N. F. Plavunov[1,2], N. I. Gaponova[1,2], V. A. Kadyshev[1,2], V. R. Abdrachmanov[1], A. E. Akimov[1,2], A. I. Kulik[2]

[1] — Federal State Budget Institution of Higher Education A. I. Yevdokimov Moscow State University of Medicine and Dentistry, Moscow, Russia

[2] — First Aid Station named after A. S. Puchkov, Moscow, Russia

CLINICAL AND STATISTICAL EVALUATION OF THE CALLS OF PATIENTS WITH ATRIAL FIBRILLATION

Abstract

This article presents the results of the clinical and statistical evaluation of calls made by patients with atrial fibrillation to the emergency medical service in Moscow.

Emergency teams performed a voluntary survey of 5,003 patients with AF. The proportion of calls regarding heart rhythm disorders was 17 % of the total number of calls regarding cardiovascular diseases, of which 88 % pertained to atrial fibrillation. A clear trend was observed in the prevalence of AF in men of working age and in women in the older age group. Among the respondents paroxysmal form of AF prevails in 70.1 % of cases. The average score of the risk of thromboembolic complications in patients with atrial fibrillation/flutter according to CHA_2DS_2-VASc was 3.56 ± 1.71. The average score of risk assessment of ischemic stroke in patients with nonrheumatic atrial fibrillation/flutter according to $CHADS_2$ was 1.85 ± 1.13. The number of patients with a score of two or more on both scales was 87.7 % and 59.3 % respectively. 28 % of patients with AF asked for medical help at least 48 hours after the onset of the paroxysm. Regular follow-up by a cardiologist is carried out in 50.5 % of cases, by a physician in 62.8 %, jointly by a physician and a cardiologist in 45 % respectively. Continuous oral anticoagulant therapy is performed in 29.8 % of patients with AF. The percentage of medical evacuations of patients with AF increased from 23.8 % in 2015 to 27.1 % in 2016. The study shows that regular clinical and statistical analysis of the effectiveness of medical care at all stages for patients with AF is necessary.

Key words: emergency medicine, cardiac arrhythmias, atrial fibrillation

BP — blood pressure, CAD — coronary artery disease, INR — international normalized ratio, TIA — transient ischemic attack, AF — atrial fibrillation, COPD — chronic obstructive pulmonary disease, HR — heart rate, ECG — electrocardiogram

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Russia has seen an increase in the number of patients with circulatory system diseases in recent years [1]. Heart rhythm disorders are a significant fraction in this pathology's structure [2, 3]. In turn, atrial fibrillation (AF) is the most frequent rhythm disorder, which is the cause for emergency calls.

Almost half of the patients with cardiovascular diseases are diagnosed with this arrhythmia [2, 3] The AF prevalence correlates with age, hypertension presence, the development of other comorbidities — coronary artery disease (CAD), diabetes mellitus, chronic obstructive pulmonary disease

*Contacts. E-mail: nade-gaponova@yandex.ru

(COPD), etc., as well as atherosclerosis progression, which in turn increases the number of hospital admissions and the mortality rate among patients [2, 4, 5].

According to the World Health Organization, up to 50 % of all cardioembolic strokes are associated with AF, which leads to more severe disability and mortality among patients compared with stroke caused by another etiology [6, 7]. AF also contributes to the incidence of chronic heart failure.

Hypertension and coronary artery disease dominate in the etiological structure of atrial fibrillation, less common arrhythmia causes are diabetes mellitus, COPD, cardiomyopathy, thyroid disorders, etc. [8].

Patients with AF need long-term, almost lifelong, anticoagulation therapy to reduce the risk of thromboembolic complications. For many years the main indirect anticoagulant drug was warfarin, an antagonist of vitamin K [9], which requires regular monitoring of the international normalized ratio (INR), which in reality cannot always be accomplished by patients due to different reasons. A new generation of oral anticoagulants — rivaroxaban, dabigatran etexilate, apixaban — are an alternative to warfarin for prevention of thromboembolic complications in patients with AF. They directly inhibit coagulation factor Xa (Stuart–Prower factor, the active protein gamma-globulin form) or thrombin. The drugs have fixed dose schedule and do not require INR monitoring [10, 11, 12].

The medical and social significance of AF is determined by the high frequency of emergency calls and the need for hospital admissions for optimal treatment strategies. Each year from 10 to 40 % of patients with AF are admitted for various reasons.

According to statistics from the First aid station named after A. S. Puchkov, Moscow, in 2015, the proportion of calls regarding heart rhythm disorders was 17 % of the total number of calls regarding cardiovascular diseases, of which 88 % pertained to atrial fibrillation. In 2016, these indicators were 17.6 % and 89.6 %, respectively. The percentage of medical evacuation of patients with AF in 2015 amounted to 23.8 %, and to 27.1 % in 2016.

The objective of the study was to conduct clinical and statistical evaluation of the frequency of calls made by patients with atrial fibrillation to the emergency medical service in Moscow, to evaluate the effectiveness of paroxysmal form management at the pre-hospital stage, which could be used later in the assessment of treatment effectiveness in organizations providing primary medical care.

Materials and methods

The study conducted at the First aid station named after A. S. Puchkov, Moscow, contains data about emergency calls and medical evacuation of patients with AF to hospitals. In 2016, 5,003 patients with AF took part in a voluntary survey, the information received was put in the original individual survey

Table 1. *Characteristics of patients with AF who applied for emergency medical care*

Indicators	Quantity of patients	
	Absolute number	%
All patients	5,003	100
Men	1,660	33.2
Women	3,343	66.8
Mean age, years	72.9 ± 9.8	
Duration of the health condition, years	6.0 ± 4.6	
Form of AF		
permanent	902	18.03
paroxysmal	3,508	70.12
newly diagnosed	593	11.85
Duration of current AF:		
≤48 hrs	3,548	70.92
≥48 hrs	1,394	27.86
Duration of AF is not defined	61	1.22
Hypertensive disease	4,276	85.47
History of myocardial infarction	1,340	26.78
Cardiomyopathy, myocarditis, valvular heart disease	230	4.60
History of stroke/TIA	577	11.53
NYHA 3-4 CHF	690	13.79
History of pulmonary embolism	60	1.74
Diabetes mellitus	641	12.81
COPD/ asthma	290	5.80

form, which was filled in by a doctor (medical assistant) only after the patient had received medical care. The emergency teams during calls conducted a survey by questioning the patients and obtained information about the duration of the main health condition, regularity of self-monitoring blood pressure (BP) and heart rate (HR), presence of other chronic diseases, drug therapy, medical evacuation to hospitals due to atrial fibrillation.

Atrial fibrillation was diagnosed taking into account medical history, analysis of complaints and examination results. For diagnostics and verification of diagnosis, emergency teams recorded and interpreted electrocardiograms (ECG) in 12 standard leads. Medical assistant teams were provided with means of sending the ECG to cardiological medical advisory panel at the First Aid Station working around the clock.

Clinical and gender characteristics of the AF patients are presented in Table 1.

Statistical processing of the obtained data was carried out using Microsoft Office Excel and the IBM SPSS Statistics 21 software package.

Results and discussion

As part of this study, 5,003 questionnaires of patients with atrial fibrillation were analyzed, 66.8 % of whom were female. The mean age of the patients was 72.9 ± 9.8 years, the duration of the health condition was 6.0 ± 4.6 years. The gender differences in the development of AF among our patients should be noted: if among working age people from 20 to 59 years men were predominant, from the age of 60 the percentage of females was predominant (Fig. 1).

Analysis of the data showed that the main reasons for emergency calls in these patients were as follows: heart rhythm disorders (66.3 %), palpitation (46.7 %), deterioration of health state (35.2 %), dyspnea/choking (9.3 %), and cardiac pain (2.4 %).

According to the study, paroxysmal AF accounts for 70.1 % (n = 3,508) of the total number of calls, which confirms the literature data [13]. It is the predominant form of rhythm disorders that occurs outside of medical organizations. The permanent AF form was 18.0 % (n = 902). In 11.8 % (n = 593) of cases, the new cases of atrial fibrillation were diagnosed by the emergency teams.

According to the literature, approximately one-third of patients with AF have no clinical symptoms, and the patients are unaware of the existence of arrhythmia [14]. Arrhythmia diagnosis made by the emergency teams allows timely commencement of treatment, thus preventing the development of complications in this group of patients [15].

A detailed analysis of the obtained data showed that in 70.9 % (n = 3,548) of cases the duration of arrhythmia did not exceed 48 hours, while in 1,394 (27.9 %) patients the attack lasted more than 48 hours, and in 1.2 % (n = 61) the duration of AF was not established. Such delay by patients in seeking medical attention worsens the prognosis of the disease and is fraught with the development of serious cardiovascular complications.

A significant factor affecting the risk of development of ischemic events in patients with AF is the presence of other diseases. Our analysis showed that among patients with AF, the most common are hypertension in 4,276 (85.5 %) patients and CAD in 1,340 (26.8 %) patients, respectively. These health conditions themselves are very serious risk factors for the development of cardiovascular complications (stroke and systemic embolisms), and this risk significantly increases in combination with AF [16].

According to the questionnaire, 577 (11.5 %) patients had a history of stroke or transient ischemic attack. Among other pathologies, congestive
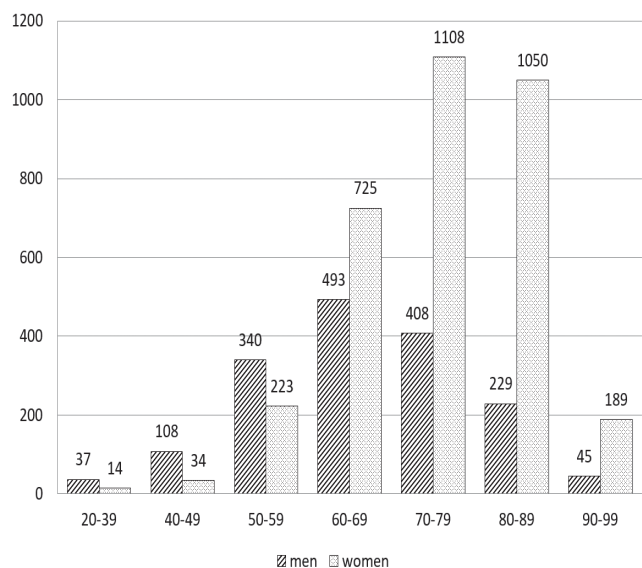
Figure 1. *Gender differences in patients with atrial fibrillation*

heart failure (690 cases, 13.8 %), diabetes mellitus (641, 12.8 %), and COPD / bronchial asthma (290, 5.8 %) were observed in patients with AF.

Thus, patients with atrial fibrillation are characterized by comorbidity that significantly aggravates the course of the pathological process.

Patients with AF, taking into account the high risk of cardiovascular complications, need regular medical check-up. Regular follow-up by a physician was carried out in 958 (57.7 %) men and in 2,184 (65.3 %) women. Such follow-up by a cardiologist was conducted in 827 (49.8 %) men and in 1,704 (50.9 %) women. 2,253 patients (45.0 %) were consulted by a physician and a cardiologist at the same time.

According to international and Russian guidelines for the management of AF there are 3 strategic steps: constant anticoagulant therapy, heart rate control with the retention of the optimal rate and additional therapy of concomitant diseases.

In our study, the average score on the scale of thromboembolic complications risk assessment in patients with atrial fibrillation / atrial flutter CHA_2DS_2-VASc (**C**ongestive heart failure, 1 point; **H**ypertension, 1 point; **A**ge — over 75 years, 2 points; **D**iabetes mellitus, 1 point; **S**troke — stroke / TIA / systemic embolism in anamnesis, **2** points; **V**ascular disease — vascular damage (history of myocardial infarction, atherosclerosis of peripheral arteries, atherosclerosis of the aorta), 1 point; **A**ge — 65–74 years, 1 point; **S**ex **c**ategory — gender (female), 1 point) was 3.56 ± 1.71. The average score on the scale of ischemic stroke risk assessment in patients with non-rheumatic atrial fibrillation / atrial flutter $CHADS_2$ (**C**ongestive heart failure, **H**ypertension, **A**ge — > 75 years, **D**iabetes mellitus, **S**troke — ischemic stroke or transient ischemic attack (TIA) in the medical history) amounted 1.85 ± 1.13.

The number of patients who scored 2 or more points on both scales (that is, those patients requiring continuous anticoagulation therapy) was 4,385 (87.7 %) and 2,967 (59.3 %), respectively, of all 5,003 patients.

However, according to our study, only 568 (11.3 %) patients received indirect anticoagulant warfarin under the INR level control, and 928 (18.5 %) patients received new oral anticoagulant drugs (rivaroxaban, dabigatran etexilate, apixaban).

Patients with a score of two or more on the scales CHA2DS2-VASc and CHADS2, were taking indirect and direct anticoagulants in a similar percentage of patients — 11.5–11.8 % and 19.4–19.7 %, respectively.

34.1 % (n = 1,705) of patients were taking antiarrhythmic drugs regularly. Surgical intervention because of AF (ablation) was performed in 4.7 % of cases (n = 236).

Analysis of the obtained survey materials revealed a fairly high level of AF patients who self-monitor their blood pressure (78.8 %) and heart rate (74.1 %).

Rational tactics of AF therapeutic and preventive measures suggests effective treatment of other clinically significant diseases in such patients. The vast majority of patients (85.5 %) had hypertension, due to which antihypertensive drugs were recommended to achieve the target blood pressure level, these patients took: ACE inhibitor / angiotensin receptor blocker — 51.3 % of patients, -blockers — 46.7 %, calcium antagonists — 16.5 %.

In patients with paroxysmal AF, at the pre-hospital stage, paroxysm was stopped in 962 patients (30.3 %), including 778 (24.5 %) patients on the primary call.

Cardioversion performance analysis was not carried out in the research group.

According to data of this questionnaire, after emergency teams provided medical care to AF patients, 1,342 (26.8 %) patients were evacuated to specialized medical institutions. The main indications for medical evacuation of patients with atrial fibrillation were: new cases of AF paroxysm; unmanaged AF paroxysm lasting less than 48 hours; AF paroxysmal form lasting more than 48 hours; AF permanent form, complicated by angina or acute heart failure; and lack of effect from treatment.

Of the 5,003 patients participating in the survey, in 2015, 1,773 patients (35.4 %) called the emergency case service for the first time regarding AF, 2,124 (42.5 %) patients called the emergency case service up to 5 times during the year, 730 (14,6 %) patients — from 6 to 10 times, 376 (7,5 %) patients — more than 10 times, and in 2016, respectively, for the first time — 670 (13.4 %), up to 5 times — 3,641 (72.8 %), 6–10 times — 488 (9.8 %) and more than 10 times — 204 (4.1 %) patients.

Conclusions

1. The provision of emergency medical care is of great importance to patients with atrial fibrillation, especially in new cases (11.8 %).

2. Gender analysis among AF patients revealed a clear domination of working age in men — 9.8 % (women — 5.4 %), and older age in women — 61.4 % (men — 23.9 %).

3. Among the polled patients, paroxysmal atrial fibrillation was diagnosed in 70.1 % of cases.

4. Twenty-eight percent of patients sought medical care 48 hours after the beginning of the atrial fibrillation attack.

5. According to the survey results, 62.8 % of AF patients were provided with active follow-up by a physician in an outpatient clinic, 50.5 % by a cardiologist, and 45.0 % by a physician and a cardiologist at the same time.

6. Constant anticoagulant therapy was used in 29.8 % of AF patients.

7. Clinical and statistical analysis should be carried out regularly to assess the effectiveness and quality of medical care for AF patients at the emergency health care stage.

Conflict of interests

The authors declare no conflict of interests.

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