

Supplementary Online Content

Kuramatsu JB, Gerner ST, Schellinger PD, et al. Anticoagulant reversal, blood pressure levels, and anticoagulant resumption in patients with anticoagulation-related intracerebral hemorrhage. JAMA. doi:10.1001/jama.2015.0846.

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This supplementary material has been provided by the authors to give readers additional information about their work.

eMethods.

Variables of interest

Evaluated indications for oral anticoagulation consisted of: (i) atrial fibrillation (A-fib) including idiopathic atrial flutter, nonvalvular, and valvular A-fib, (ii) mechanical heart valves, (iii) prior diagnosis of pulmonary embolism, or (iv) deep vein thrombosis¹. Examples of (v) other indications for OAC comprised: by-pass grafting, thrombus formation, structural cardiac disease, cerebral sinus thrombosis, arterial dissection, thrombophilia (i.e. Factor V-Leiden-mutation, etc.).

The investigated prior comorbidities consisted essentially of the CHADS₂ Score and HAS-BLED Score parameters. The CHADS₂ Score was scored as appropriate, 2 points given for prior history of cerebral ischemia, and one point each for other risk factor such as 75 years of age or older, congestive heart failure (based on objective evidence of cardiac dysfunction), hypertension² and, diabetes mellitus as defined^{3,4}. Parameters of the HAS-BLED Score were defined and scored accordingly. Renal dysfunction was defined as serum creatinine \geq 200 μ mol/L, liver dysfunction bilirubin > 2 times upper limit with transaminase elevation 3 times upper normal limit, medication history in regard to antiplatelet agents, and alcohol abuse were evaluated⁵. Parameters such as coronary artery disease was defined and scored on the basis of a history of myocardial infarction or prior coronary artery by-pass crafting, and dyslipidemia such as hypercholesterolemia and increased triglycerides scored as commonly diagnosed⁶.

We evaluated laboratory parameters at time of hospital admission and consecutively serial monitoring of coagulation parameters and blood counts within 72 hours were recorded from institutional laboratory databases. In referred patients initial laboratory values of transferring hospitals were strictly used for initial INR assessment. For INR-reversal analysis various time-points of serial INR monitoring were recorded at time of laboratory accessioning.

Evaluated in-hospital measures consisted of need for placement of external ventricular drains for occlusive hydrocephalus and its therapy with intraventricular lysis as previously defined^{7,8}. Treatment of increased ICP or perihemorrhagic edema was summated as osmotherapy (consisting of various agents, Mannitol most frequently applied) and was scored if elevated intracranial pressures were present and medication was given. Moreover, the need for mechanical ventilation, mechanical ventilation on arrival, and duration of ventilation was noted. Infectious complications, i.e. pneumonia and sepsis were scored and recorded as appropriate^{9,10}.

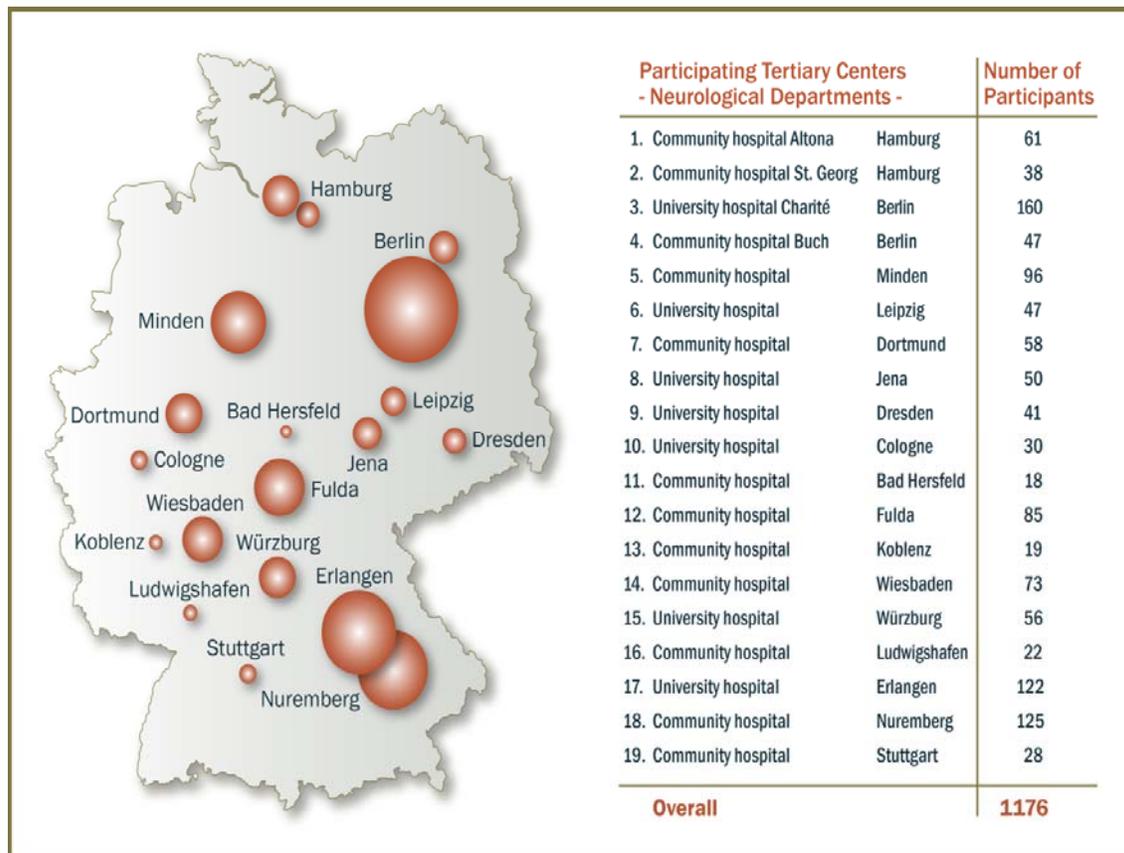
Statistical analyses

Statistical analysis was performed using the SPSS 20.0 software package (www.spss.com) and R2.12.0 (www.r-project.org). Distribution of data was calculated by Kolmogorov-Smirnov and Shapiro-Wilk tests. Data are presented as mean \pm SD (compared using the Student-T-test) or as median and IQR (compared using the Mann-Whitney U-test), as appropriate. Frequency distribution of categorized variables was tested by Pearson's χ^2 or Fisher's-exact tests. Statistical tests were two-sided and the significance level was set at $\alpha=0.05$ and consequently corrected for multiple comparisons by the Bonferroni method correcting for type 1 error accumulation before variables were entered into further analyses¹¹. Generally, unadjusted and consequently adjusted analyses were calculated and presented to expose possible selection bias. All variables included into adjusted analyses of outcomes, i.e. (i) hematoma enlargement, (ii) OAC resumption and (iii) functional outcome, were formally tested and multivariable models calculated by log-binomial regression analyses¹². Specific analyses for each outcome measure were carried out (see manuscript). For further analyses of hematoma enlargement we analyzed categorized frequency distributions of time-dependent INR thresholds (categorized by 0.10 intervals; INR range <1.20 to \geq 1.50) and time intervals (presented as 120 min intervals, time range 0 to \geq 360 min, starting at time of hospital admission until 1st INR-monitoring after reversal treatment confirmed corresponding INR thresholds) with hematoma enlargement. For analyses of systolic blood pressure we categorized blood pressure in 20 mm Hg intervals (range <120 to \geq 180 mm Hg) assessed (at 4h intervals) from time of hospital admission until 24h. These categorized frequency distributions of systolic blood pressure levels were evaluated for associations with hematoma enlargement dichotomized into <160 mm Hg *versus* \geq 160 mm Hg at each specific time point.

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eFigure 1. Participating centers.



Overview of all participating centers across Germany. Nationwide, 32 tertiary care referral centers (10 University hospitals and 22 University-affiliated community hospitals) were invited to participate and 19 centers (7 University hospitals and 12 University-affiliated large community hospitals) contributed data. The number of contributed participants is reflected by the proportional size of each circle. Germany's two largest cities (Berlin and Hamburg) were represented by two centers (ordered by number of participants). Invited tertiary care centers that did not participate in the study consisted of 3 University Hospitals and 10 University affiliated centers. Reasons for exclusion were: no response (n=4), no interest (n=3), no capacity to contribute data within requested time frame (n=6). In Germany there are ~60 existing tertiary care centers. Of these, we selected 32 centers for invitation according to current suggestions on clinical trial design in order to limit missing data¹³. Hence, selected centers have (i) participated in large cerebrovascular trials in recent years, (ii) Neurological Departments have dedicated teams of study nurses and fellows familiar in recruiting patients for stroke trials and (iii) the stroke and neurointensive care units are run by nationwide well-known stroke specialists. Overall, non-participating and non-invited centers were comparable to participating centers in terms of center setting and characteristics of treated patients according to German-wide stroke quality control database.

eTable 1. Characteristics of the entire cohort of OAC-ICH patients.

OAC-ICH	Overall (n=1,176)
Age† [yrs] (n=1176)	
mean (±SD)	74.1 (±9.2)
median (IQR)	75 (70-80)
Female sex* (n=1176)	486 (41.3%)
Prestroke mRS‡ (n=1142)	0 (0-2)
OAC indications (n=1176)	
Atrial fibrillation*	922 (78.4%)
Mechanical heart valve*	82 (7.0%)
Pulmonary embolism*	52 (4.4%)
Deep vein thrombosis*	46 (3.9%)
Other indications*	74 (6.3%)
Prior comorbidities	
Hypertension* (n=1176)	1002 (85.2%)
Diabetes mellitus* (n=1176)	330 (28.1%)
Dyslipidemia* (n=1176)	296 (25.2%)
Prior stroke* (n=1176)	326 (27.7%)
Coronary artery disease* (n=1176)	481 (40.9%)
Congestive heart failure* (n=1173)	150 (12.8%)
Abnormal kidney function* (n=1169)	288 (24.5%)
Abnormal liver function* (n=1171)	22 (1.9%)
Antiplatelet medication* (n=1170)	123 (10.5%)
CHADS₂ score‡ (n=922)	
mean (±SD)	2.4 (±1.2)
median (IQR)	2 (2-3)
High-Risk* (≥2)	713 (77.3%)
HAS-BLED score‡ (n=922)	
mean (±SD)	3.0 (±1.1)
median (IQR)	3 (2-4)
High-Risk* (≥3)	625 (67.8%)
Admission status	
Glasgow Coma Scale‡ (n=1176)	13 (8-15)
NIHSS‡ (n=1144)	13 (6-25)
ICH Score‡ (n=1176)	1 (0-3)
Initial imaging (n=1176)	
Deep ICH*	531 (45.1%)
Lobar ICH*	436 (37.1%)
Cerebellar ICH*	121 (10.3%)
Brainstem ICH*	50 (4.3%)
Primary IVH*	38 (3.2%)
ICH volume‡ [cm ³]	19.3 (6.9-52.8)
Intraventricular hemorrhage*	520 (44.2%)
Graeb Score‡ (n=520)	6 (3-9)
Initial coagulation parameters (n=1176)	
INR‡	2.77 (2.28-3.50)
PTT‡ [s]	42 (36-49)

In-hospital measures (n=1176)	
DNT/DNR orders after diagnosis*	172 (14.6%)
Mechanical ventilation*	456 (38.8%)
ICH-evacuation surgery*	160 (13.6%)
Pneumonia*	377 (32.1%)
Sepsis*	72 (6.1%)
Length of stay‡ [d]	10 (4-17)

Characteristics of the entire cohort of OAC-ICH patients including demographics, indications of OAC, prior comorbidities, initial imaging, and laboratory data as well as in-hospital measures. Scales, scores and abbreviations, with corresponding ranges: prestroke mRS: modified Rankin Scale prior to admission (range 0-5, no functional deficit to severe disability), CHADS2 score (range 0-6, low to high risk of thromboembolism), HAS-BLED score (range 0-9, low to high risk of bleeding complication under OAC), Glasgow Coma Scale (range 3-15, deep coma to alert), NIHSS: National Institutes of Health Stroke Scale (range 0-40 (42= maximum sum, in comatose ataxia is not scored), no deficit to severe neurological deficit), ICH Score: Intracerebral hemorrhage Score (range 0-6, low to high risk of mortality), Graeb Score: ventricular involvement (range 0-12, no intraventricular blood to tamponade of all ventricles); OAC: oral anticoagulation (coumadins), ICH: intracerebral hemorrhage, IVH: intraventricular hemorrhage, PCC: prothrombin-complex concentrates, FFP: fresh frozen plasma, INR: international normalized ratio, PTT: partial thromboplastin time, DNT/DNR: do not treat or resuscitate orders after initial diagnosis. Complete-case analysis for n=1,176; Left column: Number (n) given for patients with available data; * n (%); † mean (±SD); ‡ median (IQR; 25th-75th percentile).

eTable 2. Multivariable model for factors associated with hematoma enlargement.

Multivariable - parameters	Risk ratio (95% CI)	P Value (<0.05)
Onset to initial imaging [<130min], n=137/271 (50.6%) [≥130min], n=95/278 (34.2%)	2.284 (1.445-2.949)	<0.001
Diagnosis to treatment [≥80min], n=148/374 (39.6%) [<80min], n=123/371 (33.2%)	1.559 (1.142-2.130)	0.005
Deep ICH present, n=173/406 (42.6%) absent, n=134/447 (30.0%)	1.389 (1.012-1.905)	0.04
1st INR-monitoring after reversal reference increment 0.1	2.294 (1.282-4.098)	0.005
Systolic blood pressure at 4h reference increment 1 mmHg	1.007 (1.002-1.014)	0.02
NIHSS reference increment 1 point	1.017 (0.998-1.036)	0.07
Mechanical heart valve present, n=32/67 (47.8%) absent, n=275/786 (35.0%)	1.037 (0.496-1.961)	0.96
Coronary artery disease present, n=154/379 (40.6%) absent, n=153/474 (32.3%)	1.531 (1.018-2.092)	0.007

Multivariable log-binomial regression model analyzing parameters associated with hematoma enlargement. All variables showing significance (*P*-Value <0.05) in univariable analysis were included. Details of included variables: Time-scales were dichotomized by median-split (median of each variable calculated for all patients within analysis), deep ICH consisting of basal ganglia and thalamus ICH, '1st INR-monitoring after reversal' refers to first INR value obtained after initiation of reversal treatment, systolic blood pressure assessed at 4 hours of hospital admission, NIHSS: National Institutes of Health Stroke Scale (range 0-40 (42= maximum sum, in comatose ataxia is not scored), no deficit to severe neurological deficit), mechanical heart valve as indication for prior OAC treatment, coronary artery disease as prior comorbidity before admission for ICH; Potentially modifiable parameters consisting of: diagnosis to treatment, 1st INR-monitoring after reversal, systolic blood pressure at 4h; non-modifiable parameters: symptom onset to imaging, deep ICH location, NIHSS, mechanical heart valve, coronary artery disease; these parameters were used for further adjusted multivariable analysis of hematoma enlargement (Figure 3). For dichotomized variables "present" indicates No.[HE]/total No.[independent variable present] (%), "absent" indicates No.[HE]/total No.[independent variable absent] (%).

Model details (N=543): adjusted quasi-likelihood= 434.886; Wald-chi-square: onset to initial imaging: 5.6, diagnosis to treatment: 6.8, deep ICH: 3.3, 1st INR-monitoring after reversal: 7.4, systolic BP at 4h: 4.0, NIHSS: 2.3, mechanical heart valve: 1.2, CAD: 5.4. Significant parameters are expressed in bold.

eTable 3. Analysis of hematoma enlargement according to extent and timing of INR reversal.

Time to Reversal (min)	Achieved INR No. (HE-rate %)		Hematoma enlargement	
	INR < 1.20			
	Yes	No	Risk ratio (95%CI)	P Value
0 - 119	8/42 (19.0%)	299/811 (36.9%)	0.52 (0.28-0.97)	0.02
120 - 239	18/90 (20.0%)	289/763 (37.9%)	0.53 (0.35-0.81)	<0.001
240 - 359	9/26 (34.6%)	298/827 (36.0%)	0.96 (0.56-1.64)	0.89
≥ 360	39/114 (34.2%)	268/739 (36.3%)	0.94 (0.72-1.24)	0.67
total	74/272 (27.2%)	233/581 (40.1%)	0.68 (0.55-0.84)	<0.001
	INR 1.20-1.29			
	Yes	No	Risk ratio (95%CI)	P Value
0 - 119	6/35 (17.1%)	301/818 (36.8%)	0.47 (0.22-0.97)	0.02
120 - 239	11/50 (22.0%)	296/803 (36.9%)	0.60 (0.35-1.00)	0.03
240 - 359	7/21 (33.3%)	300/832 (36.1%)	0.92 (0.50-1.70)	0.79
≥ 360	18/54 (33.3%)	289/799 (36.2%)	0.92 (0.63-1.36)	0.67
total	42/160 (26.3%)	265/693 (38.2%)	0.69 (0.52-0.91)	0.004
	INR 1.30-1.39			
	Yes	No	Risk ratio (95%CI)	P Value
0 - 119	4/15 (26.7%)	303/838 (36.2%)	0.74 (0.32-1.72)	0.45
120 - 239	15/39 (38.5%)	292/814 (35.9%)	1.07 (0.71-1.61)	0.74
240 - 359	6/14 (42.9%)	301/839 (35.9%)	1.19 (0.65-2.20)	0.59
≥ 360	14/37 (37.8%)	293/816 (35.9%)	1.05 (0.69-1.61)	0.81
total	39/105 (37.1%)	268/748 (35.8%)	1.04 (0.79-1.35)	0.79
	INR 1.40-1.49			
	Yes	No	Risk ratio (95%CI)	P Value
0 - 119	6/14 (42.9%)	301/839 (35.9%)	1.19 (0.65-2.20)	0.59
120 - 239	13/30 (43.3%)	294/823 (35.7%)	1.21 (0.80-1.85)	0.39
240 - 359	6/14 (42.9%)	301/839 (35.9%)	1.19 (0.65-2.20)	0.59
≥ 360	13/28 (46.4%)	294/825 (35.6%)	1.30 (0.87-1.96)	0.24
total	38/86 (44.2%)	269/767 (35.1%)	1.26 (0.98-1.63)	0.09
	INR ≥ 1.50			
	Yes	No	Risk ratio (95%CI)	P Value
0 - 119	7/18 (38.9%)	300/835 (35.9%)	1.08 (0.60-1.95)	0.79
120 - 239	24/59 (40.7%)	283/794 (35.6%)	1.14 (0.83-1.57)	0.44
240 - 359	12/29 (41.4%)	295/824 (35.8%)	1.16 (0.74-1.80)	0.54
≥ 360	71/124 (57.3%)	236/729 (32.4%)	1.77 (1.47-2.13)	<0.001
total	114/230 (49.6%)	193/623 (31.0%)	1.60 (1.34-1.90)	<0.001

Data was categorized – “time of reversal” presented as 2h intervals (time range 0 to ≥360min) starting at time of hospital admission until 1st INR-monitoring after reversal treatment confirmed corresponding INR thresholds; – INR thresholds were categorized by 0.10 intervals (INR range <1.20 to ≥1.50). The frequency data was analyzed for its association with hematoma enlargement. Abbreviations: HE: hematoma enlargement, CI: confidence interval. Significant parameters are expressed in bold.

eTable 4. Analysis of hematoma enlargement according to systolic blood pressures at 4 hour intervals.

Systolic blood pressure	Hematoma enlargement, No. (%)	Chi-square
[mmHg]	On admission	P Value
<120	12/36 (33.3%)	
120-139	16/53 (30.2%)	
140-159	58/168 (34.5%)	0.04
160-179	66/165 (40.0%)	
≥180	118/279 (42.3%)	
[mmHg]	at 4 hours	P Value
<120	57/173 (32.9%)	
120-139	35/106 (33.0%)	
140-159	75/225 (33.3%)	<0.001
160-179	55/120 (45.8%)	
≥180	43/67 (64.2%)	
[mmHg]	at 8 hours	P Value
<120	74/202 (36.6%)	
120-139	41/131 (31.3%)	
140-159	85/215 (39.5%)	0.20
160-179	44/101 (43.6%)	
≥180	13/33 (39.4%)	
[mmHg]	at 12 hours	P Value
<120	36/123 (29.3%)	
120-139	90/236 (38.1%)	
140-159	71/197 (36.0%)	0.50
160-179	40/107 (37.5%)	
≥180	12/28 (42.9%)	
[mmHg]	at 16 hours	P Value
<120	34/98 (34.7)	
120-139	84/226 (37.2%)	
140-159	77/233 (33.0%)	0.75
160-179	38/101 (37.6%)	
≥180	8/25 (32.0%)	

Systolic blood pressure was categorized as 20 mmHg intervals (range <120 to ≥180 mmHg) for its corresponding time points of assessment and (on admission until 16 hours thereafter), frequency data was analyzed for its association with hematoma enlargement dichotomized for < 160 mmHg vs. ≥ 160 mmHg at each specific time point (horizontal line between the 3rd and 4th blood pressure category with corresponding P-Value of dichotomized analysis). Note that blood pressure measurements were not available for all patients at exact time-points. Abbreviation: HE: hematoma enlargement. Significant parameters are expressed in bold.

eTable 5. Dichotomized analysis of OAC resumption-status for the entire cohort.

Patients with 1y follow-up (n=719)	OAC resumption (n=172)	No OAC resumption (n=547)	P Value
Time to treatment‡ [days]	31 (18-65)	25 (13-46)	0.004 [^]
Age† [y] (n=719)	70.6 (±9.9)	74.5 (±8.6)	<0.001
Female sex* (n=719)	53 (30.8%)	217 (39.7%)	0.04 [^]
Prestroke mRS‡* (n=704)	0 (0-1)	0 (0-1)	0.18
OAC indications (n=719)			
Atrial fibrillation* (n=566)	110 (64.0%)	456 (83.4%)	<0.001
Mechanical heart valve* (n=50)	34 (19.8%)	16 (2.9%)	<0.001
Pulmonary embolism* (n=33)	8 (4.7%)	25 (4.6%)	0.86
Deep vein thrombosis* (n=31)	10 (5.8%)	21 (3.8%)	0.27
Other indications* (n=39)	10 (5.8%)	29 (5.3%)	0.79
Prior comorbidities			
Hypertension* (n=719)	149 (86.6%)	476 (87.0%)	0.89
Diabetes mellitus* (n=719)	48 (27.9%)	172 (31.4%)	0.38
Dyslipidemia* (n=719)	62 (36.0%)	169 (30.9%)	0.21
Prior stroke* (n=719)	43 (25.0%)	171 (31.3%)	0.12
Coronary artery disease* (n=719)	77 (44.8%)	239 (43.7%)	0.81
Congestive heart failure* (n=718)	18 (10.5%)	52 (9.5%)	0.71
Abnormal kidney function* (n=715)	42 (24.4%)	157 (28.7%)	0.27
Abnormal liver function* (n=717)	3 (1.7%)	11 (2.0%)	0.56
Antiplatelet medication* (n=716)	12 (7.0%)	48 (8.8%)	0.46
Admission status			
Glasgow Coma Scale‡ (n=719)	14 (13-15)	14 (13-15)	0.21
NIHSS‡ (n=707)	7 (3-14)	11 (5-18)	0.001
ICH Score‡ (n=719)	1 (0-1)	1 (0-2)	0.002 [^]
Imaging (n=719)			
Deep ICH*	79 (45.9%)	247 (45.1%)	0.86
Lobar ICH*	65 (37.8%)	211 (38.6%)	0.86
Cerebellar ICH*	16 (9.3%)	65 (11.9%)	0.35
Brainstem ICH*	5 (2.9%)	11 (2.0%)	0.55
Primary IVH*	7 (4.1%)	13 (2.4%)	0.29
ICH volume‡ [cm ³]	11.5 (3.9-25.1)	13.5 (5.3-33.9)	0.08
Intraventricular hemorrhage*	49 (28.5%)	196 (35.8%)	0.08
Graeb Score‡ (n=245)	4 (3-7)	4 (2-7)	0.32
Hematoma enlargement* (n=672)	43/155 (27.7%)	175/517 (33.8%)	0.15
In-hospital measures (n=719)			
Ventilation*	46 (26.7%)	170 (31.1%)	0.28
Pneumonia*	51 (29.7%)	227 (41.5%)	0.005 [^]
Sepsis*	7 (4.1%)	26 (4.8%)	0.71
External ventricular drain*	30 (17.4%)	108 (19.7%)	0.50
Length of stay‡ [d]	12 (8-19)	13 (9-20)	0.42

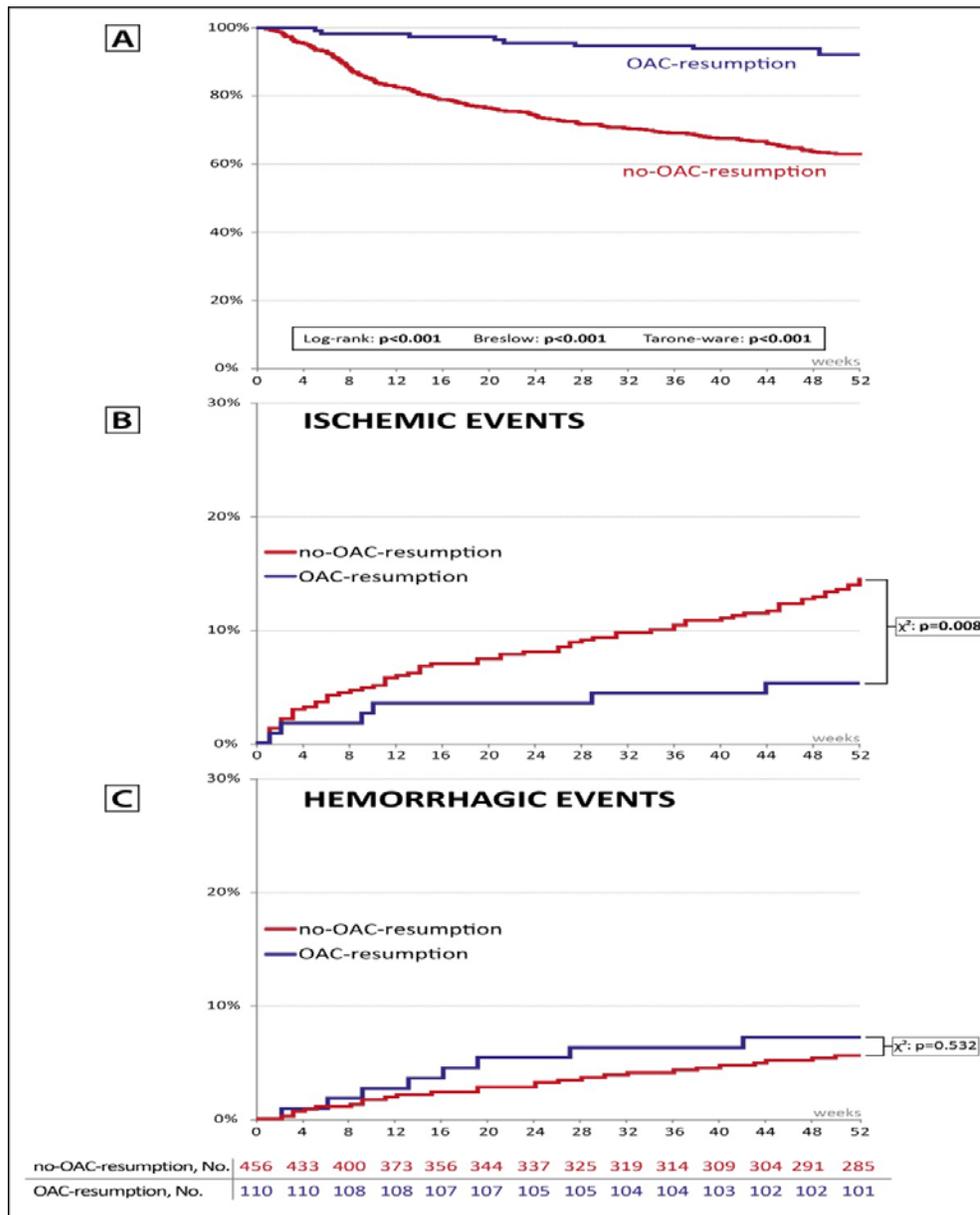
Dichotomized analysis of baseline characteristics, prior comorbidities, neurological admission status, imaging and treatment parameters according to OAC resumption status. Scales, scores and abbreviations, with corresponding ranges: prestroke mRS: modified Rankin Scale prior to admission (range 0-5, no functional deficit to severe disability), Glasgow Coma Scale (range 3-15, deep coma to alert), NIHSS: National Institutes of Health Stroke Scale (range 0-40 (42= maximum sum, in comatose ataxia is not scored), no deficit to severe neurological deficit), ICH Score: Intracerebral hemorrhage Score (range 0-6, low to high risk of mortality), Graeb Score: ventricular involvement (range 0-12, no intraventricular blood to tamponade of all ventricles); OAC: oral anticoagulation (coumadins), ICH: intracerebral haemorrhage, IVH: intraventricular hemorrhage. Complete case analysis for n=719; Left column: Number (n) of patients with available data; * n (%); † mean (±SD); ‡ median (IQR; 25th -75th percentile); [^] not sig. after Bonferroni correction (corrected significance level P<0.00143). Significant parameters are expressed in bold.

eTable 6. Dichotomized analysis of OAC resumption status for A-fib patients.

OAC-ICH patients with A-fib (n=566)	OAC resumption (n=110)	No OAC resumption (n=456)	P Value
Time to treatment‡ [days]	32 (20-69)	33 (14-55)	0.24
Age† [y] (n=566)	72.9 (±7.7)	75.5 (±7.8)	0.002 [^]
Female sex* (n=566)	36 (32.7%)	182 (39.9%)	0.16
Pre-mRS‡ (n=554)	0 (0-1)	0 (0-1)	0.37
Prior comorbidities			
Hypertension* (n=566)	95 (86.4%)	383 (84.0%)	0.54
Diabetes mellitus* (n=566)	38 (34.5%)	144 (31.6%)	0.55
Dyslipidemia* (n=566)	39 (35.5%)	141 (30.9%)	0.36
Prior stroke* (n=566)	29 (26.4%)	138 (30.3%)	0.42
Coronary artery disease* (n=566)	54 (49.1%)	203 (44.5%)	0.39
Congestive heart failure* (n=565)	11 (10.0%)	46 (10.1%)	0.89
Abnormal kidney function* (n=563)	23 (20.9%)	123 (27.0%)	0.19
Abnormal liver function* (n=565)	1 (0.9%)	5 (1.1%)	0.87
Antiplatelet medication* (n=563)	9 (8.2%)	40 (8.8%)	0.84
CHADS₂ score‡ (n=566)			
median (IQR)	2 (1-3)	2 (2-3)	0.09
High-Risk* (≥2)	81 (73.6%)	364 (79.8%)	0.16
HAS-BLED score‡ (n=566)			
median (IQR)	3 (2-4)	3 (2-4)	0.23
High-Risk* (≥3)	69 (62.7%)	310 (68.0%)	0.29
Admission status			
Glasgow Coma Scale‡ (n=566)	14 (13-15)	14 (13-15)	0.06
NIHSS‡ (n=554)	7 (3-13)	10 (4-17)	0.002 [^]
ICH Score‡ (n=566)	1 (0-1)	1 (0-2)	0.001
Imaging (n=566)			
Deep ICH*	52 (47.3%)	201 (44.1%)	0.54
Lobar ICH*	38 (34.5%)	179 (39.3%)	0.36
Cerebellar ICH*	11 (10.0%)	54 (11.8%)	0.58
Brainstem ICH*	4 (3.6%)	12 (2.6%)	0.75
Primary IVH*	5 (4.5%)	10 (2.2%)	0.18
ICH volume‡ [cm ³]	11.0 (3.9-22.0)	11.9 (4.8-31.8)	0.10
Intraventricular hemorrhage*	30 (27.3%)	156 (34.2%)	0.16
Graeb Score‡ (n=186)	4 (2-8)	4 (2-7)	0.47
Hematoma enlargement* (n=519)	22/103 (21.4%)	128/416 (30.8%)	0.06
In-hospital measures (n=566)			
Ventilation*	25 (22.7%)	137 (30.0%)	0.13
Pneumonia*	32 (29.1%)	186 (40.8%)	0.02 [^]
Sepsis*	3 (2.7%)	20 (4.4%)	0.59
External ventricular drain*	15 (13.6%)	82 (18.0%)	0.28
Length of stay* [d]	12 (8-16)	13 (9-19)	0.11
mRS at discharge (0-3)	55 (50.0%)	123 (27.0%)	<0.001

Dichotomized analysis according to OAC resumption status of baseline characteristics, prior comorbidities, neurological admission status, imaging and treatment parameters for patients with A-fib only. Scales, scores and abbreviations, with corresponding ranges: prestroke mRS: modified Rankin Scale prior to admission (range 0-5, no functional deficit to severe disability), CHADS₂ score (range 0-6, low to high risk of thromboembolism), HAS-BLED score (range 0-9, low to high risk of bleeding complication under OAC), Glasgow Coma Scale (range 3-15, deep coma to alert), NIHSS: National Institutes of Health Stroke Scale (range 0-40 (42= maximum sum, in comatose ataxia is not scored), no deficit to severe neurological deficit), ICH-Score: Intracerebral hemorrhage Score (range 0-6, low to high risk of mortality), Graeb Score: ventricular involvement (range 0-12, no intraventricular blood to tamponade of all ventricles); OAC: oral anticoagulation (coumadins), ICH: intracerebral haemorrhage, IVH: intraventricular hemorrhage. Complete case analysis for n=566; Left column: Number (n) of patients with available data; † mean (±SD); ‡ median (IQR; 25th-75th percentile); [^] not sig. after Bonferroni correction (corrected significance level P<0.00143). Significant parameters are expressed in bold.

eFigure 2. Unmatched survival and event rates in A-fib patients – analyzing OAC resumption-status.



Unmatched Kaplan-Meier survival curves, ischemic, and hemorrhagic event rates in A-fib patients with and without OAC resumption. (A) Kaplan-Meier survival rates of patients with A-fib with and without OAC resumption from index-ICH until 1-year follow-up, analyzed by log-rank, Breslow and Tarone-Ware testing, with corresponding P Values. (B) Incidence rates of new ischemic events over the 1-year follow-up period in patients with and without OAC resumption. (C) Incidence rates of hemorrhagic events over the 1-year follow-up period in patients with and without OAC resumption. Numbers for patients at risk apply to part A-C. One year after OAC-ICH 8.2% ($n=9/110$) of resumed patients versus 37.5% ($n=171/456$) of patients without OAC resumption had died ($P < 0.001$). The crude incidence of bleeding events was not significantly different among A-fib patients with and without OAC resumption (OAC resumed: 7.3% ($n=8/110$) versus 5.7% ($n=26/456$) non resumed patients; $P = 0.532$), the incidence of new ischemic events was significantly increased in patients without OAC resumption (5.4% ($n=6/110$) versus 14.9% ($n=68/456$); $P = 0.008$).

eTable 7. Analyses of confounders within OAC resumption analysis for A-fib patients – before and after propensity score matching.

OAC-ICH patients with atrial fibrillation (n=566)	OAC resumption (n=110)	No OAC resumption (n=456)	P Value	std. mean diff.
Before propensity matching				
Age† [y]	72.9 (±7.7)	75.5 (±7.8)	0.002	0.35
Prestroke mRS‡	0 (0-1)	0 (0-1)	0.37	0.09
CHADS₂ score‡				
median (IQR)	2 (1-3)	2 (2-3)	0.09	0.18
Admission status‡				
NIHSS‡	7 (3-13)	10 (4-17)	0.002	0.33
Imaging				
ICH volume‡ [cm ³]	11.0 (3.9-22.0)	11.9 (4.8-31.8)	0.10	0.30
Intraventricular hemorrhage*	30 (27.3%)	156 (34.2%)	0.16	0.17
Hematoma enlargement*	22/103 (21.4%)	128/416 (30.8%)	0.06	0.19
Hospital discharge				
mRS‡	3 (2-4)	4 (3-5)	<0.001	0.55
OAC-ICH patients with atrial fibrillation (n=261)				
After propensity matching				
Age† [y]	73.1 (±7.6)	74.2 (±8.8)	0.29	0.07
Prestroke mRS‡	0 (0-1)	0 (0-1)	0.57	0.06
CHADS₂ score‡				
median (IQR)	2 (1-3)	2 (2-3)	0.57	0.04
On admission status‡				
NIHSS‡	7 (3-13)	7 (3-14)	0.97	0.05
Imaging				
ICH volume‡ [cm ³]	10.5 (3.5-20.2)	9.9 (3.6-20.7)	0.98	0.05
Intraventricular hemorrhage*	29 (26.9%)	47 (30.7%)	0.50	0.03
Hematoma enlargement*	22 (20.4%)	31 (20.3%)	0.88	0.04
Hospital discharge				
mRS‡	4 (3-4)	4 (3-4)	0.29	0.01

Comparison of parameters possibly showing confounding by indication for OAC resumption analysis, presented are standardized mean differences before and after the matching procedure. Variables used for calculation of the propensity score in patients with A-fib only, were showing a statistical association with OAC resumption status ($P < 0.2$), prestroke mRS included for direct effects on discharge mRS value. Scales, scores and abbreviations, with corresponding ranges: pre- and at hospital discharge mRS: modified Rankin Scale prior (range 0-6, no functional deficit to death), CHADS₂ Score (range 0-6, low to high risk of thromboembolism), NIHSS: National Institutes of Health Stroke Scale (range 0-40 (42= maximum sum, yet in comatose ataxia is not scored), no deficit to severe neurological deficit), ICH: intracerebral hemorrhage. Given in bold are standardized mean differences before and after matching of all variables used for calculation. * n (%); † mean (±SD); ‡ median (IQR; 25th -75th percentile);

eTable 8. Propensity-matched analysis of event and incidence rates in A-fib patients – new ischemic stroke versus recurrent ICH.

Patients with atrial fibrillation	No. of Patients	No. of events (%)	P Value	Incidence rate per 100 patient years (95%CI)	P Value
New cerebral infarction	261	20 (7.7%)		8.7 (3.8-12.6)	
According to treatment					
OAC resumption	108	4 (3.7%)	0.04	3.9 (1.9-5.8)	0.02
No OAC resumption	153	16 (10.5%)		12.7 (6.5-19.1)	
Recurrent ICH	261	9 (3.4%)		3.9 (1.4-6.5)	
According to treatment					
OAC resumption	108	4 (3.7%)	0.55	3.9 (1.9-5.8)	0.92
No OAC resumption	153	5 (3.3%)		3.9 (2.2-5.7)	

Analysis included all OAC-ICH patients with A-fib after propensity matching. Given are: total number of patients for analysis, raw number of events and incidence rates (per 100 patient-years) calculated for time on each specific treatment (OAC versus no-OAC as defined) during 1 year of follow-up. Significant parameters are expressed in bold.

eTable 9. Propensity-matched Cox regression analyses of long-term mortality in A-fib patients.

Patients with atrial fibrillation (n=261)	No. of patients	No. of events (%)	Hazard ratio (95%CI)	P Value	Adjusted Hazard ratio 95%CI)	P Value
Overall	261	56 (21.5%)				
OAC resumption	108	9 (8.3%)	0.233 (0.114-0.476)	<0.001	0.258 (0.125-0.534)	<0.001
No OAC resumption	153	47 (30.7%)	1 (reference)		1 (reference)	

Cox regression analysis included all OAC-ICH patients with A-fib after propensity matching. Hazard ratio model was adjusted for events (new ischemic, recurrent hemorrhagic) during 1 year of follow-up and by propensity score (age, ICH volume, IVH, hematoma growth, NIHSS, CHADS₂ score as well as pre- and discharge-mRS). Assumption of proportionality was tested by locally weighted scatterplot smoothing of partial Schoenfeld residuals and PH testing. All covariates met the assumption. Significant parameters are expressed in bold.

eTable 10. Multivariable model of functional improvement (mRS ≤3) for poor grade survivors (mRS =4-5).

Multivariable - parameters	Risk ratio (95% CI)	P Value (<0.05)
Age reference increment 1 year	0.968 (0.945-0.993)	0.011
NIHSS reference increment 1 point	0.956 (0.922-0.992)	0.016
ICH volume [≥16.1cm ³], n=40/227 (17.6%) [<16.1cm ³], n=78/284 (27.5%)	0.576 (0.334-0.994)	0.035
Lobar ICH present, n=49/184 (26.6%) absent, n=69/327 (21.1%)	1.543 (0.916-2.599)	0.103
Hematoma enlargement present, n=36/159 (22.6%) absent, n=67/279 (24.0%)	0.810 (0.496-1.324)	0.401
Intraventricular hemorrhage present, n=39/215 (18.1%) absent, n=79/296 (26.7%)	0.728 (0.433-1.225)	0.232
Hemoglobin level on admission reference increment 10 g/L	1.197 (1.070-1.338)	0.002
New ischemic stroke present, n=3/53 (5.7%) absent, n=115/458 (25.1)	0.113 (0.016-0.792)	0.028

Multivariable log-binomial regression model analyzing parameters associated with functional improvement (mRS≤3) of poor-grade survivors (mRS 4-5) during 1 year follow-up. All variables showing a significant P Value < 0.05 in univariate analysis were included. Details of included variables: NIHSS: National Institutes of Health Stroke Scale (range 0-40 (42= maximum sum, in comatose ataxia is not scored), no deficit to severe neurological deficit), ICH volume included by median split (≥16.1ml), Lobar ICH location, hematoma enlargement > 33% relative volume increase, hemoglobin level on hospital admission, new ischemic stroke during 1 year follow-up; for dichotomized variables “present” indicates No.[mRS 0-3]/total No.[independent variable present] (%), “absent” indicates No.[mRS 0-3]/ total No.[independent variable absent] (%). Model details (N=351): adjusted quasi-likelihood: 340.238; Wald-chi-square: age: 6.5, NIHSS: 5.8, ICH-volume: 4.0, Lobar-ICH: 3.2, Hematoma enlargement: 1.5, IVH: 1.7, new ischemic stroke: 4.8, Significant parameters are expressed in bold.

eTable 11. Analysis of long-term outcome – favorable versus unfavorable functional outcome.

OAC-ICH	1 Year Follow-up (n=1,083)		P Value
	mRS 0-3 (n=298)	mRS 4-6 (n=785)	
Age† [y] (n=1083)	72.7 (±9.1)	74.7 (±9.1)	<0.001
Female sex* (n=1083)	111 (37.2%)	336 (42.8%)	0.10
Prestroke mRS‡ (n=1062)	0 (0-1)	1 (0-2)	<0.001
Prior comorbidities			
Hypertension* (n=1083)	253 (84.9%)	671 (85.5%)	0.81
Diabetes mellitus* (n=1083)	83 (27.9%)	229 (29.2%)	0.67
Dyslipidemia* (n=1083)	108 (36.2%)	176 (22.4%)	<0.001
Prior stroke* (n=1083)	71 (23.8%)	233 (29.7%)	0.06
Coronary artery disease* (n=1083)	125 (41.9%)	341 (43.4%)	0.65
Congestive heart failure* (n=1080)	33 (11.1%)	91 (11.6%)	0.81
Abnormal kidney function* (n=1077)	73 (24.5%)	208 (26.5%)	0.50
Abnormal liver function* (n=1076)	3 (1.0%)	18 (2.3%)	0.17
Antiplatelet medication* (n=1081)	26 (8.7%)	79 (10.1%)	0.51
OAC indications (n=1083)			
Atrial fibrillation*	233 (78.2%)	613 (78.1%)	0.98
Mechanical heart valve*	24 (8.1%)	53 (6.8%)	0.46
Pulmonary embolism*	13 (4.4%)	36 (4.6%)	0.89
Deep vein thrombosis*	13 (4.4%)	27 (3.4%)	0.47
Other indications*	15 (5.0%)	56 (7.1%)	0.21
CHADS₂ score‡ (n=846)			
median (IQR)	2 (1-3)	2 (2-3)	0.06
High-Risk* (≥2)	171 (73.4%)	489 (79.8%)	0.04 [^]
HAS-BLED score‡ (n=846)			
median (IQR)	3 (2-3)	3 (2-4)	0.02
High-Risk* (≥3)	141 (60.5%)	438 (71.5%)	0.002 [^]
Admission status (n=1083)			
Glasgow Coma Scale‡	15 (14-15)	12 (5-14)	<0.001
NIHSS‡	5 (3-11)	19 (11-28)	<0.001
ICH Score‡	1 (0-1)	2 (1-3)	<0.001
Initial imaging (n=1083)			
Deep ICH*	117 (39.3%)	380 (48.4%)	0.007 [^]
Lobar ICH*	135 (45.3%)	271 (34.5%)	0.001
Cerebellar ICH*	31 (10.4%)	71 (9.0%)	0.49
Brainstem ICH*	6 (2.0%)	40 (5.1%)	0.02 [^]
Primary IVH*	9 (3.0%)	23 (2.9%)	0.92
ICH volume‡ [cm ³]	9.3 (3.1-21.1)	30.4 (11.3-77.3)	<0.001
Intraventricular hemorrhage*	63 (21.1%)	430 (54.8%)	<0.001
Graeb Score‡ (n=493)	4 (2-6)	6 (3-9)	<0.001
Hematoma enlargement* (n=838)	42/249 (16.9%)	262/589 (44.5%)	<0.001
Initial coagulation parameters (n=1083)			
INR‡	2.60 (2.20-3.30)	2.87 (2.30-3.70)	<0.001
PTT‡ [s]	40 (36-49)	43 (36-50)	0.17

eTable 11. continued.

OAC-ICH patients	1 Year Follow-up (n=1,083)		P Value
	mRS 0-3 (n=298)	mRS 4-6 (n=785)	
In-hospital measures (n=1083)			
Intubated on arrival*	8 (2.7%)	155 (19.7%)	<0.001
Mechanical ventilation*	38 (12.8%)	400 (51.0%)	<0.001
Pneumonia*	57 (19.1%)	343 (43.7%)	<0.001
Sepsis*	2 (0.7%)	82 (10.4%)	<0.001
Length of stay‡ [d]	11 (8-15)	8 (2-16)	<0.001
ICH-evacuation surgery*	30 (10.1%)	116 (14.8%)	0.04 [^]
External ventricular drain*	27 (9.1%)	155 (19.7%)	<0.001
Intraventricular lysis* (n=182)	10/27 (37.0%)	24/155 (15.5%)	0.008 [^]
Osmotherapy*	20 (6.7%)	119 (15.2%)	<0.001
Thrombosis prophylaxis*	237 (79.5%)	455 (58.0%)	<0.001

Dichotomized analysis of favorable (mRS 0-3) versus unfavorable (mRS 4-6) functional outcome comparing baseline characteristics, prior comorbidities, neurological admission status, imaging and treatment parameters for all patients with 1-year follow-up. Scales, scores and abbreviations, with corresponding ranges: pre-mRS: modified Rankin Scale prior to admission (range 0-5, no functional deficit to severe disability), CHADS2 Score (range 0-6, low to high risk of thromboembolism), HAS-BLED (range 0-9, low to high risk of bleeding complication under OAC), Glasgow Coma Scale (range 3-15, deep coma to alert), NIHSS: National Institutes of Health Stroke Scale (range 0-40 (42= maximum sum, yet in comatose ataxia is not scored), no deficit to severe neurological deficit), ICH Score: Intracerebral hemorrhage Score (range 0-6, low to high risk of mortality), Graeb Score: ventricular involvement (range 0-12, no intraventricular blood to tamponade of all ventricles); OAC: oral anticoagulation (coumadins), ICH: intracerebral haemorrhage, IVH: intraventricular hemorrhage. Complete-case analysis for n=1083, Left column: Number (n) of patients with available data, † mean (±SD); ‡ median (IQR; 25th-75th percentile); [^] not sig. after Bonferroni correction (corrected significance level p<0.00111). Significant parameters are expressed in bold.

eTable 12. Multivariable model of unfavorable long-term outcome for the entire cohort.

Multivariable - parameters	Risk ratio (95% CI)	P Value (<0.05)
Age reference increment 1 year	1.019 (1.003-1.036)	0.018
NIHSS reference increment 1 point	1.057 (1.034-1.079)	<0.001
ICH volume [≥16.1cm ³], n=483/564 (85.6%) [<16.1cm ³], n=302/519 (58.2%)	1.388 (1.020-1.889)	0.037
Hematoma enlargement present, n=262/304 (86.2%) absent, n=327/534 (61.2%)	1.569 (1.186-2.075)	0.002
Intraventricular hemorrhage present, n=430/493 (87.2%) absent, n=355/590 (60.2%)	1.608 (1.193-2.167)	0.002
New ischemic stroke present, n=45/63 (71.4%) absent, n=384/656 (58.5%)	1.554 (1.101-2.419)	0.024
Recurrent ICH present, n=27/30 (90.0%) absent, n=394/689 (57.2%)	2.884 (1.203-8.636)	0.028
OAC resumption present, n=54/172 (31.4%) absent, n=367/547 (67.1%)	0.330 (0.205-0.531)	<0.001

Multivariable log-binomial regression model analyzing factors associated with unfavorable functional long-term outcome (mRS 4-6) at 1 year. Details of included variables: NIHSS: National Institutes of Health Stroke Scale (range 0-40 (42= maximum sum, in comatose ataxia is not scored), no deficit to severe neurological deficit), ICH volume included by median split (≥16.1ml), hematoma enlargement > 33% relative volume increase, new ischemic stroke during 1 year follow-up, recurrent ICH during 1 year follow-up, OAC resumption after index ICH; for dichotomized variables “present” indicates No.[mRS 4-6]/total No.[independent variable present] (%), “absent” indicates No.[mRS 4-6]/total No.[independent variable absent] (%). Model details (N=515): adjusted quasi-likelihood= 490.832; Wald-chi-square: age=5.6, NIHSS=25.4, ICH-volume=5.4, hematoma enlargement=10.0, intraventricular hemorrhage=9.7, new ischemic stroke=5.1, recurrent ICH=4.9, OAC resumption=20.9; Significant parameters are expressed in bold.

eTable 13. Multivariable model of unfavorable long-term outcome for propensity-matched A-fib patients.

Multivariable – parameters	Risk ratio (95% CI)	P Value (<0.05)
Age reference increment 1 year	1.005 (0.990-1.021)	0.520
NIHSS reference increment 1 point	1.047 (1.027-1.067)	<0.001
ICH volume [≥10.3cm ³], n=63/131 (48.1%) [<10.3cm ³], n=48/130 (36.9%)	1.305 (0.994-1.715)	0.055
Intraventricular hemorrhage present, n=45/76 (59.2%) absent, n=66/185 (35.7%)	1.223 (0.893-1.673)	0.209
New ischemic stroke present, n=13/20 (65.0%) absent, n=98/241 (40.7%)	1.432 (1.055-1.943)	0.021
Recurrent ICH present, n=8/9 (88.9%) absent, n=103/252 (40.9%)	2.581 (1.708-3.900)	<0.001
OAC resumption present, n=30/108 (27.8%) absent, n=91/153 (59.5%)	0.552 (0.394-0.775)	0.001

Multivariable log-binomial regression model of the propensity-matched cohort analyzed for factors associated with unfavorable functional long-term outcome (mRS 4-6) at 1 year. Details of included variables: NIHSS: National Institutes of Health Stroke Scale (range 0-40 (42= maximum sum, in comatose ataxia is not scored), no deficit to severe neurological deficit), ICH volume included by median split (≥10.3ml), new ischemic stroke during 1 year follow-up, recurrent ICH during 1 year follow-up, OAC resumption after index ICH; for dichotomized variables “present” indicates No.[mRS 4-6]/total No.[independent variable present] (%), “absent” indicates No.[mRS 4-6]/total No.[independent variable absent] (%). Model details (N=242): adjusted quasi-likelihood= 159.346; Wald-chi-square: age=1.4, NIHSS=22.9, ICH-volume=3.7, IVH=1.6, new ischemic stroke: 5.3, recurrent ICH: 20.2, OAC-resumption: 11.8; Significant parameters are expressed in bold.

eTable 14. Comparison of surviving patients included versus those excluded for resumption and long-term outcome analyses.

Surviving Patients (n=812)	included (n=719)	excluded (n=93)	P Value
Age† [y]	73.6 (±9.1)	72.4 (±9.2)	0.24
Female sex*	270 (37.6%)	37 (39.8%)	0.68
Prestroke mRS‡*	0 (0-1)	0 (0-1)	0.47
OAC indication			
Atrial fibrillation*	566 (78.7%)	73 (78.5%)	0.99
Mechanical heart valve*	50 (7.0%)	5 (5.4%)	0.57
Pulmonary embolism*	33 (4.6%)	3 (3.2%)	0.61
Deep vein thrombosis*	31 (4.3%)	6 (6.5%)	0.42
Other indications*	39 (5.4%)	6 (6.5%)	0.68
Prior comorbidities			
Hypertension*	625 (86.9%)	78 (83.9%)	0.42
Diabetes mellitus*	220 (30.6%)	23 (24.7%)	0.25
Dyslipidemia*	231 (32.1%)	22 (23.7%)	0.10
Prior stroke*	214 (29.8%)	22 (23.7%)	0.22
Coronary artery disease*	316 (43.9%)	41 (44.1%)	0.99
Congestive heart failure*	70 (9.7%)	5 (5.4%)	0.17
Abnormal kidney function*	199 (27.7%)	17 (18.3%)	0.05
Abnormal liver function*	14 (1.9%)	2 (2.2%)	0.99
Antiplatelet medication*	60 (8.3%)	10 (10.8%)	0.43
Admission status			
Glasgow Coma Scale‡	14 (12-15)	14 (13-15)	0.06
NIHSS‡	9 (4-17)	7 (2-12)	0.002 [^]
ICH Score‡	1 (0-2)	1 (0-1)	0.08
Imaging			
Deep ICH*	327 (45.5%)	39 (41.9%)	0.52
Lobar ICH*	277 (38.5%)	33 (35.5%)	0.57
Cerebellar ICH*	81 (11.3%)	11 (11.8%)	0.86
Brainstem ICH*	16 (2.2%)	4 (4.3%)	0.27
Primary IVH*	18 (2.5%)	6 (6.4%)	0.05 [^]
ICH volume‡ [cm ³]	12.8 (4.9-31.7)	10.8 (5.2-19.4)	0.15
Intraventricular hemorrhage*	245 (34.1%)	28 (30.1%)	0.45
Graeb Score‡ (n=273)	4 (2-7)	3 (1-5)	0.04 [^]
Hematoma enlargement*	218/672 (32.4%)	17/52 (32.7%)	0.98
In-hospital measures (n=719)			
Ventilation*	216 (30.0%)	24 (25.8%)	0.40
Pneumonia*	278 (38.7%)	26 (28.0%)	0.04 [^]
Sepsis*	33 (4.6%)	5 (5.4%)	0.79
External ventricular drain*	138 (19.2%)	16 (17.2%)	0.65
Length of stay‡ [d]	13 (9-20)	13 (8-20)	0.54

Dichotomized comparison of baseline characteristics, prior comorbidities, neurological admission status, imaging and treatment parameters for patients included versus those excluded of resumption and long-term outcome analyses. Scales, scores and abbreviations, with corresponding ranges: pre-mRS: modified Rankin Scale prior to admission (range 0-5, no functional deficit to severe disability), Glasgow Coma Scale (range 3-15, deep coma to alert), NIHSS: National Institutes of Health Stroke Scale (range 0-40 (42= maximum sum, in comatose ataxia is not scored), no deficit to severe neurological deficit), ICH-Score: Intracerebral hemorrhage Score (range 0-6, low to high risk of mortality), Graeb Score: ventricular involvement (range 0-12, no intraventricular blood to tamponade of all ventricles); OAC: oral anticoagulation (coumadins), ICH: intracerebral hemorrhage. Complete-case analysis for n=719; Left column: Number (n) of patients with available data; * n (%); † mean (±SD); ‡ median (IQR; 25th -75th percentile); [^] not sig. after Bonferroni correction (corrected significance level *P* <0.00143). Significant parameters are expressed in bold.

eTable 15. Comparison of investigated outcomes between complete-case versus multiple imputation analysis.

	Complete-case Analysis	Multiple imputation Analysis
OAC resumption overall A-fib	n=172/719 (23.9%) n=110/566 (19.4%)	n=188/812 (23.2%) n=122/628 (19.4%)
Ischemic events entire cohort OAC resumption No OAC resumption	n=9/172 (5.2%) n=82/547 (15.0%)	n=15/188 (8.0%) n=110/624 (17.6%)
Hemorrhagic events entire cohort OAC resumption No OAC resumption	n=14/172 (8.1%) n=36/547 (6.6%)	n=23/188 (12.2%) n=76/624 (12.2%)
Ischemic events A-fib cohort OAC resumption No OAC resumption	n=6/110 (5.5%) n=68/456 (14.9%)	n=7/122 (5.7%) n=78/506 (15.4%)
Hemorrhagic events A-fib cohort OAC resumption No OAC resumption	n= 8/110 (7.3%) n= 26/456 (5.7%)	n=13/122 (10.7%) n=56/506 (11.1%)
Ischemic stroke A-fib cohort OAC resumption No OAC resumption	n=5/110 (4.5%) n=51/456 (11.2%)	n=9/122 (7.4%) n=85/506 (16.8%)
Hemorrhagic stroke A-fib cohort OAC resumption No OAC resumption	n=4/110 (3.6%) n=18/456 (3.9%)	n=11/122 (9.0%) n=50/506 (9.9%)
Mortality at 1 year Unfavorable outcome at 1 year	n=608/1083 (56.1%) n=786/1083 (72.6%)	n=623/1176 (53.0%) n=835/1176 (71.0%)

We here present, the comparison of multiple imputation [MI] versus complete-case analysis of variables of interest regarding both OAC resumption and long-term outcome analysis. We calculated MI including all parameters available for outcome analyses: baseline characteristics (age, sex, comorbidities, OAC-indication, CHADS₂ Score, HAS-BLED Score, prestroke mRS), neurological status (GCS, NIHSS), imaging (ICH location, initial ICH volume, IVH, hematoma enlargement), in-hospital measures (ventilation, pneumonia, sepsis, LOS, EVD, mRS at discharge), follow-up measures (time of survival, mRS at 3 months and 1 year, mortality at 3 months and 1 year, ischemic and hemorrhagic complications, ischemic and hemorrhagic stroke, duration until each complication, OAC resumption, duration until treatment initiation). MI would increase both incidences of ischemic and hemorrhagic complications, yet without changing statistical significance. Specifically, MI for the entire cohort would introduce 83 new events, 34 ischemic- and 49 hemorrhagic events, though rate of clinical end points such as mortality and functional outcome would paradoxically decrease at 3 months and 1 year of follow-up. Therefore, it appears that MI rather introduces possible bias, especially when these rates are compared to existing data.