



Impact of atrial fibrillation on natural history and treatment of heart failure – a multicentre registry study

Wpływ migotania przedsionków na przebieg kliniczny i leczenie pacjentów z niewydolnością serca – dane z wieloośrodkowego rejestru

Radosław Bartkowiak^{1,2} , Iwona Gorczyca^{1,2} 
Beata Wożakowska-Kapłon^{1,2} , Maciej Kluk¹ 

¹1st Clinic of Cardiology and Electrotherapy, Świętokrzyskie Cardiology Centre, Kielce, Poland

²Chair of Heart Disease Prevention and Pharmacotherapy, *Collegium Medicum*,
Jan Kochanowski University, Kielce, Poland

Abstract

Introduction. When heart failure (HF) and atrial fibrillation (AF) afflict the same patient simultaneously, it becomes a challenge for cardiologists. This is not only due to the need to intensify preventive measures to reduce the prevalence of common aetiological factors, but also due to growing healthcare costs, particularly care costs for elderly patients at high risk of accumulated complications of both diseases. Our study was aimed at evaluating the concomitant incidence of AF on the natural history and treatment of Polish HF patients on the basis of data obtained in a multicentre registry study.

Material and methods. In this study, the population subjected to retrospective analysis consisted of Polish patients included in the long-term ESC-HF registry study (N = 1,126). A comparative analysis of the study group (AF+) and the control group (AF–) was carried out.

Results. No differences were observed in the rates of in-hospital deaths between the (AF+) and the (AF–) group: 2.9% versus 2.8%, [p = not significant (NS)]. The average duration of hospitalisation in the AF+ group was 9.8 ± 14.7 days compared to 8.8 ± 10.9 days in the AF– group (p = NS). In the AF+ group, compared to the AF– group, significantly higher frequencies were recorded for the following parameters: exacerbation of chronic HF as the cause of hospitalisation, intravenous diuretics usage during hospitalisation, electrical cardioversion, as well as in-hospital use of mineralocorticoid receptor antagonists, diuretics, digoxin, oral antithrombotic agents and amiodarone.

Conclusions. In the population of HF patients requiring hospitalisation, the AF+ subgroup is characterised by poorer clinical condition (biventricular cardiac decompensation, lower systolic blood pressure, higher heart rate on admission, and more frequent use of intravenous diuretics). The concomitance of AF significantly impacts the natural history and treatment of HF patients.

Key words: heart failure, atrial fibrillation, treatment, clinical outcome, registry

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Introduction

Atrial fibrillation (AF) is a subtype of supraventricular arrhythmia characterised by disordered activation of cardiac atria that results in the impairment of their mechanical function [1]. AF is one of the most common arrhythmias encountered by clinicians in everyday practice. AF is associated with an elevated risk of brain stroke [2], heart failure (HF), and death [3, 4]. Due to difficulties in the selection of appropriate treatment, and thus in achieving desired outcomes, AF constitutes a significant clinical problem. Management in AF involves the prevention of thromboembolic events, appropriate control of heart rate to reduce the risk of tachycardia-induced cardiomyopathy, and correction of arrhythmia by attempts to restore and maintain sinus rhythm. The incidence of AF increases with age and amounts to about 0.5% in subjects in their 50s, 3–5% in subjects aged over 65, and nearly 10% in subjects aged over 80 [5, 6]. In Poland, AF affects about 500,000 individuals [7]. AF increases the risk of death by a factor of 1.5 in men and 1.9 in women [8].

The incidence of HF in the overall population is comparable to the incidence of AF (2% in developed countries) and is likewise characterised by an increasing trend [9]. According to estimates, HF affects about 600,000 individuals in Poland [10]. Frequently encountered common aetiological factors such as obesity, arterial hypertension and diabetes increase the risk of new HF and AF cases, including cases where both these disorders occur simultaneously. Importantly, the incidence of both disorders is additionally increased by the fact that HF and AF are interrelated by means of a pathogenetic ‘vicious circle’, wherein isolated onset of one of these disorders can lead to development of the other [11, 12]. Pharmacoeconomic analyses are indicative of progressively increasing healthcare costs related to the diagnostics and treatment of concomitant HF with AF and complications thereof [13].

Therefore, concomitance of HF and AF becomes a challenge for cardiologists not only due to the need to intensify preventive measures to reduce the prevalence of common aetiological factors, but also due to growing healthcare costs, particularly care costs for elderly patients at high risk of accumulated complications of both diseases, including permanent disability due to severe HF, and thromboembolic complications in the natural history of AF [14].

Our main objective consisted in the evaluation of the influence of concomitant AF on the natural history and treatment of Polish HF patients on the basis of data obtained in a multicentre registry study.

Material and methods

The European Society of Cardiology (ESC) registry study in HF patients (ESC-HF Long-term Registry) was designed as

one of the integral elements of an ESC research programme named EORP (the EURObservational Research Programme), initiated in 2008 as a continuation of the Euro Heart Survey concept that originated in 2000 [15].

The objective of EORP is to collect reliable up-to-date data on the most important cardiological heart problems of the 21st century so as to estimate their prevalence, prognosis and treatment, as well as to assess the compliance of management routines with current ESC guidelines. During the long-term phase of the ESC-HF study, a total of 12,240 patients treated at study sites across Europe was enrolled, including 7,401 patients treated in outpatient settings (59.5%) and 5,039 (40.5%) hospitalised patients [16]. The ESC-HF study was carried out according to a prospective and observational design. In this study, the population subjected to retrospective analysis consisted of Polish patients included in the long-term ESC-HF registry study (N = 1,126), corresponding to 9.1% of the entire registry population. HF patients treated in outpatient settings accounted for 32.1% of the study group (N = 361), while the remaining patients (67.9%, N = 765) were enrolled during hospitalisation due to newly diagnosed decompensated HF or exacerbation of chronic HF (patients with acute HF) or due to other causes. All patients (N = 1,126) were assessed in terms of AF prevalence: the criterion for a diagnosis of arrhythmia was defined as a history of AF regardless of its form (paroxysmal, sustained, or chronic) and/or electrocardiographic (ECG) documentation of an AF episode (resting or Holter ECG records) at the enrollment visit (outpatients) or during hospitalisation. A comparative analysis of the study group (AF+) and the control group (AF–) was carried out in terms of clinical characteristics and natural history in case of hospitalised patients (*i.e.* comparisons of clinical parameters measured at admission and discharge, analysis of in-hospital deaths). Parameters related to natural history were compared between the study and the control group only in the subpopulation of hospitalised HF patients. This was because the inpatient setting allowed for the assessment of selected parameters at admission, during treatment, and upon discharge. The statistical significance level was established at $p < 0.05$ for all tests. Statistical analysis was performed using MedCalc Statistical Software version 15.11.4.

Results

All patients were divided according to their AF status regardless of the time and form of prevalence: the study group AF+ (N = 521, 46.3% of all patients), and the control group AF– (N = 605, 53.7%). The hospitalisation rate was significantly higher in the AF+ group compared to the AF– group (72.6% vs. 64.0% of all patients, $p = 0.0026$). In the population of hospitalised patients (N = 765), in which the impact of concomitant AF on the natural history and

Table 1. Clinical characteristics of Polish heart failure (HF) inpatients in multicentre European Society of Cardiology (ESC) registry

Variable	Value
Number of hospitalised patients	765
Age [years], median	67
Gender – female [%]	32.5
BMI [kg/m ²], median	27.7
LVEF [%], median	34.0
LVEF > 45% [%], (HFpEF)	23.5
NYHA class III–IV [%]	76.8
Ischaemic HF [%]	55.3
Brain stroke/TIA [%]	11.0
AF [%]	49.4

BMI – body mass index; LVEF – left ventricular ejection fraction; HFpEF – heart failure with preserved ejection fraction; NYHA – New York Heart Association; TIA – transient ischaemic attack; AF – atrial fibrillation

treatment of HF was evaluated, patients with confirmed AF (AF+) accounted for 49.4% of the population (N = 378). Clinical characteristics of the population of Polish HF patients enrolled into the registry while hospitalised are set out in Table 1.

In the AF+ group, compared to the AF– group, significantly higher frequencies were recorded for the following parameters: exacerbation of chronic HF as the primary cause of hospitalisation, intravenous diuretics being used during hospitalisation, electrical cardioversion for any type of arrhythmia or AF, as well as in-hospital use of mineralocorticoid receptor antagonists (MRA), diuretics, digoxin, oral antithrombotic agents, and amiodarone (see *results* in Table 2).

In the AF– group, compared to the AF+ group, significantly higher frequencies were recorded for the following parameters: newly diagnosed HF, admission due to acute coronary syndrome (ACS) or ventricular arrhythmias, intravenous administration of nitrates during hospitalisation, coronary angiography and revascularisation during hospitalisation, as well as the use of statins and antiplatelet drugs (see *results* in Table 2).

The two groups did not differ significantly in terms of the incidence of HF as the primary reason for hospitalisation, the use of pressor amines during hospitalisation, the frequency of invasive electrophysiological procedures, percutaneous ablation, and implantation of electrotherapeutic devices during hospitalisation, as well as in history of angiotensin-converting enzyme (ACE) inhibitors, angiotensin II receptor blockers (ARB), and beta-blockers (BB). Notably, the design of the form used in the ESC registry trial allowed for more than one cause for hospitalisation to be given, for example in cases of acute coronary syndrome with heart failure complication (see *results* in Table 2).

In the population of hospital patients, biventricular HF was the most common clinical form of HF in both the AF+ and the AF– group (74.6% vs. 62.5% compared to 68.5% in the entire population of hospitalised patients). The remaining clinical forms of HF (ACS-related decompensation of HF, HA, cardiogenic pulmonary oedema, right-ventricular HF, cardiogenic shock) were less common. No statistical differences were observed between the AF+ and AF– groups with the exception of the incidence of ACS (13.7% in the AF– compared to 5.3% in the AF+ group, $p < 0.0001$; Figure 1).

The average duration of hospitalisation in the AF+ group was 9.8 ± 14.7 days compared to 8.8 ± 10.9 days in the AF– group [$p =$ not significant (NS)]. In addition, the New York Heart Association (NYHA) class clinical status was compared in patients of both groups at admission and discharge. In the AF+ group, the average NYHA class score at admission was 3.2 ± 0.7 compared to 3.0 ± 0.8 in the AF– group ($p < 0.0001$). At discharge, the average NYHA class scores in both groups were 2.3 ± 0.6 vs. 2.3 ± 0.6 , ($p =$ NS). In the AF+ group, the average left ventricular ejection fraction (LVEF) at admission was $37.2 \pm 14.8\%$, compared to $33.6 \pm 14.1\%$ in the AF– group ($p =$ NS). At discharge, the average LVEF in both groups was $39.2 \pm 15.2\%$ vs. $35.7 \pm 15.2\%$ respectively, and the difference was statistically significant ($p = 0.006$).

In the AF+ group, the average systolic blood pressure (SBP) at admission was 127.8 ± 24.4 mm Hg compared to 130.3 ± 29.2 mm Hg in the AF– group ($p < 0.0001$). At discharge, the SBP values in both groups were 116.7 ± 14.1 vs. 118.7 ± 17.1 mm Hg, respectively ($p < 0.0001$). In the AF+ group, the average heart rate (HR) at admission was 93.8 ± 27.4 bpm compared to 81.4 ± 21.0 bpm in the AF– group ($p < 0.0001$). At discharge, the HR values were 77.0 ± 18.0 vs. 72.3 ± 15.8 bpm, respectively ($p < 0.0001$). In the AF+ group, the average body mass at admission was 80.4 ± 16.8 kg compared to 80.4 ± 17.1 kg in the AF– group (NS). At discharge, the average body mass was 77.8 ± 16.5 vs. 78.6 ± 16.8 kg, respectively ($p < 0.0001$). All the above results can be seen in Table 3.

Overall, a total of 68 episodes of restored sinus rhythm were observed during hospitalisation in the entire AF+ group (N = 378), including 54 (79.4%) cases of spontaneous restoration of sinus rhythm.

A total of 22 deaths (2.9%) occurred in the subpopulation of hospitalised patients. No differences were observed in the rates of in-hospital deaths between the AF+ (N = 11/378) and the AF– (N = 11/387) groups: 2.9% vs. 2.8%, $p =$ NS (Figure 2).

Discussion

After evaluating the results obtained in our retrospective analysis of data collected in Polish patients included in the ESC-HF registry, we conclude that concomitance of AF

Table 2. Comparison of selected factors related to course of hospitalisation in study group (AF+) and control group (AF-)

Factors [%] (N)	AF+ N = 378	AF- N = 387	p AF+ vs. AF-
Acute HF <i>de novo</i>	9.8% (37)	19.1% (74)	0.0004
Chronic HF exacerbation	90.2% (341)	80.95% (313)	0.0004
Reason for hospitalisation			
HF	89.2% (337)	86.0% (333)	NS
ACS/MI	16.1% (61)	28.7% (111)	< 0.0001
Ventricular arrhythmia	7.1% (27)	13.2% (51)	0.0083
Intravenous drugs during hospitalisation			
Dopamine	6.3% (24)	5.7% (22)	NS
Dobutamine	6.3% (24)	6.7% (26)	NS
Nitrates	9.5% (36)	15.0% (58)	0.0284
Diuretics	64.3% (243)	51.4% (199)	0.0004
Invasive procedures during hospitalisation			
Coronarography	19.0% (72)	33.9% (131)	< 0.0001
Coronary revascularisation	8.5% (32)	15.5% (60)	0.036
Invasive electrophysiological exam	1.1% (4)	0.8% (3)	NS
Ablation	1.6% (6)	0.8% (3)	NS
Electric cardioversion	3.7% (14)	1.0% (4)	0.0284
AF cardioversion	3.7% (14)	0.0% (0)	0.0004
CRT implantation	6.1% (23)	7.0% (27)	NS
ICD implantation	12.7% (48)	17.1% (66)	NS
Pharmacotherapy during hospitalisation			
ACE inhibitors	71.2% (269)	75.7% (293)	NS
ARB	9.3% (35)	10.9% (42)	NS
Beta-blockers	89.2% (337)	87.6% (339)	NS
MRA	71.7% (271)	61.0% (236)	0.0022
Diuretics	89.9% (340)	78.6% (304)	< 0.0001
Digoxin	34.4% (130)	11.4% (44)	< 0.0001
Statins	62.4% (236)	70.5% (273)	0.0215
Antiplatelets drugs	42.3% (160)	76.2% (295)	< 0.0001
Oral anticoagulants	75.1% (284)	16.5% (64)	< 0.0001
Amiodarone	17.2% (65)	9.6% (37)	0.0027

N – number of patients; AF – atrial fibrillation; HF – heart failure; NS – not significant; ACS – acute coronary syndrome; MI – myocardial infarction; CRT – cardiac resynchronisation therapy; ICD – implantable cardioverter-defibrillator; ACE – angiotensin-converting enzyme; ARB – angiotensin II receptor blockers; MRA – mineralocorticoid receptor antagonist

significantly impacts the natural history and treatment of HF patients.

Our study showed that in both subgroups of patients hospitalised in the course of HF with or without AF, clinical improvement was achieved as the result of hospital treatment. The coincidence of AF had no significant impact on in-hospital mortality rates (2.9% vs. 2.8%).

In the subgroup of AF+ patients, significantly higher incidence was observed for exacerbations of previously diagnosed chronic HF; this was associated with a higher

incidence of advanced HF of more than six months' duration in the medical history. So far as admission reasons other than AF were concerned, acute coronary syndrome, myocardial infarction, and ventricular arrhythmias were more common in the AF- group. In the study by Ozierański et al. [17], patients without AF were also more frequently admitted to hospital due to ACS. In this study, AF was present in 49.4% of hospitalised HF patients compared to 41.4% of patients in the study by Ozierański et al. Patients from the AF+ group were characterised by a significantly

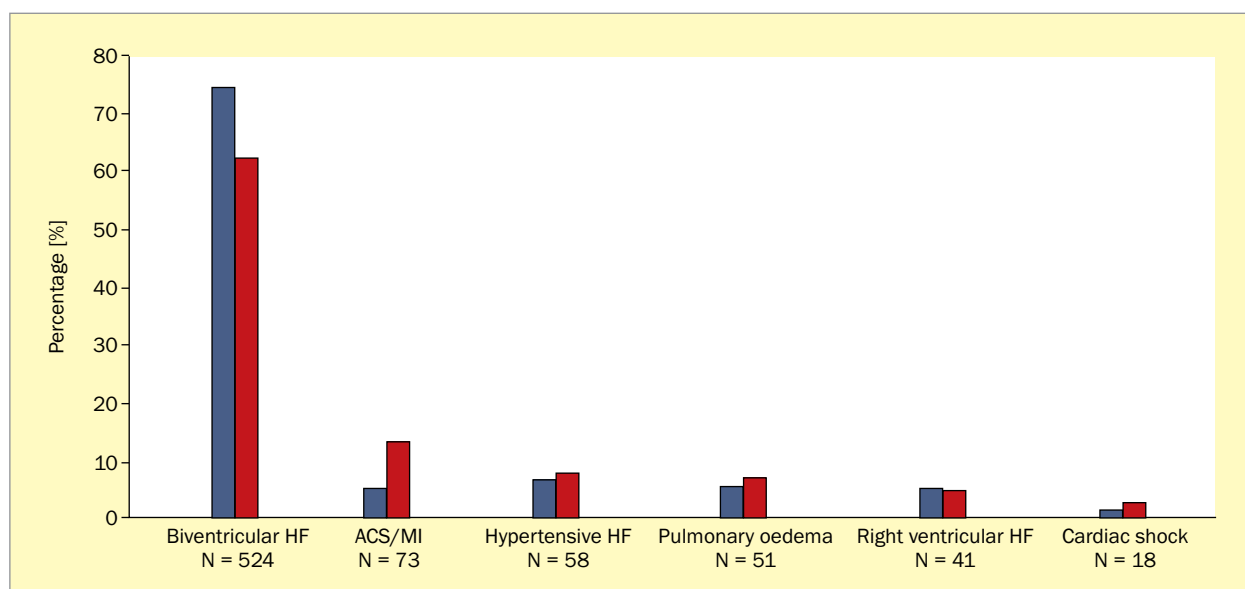


Figure 1. Clinical form of heart failure (HF) on admission to hospital; N – number of patients; ACS – acute coronary syndrome; MI – myocardial infarction

Table 3. Comparison of selected clinical parameters in study group (AF+) and control group (AF-)

Group	AF+ N = 378	AF- N = 387	AF+ vs. AF- p
Duration of hospitalisation [days], mean ± SD	9.8 ± 14.7	8.8 ± 10.9	NS
NYHA class at admission, mean ± SD	3.2 ± 0.7	3.0 ± 0.8	p < 0.0001
NYHA class at discharge, mean ± SD	2.3 ± 0.6	2.3 ± 0.6	NS
LVEF [%] at admission, mean ± SD	37.2 ± 14.8	33.6 ± 14.1	NS
LVEF [%] at discharge, mean ± SD	39.2 ± 15.2	35.7 ± 15.2	p = 0.006
SBP [mm Hg] at admission, mean ± SD	127.8 ± 24.4	130.3 ± 29.2	p < 0.0001
SBP [mm Hg] at discharge, mean ± SD	116.7 ± 14.1	118.7 ± 17.1	p < 0.0001
HR [bpm] at admission, mean ± SD	93.8 ± 27.4	81.4 ± 21.0	p < 0.0001
HR [bpm] at discharge, mean ± SD	77.0 ± 18.0	72.3 ± 15.8	p < 0.0001
Body mass at admission, mean ± SD	80.4 ± 16.8	80.4 ± 17.1	NS
Body mass at discharge, mean ± SD	77.8 ± 16.5	78.6 ± 16.8	p < 0.0001

AF – atrial fibrillation; N – number of patients; SD – standard deviation; NS – not significant; NYHA – New York Heart Association; LVEF – left ventricular ejection fraction; SBP – systolic blood pressure; HR – heart rate

higher frequency of used intravenous diuretics. This reflected a higher incidence of decompensated biventricular HF, whereas patients from the AF- group were characterised by a significantly higher frequency of applied intravenous nitrates due to a higher frequency of episodes of myocardial ischaemia, coronary disease and ACS as a reason for hospitalisation in the study population. No differences were observed with regard to the frequency of pressor amines being used in hospital management of decompensated, advanced HF in both study groups.

In the AF+ group, significantly higher frequency of electrical cardioversion procedures was observed regardless of the type of arrhythmia, although the outcomes were largely affected by the fact that all cardioversion procedures due to AF were performed in this subgroup of patients. On the other hand, in the AF- group, higher frequency of coronary angiography and revascularisation was observed since ACS were a more common cause of hospitalisations. As part of oral pharmacotherapy, the AF+ group was characterised by a higher use of aldosterone antagonists, loop

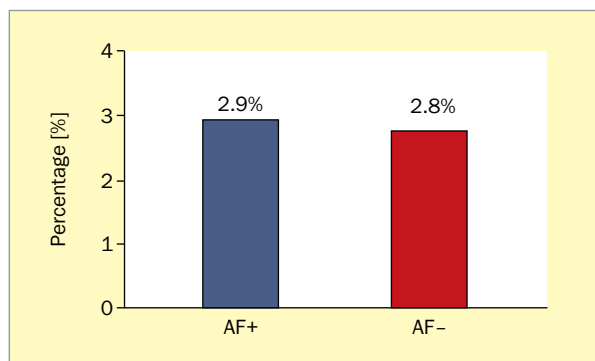


Figure 2. In-hospital deaths in study group (AF+) and control group (AF-); AF – atrial fibrillation

diuretics, amiodarone, digoxin, and oral anticoagulants (due to more advanced HF at admission, worse clinical performance status of patients, the presence of AF, and the requirement to control rhythm rate or rhythm after cardioversion), whereas the AF- group was characterised by a higher use of statins and anticoagulants (again due to the effects of coronary heart disease and the frequency of ACS as the cause of hospitalisation).

On the other hand, no differences were observed with regard to the use of basic drugs applied in the treatment of HF and which have a proven positive impact on the prognosis, such as ACE inhibitors, angiotensin II receptor antagonists (sartans) as well as beta-blockers. These drugs were used in more than 80% of patients in both groups, regardless of AF status. No significant differences were also observed with regard to the frequency of electrotherapeutic procedures [implantable cardioverter-defibrillator (ICD) and cardiac resynchronisation therapy (CRT) implantations] in the treatment of HF.

No significant difference was observed in the duration of hospitalisation, and clinical improvement was achieved in both groups. NYHA class was higher at admission than at discharge in both groups. Patients in the AF- group were characterised by higher SBP values compared to the AF+ group (haemodynamic impact of tachycardia on hypotension). SBP was found to be lower at discharge compared to admission (impact of initial doses of drugs in HF combination treatment during hospitalisation).

No differences were observed between the groups in terms of patient body mass on admission undergoing a significant reduction at discharge. This might be due to the high frequency of biventricular HF in both study groups. Patients required combination compensatory treatment, including intensive diuretic treatment, which led to reduced retention of fluids, reduced body mass, and reduced arterial pressure. In the AF+ group, the heart rate on admission was significantly higher than in the AF- group (93.8 ± 27.4 vs. 81.4 ± 21.0 , $p < 0.0001$). Reduction in heart rates was

achieved in both groups at discharge, with heart rate control level in the AF+ group (mean HR 77 bpm) meeting the recommended level set out in guidelines [1, 18], as opposed to the AF- group where target heart rate value was not achieved (mean HR 72 bpm) [9].

Upon admission, both groups were characterised by similar LVEF values (mean LVEF 37.2% vs. 33.6%). No significant increase in LVEF values was achieved upon discharge in either group. This might have been due to the short period between echocardiographic examinations of patients with moderate reduced ejection fraction in the majority of cases. Patients with HF need at least three months of optimal pharmacological treatment to improve left ventricle systolic function significantly. In this study, treatment of AF+ patients was based on rhythm control strategy in 17% of cases, mainly cases of spontaneous restoration of sinus heart rhythm. However, ablation procedures used to eliminate the basis of supraventricular arrhythmias, including AF, were not taken into account due to sparse data confirming that such procedures had indeed been performed. In light of the AATAC-AF (Ablation vs. Amiodarone for Treatment of Atrial Fibrillation in Patients With Congestive Heart Failure and Implanted ICD/CRT-D) study, in the population of patients with heart failure with reduced ejection fraction (HFrEF) and symptomatic, sustained AF, ablation of arrhythmia is more effective and safer than amiodarone treatment – during 26 months of follow-up, no recurrence of arrhythmia was observed in 70% of patients (compared to 34% of patients in the amiodarone group). In addition, the incidence of hospitalisations and deaths was also lower, provided that the procedure had been performed in a safe manner by experienced staff. The lack of benefits in the amiodarone group was associated with the adverse effects of the drug [19]. The relatively low contribution of rhythm control strategies to overall treatment in this study compared to findings published by Sosnowska-Pasiarska et al. [20] in 2010 is indicative of a trend towards ventricular rate control strategies becoming more common. In the population of Polish patients enrolled in the pilot phase of the ESC-HF Registry study, AF was present in 40% of patients on admission compared to 27% on discharge. However, it should be highlighted that in the population presented in our study, being much larger than that in the pilot phase of the registry study, the in-hospital mortality rate was 2.9% and this was lower than in the reference study (3.8%).

Thus, it appears that the choice of the strategy rhythm control vs the rate control in AF patients had no impact upon in-hospital survival of patients in the study population. In the analysis of heart rhythm on discharge in the AF+ group (data available for $N = 374$ patients), AF was still present in 58.3% of patients, which means that nearly 60% of patients received medications to control ventricular rate in AF upon being discharged. In 11.5% of cases,

the predominant rhythm at discharge was identified as the pacemaker rhythm, despite the fact that all patients had AF in their medical histories.

Conclusions

In the population of HF patients requiring hospitalisation, the AF+ subgroup is characterised by worse clinical condition (more common symptoms of cardiac decompensation, mostly biventricular, lower systolic blood pressure, higher heart rate on admission, and more frequent use of intravenous diuretics). No differences were observed between groups regarding the duration of hospitalisation or the frequency of pressor amines being used during hospitalisation. Moreover, arrhythmia had no impact on in-hospital mortality rates.

In the group of HF and AF patients, the most common strategy to control heart rate consists of the administration of BB and digoxin. Less commonly, rhythm is controlled by amiodarone as a means to prevent the recurrence of arrhythmia. The choice of the management strategy to be pursued during hospitalisation is associated, among others, with the high percentage of patients with permanent AF.

Participating centres, investigators and data collection officers

1. Zabrze (ul. Szpitalna): L. Poloński, M. Zembala, P. Rozentryt, J. Niedziela, J. Waclawski, M. Świetlińska
2. Wrocław: P. Ponikowski, E. Jankowska
3. Warszawa (ul. Banacha): G. Opolski, A. Kapłon-Cieślicka, M. Marchel, P. Balsam
4. Wałbrzych: R. Szelemej, T. Nowak
5. Biała: Z. Juszczak, S. Stankala
6. Kraków (ul. Skarbowa): E. Mirek-Bryniarska, M. Zabojszcz, A. Grzegórzko
7. Zamość: A. Kleinrok, G. Prokop-Lewicka
8. Łódź (ul. Sterlinga): J. Drożdż, K. Wojtczak-Soska, A. Retwiński
9. Bydgoszcz: W. Sinkiewicz, W. Gilewski, J. Pietrzak
10. Kielce: B. Wożakowska-Kapłon, B. Sosnowska-Pasiarska, R. Bartkowiak
11. Poznań: S. Grajek, E. Straburzyńska-Migaj, H. Wachowiak-Baszyńska, A. Katarzyńska-Szymańska
12. Sochaczew: E. Piasecka-Krysiak, J. Zambrzycki
13. Kraków (ul. Prądnicka): J. Nessler, K. Bury
14. Łódź (ul. Kniaziewiczza): M. Broncel, A. Poliwczak
15. Zabrze (ul. M. Curie-Skłodowskiej): E. Nowalany-Kozielska, A. Rolnik, J. Jojko
16. Kalisz: J. Tarchalski, G. Borej, R. Bartliński
17. Suwałki: J. Korszun
18. Bełchatów: D. Stachurski
19. Gdańsk: A. Rynkiewicz, J. Bellwon
20. Sieradz: P. Ruszkowski, G. Bednarczyk
21. Warszawa (ul. Solec): A. Mamcarz, A. Folga, M. Wełnicki
22. Kluczbork: A. Krzemiński
23. Częstochowa: P. Kardaszewicz, J. Gabryel, M. Łazorko-Piega
24. Gorlice: P. Kukla
25. Chełmża: P. Kasztelowicz
26. Sosnowiec: J. Olender
27. Zielona Góra: B. Kudlińska
28. Gostynin-Kruk: M. Pagórek, S. Olczyk
29. Rzeszów: J. Kuźniar, T. Rzeszuto

Conflict(s) of interest

The authors declare no conflict of interest.

Streszczenie

Wstęp. Współwystępowanie niewydolności serca (HF) i migotania przedsionków (AF) staje się wyzwaniem dla kardiologii nie tylko ze względu na konieczność intensyfikacji działań prewencyjnych w kierunku ograniczenia rozpowszechnienia wspólnych czynników etiologicznych, lecz również z powodu rosnących kosztów opieki nad głównie starszymi pacjentami obciążonymi wysokim ryzykiem skumulowanych powikłań obu chorób, w tym trwałej niepełnosprawności z powodu ciężkiej HF i powikłań zakrzepowo-zatorowych w przebiegu AF.

Głównym celem pracy była ocena wpływu współwystępowania AF na przebieg kliniczny oraz leczenie polskich pacjentów z HF na podstawie danych z wieloośrodkowego badania rejestrowego.

Materiał i metody. Populacja poddana retrospektywnej analizie w prezentowanej pracy obejmowała polskich pacjentów włączonych do Rejestru Niewydolności Serca ESC w trakcie fazy długoterminowej (n = 1126). Przeprowadzono analizę porównawczą grupy badanej (AF+) i grupy kontrolnej (AF-).

Wyniki. Nie stwierdzono różnic w częstości zgonów wewnątrzszpitalnych między grupami AF+ oraz AF-: 2,9% w porównaniu z 2,8% ($p =$ nieistotne [NS]). Średni czas hospitalizacji w grupie AF+ wynosił $9,8 \pm 14,7$ dnia w porównaniu z $8,8 \pm 10,9$ w grupie AF- ($p =$ NS). W grupie AF+ w porównaniu z grupą AF- istotnie częściej: zaostrzenie przewlekłej HF występowało jako przyczyna hospitalizacji, podczas hospitalizacji stosowano leki moczopędne dożylnie, wykonywano kardiowersję elektryczną, a także istotnie częściej stosowano w trakcie hospitalizacji antagonistów receptorów mineralokortykoidowych, diuretyki, digoksynę, doustne leki przeciwwzakrzepowe oraz amiodaron.

Wnioski. W populacji chorych z HF wymagających hospitalizacji podgrupa z AF charakteryzuje się gorszym stanem klinicznym (częściej występujące objawy dekomensacji układu krążenia, głównie obukomorowej, niższe ciśnienie skurczowe, wyższa częstość rytmu serca przy przyjęciu oraz częstsze stosowanie diuretyków dożylnie). Współwystępowanie AF istotnie wpływa na przebieg kliniczny oraz leczenie pacjentów z HF.

Słowa kluczowe: niewydolność serca, migotanie przedsionków, leczenie, wyniki kliniczne, rejestr

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