**Supplementary Material**

Supplementary Table 1. Baseline Characteristics of Patients with Intraventricular Hemorrhage and Intraparenchymal Hemorrhage Stratified by Etiology.

| | IP-IVH (n = 46) | HTN-IPH (n = 399) | CAA-IPH (n = 351) |
|---|---|---|---|
| Age (years), mean ± SD | 74 (±12) | 70 (±14)[a] | 75 (±11) |
| Female sex | 18 (39) | 170 (43) | 169 (48) |
| Past medical history | | | |
| *Hypertension* | 40 (87) | 345 (87) | 265 (76) |
| *Hyperlipidemia* | 27 (59) | 199 (50) | 190 (54) |
| *Diabetes* | 14 (30) | 108 (27) | 60 (17)[a] |
| *Coronary artery disease* | 15 (33) | 80 (20) | 69 (20) |
| *Atrial fibrillation* | 19 (41) | 92 (23)[a] | 64 (18)[b] |
| Prior cerebrovascular events | | | |
| *Previous ischemic stroke* | 12 (26) | 206 (27) | 52 (15) |
| *Previous hemorrhage* | 2 (4) | 40 (10) | 58 (17)[a] |
| Substance use | | | |
| *Smoking history* | 31 (67) | 208 (52)[a] | 173 (50)[a] |
| *Alcohol abuse* | 17 (37) | 156 (39) | 137 (39) |
| Premorbid disability | | | |
| *Prior dependence* | 15 (33) | 73 (18)[a] | 64 (18)[a] |
| *Dementia* | 9 (20) | 33 (8)[a] | 32 (9)[a] |
| *Baseline mRS, median (IQR)* | 1 (0, 3) | 0 (0, 2)[a] | 0 (0, 0)[a] |
| Antithrombotic therapies | | | |
| *None* | 11 (24) | 164 (41)[a] | 158 (45)[a] |
| *Antiplatelet* | 26 (57) | 187 (47) | 164 (47) |
| *Anticoagulant* | 17 (37) | 91 (23)[a] | 50 (14)[b] |

Data are counts (n) and percentages (%), means and standard deviations (SD), or medians and interquartile ranges (IQR). The *p* values reported in the HTN-ICH column refer to comparisons between patients with IP-IVH and HTN-ICH. The *p* values reported in the CAA-ICH column refer to comparisons between patients with IP-IVH and CAA. mRS: modified Rankin Scale; IP-IVH: idiopathic primary intraventricular hemorrhage; HTN-ICH: hypertensive cerebral small vessel disease-related intraparenchymal hemorrhage; CAA-ICH: cerebral amyloid angiopathy-related intraparenchymal hemorrhage. [a] $p < 0.05$; [b] $p < 0.001$; all others not significant.

Supplementary Table 2. Imaging Characteristics of Patients with Intraventricular Hemorrhage and Intraparenchymal Hemorrhage Stratified by Etiology.

| | IP-IVH (n = 35) | HTN-IPH (n = 399) | CAA-IPH (n = 351) |
|---|---|---|---|
| *Presence of cerebral microinfarcts* | 6 (16) | 47 (12) | 50 (14) |
| *Severe white matter hyperintensities (Fazekas ≥ 2)* | 32 (87) | 316 (79) | 265 (76) |
| *White matter hyperintensity patterns* | | | |
| *Multiple subcortical spots* | 8 (22) | 41 (10)[a] | 39 (11) |
| *Anterior subcortical patches* | 10 (27) | 68 (17) | 46 (13) |
| *Large posterior subcortical patches* | 13 (35) | 107 (27) | 91 (26) |
| *Peri-basal ganglia pattern* | 2 (5) | 46 (12) | 11 (3) |
| *Presence of lacunes* | 18 (49) | 177 (44) | 74 (21)[a] |
| *Presence of deep lacunes* | 15 (41) | 163 (41) | 55 (16)[a] |
| *Presence of lobar lacunes* | 5 (14) | 42 (11) | 31 (9) |
| *Presence of severe perivascular spaces (BG)* | 7 (19) | 57 (14) | 25 (7)[a] |
| *Presence of severe perivascular spaces (CSO)* | 5 (14) | 29 (7) | 40 (11) |
| *Presence of cortical superficial siderosis* | 7 (20) | 30 (8)[a] | 91 (26) |
| *Presence of cerebral microbleeds* | 18 (51) | 243 (61) | 181 (52) |
| *Presence of cerebral microbleeds (deep)* | 8 (23) | 193 (48)[a] | 0 (0)[b] |
| *Presence of cerebral microbleeds (lobar)* | 14 (40) | 175 (44) | 169 (48) |
| *Strictly deep ICH/microbleeds* | 4 (11) | 58 (15) | 0 (0)[b] |
| *Strictly lobar ICH/microbleeds* | 10 (29) | 40 (10)[a] | 169 (48) |
| *Mixed-location ICH/microbleeds* | 4 (11) | 135 (34)[a] | 0 (0)[b] |
| *No microbleeds* | 17 (49) | 166 (42) | 182 (52) |
| Presence of any cSVD biomarker | 33 (94) | 354 (89) | 313 (89) |
| SVD score, median (IQR) | 2 (1, 3) | 2 (1, 3) | 2 (1, 3) |

Data are counts (n) and percentages (%), means and standard deviations (SD), or medians and interquartile ranges (IQR). The *p* values reported in the HTN-ICH column refer to comparisons between patients with IP-IVH and HTN-ICH. The *p* values reported in the CAA-ICH column refer to comparisons between patients with IP-IVH and CAA. IVH: idiopathic primary intraventricular hemorrhage; ICH: intracerebral hemorrhage; cSVD: cerebral small vessel disease; HTN-ICH: hypertensive cerebral small vessel disease-related intraparenchymal hemorrhage; CAA-ICH: cerebral amyloid angiopathy-related intraparenchymal hemorrhage; BG: basal ganglia; CSO: centrum semiovale. [a] $p < 0.05$; [b] $p < 0.001$; all others not significant.