

Prevalence of atrial fibrillation in emergency medicine practice

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Summary:

Introduction: Atrial fibrillation is a condition of heterogeneous etiology and diverse clinical picture. It is a challenge for the system of Emergency Services.

Aim of the study: The aim of this study was to analyze selected epidemiological data of patients with atrial fibrillation treated at the Emergency Department of the M. Kopernik Provincial Specialist Hospital in Lodz between 01.2010 and 12.2010.

Material and methods: Study included 422 patients with atrial fibrillation (237 women and 185 men) aged 25 to 96 years (mean age — 73.51 years).

Results: Atrial fibrillation was more common in women than in men (56% vs. 44%). Mean age was higher in the female than the male population (76.5 vs. 69.3 years). The majority of medical interventions concerned patients aged 80-89 years.

Conclusions: In our material, atrial fibrillation involved mainly patients older than 70 years. Atrial fibrillation is more common in women than in men. Atrial fibrillation occurs most often during winter season, between 10 and 12 o'clock.

Key words: atrial fibrillation, seasonality, medical emergency response team.

Introduction

Despite considerable advancements in the diagnostics and treatment that took place in the recent few years, atrial fibrillation (AF) still poses a serious clinical and social problem [1]. It is the most common form of arrhythmia encountered by the Medical Emergency Response Teams [2].

According to the guidelines of European Society of Cardiology, atrial fibrillation is a type of arrhythmia that presents on an ECG as absolute rhythm irregularity, i.e. completely irregular RR intervals. Moreover, there are no discernible P waves on an ECG, atrial cycle length between

the following atrial activations is variable and less than 200 ms, leading to hemodynamic disturbances [2, 3]. These changes often result from irregular and excessive ventricular rates as well as atrioventricular dyssynchrony.

Prevalence of AF in general population is estimated at 0.4-1.0% and increases with age, reaching 8% in people over 80 years old. Median age of patients with AF is about 75 years. Results of prospective studies indicate that yearly incidence of AF increases with age from less than 0.1% in people below 40 years old, to 1.5% in women and 2% in men above 80 years old [3].

Aim of the study

The goal of the study was to assess selected epidemiological parameters associated with atrial fibrillation among patients of hospital Emergency Department (ED).

Material and methods

In this study we retrospectively analyzed patients with atrial fibrillation treated at the Emergency Department of M. Kopernik Provincial Specialist Hospital between 01.01.2010 and 31.12.2010.

Analyses were conducted using Statistica v. 8.0 software. A t-student test, rank Wilcoxon test, chi-square match test, chi-square test for contingency tables and Cramer's V association coefficient were used for analysis. All tests were performed at a significance level $\alpha=0.05$.

Results

In 2010, during the time of the study, 422 patients were treated for atrial fibrillation (AF) at the Emergency Department of the M. Kopernik Provincial Specialist Hospital.

Women constituted 52% of 422 patients with AF. Atrial fibrillation was noted in 185 men, which constituted 46% of the study group. Analysis revealed statistically significant influence of gender on the diagnosis of atrial fibrillation ($p<0.01$).

In the studied group patient age ranged from 25 to 96 years. The majority of AF cases occurred in the 80-89 age group ($n=139$; 33%), followed by the group aged 70-79 years ($n=125$; 30%). Patients aged less than 40 years comprised only 2% of the entire study group ($n=6$). There is a statistically significant difference in the ages of patients treated in EM due to atrial fibrillation ($p<0.001$) (Fig. 1).

Mean age of patients was 73.51 years (SD 12.65), mean age of women being 7 years higher (76.5 years) than that of men (69.3 years). The above results were statistically significant ($H=27.62940$; $p = 0.0000$). Figure 2 depicts mean ages of men and women in the studied group.

In order to illustrate the yearly cycle of atrial fibrillation occurrence, the study group was divided

depending on the month of hospitalization (Fig. 3). Most cases of atrial fibrillation were noted in February ($n=48$; 11%), followed by October ($n=39$; 9%) and April ($n=38$; 9%). In August ($n=29$; 7%), July ($n=30$; 7%) and March ($n=31$; 7%) we observed a reduction in the number of diagnoses. Statistical analysis revealed significant differences in the incidence of atrial fibrillation episodes in a yearly cycle ($p<0.01$).

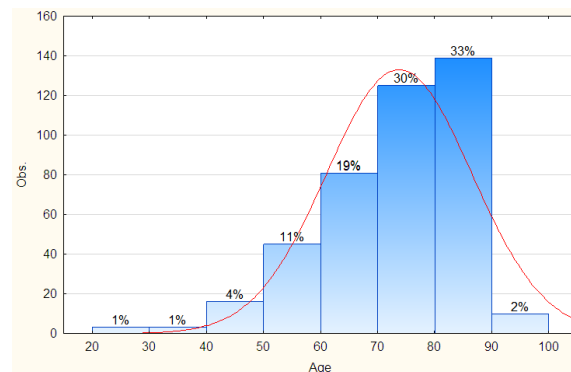


Figure 1: Patient ages in the studied group.

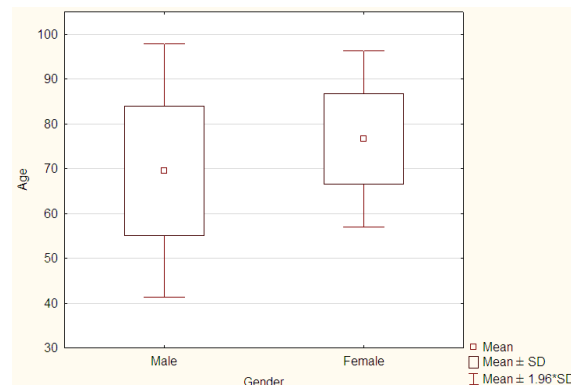


Figure 2: A box-and-whisker plot depicting mean ages of men and women in the studied group.

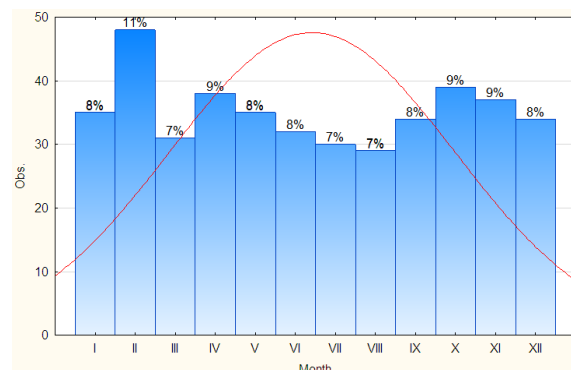


Figure 3: Incidence of atrial fibrillation in a yearly cycle.

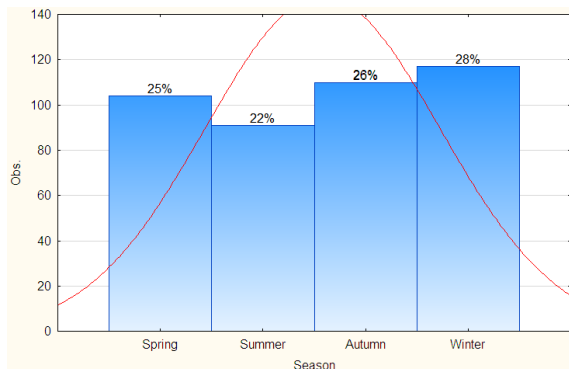


Figure 4: Prevalence of atrial fibrillation depending on the season.

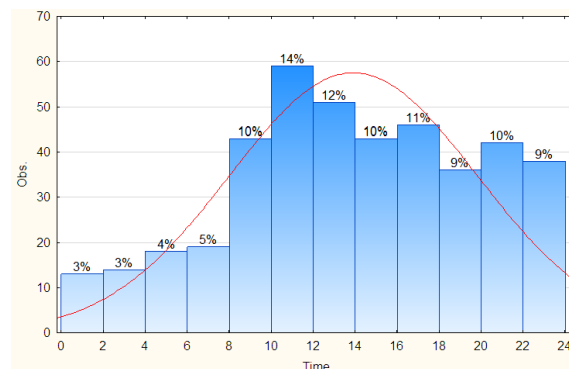


Figure 5: Daily cycle of atrial fibrillation episodes.

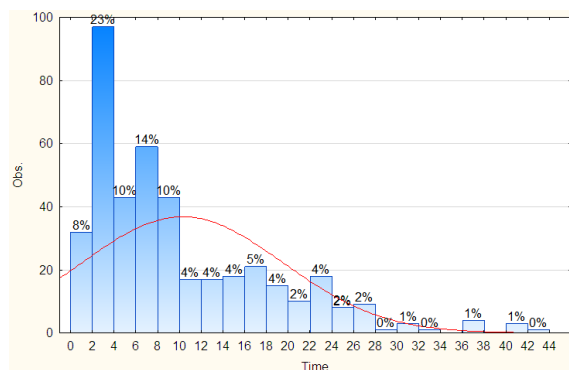


Figure 6: Length of patient stay at the Emergency Department [hours].

Additional analysis was conducted on months grouped into seasons. Analysis revealed increased incidence of atrial fibrillation during winter (n=117; 28%), followed by autumn and spring (Fig. 4). During summer, we observed a reduction in the number of AF patients (n=91; 22%). The above results are also statistically significant (p<0.01).

Incidence of episodes of atrial fibrillation among ED patients was analyzed in relation to a daily

cycle. The majority of admissions to ED occurred between 10:00 and 11:59 (n=59; 14%) as well as between 12:00 and 13:59 (n=51; 12%). There were only 27 cases noted between 0:00 and 3:59, which constituted 6% of all patients (Fig. 5). There is a statistically significant association between occurrence of AF episode and the time of day (p<0.001).

Pharmacological cardioversion was used in 265 cases to restore sinus rhythm. Effectiveness of this type of cardioversion was 33%. Electrical cardioversion was performed in 6 cases and it was effective in 66% of cases. Together, sinus rhythm was restored in 140 cases (33%) (p<0.001).

Mean length of stay at the ED was 10 hours (p=0.001). A detailed distribution of treatment and observation time of patients at the Emergency department is shown in Figure 6.

In case of most patients therapy at the hospital Emergency Department ended in discharge home (n=215; 51%). One hundred and eighty-one patients were admitted to a different ward and 19 patients were transported to a different hospital. In 7 cases treatment ended in death (Fig. 7) (p<0.001).

Discussion

Atrial fibrillation is the most common form of arrhythmia. The task of Medical Emergency Response Teams and hospital Emergency Departments is to quickly perform the initial diagnostics and stabilize vital functions of

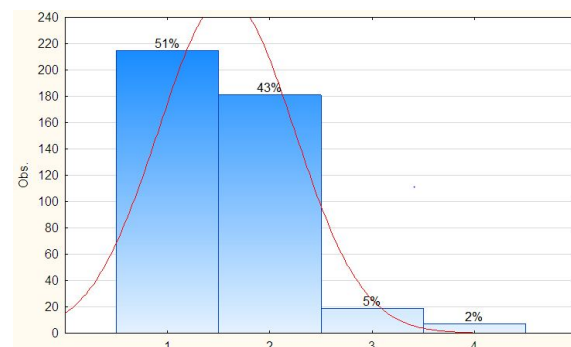


Figure 7: Incidence of atrial fibrillation in a yearly cycle.

- Legend:**
- 1 – discharge home.
 - 2 – admission to a hospital ward.
 - 3 – transfer to a different hospital.
 - 4 – death.

patients in life-threatening or health-threatening conditions [7].

In the analyzed material atrial fibrillation was more common in women (56%). Other authors also noted the predominance of women among patients with atrial fibrillation, e.g. Gluszek *et al.* — 52% [8], Lubitz *et al.* — 54% [9], Mashal *et al.* — 55.3% [10] and Lengyel *et al.* — 70% [11]. Male predominance was shown in studies by, i.a. Olsson *et al.* — 56.5% [12] and Arribas-Leal *et al.* — 72% [3].

Studies conducted by the Gluszek research team showed that atrial fibrillation is most common in winter [8]. Our own observations corroborate this tendency. In this study, the highest incidence of atrial fibrillation was noted in February, and the lowest in March, July and August. On the other hand, Murphy *et al.* showed that atrial fibrillation episodes occur most often in December and are rarest in June [16].

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The peak of admissions due to atrial fibrillation falls between 10:00 and 11:59. A statistically significant reduction in AF admissions was observed during early morning hours — between 0:00 and 3:59.

Electrical and pharmacological cardioversion was the reason for the return of sinus rhythm in 140 patients. In our study, effectiveness of electrical cardioversion reached 66% and was higher than that noted in the studies by Kanji *et al.* (27%) [17].

Conclusions

- 1) In our material, atrial fibrillation mainly concerned patients above 70 years old.
- 2) Atrial fibrillation is more common in women than in men.
- 3) Atrial fibrillation occurs more often during winter season and between 10 and 12 o'clock.