0.87)	0.37 (0.26-0.49)	0.46 (0.35-0.57)	0.69 (0.52-0.83)	1.21 (0.96-1.53)	0.64 (0.36-1.13)	0.53 (0.44-0.62)	1.91 (0.85-4.26)
Hypodensity	0.35 (0.28-0.44)	0.51 (0.37-0.65)	0.75 (0.64-0.85)	0.59 (0.43-0.74)	0.69 (0.57-0.79)	2.07 (1.28-3.35)	0.65 (0.48-0.89)	0.65 (0.56-0.74)	3.18 (1.48-6.83)
Black hole	0.10 (0.06-0.16)	0.20 (0.10-0.33)	0.97 (0.90-1.00)	0.83 (0.52-0.98)	0.63 (0.54-0.72)	7.16 (1.64-31.30)	0.83 (0.72-0.95)	0.65 (0.56-0.74)	8.66 (1.81-41.46)
Blend	0.15 (0.10-0.23)	0.24 (0.13-0.37)	0.90 (0.81-0.96)	0.63 (0.38-0.84)	0.63 (0.53-0.72)	2.45 (1.04-5.80)	0.85 (0.71-1.00)	0.63 (0.54-0.71)	2.90 (1.05-7.99)
Fluid level	0.07 (0.04-0.13)	0.04 (0.00-0.13)	0.90 (0.81-0.96)	0.22 (0.03-0.60)	0.57 (0.48-0.67)	0.41 (0.09-1.89)	1.06 (0.97-1.17)	0.55 (0.46-0.64)	0.38 (0.08-1.93)
Any density	0.77 (0.68-0.83)	0.82 (0.69-0.92)	0.27 (0.18-0.39)	0.44 (0.34-0.55)	0.69 (0.49-0.85)	1.13 (0.94-1.37)	0.64 (0.32-1.30)	0.50 (0.41-0.59)	1.76 (0.73-4.27)
Shape markers									
Barras shape	0.50 (0.41-0.59)	0.63 (0.48-0.76)	0.59 (0.47-0.70)	0.52 (0.39-0.65)	0.69 (0.56-0.80)	1.53 (1.08-2.16)	0.63 (0.42-0.95)	0.60 (0.51-0.69)	2.41 (1.16-5.03)
Island	0.17 (0.11-0.25)	0.20 (0.10-0.33)	0.85 (0.75-0.92)	0.48 (0.26-0.70)	0.60 (0.50-0.70)	1.30 (0.60-2.83)	0.95 (0.80-1.12)	0.58 (0.49-0.67)	1.37 (0.54-3.53)
Satellite	0.65 (0.57-0.73)	0.78 (0.65-0.89)	0.44 (0.32-0.56)	0.49 (0.38-0.61)	0.74 (0.59-0.86)	1.40 (1.09-1.79)	0.49 (0.27-0.88)	0.58 (0.49-0.67)	2.84 (1.26-6.39)
Any shape	0.70 (0.62-0.78)	0.82 (0.69-0.92)	0.38 (0.27-0.50)	0.48 (0.37-0.59)	0.76 (0.59-0.88)	1.34 (1.07-1.67)	0.46 (0.24-0.89)	0.56 (0.47-0.65)	2.90 (1.23-6.87)
Combinations									
At least 1 marker (any)	0.84 (0.76-0.89)	0.90 (0.79-0.97)	0.21 (0.12-0.32)	0.44 (0.34-0.54)	0.75 (0.51-0.91)	1.14 (0.98-1.32)	0.48 (0.19-1.23)	0.49 (0.40-0.58)	2.38 (0.81-7.03)
Expansion prone hematoma	0.31 (0.23-0.40)	0.43 (0.29-0.58)	0.77 (0.65-0.86)	0.56 (0.40-0.72)	0.66 (0.55-0.76)	1.85 (1.10-3.12)	0.74 (0.57-0.97)	0.63 (0.54-0.71)	2.50 (1.15-5.43)
2 shape markers	0.33 (0.25-0.42)	0.47 (0.33-0.62)	0.77 (0.65-0.86)	0.59 (0.42-0.74)	0.67 (0.56-0.77)	2.02 (1.22-3.36)	0.69 (0.52-0.92)	0.65 (0.55-0.73)	2.93 (1.35-6.34)
3 shape markers	0.15 (0.09-0.22)	0.16 (0.07-0.29)	0.86 (0.76-0.93)	0.44 (0.22-0.69)	0.59 (0.49-0.69)	1.15 (0.49-2.70)	0.98 (0.84-1.13)	0.57 (0.48-0.66)	1.17 (0.43-3.21)
2 density markers	0.24 (0.18-0.32)	0.16 (0.07-0.29)	0.70 (0.58-0.80)	0.27 (0.12-0.46)	0.54 (0.44-0.65)	0.52 (0.25-1.08)	1.21 (1.00-1.46)	0.48 (0.39-0.57)	0.43 (0.17-1.07)
3 density markers	0.15 (0.09-0.22)	0.18 (0.08-0.31)	0.88 (0.78-0.94)	0.50 (0.26-0.74)	0.60 (0.50-0.70)	1.43 (0.61-3.36)	0.94 (0.81-1.10)	0.59 (0.50-0.68)	1.52 (0.56-4.15)
4 density markers	0.13 (0.08-0.20)	0.22 (0.11-0.35)	0.93 (0.85-0.98)	0.69 (0.41-0.89)	0.63 (0.53-0.72)	3.15 (1.16-8.52)	0.84 (0.72-0.98)	0.64 (0.55-0.72)	3.74 (1.21-11.54)
2 markers (any)	0.19 (0.13-0.26)	0.10 (0.03-0.21)	0.75 (0.64-0.85)	0.22 (0.07-0.44)	0.54 (0.44-0.64)	0.40 (0.16-1.00)	1.20 (1.02-1.40)	0.48 (0.39-0.58)	0.33 (0.11-0.96)
3 markers (any)	0.12 (0.07-0.19)	0.08 (0.02-0.19)	0.85 (0.75-0.92)	0.27 (0.08-0.55)	0.57 (0.47-0.66)	0.52 (0.18-1.54)	1.09 (0.96-1.23)	0.53 (0.44-0.62)	0.48 (0.14-1.60)
4 markers (any)	0.19 (0.13-0.26)	0.22 (0.11-0.35)	0.84 (0.73-0.91)	0.48 (0.27-0.69)	0.60 (0.50-0.70)	1.31 (0.63-2.74)	0.94 (0.79-1.12)	0.58 (0.49-0.67)	1.40 (0.56-3.47)
5 markers (any)	0.07 (0.04-0.13)	0.06 (0.01-0.16)	0.92 (0.83-0.97)	0.33 (0.07-0.70)	0.58 (0.49-0.67)	0.72 (0.19-2.73)	1.03 (0.93-1.13)	0.56 (0.47-0.65)	0.70 (0.17-2.93)
6 markers (any)	0.10 (0.06-0.17)	0.18 (0.08-0.31)	0.95 (0.87-0.98)	0.69 (0.39-0.91)	0.62 (0.52-0.71)	3.22 (1.05-9.89)	0.87 (0.76-1.00)	0.63 (0.54-0.71)	3.70 (1.07-12.76)
*PPV=positive predictive value; NPV=Negative predictive value; PLR=positive likelihood ratio; NLR=negative likelihood ratio; OR=odds ratio Confidence intervals for prevalence were estimated using the Wilson method without continuity correction. Estimation of confidence intervals for the other metrics follow the description in the methods section of the manuscript.									

Supplemental Table S4: Baseline characteristics of the study population, comparing patients with or without standard hematoma expansion

Characteristics	sHE (n=35)	No sHE (n=89)	p-value
Age (mean±SD)	75±12	70±13	0.07
Women (n, %)	17 (49)	37 (42)	0.61
Medical History			
Hypertension (n, %)	32 (91)	64 (72)	0.04
Dyslipidemia (n, %)	18 (51)	34 (38)	0.25
Diabetes (n, %)	9 (26)	17 (19)	0.57
Atrial fibrillation (n, %)	7 (20)	14 (16)	0.76
Coronary artery disease (n, %)	5 (14)	17 (19)	0.71
Previous ischemic stroke (n, %)	3 (9)	18 (20)	0.18
Previous ICH (n, %)	6 (17)	10 (11)	0.38
Major neurocognitive disorder (n, %)	10 (29)	15 (17)	0.22
Active smoking (n, %)	5 (14)	8 (9)	0.51
Antiplatelets (n, %)	11 (31)	23 (26)	0.69
Anticoagulant (n, %)	9 (26)	17 (19)	0.57
Current Stroke Event			
Systolic BP (mean±SD)	181±34	179±40	0.73
Diastolic BP (mean±SD)	91±20	93±22	0.58
Platelets (10 ⁹ /L, mean±SD)	194±60	233±92	0.01
Glasgow coma scale (median, IQR)	14 (12-15)	15 (13-15)	0.82
Initial Neuroimaging			
LTSN to initial head CT (minutes, median, IQR)	100 (74-187)	110 (81-348)	< 0.01
Hematoma location			
Supratentorial deep (n, %)	17 (49)	54 (61)	0.22
Supratentorial superficial (n, %)	15 (43)	26 (29)	0.15
Infratentorial (n, %)	3 (9)	9 (10)	1
ICH volume (mL, median, IQR)	33 (14-46)	12 (5-28)	0.04
IVH volume (mL, median, IQR)	0 (0-2)	0 (0-2)	0.88
Any IVH (n, %)	14 (40)	34 (38)	1.00
ICH + IVH volume (mL, median, IQR)	36 (14-47)	16 (6-34)	0.08
Abbreviations: BP: blood pressure, ICH: intracerebral hemorrhage, IVH: intraventricular hemorrhage, LTSN: last time seen normal.			

Supplemental Table S5: Predictive accuracy of expansion markers for standard hematoma expansion

	Prevalence	Sensitivity	Specificity	PPV	NPV	PLR	NLR	Accuracy	Diagnostic OR
Density markers									
Barras density	0.45 (0.37-0.54)	0.54 (0.37-0.71)	0.58 (0.47-0.69)	0.34 (0.22-0.48)	0.76 (0.65-0.86)	1.31 (0.88-1.93)	0.78 (0.52-1.17)	0.57 (0.48-0.66)	1.67 (0.76-3.67)
Swirl	0.69 (0.60-0.76)	0.77 (0.60-0.90)	0.35 (0.25-0.46)	0.32 (0.22-0.43)	0.79 (0.64-0.91)	1.18 (0.94-1.50)	0.66 (0.34-1.28)	0.47 (0.38-0.56)	1.80 (0.73-4.44)
Hypodensity	0.35 (0.28-0.44)	0.54 (0.37-0.71)	0.72 (0.61-0.81)	0.43 (0.28-0.59)	0.80 (0.70-0.88)	1.93 (1.23-3.03)	0.64 (0.43-0.93)	0.67 (0.58-0.75)	3.04 (1.35-6.83)
Black hole	0.10 (0.06-0.16)	0.17 (0.07-0.34)	0.93 (0.86-0.97)	0.50 (0.21-0.79)	0.74 (0.65-0.82)	2.54 (0.88-7.35)	0.89 (0.76-1.04)	0.72 (0.63-0.79)	2.86 (0.86-9.58)
Blend	0.15 (0.10-0.23)	0.26 (0.12-0.43)	0.89 (0.80-0.94)	0.47 (0.24-0.71)	0.75 (0.66-0.83)	2.29 (1.02-5.15)	0.84 (0.68-1.03)	0.71 (0.62-0.79)	2.73 (1.00-7.46)
Fluid level	0.07 (0.04-0.13)	0.06 (0.01-0.19)	0.92 (0.84-0.97)	0.22 (0.03-0.60)	0.71 (0.62-0.79)	0.73 (0.16-3.33)	1.02 (0.92-1.13)	0.68 (0.59-0.76)	0.71 (0.14-3.60)
Any density	0.77 (0.68-0.83)	0.83 (0.66-0.93)	0.26 (0.17-0.36)	0.31 (0.21-0.41)	0.79 (0.60-0.92)	1.12 (0.92-1.36)	0.66 (0.30-1.49)	0.42 (0.33-0.51)	1.68 (0.62-4.57)
Shape markers									
Barras shape	0.50 (0.41-0.59)	0.69 (0.51-0.83)	0.57 (0.46-0.68)	0.39 (0.27-0.52)	0.82 (0.70-0.91)	1.61 (1.16-2.23)	0.55 (0.33-0.92)	0.60 (0.51-0.69)	2.93 (1.28-6.70)
Island	0.17 (0.11-0.25)	0.23 (0.10-0.40)	0.85 (0.76-0.92)	0.38 (0.18-0.62)	0.74 (0.64-0.82)	1.56 (0.71-3.45)	0.90 (0.74-1.10)	0.68 (0.59-0.76)	1.73 (0.65-4.63)
Satellite	0.65 (0.57-0.73)	0.80 (0.63-0.92)	0.40 (0.30-0.51)	0.35 (0.24-0.46)	0.84 (0.69-0.93)	1.34 (1.06-1.70)	0.49 (0.24-1.00)	0.52 (0.42-0.61)	2.72 (1.07-6.89)
Any shape	0.70 (0.62-0.78)	0.83 (0.66-0.93)	0.35 (0.25-0.46)	0.33 (0.24-0.44)	0.84 (0.68-0.94)	1.27 (1.03-1.57)	0.49 (0.23-1.08)	0.48 (0.39-0.58)	2.58 (0.97-6.89)
Combinations									
1 marker (any)	0.84 (0.76-0.89)	0.89 (0.73-0.97)	0.18 (0.11-0.28)	0.30 (0.21-0.40)	0.80 (0.56-0.94)	1.08 (0.93-1.26)	0.64 (0.23-1.77)	0.38 (0.29-0.47)	1.70 (0.53-5.49)
Expansion prone hematoma	0.31 (0.24-0.40)	0.43 (0.26-0.61)	0.73 (0.63-0.82)	0.38 (0.23-0.55)	0.76 (0.66-0.85)	1.59 (0.95-2.65)	0.78 (0.57-1.07)	0.65 (0.55-0.73)	2.03 (0.90-4.60)
2 shape markers	0.33 (0.25-0.42)	0.49 (0.31-0.66)	0.73 (0.63-0.82)	0.41 (0.26-0.58)	0.78 (0.68-0.87)	1.80 (1.11-2.92)	0.70 (0.50-1.00)	0.66 (0.57-0.74)	2.56 (1.14-5.76)
3 shape markers	0.15 (0.09-0.22)	0.20 (0.08-0.37)	0.88 (0.79-0.94)	0.39 (0.17-0.64)	0.74 (0.64-0.82)	1.62 (0.68-3.84)	0.91 (0.76-1.10)	0.69 (0.60-0.77)	1.77 (0.63-5.02)
2 density markers	0.24 (0.18-0.32)	0.17 (0.07-0.34)	0.73 (0.63-0.82)	0.20 (0.08-0.39)	0.69 (0.59-0.78)	0.64 (0.28-1.42)	1.13 (0.93-1.38)	0.57 (0.48-0.66)	0.56 (0.21-1.52)
3 density markers	0.15 (0.09-0.22)	0.20 (0.08-0.37)	0.88 (0.79-0.94)	0.39 (0.17-0.64)	0.74 (0.64-0.82)	1.62 (0.68-3.84)	0.91 (0.76-1.10)	0.69 (0.60-0.77)	1.77 (0.63-5.02)
4 density markers	0.13 (0.08-0.20)	0.20 (0.08-0.37)	0.90 (0.82-0.95)	0.44 (0.20-0.70)	0.74 (0.65-0.82)	1.98 (0.80-4.90)	0.89 (0.74-1.07)	0.70 (0.61-0.78)	2.22 (0.76-6.53)
2 markers (any)	0.19 (0.13-0.26)	0.11 (0.03-0.27)	0.79 (0.69-0.87)	0.17 (0.05-0.39)	0.69 (0.59-0.78)	0.54 (0.20-1.46)	1.13 (0.96-1.32)	0.60 (0.50-0.68)	0.48 (0.15-1.51)
3 markers (any)	0.12 (0.07-0.19)	0.09 (0.02-0.23)	0.87 (0.78-0.93)	0.20 (0.04-0.48)	0.71 (0.61-0.79)	0.64 (0.19-2.12)	1.06 (0.93-1.20)	0.65 (0.55-0.73)	0.60 (0.16-2.28)
4 markers (any)	0.19 (0.13-0.26)	0.20 (0.08-0.37)	0.82 (0.72-0.89)	0.30 (0.13-0.53)	0.72 (0.62-0.81)	1.11 (0.50-2.47)	0.98 (0.80-1.18)	0.65 (0.55-0.73)	1.14 (0.42-3.07)
5 markers (any)	0.07 (0.04-0.13)	0.09 (0.02-0.23)	0.93 (0.86-0.97)	0.33 (0.07-0.70)	0.72 (0.63-0.80)	1.27 (0.34-4.81)	0.98 (0.87-1.10)	0.69 (0.60-0.77)	1.30 (0.31-5.50)
6 markers (any)	0.10 (0.06-0.17)	0.17 (0.07-0.34)	0.92 (0.84-0.97)	0.46 (0.19-0.75)	0.74 (0.65-0.82)	2.18 (0.79-6.03)	0.90 (0.76-1.06)	0.71 (0.62-0.79)	2.42 (0.75-7.81)
PPV=positive predictive value; NPV=Negative predictive value; PLR=positive likelihood ratio; NLR=negative likelihood ratio; OR=odds ratio Confidence intervals for prevalence were estimated using the Wilson method without continuity correction. Estimation of confidence intervals for the other metrics follow the description in the methods section of the manuscript.									

Supplemental Table S6: Association of expansion markers with standard hematoma expansion

Expansion marker	Unadjusted		Adjusted**	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Barras density	1.67 (0.76-3.70)	0.20	1.17 (0.45-3.00)	0.75
Black hole	2.86 (0.83-9.84)	0.09	1.97 (0.51-7.48)	0.31
Blend	2.73 (0.99-7.53)	0.049*	2.20 (0.63-7.63)	0.21
Fluid level	0.71 (0.10-3.12)	0.68	0.73 (0.10-3.40)	0.71
Hypodensity	3.04 (1.36-6.92)	0.007*	2.68 (0.96-7.63)	0.06
Swirl	1.80 (0.76-4.68)	0.20	1.35 (0.50-3.88)	0.56
Barras shape	2.93 (1.30-6.91)	0.01*	2.30 (0.90-6.09)	0.09
Island	1.73 (0.63-4.58)	0.27	1.28 (0.37-4.23)	0.69
Satellite	2.72 (1.12-7.36)	0.04*	1.98 (0.71-5.98)	0.21
Combined expansion markers				
Any shape marker	2.58 (1.02-7.49)	0.06	1.86 (0.63-6.10)	0.28
Any density marker	1.68 (0.65-4.95)	0.31	1.15 (0.38-3.77)	0.81
Shape marker count	1.67 (1.14-2.51)	0.01*	1.56 (0.94-2.62)	0.09
Density marker count	1.51 (1.16-1.99)	0.003*	1.39 (0.94-2.09)	0.10
Any expansion marker	1.70 (0.57-6.29)	0.38	1.09 (0.31-4.48)	0.90
Expansion marker count	1.31 (1.06-1.60)	0.005*	1.37 (1.03-1.86)	0.03*
Expansion prone hematoma	2.03 (0.89-4.61)	0.09	1.55 (0.50-4.72)	0.44
Abbreviations: CI = confidence interval; OR = odds ratio				
* indicates a p-value inferior to 0.05				
**Adjusted for antiplatelet use, anticoagulant use, baseline ICH volume and last-seen-normal to initial CT				
Standard hematoma expansion was defined as any of a ≥ 6 mL or $\geq 33\%$ increase in intracerebral hemorrhage volume				

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