**Supplementary Materials**

**Supplementary Table 1. Comparison of baseline clinical characteristics of SNV subgroups**

|                          | MPA (n=904)       | GPA (n=606)       | EGPA (n=593)      | PAN (n=541)       | p-value  |
|--------------------------|-------------------|-------------------|-------------------|-------------------|----------|
| **Age at diagnosis (years)** | 64.26±14.00       | 58.30±15.06       | 53.01±15.57       | 46.08±17.72       | <0.001   |
| ≥54                      | 161 (17.8)        | 215 (35.5)        | 314 (53.0)        | 362 (66.9)        | <0.001   |
| 55-74                    | 533 (59.0)        | 304 (50.2)        | 237 (40.0)        | 151 (27.9)        |          |
| ≥75                      | 210 (23.2)        | 87 (14.3)         | 42 (7.0)          | 28 (5.2)          |          |
| **Sex, n (%)**           |                   |                   |                   |                   |          |
| Male                     | 375 (41.5)        | 291 (48.0)        | 282 (47.5)        | 243 (44.9)        | 0.040    |
| Female                   | 529 (58.5)        | 315 (52.0)        | 311 (52.5)        | 298 (55.1)        |          |
| **Geographic Area, n (%)** |                  |                   |                   |                   |          |
| Seoul                    | 456 (50.4)        | 237 (39.1)        | 232 (39.1)        | 272 (50.3)        | <0.001   |
| Outside Seoul            | 448 (49.6)        | 369 (60.9)        | 361 (60.9)        | 269 (49.7)        |          |
| **Comorbidities [ICD-10 code]** |   |                   |                   |                   |          |
| Hypertension [I10-15]    |                   |                   |                   |                   |          |
| No                       | 377 (41.7)        | 347 (57.3)        | 381 (64.3)        | 372 (68.8)        | <0.001   |
| Yes                      | 527 (58.3)        | 259 (42.7)        | 212 (35.7)        | 169 (31.2)        |          |
| Diabetes mellitus [E10-14]|                   |                   |                   |                   |          |
| No                       | 547 (60.5)        | 405 (66.8)        | 438 (73.9)        | 423 (78.2)        | <0.001   |
| Yes                      | 357 (39.5)        | 201 (33.2)        | 155 (26.1)        | 118 (21.8)        |          |
| Atrial fibrillation/flutter [I48] | |                   |                   |                   |          |
| No                       | 867 (95.9)        | 593 (97.9)        | 581 (98.0)        | 535 (98.9)        | 0.003    |
| Yes                      | 37 (4.1)          | 13 (2.1)          | 12 (2.0)          | 6 (1.1)           |          |
| Dyslipidemia [E78]       |                   |                   |                   |                   |          |
| No                       | 384 (42.5)        | 318 (52.5)        | 344 (58.0)        | 363 (67.1)        | <0.001   |
| Yes                      | 520 (47.5)        | 288 (47.5)        | 249 (42.0)        | 178 (32.9)        |          |
| **Medication usage, n (%)** |   |                   |                   |                   |          |
| Immunosuppressive agents |                   |                   |                   |                   |          |
| Glucocorticoid usage ≥ 1 year | 377 (41.7) | 302 (49.8) | 336 (56.7) | 210 (38.8) <0.001 |
| Cyclophosphamide         | 503 (55.6)        | 312 (51.5)        | 194 (32.7)        | 115 (21.3)        | <0.001   |
| Rituximab                | 158 (17.5)        | 86 (14.2)         | 3 (0.5)           | 5 (0.9)           | <0.001   |
| Azathioprine/mizoribine   | 392 (43.4)        | 243 (40.1)        | 183 (30.9)        | 173 (32.0)        | <0.001   |
| Methotrexate             | 61 (6.8)          | 175 (28.9)        | 74 (12.5)         | 121 (22.4)        | <0.001   |
| Antiplatelet agents | 230 (25.4) | 132 (21.8) | 98 (16.5) | 148 (27.4) | <0.001 |
|--------------------|------------|------------|-----------|------------|--------|
| Aspirin            | 106 (11.7) | 38 (6.3)   | 41 (6.9)  | 47 (8.7)   | <0.001 |
| Clopidogrel        |            |            |           |            |        |
| Statins            | 397 (43.9) | 257 (42.4) | 194 (32.7)| 148 (27.4)| <0.001 |

Values are expressed as mean (standard deviation) or number (percentages).

SNV: Systemic necrotizing vasculitis, ICD: International classification of diseases, MPA: Microscopic polyangiitis, GPA: Granulomatosis with polyangiitis, EGPA: Eosinophilic granulomatosis with polyangiitis, PAN: Polyarteritis nodosa
### Supplementary Table 2. Estimation of incidence rate ratio of stroke among the SNV subgroups

| Diagnosis | # of events | Person-years | Incidence rate (/1000 person-years) | 95% CI | Crude incidence rate ratio | 95% CI | Adjusted incidence rate ratio* | 95% CI |
|-----------|-------------|--------------|-------------------------------------|--------|-----------------------------|--------|------------------------------|--------|
| MPA       | 79          | 2249.29      | 35.12                               | (27.94-43.45) | 4.85                        | (2.87-8.19) | 1.98                        | (1.15-3.40) |
| GPA       | 31          | 1992.43      | 15.56                               | (10.70-21.70) | 2.15                        | (1.19-3.88) | 1.14                        | (0.63-2.08) |
| EGPA      | 32          | 2149.22      | 14.89                               | (10.31-20.66) | 2.06                        | (1.14-3.70) | 1.44                        | (0.80-2.59) |
| PAN       | 17          | 2348.47      | 7.24                                | (4.32-11.24) | 1.00 (ref)                  |        | 1.00 (ref)                  |        |
| **Total** | **159**     | **8739.41**  | **18.19**                           | (15.51-21.17) |                             |        |                             |        |

*Adjustment was performed by age and sex.

SNV: Systemic necrotizing vasculitis, CI: Confidence interval, MPA: Microscopic polyangiitis, GPA: Granulomatosis with polyangiitis, EGPA: Eosinophilic granulomatosis with polyangiitis, PAN: Polyarteritis nodosa
Supplementary Figure 1. Generation of the HIRA database and data utilization

A schematic figure representing the generation and utilization of HIRA data. The data of healthcare utilization of a patient, which is submitted by the hospitals to the HIRA for financial reimbursement after patient care, are accumulated and is stored in the data warehouse. These data are transmitted to the NHIS and monetary reimbursement is made to the hospitals when it conforms to the insurance standards; researchers are authorized to assess the HIRA database through a remote account when the study is both approved by the HIRA and the medical institution where the researcher is affiliated.

HIRA: Health Insurance and Review Agency, NHIS: National Health Insurance System

Supplementary Figure 2. Overall and disease-subgroup specific risk of stroke in SNV patients

The overall and SNV subgroup-specific SIR of stroke adjusted by age was calculated.

SNV: Systemic necrotizing vasculitis, SIR: Standardized incidence ratio, CI: Confidence interval, MPA: Microscopic polyangiitis, GPA: Granulomatosis with polyangiitis, EGPA: Eosinophilic granulomatosis with polyangiitis, PAN: Polyarteritis nodosa