CLINICAL STUDY

Low Consultation Rate of General Population with Atrial Fibrillation

From the Ibara-AF Study

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Summary

In order to prevent ischemic stroke, it is important to identify and treat patients with atrial fibrillation (AF) who do not consult a doctor in a medical institution. The aim of this study was to determine the consultation rate at medical institutions for patients with AF in group medical examinations conducted in a city in western Japan. Of 6101 examinees of group medical examinations (40 years of age or older) conducted in Ibara City, Okayama Prefecture, Japan, from 2012 to 2014, 4338 participants (71.1%) who were evaluated by electrocardiogram (ECG) gave written informed consent and responded to surveys in the form of questionnaires through a personal interview conducted by nurses were included in the Ibara-AF study. A cumulative total of 82 subjects were diagnosed as having AF by ECG (prevalence of AF = 1.89%), and 51 individuals had AF during the three-year period.

15 (29.4%) of the 51 patients with AF did not regularly visit medical institutions. Among them, 46.7% (n = 7) and 53.3% (n = 8) of the patients were symptomatic and asymptomatic, respectively, and 73.3% of the patients had a $CHADS_2$ score of more than one point. There were no significant differences in patients' characteristics between regular and non-regular visit groups. In conclusion, about one-third of the patients with AF did not regularly see a doctor in a medical institution and most of them had a $CHADS_2$ score of more than one point in a Japanese rural area. Educating the public about the risks of AF is required.

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Key words: Stroke, $CHADS_2$ score

Atrial fibrillation (AF) is a common type of arrhythmia that has high risks for mortality, impaired cardiac function, and thromboembolism, especially cardioembolic stroke.[1-7] AF is a predictive factor for severe stroke and early death in patients with acute ischemic stroke.[8]

The prevalence of AF increases as people age.[2,9,10] Appropriate treatment including anticoagulant medication is needed to prevent ischemic stroke.[11-15] However, asymptomatic patients would not go to a hospital, and some symptomatic patients with mild symptoms may also not go to a hospital. Therefore, it is also important to identify and treat patients with AF who do not see a doctor in a medical institution.

The aim of this study was to determine the consultation rate at medical institutions for patients with AF, including both symptomatic and asymptomatic patients. We examined the rates in group medical examinations conducted in Ibara City, Okayama Prefecture, Japan, from 2012 to 2014 by the use of electrocardiograms (ECGs) and surveys in the form of questionnaires using a personal interview method by nurses.

Methods

Patient population: Of 6101 examinees of group medical examinations (40 years of age or older) conducted in Ibara City from 2012 to 2014, 4338 participants (71.1%) who were evaluated by ECGs, gave written informed consent, and responded to surveys in the form of question-

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Questionnaire	
QUESTIONS	
Have you ever visited a medical institution due to arrhythmia? or Do you regularly visit a medical institutions due to arrhythmia?	
ANSWERS: Please put a check mark.	**Grouping**
☐ 1. Yes, I see a doctor regularly.	Regular visit group
☐ 2. Yes, I see a doctor when I have an attack of arrhythmia.	Non-regular visit group (Attack group)
☐ 3. Yes, I saw a doctor in the past, but I do not regularly see a doctor now due to arrhythmia.	Non-regular visit group (Past group)
☐ 4. No, I have not seen a doctor due to arrhythmia.	Non-regular visit group (Not seen group)

Figure 1. Questionnaire and grouping.

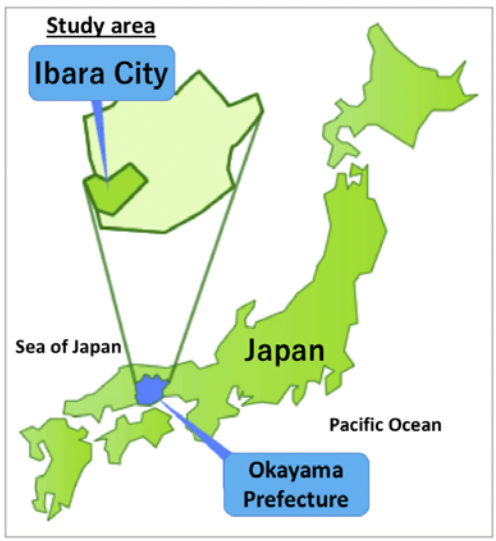

Figure 2. Geographic location of Ibara City in Okayama Prefecture of Japan (http://www.city.ibara.okayama.jp/english/).

naires using a personal interview conducted by nurses were included in the Ibara-AF study (Figure 1). Ibara City is located in the western part of Honshu Island in Japan (Figure 2). The population of Ibara City was 42,787 (20,389 men and 22,398 women) in the 2014 census. The number of medical institutions, including clinics and hospitals, in 2015 was 24 (58 per 100,000) and the number of medical doctors was 46 (111 per 100,000) (http://jmap.jp/cities/detail/city/33207). Ibara-AF study was performed along with the "Ibara Study," which investigated the association between occupational dysfunction and metabolic syndrome.[16] The study protocol was approved by the Ethics Committee of the Okayama University Graduate School of Medicine, Dentistry, and Pharmaceutical Sciences (application number of Ethical Committees of Okayama University [1506-079]), and written informed consent was obtained from all participants.

In the present study, subjects were defined as having AF when their ECG showed AF at the time of the health examination, and the prevalence of AF as assessed by ECG was calculated.

Questionnaires and grouping of participants: To determine the consultation rate at medical institutions for patients with AF, including both symptomatic and asymptomatic patients, we surveyed medical examinees by questionnaires using a personal interview method conducted by nurses. The questionnaire is shown in Figure 1. Based on answers to questions in the questionnaire, we divided the participants into "Regular visit" (to a doctor) and "Non-regular visit" (to a doctor) groups. We also divided the participants in the non-regular visit group into "Attack," "Past," and "Not seen" groups (Figure 1). The Attack group included participants who answered "I see a doctor when I have an attack of arrhythmia," the Past group included participants who answered "I saw a doctor in the past, but I do not regularly see a doctor now due to arrhythmia," and the Not seen group included participants who answered "I have not seen a doctor due to arrhythmia." There were questions about symptoms, including arrhythmia, palpitation, a sense of oppression in the chest or chest discomfort, chest pain, general fatigue, dizziness, and syncope, and about histories of cardiovascular diseases, including heart failure, arrhythmia (AF, atrial flutter, supraventricular premature contraction, ventricular premature contraction, paroxysmal supraventricular tachycardia, ventricular tachycardia, ventricular fibrillation, sick sinus syndrome, atrioventricular block, and others), and others. The $CHADS_2$ score was also calculated by asking the age and histories of congestive heart failure, hypertension, diabetes, and stroke.[17] The prevalence of AF and the consultation rate for AF as assessed by ECG and interview were also calculated.

Statistical analysis: Data are given as mean ± standard deviation (SD), number, or percentage. Statistical analysis was performed by Student's t-test or the chi-squared test. Values of $P < 0.05$ were considered to be significant.

Results

Prevalence of AF: Of 6101 examinees of group medical examinations conducted in Ibara City from 2012 to 2014, 4338 participants (71.1%) were included in the Ibara-AF study. Of 1974 elderly examinees (75 years of age or older), 1646 people (83.4%) participated in this study. A cumulative total of 82 subjects were diagnosed as having

Table I. Age- and Gender-Specific Numbers of Participants and Subjects with AF

Age, years	Study participants				Subjects with AF			
	2012	2013	2014	Cumulative total	2012	2013	2014	Cumulative total
Men								
40-49	4	32	36	72	0	0	0	
50-59	18	31	32	81	0	0	0	
60-69	111	205	213	529	1 (0.90%)	6 (2.93%)	6 (2.82%)	13 (2.46%)
70-79	179	274	294	747	7 (3.91%)	9 (3.28%)	12 (4.08%)	28 (3.75%)
80-	152	131	157	440	10 (6.58%)	5 (3.81%)	9 (5.73%)	24 (5.45%)
All ages	464	673	732	1869	18 (3.88%)	20 (2.97%)	27 (3.69%)	65 (3.48%)
Women								
40-49	5	14	33	52	0	0	0	
50-59	18	48	36	102	0	0	0	
60-69	176	319	305	800	0	0	0	
70-79	254	403	398	1055	3 (1.18%)	2 (0.50%)	4 (1.01%)	9 (0.85%)
80-	152	145	163	460	3 (1.97%)	3 (2.07%)	2 (1.23%)	8 (1.74%)
All ages	605	929	935	2469	6 (0.99%)	5 (0.54%)	6 (0.64%)	17 (0.69%)
All (men and women)								
40-49	9	46	69	124	0	0	0	
50-59	36	79	86	183	0	0	0	
60-69	287	524	518	1329	1 (0.35%)	6 (1.15%)	6 (1.16%)	13 (0.98%)
70-79	433	677	692	1802	10 (2.31%)	11 (1.62%)	16 (2.31%)	37 (2.05%)
80-	304	276	320	900	13 (4.28%)	8 (2.90%)	11 (3.44%)	32 (3.56%)
All ages	1069	1602	1667	4338	24 (2.25%)	25 (1.56%)	33 (1.98%)	82 (1.89%)

AF indicates atrial fibrillation.

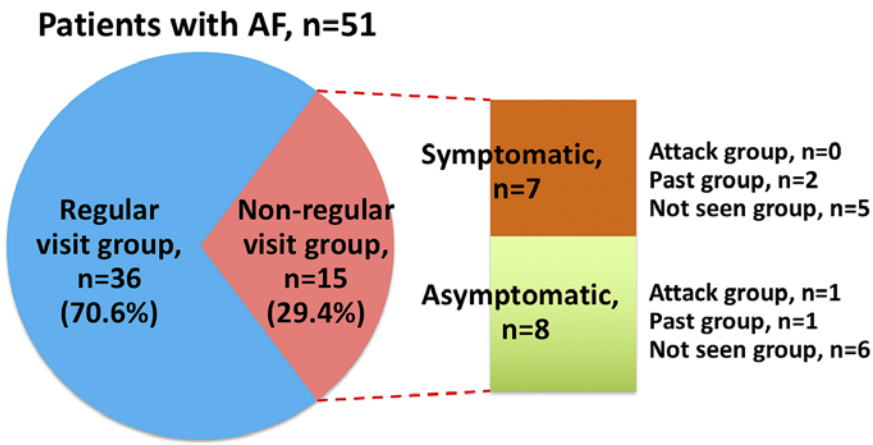

Figure 3. Consultation rate in patients with AF, symptomatic or asymptomatic, and grouping.

AF by ECG (prevalence of AF = 1.89%) (Table I), and the number of individuals who had AF during the three-year period was 51. The prevalence of AF increased with advancing age in both men and women, and the prevalence was lower in women than in men for each age group.

Interviews by nurses revealed that a cumulative total of 18 patients with AF who were diagnosed in different situations showed sinus rhythm in the ECG of the health check among study participants. The prevalence of AF as assessed by ECG and interview (n = 100) was 2.31%.

Consultation rate in patients with AF: Of the 51 patients with AF as assessed by ECG, 15 (29.4%) did not regularly visit medical institutions (Figure 3). Among the 15 patients who did not regularly visit medical institutions (non-regular visit group), 46.7% (n = 7) and 53.3% (n = 8) of the patients were symptomatic and asymptomatic, respectively. Thus, not only asymptomatic patients, but also symptomatic patients did not see a doctor regularly. One patient who answered "I see a doctor when I have an attack of arrhythmia" (attack group) had no symptoms despite the existence of AF on ECG. Furthermore, more than half of the patients in both symptomatic and asymptomatic patients had never seen a doctor due to arrhythmia (not seen group).

A total of 31 (31.0%) of the cumulative total of 100 patients with AF as assessed by ECG and interview did not regularly visit medical institutions (n = 1, attack group; n = 11, past group and n = 19, not seen group). There was no significant difference between consultation rates for patients with AF as assessed by ECG and patients with AF as assessed by ECG and interview (31.7%

Table II. Characteristics of Patients with Atrial Fibrillation

	Regular visit group (n = 36)	Non-regular visit group (n = 15)	P value
Age, years	75 ± 7	75 ± 8	0.976
Female gender (%)	7 (19)	3 (20)	0.964
Body mass index	24.1 ± 2.6	23.6 ± 3.3	0.961
$CHADS_2$ score	1.6 ± 0.9	1.2 ± 0.9	0.838
High school or higher education, %	64	53	0.482
Employment rate, %	6	7	0.878
Marital status (married), %	86	67	0.111

Data are given as mean ± standard deviation, number, or percentage.

versus 31.0%, P = 0.918).

Moreover, 73.3% (n = 11) of the patients in the non-regular visit group had a $CHADS_2$ score of more than one point (n = 4/4/7/0 for $CHADS_2$ scores).

There were no significant differences in patients' characteristics (age, sex, body mass index, $CHADS_2$ score, education levels, employment rate, and marital status) between the regular visit and non-regular visit groups (Table II).

Discussion

There were three major findings in the present study: 1) about one-third of the patients with AF did not regularly see a doctor in medical institutions, 2) not only asymptomatic patients, but also symptomatic patients did not see a doctor regularly, and 3) most of the AF patients who did not regularly see a doctor in medical institutions had a $CHADS_2$ score of more than one point in a Japanese rural area. To our knowledge, this is the first report on a survey for hospital visiting rates of AF patients.

The prevalence of AF increased with advancing age in both men and women, and the prevalence was lower in women than in men for each age group in this study. These results agree with a previous Japanese report on AF prevalence.[2)]

The questionnaires showed that not only asymptomatic patients, but also symptomatic patients did not see a doctor regularly. These results indicate that there is no increase in the consultation rate at medical institutions for patients with AF depending on only symptoms. Interestingly, one patient in the attack group had no symptoms despite the existence of AF on ECG. His symptoms had disappeared. Xiong *et al*. reported that no difference was found in all-cause death between patients with asymptomatic AF and patients with symptomatic AF, and there was also no difference in cardiovascular death or stroke/thromboembolism.[18)] Therefore, we should not determine our approach to prevention therapies for cardiovascular diseases depending on the presence or absence of symptoms.

Most of the patients in the non-regular visit group had a $CHADS_2$ score of more than one point. Therefore, AF patients who did not visit medical institutions regularly had a high risk of stroke.

Nationwide education about the risks of AF is needed to increase the consultation rate at medical institutions for patients with AF. Individualized instructions for patients with AF may also be useful. Physicians also need to persuade patients with AF to visit a doctor regularly.

There were no significant differences in patients' characteristics between regular visit and non-regular visit groups. Therefore, characteristics of patients with AF who did not regularly visit medical institutions were not clearly defined in this study.

This study was performed in a region with a shortage of doctors, and that might have affected the results of this study. Not only several asymptomatic but also some symptomatic patients in this study did not go to hospitals. We do not know the precise reason why they did not go to hospitals. A shortage of doctors might influence the patient's behavior. Furthermore, there are only five cardiovascular departments in the city. Attending doctors of some patients with AF who had a $CHADS_2$ score of more than one point might not be cardiologists.

There are several limitations to this study. First, because this research is a survey targeting only one rural area, its generalizability may be limited. Second, this study was performed in a small population of AF patients. Further large-scale studies are needed. Third, this study was carried out in a region with a shortage of doctors. Therefore, surveys for hospital visiting rates of AF patients in regions with a sufficient number of doctors are also needed.

In conclusion, this study showed that about one-third of patients with AF in a Japanese rural area did not regularly see a doctor in a medical institution and that most of them had a high risk of stroke. Educating the public about the risks of AF is therefore, necessary.

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Disclosure

Conflicts of interest: The authors declare that there is no conflict of interest.

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