Data Article

Data for rate versus rhythm control strategy on stroke and mortality in patients with atrial fibrillation

Chi-Jen Wenga, Cheng-Hung Lia, Ying-Chieh Lia, Che-Chen Lin, Jiunn-Cherng Lin, Shih-Lin Chang, Chu-Pin Lo, Kuo-Ching Huang, Jin-Long Huang, Ching-Heng Lin, Yu-Cheng Hsieha, Tsu-Juey Wua

a Cardiovascular Center, Taichung Veterans General Hospital, Taichung, Taiwan
b Department of Internal Medicine, Faculty of Medicine, Institute of Clinical Medicine, Cardiovascular Research Center, National Yang-Ming University School of Medicine, Taipei, Taiwan
c Department of Data Science and Big Data Analytics, Providence University, Taichung, Taiwan
d Department of Financial Engineering, Providence University, Taichung, Taiwan
e Department of Medical Research, Taichung Veterans General Hospital, Taichung, Taiwan
f Department of Internal Medicine, Taichung Veterans General Hospital Chiayi Branch, Chiayi, Taiwan
g Division of Cardiology, Department of Medicine, Taipei Veterans General Hospital, Taipei, Taiwan

ABSTRACT

The data relates to the cohort of patients with atrial fibrillation (AF) from the National Health Insurance Research Database of Taiwan, “Rhythm Control Better Prevents Stroke and Mortality than Rate Control Strategies in Patients with Atrial Fibrillation - A Nationwide Cohort Study” (Weng et al., in press). The AF patients might receive either rate or rhythm control strategy according to the medication used. The baseline medication in rate and rhythm control groups was included in this dataset. Multivariate Cox hazards regression model was used to evaluate the hazard ratio (HR) for major adverse cardiovascular events (MACE), including ischemic/hemorrhagic stroke and mortality in AF patients receiving rate or rhythm control. The occurrence of MACE was identified from the ICD-9-CM codes. The data also contains the HR for MACE...
stratified by the CHA2DS2-VASc score, baseline characteristics, and the duration of strategy employed of the AF patients.

© 2018 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

### Specifications table

| Subject area                  | Cardiology                                      |
|-------------------------------|-------------------------------------------------|
| More specific subject area    | Atrial fibrillation on stroke and mortality     |
| Type of data                  | Tables and figures                              |
| How data was acquired         | Data analysis from the National Health Insurance Research Database of Taiwan |
| Data format                   | Analyzed                                        |
| Experimental factors          | Atrial fibrillation patients receiving either rate or rhythm control strategy on cardiovascular outcome |
| Experimental features         | Retrospective, observational, nationwide, and population-based cohort of patients with atrial fibrillation |
| Data source location          | National Health Insurance Research Database of Taiwan |
| Data accessibility            | The analyzed data is with this article.         |
| Related research article      | Weng CJ, Li CH, Liao YC, et al. Rhythm Control Better Prevents Stroke and Mortality than Rate Control Strategies in Patients with Atrial Fibrillation - A Nationwide Cohort Study. Int J Cardiol 2018 (in press) [1] |

### Value of the data

- This data provides the researchers to compare the different therapeutic strategies on cardiovascular outcomes in AF patients.
- The data has a real-world long-term cardiovascular outcome in AF patients undergoing different control strategies.
- Subgroup analysis data identifies risk factors contributing to favorable/detrimental outcomes in AF patients and helps to find out the patients at risk.

### 1. Data

Taiwan National Health Insurance program started in 1995. In this program, over 99% of the Taiwanese population (~23 million) is enrolled. The National Health Insurance Research Database of Taiwan includes records of outpatient visits, hospital admissions, prescriptions, and disease diagnoses, and is managed by the Taiwan National Health Research Institute (NHRI) [2,3]. This data set contains AF patients retrieving from the National Health Insurance Research Database. AF patients receiving either rate or rhythm control strategies constitute the AF cohort (data set Fig. 1). The data of AF patients receiving rate versus rhythm control on major adverse cardiovascular event (MACE) stratified by CHA2DS2-VASc score is shown in Fig. 2. The medication data used in this AF cohort is shown in Table 1. Subgroup analysis data of the hazard ratio for stroke and death in this AF cohort are shown in the data set Tables 2A and 2B, respectively. The data of the hazard ratio for stroke, death and MACE by the rate/rhythm control duration is shown in Table 3.
Fig. 1. Flow chart of the AF cohort. AF, atrial fibrillation; LHID, longitudinal health insurance database.

Fig. 2. The risk of stroke (A), mortality (B), and MACE (C) between rate and rhythm control groups in low (CHA2DS2-VASc score ≤ 1), intermediate (CHA2DS2-VASc score = 2), and high (CHA2DS2-VASc score ≥ 3) risk patients. MACE, major adverse cardiovascular event. * included ischemic and hemorrhagic stroke; ** included ischemic/hemorrhagic stroke and mortality.
Table 1
Medications used for rate and rhythm control in patients with AF.

| Medications | Rate control | Rhythm control | p-Value |
|-------------|--------------|----------------|---------|
|             | N = 2196 (%) | N = 654 (%)    |         |
| Rate control|              |                |         |
| β-blocker   | 1404 (63.9)  | 295 (45.1)     | < 0.0001|
| Diltiazem   | 824 (37.5)   | 127 (19.4)     | < 0.0001|
| Verapamil   | 309 (14.1)   | 59 (9.02)      | 0.0007  |
| Digoxin     | 1507 (68.6)  | 142 (21.7)     | < 0.0001|
| Rhythm control|            |                |         |
| Quinidine   | 5 (0.76)     |                |         |
| Flecanide   | 6 (0.92)     |                |         |
| Propafenone | 277 (42.4)   |                |         |
| Amiodarone  | 481 (73.6)   |                |         |
| Sotalol     | 9 (1.38)     |                |         |
| Cardiovascular medication| | | |
| ACEI/ARB    | 1391 (63.3)  | 299 (45.7)     | < 0.0001|
| α-blocker   | 311 (14.2)   | 87 (13.3)      | 0.58    |
| Diuretics   | 1399 (63.7)  | 255 (39.0)     | < 0.0001|
| Fibrates    | 111 (5.05)   | 29 (4.43)      | 0.52    |
| Statin      | 296 (13.5)   | 96 (14.7)      | 0.43    |
| Anti-thrombotics|       |                |         |
| Aspirin     | 1393 (63.4)  | 429 (65.6)     | 0.31    |
| Clopidogrel | 188 (8.6)    | 74 (11.3)      | 0.03    |
| Warfarin    | 420 (19.1)   | 81 (12.4)      | < 0.0001|

ACEI, angiotensin converting enzyme inhibitor; ARB, angiotensin receptor blocker.

Table 2A
Subgroup analysis of the hazard ratio for stroke in AF patients.

| Variable | Rate control | Rhythm control | Adjusted HR (95% CI) | p-Value | p for interaction |
|----------|--------------|----------------|----------------------|---------|------------------|
|          | Event        | Rate           | Event                | Rate    |                  |
| Agea     |              |                |                      |         |                  |
| < 65     | 138          | 24.0           | 27                   | 13.3    | 0.65 (0.42–0.99)  | 0.04 |
| ≥ 65     | 305          | 45.7           | 51                   | 29.0    | 0.68 (0.50–0.92)  | 0.01 |
| Sexb     |              |                |                      |         |                  |
| Female   | 199          | 36.5           | 35                   | 27.3    | 0.80 (0.56–1.16)  | 0.24 |
| Male     | 244          | 35.0           | 43                   | 17.2    | 0.60 (0.43–0.83)  | 0.002|
| CHA2DS2-VASCc | | | | | |
| ≤ 1      | 32           | 17.7           | 12                   | 10.3    | 0.61 (0.31–1.20)  | 0.15 |
| 2        | 64           | 24.2           | 12                   | 16.3    | 0.66 (0.35–1.23)  | 0.19 |
| ≥ 3      | 347          | 43.5           | 54                   | 28.7    | 0.66 (0.49–0.88)  | 0.005|
| Aspirind |              |                |                      |         |                  |
| No       | 149          | 30.7           | 25                   | 18.9    | 0.72 (0.46–1.10)  | 0.13 |
| Yes      | 294          | 38.9           | 53                   | 21.6    | 0.67 (0.49–0.90)  | 0.007|
| Clopidogreld |       |                |                      |         |                  |
| No       | 416          | 35.8           | 68                   | 19.6    | 0.65 (0.50–0.84)  | 0.001|
| Yes      | 27           | 33.1           | 10                   | 32.6    | 0.91 (0.43–1.94)  | 0.81 |
| Warfarind |              |                |                      |         |                  |
| No       | 354          | 35.4           | 67                   | 20.4    | 0.69 (0.53–0.91)  | 0.007|
| Yes      | 89           | 36.7           | 11                   | 22.0    | 0.65 (0.35–1.23)  | 0.19 |

a Model adjusted for sex, heart failure, hypertension, DM, hyperlipidemia, COPD, CKD, liver disease and peripheral vascular disease
b Model adjusted for age, heart failure, hypertension, DM, hyperlipidemia, COPD, CKD, liver disease and peripheral vascular disease
c Model adjusted for hyperlipidemia, COPD, CKD and liver disease
d Model adjusted for age, sex, heart failure, hypertension, DM, hyperlipidemia, COPD, CKD, liver disease and peripheral vascular disease
Table 2B
Subgroup analysis of the hazard ratio for death in AF patients.

| Variable          | Rate control | Rhythm control | Adjusted HR (95% CI) | p-Value | p for interaction |
|-------------------|--------------|----------------|-----------------------|---------|------------------|
|                   | Event Rate   | Event Rate     |                       |         |                  |
| Age               |              |                |                       |         |                  |
| < 65              | 177 28.1     | 33 15.6        | 0.67 (0.46–0.98)      | 0.04    |                  |
| ≥ 65              | 747 100      | 145 74.7       | 0.82 (0.68–0.98)      | 0.03    |                  |
| Sex               |              |                |                       |         |                  |
| Female            | 385 63.8     | 77 55.3        | 0.95 (0.74–1.23)      | 0.72    |                  |
| Male              | 539 69.6     | 101 38.0       | 0.70 (0.57–0.87)      | 0.002   |                  |
| CHA2DS2-VASc       |              |                |                       |         |                  |
| ≤ 1               | 40 20.8      | 18 15.0        | 0.83 (0.47–1.46)      | 0.52    |                  |
| 2                 | 101 35.0     | 20 25.4        | 0.75 (0.47–1.22)      | 0.25    |                  |
| ≥ 3               | 783 87.4     | 140 67.7       | 0.78 (0.65–0.93)      | 0.006   |                  |
| Aspirin           |              |                |                       |         |                  |
| No                | 327 61.7     | 72 51.3        | 0.96 (0.74–1.24)      | 0.75    |                  |
| Yes               | 597 70.4     | 106 40.0       | 0.74 (0.60–0.91)      | 0.005   |                  |
| Clopidogrel       |              |                |                       |         |                  |
| No                | 837 64.8     | 150 40.3       | 0.77 (0.64–0.92)      | 0.004   |                  |
| Yes               | 87 102       | 28 83.6        | 1.00 (0.64–1.55)      | 0.99    |                  |
| Warfarin          |              |                |                       |         |                  |
| No                | 758 68.5     | 160 45.5       | 0.85 (0.71–1.01)      | 0.06    |                  |
| Yes               | 166 61.4     | 18 33.7        | 0.60 (0.37–0.98)      | 0.04    |                  |

* Model adjusted for age, sex, heart failure, hypertension, DM, hyperlipidemia, COPD, CKD, liver disease and peripheral vascular disease.

Table 3
Hazard ratio for stroke, death and MACE by the rate/rhythm control duration.

| AF control Strategy | Adjusted HR (95% CI) |
|---------------------|----------------------|
|                     | Stroke               | Mortality            | MACE                |
| Rate control Ref    | Ref                  | Ref                  | Ref                 |
| Rhythm control      |                       |                      |                     |
| 30–179 cDDD         | 0.74 (0.53–1.02)     | 0.91 (0.74–1.13)     | 0.93 (0.77–1.13)    |
| 180–364 cDDD        | 0.77 (0.54–1.12)     | 0.73 (0.56–0.95)     | 0.79 (0.63–1.00)    |
| ≥ 365 cDDD          | 0.34 (0.16–0.72)     | 0.68 (0.45–1.02)     | 0.60 (0.41–0.87)    |

Model adjusted for age, sex, heart failure, hypertension, DM, hyperlipidemia, COPD, CKD, liver disease and peripheral vascular disease.

The duration of rate/rhythm control was stratified by cumulative defined daily doses (cDDDs) of the rate/rhythm control medication used.

* < 0.05

2. Experimental design, materials and methods

2.1. Research database

The data set was created by a systemic randomized sampling of 1,000,000 patients from 1999 to 2010 in the National Health Insurance Research Database. This data set has been confirmed to be representative of the general Taiwanese population. Since the patient’s data was provided in an
anonymous format, the written informed consents were waived. The creation of this data set was approved by the Institutional Review Board of Taichung Veterans General Hospital (CE13152B-4).

2.2. Patient population

To create the AF cohort data set, patients aged \( \geq 18 \) years with a diagnosis of atrial flutter/ fibrillation (AF), were identified by the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) codes 427.3, 427.31, and 427.32. The diagnosis of AF was defined as three or more outpatient visits with a diagnostic code of AF within a year, or at least one hospitalization under an AF diagnostic code. The primary endpoints of the AF cohort were MACE, including hemorrhagic stroke (ICD-9-CM: 430-432), ischemic stroke (ICD-9-CM: 433–438), and death, therefore, patients were excluded from this cohort if they had experienced prior stroke or had died within one year of enrollment.

2.3. Definitions of medication use

Patients who had used any one of the anti-arrhythmic drug (AADs) for AF rhythm control, and had a defined daily dose (DDD) of \( \geq 30 \) within the first year of enrollment, were defined as the rhythm control group. The AADs and their classes for AF rhythm control included amiodarone (III), sotalol (III), propafenone (Ic), flecainide (Ic), quinidine (Ia), and procainamide (Ia). AF patients who received any rate control medications, including beta-blockers, calcium channel blockers (diltiazem, verapamil), and digitalis for \( \geq 30 \) DDD within the first year of enrollment constituted the rate control group. Patients who used both rhythm and rate control medications were classified as the rhythm control group. AF treatment strategies in this cohort were chosen by physicians’ clinical discretion. Current use was defined as taking medication between the prescription date and the end date of drug supply. Discontinuation was defined as when no medication was refilled after the end date of drug prescription. The data set also contains commonly prescribed antithrombotic therapies, including warfarin, acetylsalicylic acid, and clopidogrel for analysis.

2.4. Outcomes and covariates

The baseline demographic data was recorded. Cardiovascular co-morbidities including hypertension, hyperlipidemia, liver disease, diabetes mellitus (DM), coronary heart disease (CHD), congestive heart failure (CHF), peripheral vascular disease (PVD), valvular heart disease (VHD), chronic obstructive pulmonary disease (COPD), and chronic kidney disease (CKD) were identified by the ICD-9-CM diagnostic code if the patient had at least 1 hospitalization or 3 consecutive outpatient visits under the diagnosis of the above listed diseases.

2.5. Statistical analysis

Continuous variables were presented as mean ± standard deviations (SD), while proportions were used for categorical variables. Analysis of variance and Chi-square tests were used for comparing differences in the continuous and categorical variables. Multivariable Cox proportional hazard regression models were used to exclude confounding factors contributing to MACE occurrence (adjusted for age, gender, co-morbidities, and medications). A stratified analysis was used to evaluate the cardiovascular outcomes in patients with/without the specified medications. The rate control group served as the reference, and the occurrence of MACE in the rhythm control group was expressed by the hazard ratio (HR) and a 95% confidence interval (CI). All statistical analyses were carried out using SAS software version 9.2 (SAS Institute, Inc., Cary, NC, USA). A p value of \(< 0.05\) was considered statistically significant.
Acknowledgements

This data was supported in part by grants from Taichung Veterans General Hospital, Taiwan (TCVGH-NHRI10603, TCVGH-1067310C, TCVGH-FCU1068205, TCVGH-YM1060201, TCVGH-VTA106PREM1, TCVGH-1033103C, TCVGH-1033105C, TCVGH-1043109C, TCVGH-1053108C, TCVGH-VHCY1068606, TCVGH-VHCY1078603) and the National Science Council, Taiwan (102-2314-B-075A-009-MY2, 104-2314-B-367-001, 105-2314-B-075A-016-MY3).

Transparency document. Supporting information

Transparency data associated with this article can be found in the online version at https://doi.org/10.1016/j.dib.2018.08.199.

References

[1] C.J. Weng, C.H. Li, Y.C. Liao, et al., Rhythm control better prevents stroke and mortality than rate control strategies in patients with atrial fibrillation - a nationwide cohort study, Int. J. Cardiol. (2018), https://doi.org/10.1016/j.ijcard.2018.06.090 (In press).

[2] C.Y. Hung, Y.C. Hsieh, C.H. Li, J.L. Huang, C.H. Lin, T.J. Wu, Age and CHADS2 score predict the effectiveness of renin-angiotensin system blockers on primary prevention of atrial fibrillation, Sci Rep. 5 (2015) 11442.

[3] Y.C. Hsieh, C.Y. Hung, C.H. Li, et al., Angiotensin-receptor blocker, angiotensin-converting enzyme inhibitor, and risks of atrial fibrillation: a nationwide cohort study, Medicine 95 (2016) e3721.