A Real-World Study of Patient Characteristics and Treatment Patterns for Atrial Fibrillation and Atrial Flutter in China

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BACKGROUND AND STUDY OBJECTIVES

Atrial fibrillation and atrial flutter (AF) are the most common forms of cardiac arrhythmia. It has been estimated that 6.9-21.0 million people in China have with either atrial fibrillation or atrial flutter[1]. Prevalence of AF is projected to more than double in the next 50 years because of an aging population[2]. What is more, patients with AF have a 4- to 5-fold increased risk of stroke compared to the general population[3]. These lead to a dramatic increase in disease burden of atrial fibrillation or atrial flutter worldwide. Meanwhile, the treatment patterns of AF in China is not well understood. This research aimed to identify the AF population in China and document their baseline demographic characteristics, treatment patterns, and percentages of treated and untreated AF patients.

METHODS

Data Sources

SuValue database [4] was used in this study, it :

- is an electronic medical record (EMR) database
- covers over 100 million patients from 192 hospitals
- contains data from 20 provinces and 2 autonomous regions in China
- reports patient demographic information, patients' disease severity, and hospital characteristics
- reports medical records including inpatient stays, office visits, lab tests, and medical prescriptions

Sample

Inclusion criteria:

- Adult patients, aged 18-105 at diagnosis of AF
- Had an index diagnosis of atrial fibrillation or atrial flutter [5-6]
- Diagnosed in year 2010-2019
- Continuously received medical services from the in-network hospitals for 6+ months

Disease	Diagnosis description	ICD-9-CM	ICD-10-CM
Atrial Fibrillation	Diagnosis filed by physicians	427.31	I48.0, I48.1, I48.2, I48.91
Atrial Flutter	Diagnosis filed by physicians	427.32	I48.3, I48.4, I48.92

Exclusion criteria:

- Patients with following procedures within 30 days before diagnosis [7]
  - Coronary artery bypass graft, pericardial surgery, structural cardiac repair
  - Electrical cardioversion
- Patients with following medications before diagnosis
  - Heart rate medications, heart rhythm medication, antithrombotic therapies

Comorbidity conditions

Comorbidity conditions included in this study are:

- Hypertension
- Diabetes
- Liver disease
- Chronic obstructive pulmonary disease (COPD)
- Bleeding history
- Coronary artery disease
- Previous stroke / transient ischemic attack
- Renal disease

Medication Use

- The following medications were identified after the diagnosis of AF and before the first event of stroke or the end of medical records, whichever came first.

Drug type		Medication
Heart rate medications		digoxin, atenolol, bisoprolol, carvedilol, metoprolol, propranolol, timolol, diltiazem, verapamil
Heart rhythm medications		flecainide, propafenone, quinidine, amiodarone, dofetilide, sotalol
Antithrombotic therapies	Anticoagulants	apixaban, dabigatran, heparin, rivaroxaban, warfarin, enoxaparin
	Antiplatelets	aspirin, clopidogrel, prasugrel, ticagrelor, vorapaxar

Outcomes of Interest

Descriptive data analysis was conducted to summarize patient baseline demographics, illness severity, medication use, and risks of stroke.

Baseline demographic information:

- Age, gender, marital status
- Geographical region
- Medical insurance types
- Hospital characteristics

Patient illness severity

- Comorbidity conditions
- CHA_2DS_2-VASc and $CHADS_2$ scores

Medication use

- Heart rate medications
- Heart rhythm medications
- Antithrombotic therapies (anticoagulants and antiplatelets)

Risks of stroke

- Percentage of patients with stroke after diagnosis of AF
- Time in days from diagnosis to the first stroke event

Sensitivity Analysis

Due to the nature and limitations of the EMR database, a large portion of patients may not have enough longitudinal follow-up records

- We examined patients with at least one medical visit after diagnosis of AF

RESULTS

Summary statistics

- 8,081 patients received services from the in-network hospitals for 6+ months.
- Patients aged 68.8 ±13.0 years old at diagnosis of AF
- 49.7% were female (N=3,992)
- 41.8% were married (N=3,434)
- 41.2% were covered by insurance (N=3,329)
- Top 3 common comorbidities are
  - Coronary artery disease(50.7%)
  - Hypertension(37.6%)
  - Heart failure(14.4%)

Medication Use

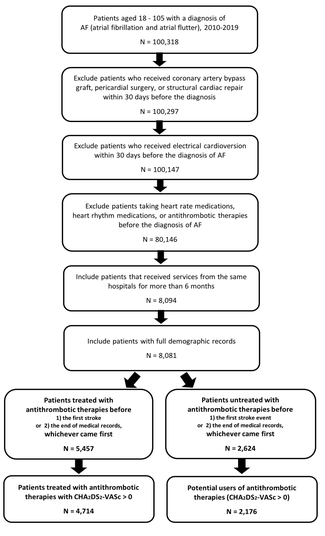
Patients were treated with

- Heart rate medications (63.5%)
- Heart rhythm medications (1.3%)
- Antithrombotic therapies (67.5%)
  - anticoagulants (44.9%)
  - antiplatelets (48.4%)
  - both (25.8%)
- The top 4 commonly used antithrombotic therapies
  - aspirin (41.6%)
  - heparin (34.6%)
  - clopidogrel (16.4%)
  - warfarin (15.9%)

Risk of Stroke

- 11.2% of patients had stroke events after diagnosis
- Mean days from diagnosis to first stroke events is
  - 295.9 (±190.2) days for all AF patients;
  - 295.3 (±188.0) days for treated group.

Figure 1. Flowchart of Stroke Cohort Selection



Summary Statistics

Table 1. Baseline Information for Patients with AF

Variables	Patients newly diagnosed with AF
Number of patients (N=)	8,081
Baseline demographic information***	
Age	
Mean (SD)	68.8 (13.0)
Age 65 and older	69.1%
Age 75 and older	37.5%
Gender	
Female	49.4%
Marital Status	
Married	42.5%
Others	57.5%
Medical insurance type	
Health insurance in urban area	22.3%
Health insurance in rural area	18.9%
Self-supported	30.9%
The level of hospital†	
Level I	0.7%
Level II	62.6%
Level III	36.7%
Geographical region‡	
East	27.2%
Central	6.1%
West	66.5%
Northeast	0.2%
CHA2DS2-VASc score	
Mean (SD)	2.0 (1.4)
0	14.7%
1	24.02%
2	26.82%
>2	34.43%
CHADS2 score	
Mean (SD)	0.8 (1.0)
0	49.3%
1	30.2%
2	10.3%
>2	10.1%
Comorbidity	
Hypertension	37.6%
Coronary artery disease	50.7%
Heart failure	14.4%
COPD	8.4%
Diabetes	10.5%
Previous stroke/transient ischemic attack	19.3%
Liver disease	0.1%
Renal disease	1.2%
Bleeding history	4.4%

† Level of hospitals are defined according to Chinese hospital administrative classification system. Level III hospitals are equipped with more hospital beds, professions, and equipment comparing to Level I and II hospitals.
‡ Geographical regions are defined by the National Bureau of Statistics of China, based on the geographic location and economic situation of each province.
a Among patients who were treated with antithrombotic therapies, 85.3% (24.02%+26.82%+34.43%=85.27%) had a CHA2DS2-VASc score larger than 0, N=6,890.

Medication Use

Figure 2. Percentage of Medicated Patients

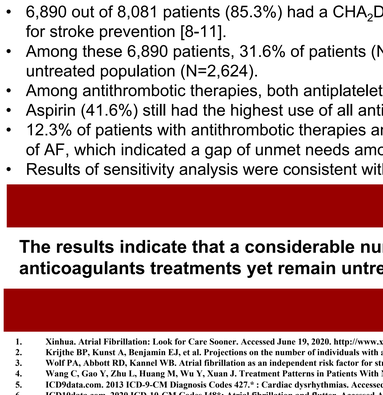
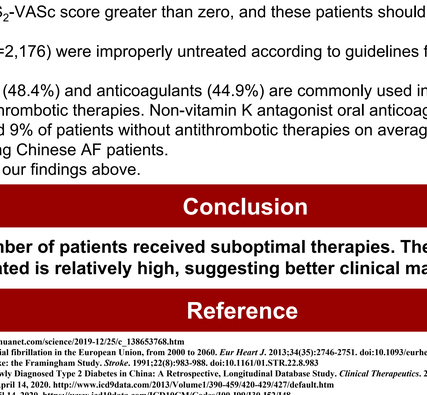


Figure 3. Top 5 Treatment Patterns for AF Patients



Risk of Stroke and Major Bleeding

Figure 4. Percentage of Patients with Stroke After Diagnosis of AF, All, Treated, vs. Untreated Groups

Note: The bars indicate (1) stroke percentage for overall group, N=8,081; (2) stroke percentage for treated patients, N=5,457; (3) stroke percentage for untreated patients, N=2,624.

Discussion

- 6,890 out of 8,081 patients (85.3%) had a CHA_2DS_2-VASc score greater than zero, and these patients should use antithrombotic therapies according to treatment guidelines for stroke prevention [8-11].
- Among these 6,890 patients, 31.6% of patients (N=2,176) were improperly untreated according to guidelines for stroke prevention [8-11], which also amounted to 82.9% of untreated population (N=2,624).
- Among antithrombotic therapies, both antiplatelets (48.4%) and anticoagulants (44.9%) are commonly used in China.
- Aspirin (41.6%) still had the highest use of all antithrombotic therapies. Non-vitamin K antagonist oral anticoagulants (NOACs) were not widely used in China even in 2019.
- 12.3% of patients with antithrombotic therapies and 9% of patients without antithrombotic therapies on average experienced a stroke event about 1 year after the diagnosis of AF, which indicated a gap of unmet needs among Chinese AF patients.
- Results of sensitivity analysis were consistent with our findings above.

Conclusion

The results indicate that a considerable number of patients received suboptimal therapies. The percentage of patients that potentially require anticoagulants treatments yet remain untreated is relatively high, suggesting better clinical management is needed.

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