HOSPITALIZATIONS FOR PAROXYSMAL ATRIAL FIBRILLATION OR ATRIAL FLUTTER AT SECONDARY AND TERTIARY CARE HOSPITALS IN KAUNAS CITY, LITHUANIA

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Summary

Objectives: The purpose of the study was to analyse emergency medical admissions to Kaunas city hospitals for recent attacks of paroxysmal atrial fibrillation or atrial flutter (AF/AFl) during a six-month period (from February 1 to July 31, 2002).

Design and Methods: A cohort of the study consisted of patients (patients) who were hospitalized with a diagnosis of paroxysmal AF/AFl (cases of acute coronary syndromes were not included). Detailed information was obtained from the patients and recorded into the original case record form. A trained medical staff in a central location analysed the parameters gained (demography, history, ECG, treatment).

Results: 710 hospitalizations (250/100,000 local residents or 226/100,000 men and 268/100,000 women) were included into the study. The incidence of hospitalizations up to 59 years old was significantly higher in men as compared with women. Ischemic heart disease (IHD) with arterial hypertension was revealed in 354 (49.8%); IHD without arterial hypertension – in 176 (24.7%); arterial hypertension without IHD – in 96 patients (13.4%). The distribution of patients according to NYHA was as follows: Class I – 20 (2.8%); Class II – 416 (58.6%); Class III – 268 (37.8%); Class IV – 6 patients (0.8%). Some possible non-cardiovascular precipitants of the attacks during the preceding 24 h were detected: physical stress – in 89 (24.9%); emotional stress – in 163 (22.9%); alcohol consumption – in 17 (2.4%); hypokalemia (<3.6 mmol/l) – in 63 patients (8.9%). Thirteen patients (1.9%) had suffered thromboembolic complications including two patients who experienced embolism during hospitalization. Sinus rhythm was restored in 688 (96.9%) of the studied patients: in 435 (61.3%) – with antiarrhythmic drugs; in 215 (30.3%) – by electrical cardioversion; in 38 patients (5.3%) – spontaneously.

Conclusions: The incidence of hospitalizations for paroxysmal atrial fibrillation/flutter in Kaunas city was 250/100,000 adult residents during a six-month period (from February 1 to July 31, 2002).

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Atrial fibrillation (AF) and atrial flutter (AFl) are the most common and serious arrhythmias, observed in 0.4–1.0% of the general population [1,2]. The incidence of AF/AFl increases with age. According to the Framingham study, the prevalence of AF doubles with every decade of age: 0.55% among 50 to 59 year-old persons and 8.8% in persons at the age of 81–90 years [2,3]. During the last 20 years, a tendency to increase in the frequency of AF (especially among males) has been noticed in the population of the Framingham study [3,4]. The hospitalization rate increases as well. In the US, the hospitalization rate for AF has doubled (2.5 times) during the period of 1985–1999 [4–6].

A negative influence of AF/AFl on health condition has been also noticed: the risk of thromboem-

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bolism increases 4–5 times, mortality rate – 1.5–2.0 times. This may lead to the development and progression of heart failure and a decreased quality of life [6–8]. Among all the hospitalized patients with heart rhythm disorders, AF has been detected in 34%, AFl – in 4% of patients [4].

As usual, at the very beginning, AF is paroxysmal. The proportion of paroxysmal AF among all the population with AF varies from 22% to 65% based on the population studies [9,10]. In quite a large (35–78%) proportion of patients, AF/AFl becomes persistent or permanent in the long-run. The later this happens the later the quality of life of patients will worsen. Approximately, 30% of patients with paroxysmal AF develop a chronic pattern during a few years [11].

Scientific data on paroxysmal AF are scarcer than on chronic AF. We have not found publications on the incidence and prevalence of AF in Lithuania, despite of numerous published papers concerning the diagnosis and treatment of the disorder.

The aim of the study was to determine the number of hospitalizations due to paroxysmal AF/AFl (acute – *de novo* or recurrent attack), to analyse risk factors and usual precipitating factors for such an arrhythmia and also to reveal ways and efficacy of the AF/AFl treatment.

Design and Methods

The data on paroxysmal AF/AFl in Kaunas city were accumulated during a six-month period (from January 1 to July 31, 2002). Our study cohort consisted of the patients hospitalized with the diagnosis of paroxysmal AF/AFl (International Classification of Diseases 10, code I48) in the main secondary health care institutions of Kaunas city: Kaunas 2nd Clinical Hospital (252 patients), Kaunas District Hospital (190 patients), Kaunas Red Cross Hospital (118 patients), as well as in a tertiary health care institution – Department of Cardiology of the Kaunas University Hospital (150 patients). Patients with acute coronary syndromes were excluded. In total, the study cohort consisted of 710 patients. In 2002, there were 284,111 adult local inhabitants in Kaunas city.

Detailed information was taken from the patients' medical charts and was recorded as an original case record form, which consisted of various modules concerning personal identification (age, gender, etc.), anamnestic data, clinical characteristics, laboratory data, ECG, and echocardiographic parameters. On the basis of these data, a trained medical staff in a central location analysed the accumulated parametric values. Continuous variables were reported as medians and means with SD. Statistical analysis was conducted using Student's t-test or χ^2 test where appropriate.

The study was conducted according to the principles of the Declaration of Helsinki.

Results

In total, there were 710 patients hospitalized due to AF/AFl: 278 men (39.2%) and 432 women (60.8%). The incidence of AF/AFl in Kaunas city equals to 250/100,000 and differs depending on the patients' gender: the incidence of AF/AFl among men – 225.9/100,000 and among women – 268.2/100,000.

The hospitalization rate differed in various sex and age groups (Table 1). Men up to the age of 60 were hospitalized more frequently than women. This finding could be explained by a higher prevalence of arterial hypertension and ischemic heart disease (IHD) among men in this age group.

Table 1. Incidence of atrial fibrillation and atrial flutter according to the patients' age group and gender in Kaunas city population

Age group (years)	*Men*		*Women*		*In total*	
	Number of cases	*Number of cases per 100,000 inhabitants*	*Number of cases*	*Number of cases per 100,000 inhabitants*	*Number of cases*	*Number of cases per 100,000 inhabitants*
20–29	4	13.7	1	3.2	5	8.2
30–39	8	29.1	1	3.3	9	15.5
40–49	29	123.6	4	13.7	33	62.7
50–59	80	429.0	55	214.9	135	305.2
60–69	70	499.0	157	722.5	227	634.8
70–79	76	955.4	153	656.9	229	958.4
80–89	9	494.0	59	1087.8	68	438.5
90–99	2	490.2	2	195.5	4	279.5
In total	278	226.0	432	268.2	710	249.9

Seventy one patients (10%) were readmitted during the screening period because of the recurrent AF/AFl. The average age of the patients was 66.2 years: 69.1 in women and 61.6 in men. AF was diagnosed in the majority of cases – 613 patients (86.3%); AFl was revealed in 60 patients (8.5%), the coexistence of both rhythm disturbances was diagnosed in 33 patients (4.6%) and only 4 patients (0.6%) had AF or AFl together with WPW syndrome. On admission to a hospital the duration of AF/AFl longer than 24 h was revealed only in 98 patients (13.8%).

The first detected (*de novo*) recent attacks of AF/AFl were found in 145 patients (20.4%). In the remaining 565 patients (79.6%) episodes of paroxysmal AF/AFl were recurrent. There were 26 patients (3.6%) with previously implanted pacemakers. Radiofrequency ablation had been performed previously in four out of 60 patients (6.7%) with paroxysmal AFl. The most typical complaints of our patients during the attack were as follows: palpitations – in 652 (91.8%); general fatigue – in 369 (52.0%); dyspnea – in 180 (25.3%); chest pain – in 170 (24.0%); dizziness or syncope – in 10 patients (1.4%). Heart disease was observed in 697 patients (98.2%). IHD in combination with arterial hypertension was revealed in 354 (49.9%); IHD – in 176 (24.8%); hypertensive heart disease – in 96 (13.5%); valvular heart diseases – in 34 (4.8%); cardiomyopathies – in 12 (1.7%); congenital heart diseases – in 11 (1.6%); hyperthyroidism – in 14 patients (2.0%). A lone AF/AFl was observed in 13 patients (1.7%). *Diabetes mellitus* was present in 67 patients (18.7%). Obesity was determined in 297 patients (41.8%). The patients were distributed in accordance with NYHA Class I 27 (3.8%); Class II – 165 (27.5%); Class III – 28 (3.9%); Class IV – 6 patients (0.8%). The regular moderate and high alcohol intake was confessed by 31 patients (4.4%). Some possible non-cardiovascular precipitants of the attacks during the preceding 24 h were revealed during the work-up: physical stress – in 89 (24.9%); emotional stress – in 163 (22.9%); alcohol consumption – in 17 (2.4%); hypokalemia (<3.6 mmol/l) – in 63 patients (8.9%). Thirteen patients (1.9%) had thrombembolic complications, including two patients who had embolism during the hospitalization. The palpable thyroid gland was detected in 60 patients (8.5%). During hospitalization the profile of thyroid hormones was analysed in 50 patients (15%) patients, and hyperthyroidism detected in 14 patients (2.0%); hypothyroidism – in 16 (2.3%). Most of the patients regularly used various medications: antiarrhythmics – 61.5%; ACE inhibitors – 56.6%; aspirin – 45.1%; warfarin – 11.0%; diuretics – 10.2%; digoxin – 6.3%. The mean heart rate in the studied patients was 124.2 ± 24.1 beats per minute, blood pressure – $142.4 \pm 0.88/87.25 \pm 0.5$ mm Hg. Before paroxysmal AF/AFl, during sinus rhythm, stable intraventricular conduction disturbances were found in 48 patients (8.6%). Transient intraventricular conduction disturbances during the attacks of AF/AFl were detected in additional 10 patients (1.8%).

Sinus rhythm was restored in 688 (96.9%) out of 710 patients: by means of antiarrhythmic drugs – in 435 (61.3%); by means of electrical cardioversion – in 215 (30.3%); spontaneously – in 38 patients (5.3%). AF/AFl persisted in 22 patients (3.1%). Immediate (acute) electrical cardioversion was used effectively in 81 patients (11.4%) and electrical cardioversion after pharmacological cardioversion failure was successfully applied in 134 patients (18.9%). Totally, electric cardioversion was effective in 215 (90.7%) out of 237 patients. Pharmacological antiarrhythmic therapy was used in 586 patients (82.5%): amiodarone infusion – in 164 (23.1%); amiodarone i/v bolus – in 53 (7.5%); peroral amiodarone – in 46 (6.5%); quinidine – in 100 (13.5%); peroral propafenone – in 82 (11.5%); i/v propafenone – in 16 (22.5%); beta blockers – in 31 (4.4%); i/v verapamil – in 10 (1.3%); i/v potassium chloride – in 98 (13.8%); i/v digoxin – in 49 patients (6.9%).

Discussion

The hospitalization rate in Kaunas in cases of recent attacks of AF/AFl was determined: the incidence of hospitalization during a six- month period was 250/100,000 local residents. This data does not represent the real number of symptomatic attacks of AF/AFl, because most of attacks are asymptomatic [12]. Some patients did not call for medical care, some were treated in outpatient clinics or departments or in non-cardiological departments of Kaunas hospitals. In any case, our data represents a considerable number of hospitalizations (approximately four per day), showing that paroxysmal AF/AFl is an important problem of health care in Kaunas city. According to our data, the incidence of hospitalizations for paroxysmal AF/AFl increased three-fivefold with every decade of age but it decreased twofold in population older than 79 years, probably, because AF/AFl then became permanent. According to literature data, the incidence of AF at all ages is greater in men than in women [1,13]. However, the total hospitalization rate for paroxysmal AF/AFl in Kaunas city was slightly higher in women than in men and only in patients under 60 years the hospitalization rate was greater in men than in women (Table 1). According to literature data, the prevalence of AF is higher in men but the recurrence of paroxysmal AF/AFl is higher in women [14]. Therefore, there may be some inadequacy in gender specificity of prevalence and the hospitalization rate in patients with AF/AFl. The men hospitalized for recent AF/AFl were 7.5 years younger

than women. It is well known that men develop IHD and hypertension earlier than women (probably, because of higher physical stress, smoking, alcohol abuse). Emotional stress and hyperthyroidism more frequently provoked arrhythmias in women than in men. The most common causes of AF/AFl (87.9%) were IHD and hypertensive heart disease. This fact is in accordance with literature data [1,6,9]. We have determined other important risk factors for AF/AFl: obesity (41.8%), diabetes mellitus (18.7%), hypokalemia (8.9%), diuretics (10.2%), and hyperthyroidism (2.0%). About 2–3% of patients admitted for AF have hyperthyroidism as the cause [15, 16]. In approximately 25% of patients the arrhythmic attacks were provoked by physical stress (more frequently in men) or emotional stress (more frequently in women). These facts are important in clinical practice for the prevention of recurrent episodes of AF/AFl. According to our data, the outcomes of paroxysmal AF/AFl were benign. Our patients (61%) predominantly were in NYHA Classes I and II. Most of the studied patients were using cardiovascular drugs on regular basis. All the studied patients were hospitalized during the first 48 hours of AF/AFl attack and were treated intensively [6,17]. Thromboembolic complications were observed only in two patients, syncope – in 10 patients. Spontaneous restoration of sinus rhythm was observed in 38 patients (5.3%) patients. It occurred more frequently in patients with the first recent (*de novo*) attacks than in patients with recurrent attacks of AF/AFl (accordingly, in 13 (9.0%) out of 145 patients and 25 (4.4%) out of 565 patients ($\chi^2 = 4.5$; $p = 0.033$). In out-of-hospital setting, approximately 50–60% of new onset (<72 h) episodes of AF terminated spontaneously [18]. In our opinion the successful treatment of attacks (in 63.4% of patients with drugs and in 30.3% of patients by electrical cardioversion) was predetermined by several factors: (a) most of patients used cardiovascular drugs on regular basis; (b) most of patients (61.4%) were in NYHA functional classes I and II; (c) a considerable number of patients were experiencing the first attack of AF/AFl, which reverted to sinus rhythm spontaneously twofold more frequently than recurrent attacks; (d) most patients were hospitalized early and treated intensively. The objective of treatment in most patients was the restoration of sinus rhythm. The antiarrhythmic drugs of choice at Kaunas city hospitals were amiodarone and propafenone. Our data do not support a sceptical opinion on amiodarone for the conversion of AF to sinus rhythm [18]. There were no serious side effects of medications in the study. Only 15–25% of all the patients with acute AF do not respond to drug conversion [19]. In our study, the efficacy of drug conversion was documented in 435 (74.2%) out of 586 pharmacologically treated patients. Rates of the efficacy of direct electrical cardioversion of AF vary from 70% to 90% [20]. In this study it was very effective – 90.7%. After the restoration of sinus rhythm patients with AFl were considered for radiofrequency ablation on the individual basis. Prompt treatment and a carefully planned work-up for each AF patient is mandatory in order to restore sinus rhythm, if possible [19], but there is no need to hospitalize all the patients with the acute attack of AF [21]. The hospitalization rate and costs of treatment for paroxysmal AF/AFl can be diminished by the optimization of the primary and secondary prevention of AF/AFl and also by the interruption of attacks without hospitalization of patients [21], especially of the patients with low risk of complications and early recurrence: young persons, *de novo* AF, patients in NYHA functional classes I–II and without serious structural heart disease, WPW syndrome or hypokalemia [20–22]. Elderly patients may be more safely treated in a hospital, especially those with significant underlying heart disease (e.g., severe mitral regurgitation), or increased left atrial superio-inferior dimension, who have hemodynamic consequences from AF/AFl or are at risk of complications resulting from treatment.

Limitations of the study

Our data concerning hospitalization incidence for paroxysmal AF/Fl in Kaunas do not reflect the exact incidence of this kind of arrhythmia in the city: (1) some patients with paroxysmal AF/AFl were treated successfully in an out-patient setting (at home or emergency rooms); (2) the duration of the study was only six months; (3) it is known that episodes of symptom-free paroxysmal AF may occur 12 times more frequently than symptomatic episodes [12].

Conclusions

1. The incidence of hospitalizations due to paroxysmal atrial fibrillation /flutter in Kaunas city was 250/100,000 residents during six-month period.
2. The incidence of hospitalizations was higher in men than women among the population under 60 years old.
3. Ischemic heart disease and/or arterial hypertension were the underlying heart diseases in 87.9% of patients.
4. Physical stress provoked attacks in 25% of patients (mostly in men): emotional stress – in 23% of patients (mostly in women); hypokalemia was determined in 8.9% of patients.
5. The outcomes of the attacks and the efficacy of treatment were good. Sinus rhythm was restored in 96.9% of patients: with antiarrhythmic drugs in 61.3% of patients and by electric cardioversion – in 30.3%; spontaneous restoration of sinus rhythm occurred in 5.3% of patients.

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