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Heart failure patients from hospital settings in Poland: Population characteristics and treatment patterns, a multicenter retrospective study

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Abstract

Background: *Despite physicians' increasing knowledge regarding heart failure (HF), a significant percentage of patients still do not receive adequate treatment. The aim of this multicentre, retrospective descriptive study was to reveal the pharmacotherapy patterns in HF patients hospitalized in cardiology (CARD) and internal medicine (INT) wards in Poland.*

Methods: *Included into the study were 800 consecutive patients who were admitted to the hospitals: 350 patients from 7 CARD wards and 450 patients from 9 INT wards.*

Results: *The average age in the study group was about 70 years (youngest participant under 40 and oldest at 95 years of age). Decompensation of HF or acute HF were the most frequent causes of hospitalization (in both groups > 50%). The main etiology was coronary artery disease, either alone or together with hypertension (from about 60% in INT patients to about 78% in CARD patients, p = NS). With regard to pharmacotherapy, angiotensin converting enzyme inhibitors were used in 81% of cases (77% CARD and 83% INT; p = 0.05); out of this group, doses were at optimal or larger in 39.3% of patients (38% CARD patients and 39.4% INT patients). Beta-blockers were administered in 31.4% and 19.1% of patients from the CARD and INT groups respectively (p<0.0001), but optimal dosing was negligible.*

Conclusions: *Compared with an assessment conducted several years ago, the past education initiatives have significantly improved the quality of standard-based HF treatment. However, suboptimal dosing and the use of drugs that do not improve prognosis remain an unresolved issue in this population.* (Cardiol J 2008; 15: 169–180)

Key words: heart failure, treatment, hospitalization

Introduction

Heart failure (HF) is an important clinical and social problem with high morbidity and mortality rates. Coronary artery disease and arterial hypertension are the most common causes of HF, whereas primary or secondary cardiomyopathy and heart defects are less frequent. Incidence of HF in the general population is estimated at 0.4% to 2% [1], thus it must be assumed that 700,000 patients in

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Poland are affected. The aging of the general population and advances in cardiovascular disease treatment lead to a gradual increase in the HF population. It is believed that 90% of the new cases are people over 60 and the majority of this population is made up of elderly subjects. The increasing number of HF patients means an increasing percentage of patients requiring intensive medical care as well as an increase in hospitalization rates. European and American data indicate a twofold increase in the rate of hospitalizations due to CHF within the last 10–15 years, and the rate of re-hospitalizations within the period of 3–6 months in elderly CHF patients has reached 29–47% [2]. Therefore, it is not surprising that treatment costs in HF patients make up approximately 1–2% of the entire healthcare budget in developed countries [3].

Numerous clinical studies conducted during the last two decades have confirmed the beneficial effect of angiotensin converting enzyme inhibitors (ACEI), beta-blockers (BBs), spironolactone and sartans in the HF population [4–9]. Based on these studies, scientific and national guidelines regarding management of HF patients, including recommended pharmacotherapy, have been developed [10, 11]. However, despite the expanding knowledge of physicians regarding HF, bibliographic data indicates that a significant percentage of this population do not receive treatment of proven beneficial effect on prognosis. It is unknown whether non-optimal treatment in HF patients from the general population is a consequence of the selection of participants for clinical studies or due to poor compliance of ambulatory physicians with published guidelines. Inconclusive opinions result from the scarcity of reliable data regarding the pharmacotherapy and prognosis in HF patients from the general population, particularly from hospital health settings.

The aim of this study was to obtain information regarding the most common pharmacotherapy methods in HF patients admitted to hospitals (reference level I or II) in Poland, with particular attention being paid to ACEI and BBs, as well as obtaining the characteristics of the in-patient population diagnosed with HF, hospitalized in internal and cardiology wards.

Methods

Study design and population characteristics

This was a multicentre retrospective cross-country descriptive study, conducted by 16 investigators from 16 randomly selected centres from the hospital database, including 9 internal medicine (INT) and 7 cardiology (CARD) wards (reference level I or II) throughout Poland. With respect to entry criteria, all patients included in study had to have systolic heart failure diagnosis based on objective verification (in accordance with 2001 European Cardiology Society guidelines — an objective confirmation of systolic dysfunction was required) documented in medical records in the past or during analysed hospitalization. Fifty consecutive patients with a confirmed diagnosis of HF, admitted within the 6 months preceding the study, were included by each investigator regardless of the primary cause of hospitalization (the most recent hospitalization). A heart failure patient hospitalization questionnaire was filled out for each patient, which consisted of four parts: general information on the hospital and ward, detailed information — about the patient, hospitalization course and medical history, and detailed information on the use of both ACEI and BBs.

Statistical analysis

All statistical analyses were conducted at the Office of Biostatistics in the Department of Epidemiology and Cardiovascular Disease Prevention of the Institute of Cardiology in Warsaw. All statistical analyses were performed using SAS v 8.2 software (SAS Institute, Cary, NC).

Our statistical analysis included demographic and clinical variables obtained from questionnaires, especially the number and duration of hospitalizations and HF pharmacotherapy, both prior to and during the analyzed hospitalization. For the purpose of this study, the α level of significance was set at 5% for all statistical calculations. Depending on the normal distribution and the number of groups compared, the following tests were used for the quantitative variables: Student's t-test, Mann-Whitney test, analysis of variance and Kruskal-Wallis test. For qualitative variables we used the χ^2 test and Fisher's exact test. An assessment of relationships between study variables was performed by Pearson, Spearman, and Cramer correlation coefficients.

Results

The final analysis was based on data from 800 patients diagnosed with HF, hospitalized between October 2002 and April 2003. There were 350 CARD subjects and 450 INT patients.

Population characteristics

Demographic and clinical data are presented in Table 1. The gender distribution in the two hospital population subsets was alike. The average age

Table 1. Study population characteristics.

Parameter	Cardiology Ward (n = 350)	Internal medicine ward (n = 450)	Total (n = 800)
Gender (% males)	50.9%	45.8%	48.0%
Age (range) (years)	69.1 ± 10.8 (37–95)	71.1 ± 10.0 (43–94)	70.2 ± 10.4 (37–95)
Body mass index > 25 (%)	88.1%	83.4%	85.1%
Systolic blood pressure [mm Hg]*	146.0 ± 30.7	151.8 ± 33.5	149.3 ± 32.4
Diastolic blood pressure [mm Hg]	87.4 ± 17.3	89.8 ± 17.3	88.7 ± 17.3
Heart rate [min^{-1}]	97.7 ± 28.6	95.1 ± 25.1	96.3 ± 26.7
Smokers (%)**	27.7%	18.4%	22.5%
Average hospitalization (days)	11.0 ± 5.7	11.6 ± 7.2	11.3 ± 6.6

Data as means ±SD; *p = 0.01; **p < 0.0001; all other p = NS

in the study population was approximately 70 years, with the youngest patient under 40 and the oldest 95 years old. The body mass index (BMI) was similarly elevated in both groups, without significant difference. Systolic blood pressure was elevated in the entire population, especially in INT patients. Among all patients, decompensation of HF or acute HF were the most common causes of index hospitalization and rates were similar in both groups, exceeding 50%. Other cardiac causes of hospitalization included acute coronary syndromes, in approximately 25% of CARD patients, with lower frequency in INT patients. Extra-cardiac hospitalization causes made up only a small portion (2%) of CARD, but almost 13% of INT admissions. Out of the study population, 34.9% CARD and 33.1% INT patients reported hospitalization for cardiovascular reasons within the 12 months preceding the study. On the other hand, 47.7% and 32.9% patients, respectively, did not confirm hospitalization due to cardiovascular reasons, with no data for 17.4% of CARD patients and 34% of INT (p < 0.0001).

Etiology, diagnosis and progression of heart failure and concomitant diseases

Coronary artery disease, either alone or together with arterial hypertension, were the most common etiology of HF in both groups; however, they differed significantly with this regard (Fig. 1).

In most cases heart failure was diagnosed before the index hospitalization (46.3% CARD *vs*. 44% INT) although there were no data for a substantial proportion of the patients: 40% *vs*. 21.1% (p < < 0.0001) for INT and CARD, respectively. With regard to diagnostic examinations, 53.2% of patients had an echocardiogram performed during the analyzed hospitalization, more frequently in CARD (73.1%) compared with INT (54.8%; p < 0.0001). In subjects who underwent an echocardiographic examination, only 40% from the CARD group (data

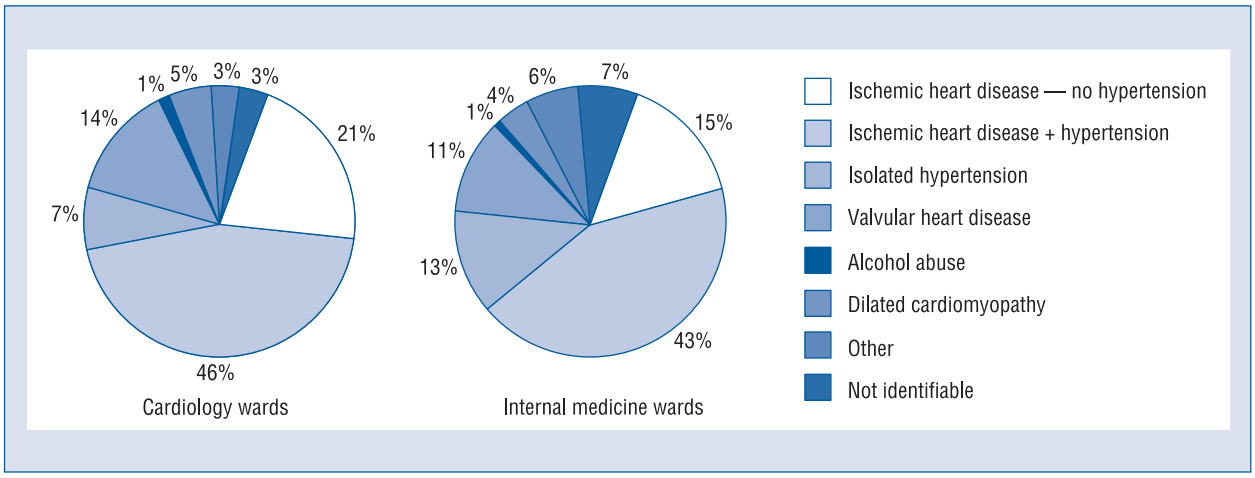

Figure 1. Distribution of suspected etiology of heart failure.

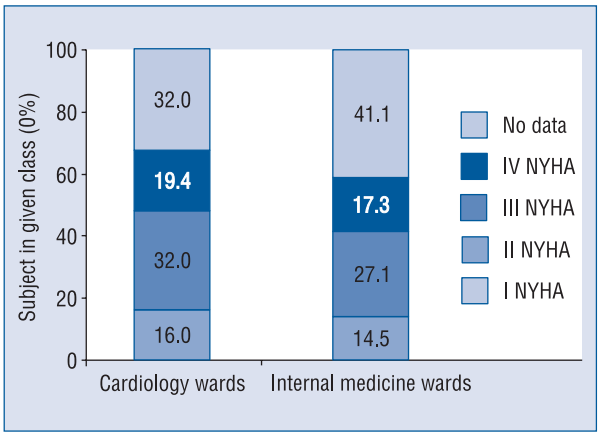

Figure 2. Distribution of NYHA classification in studied population.

for 48% of the whole group) and 46% from the INT group (data for 42% of the whole group) were found to have EF ≤ 40%; p < 0.0001.

The progression of HF was determined by NYHA classification in 62.9% patients. Patients in NYHA class III constituted the largest percentage of patients; however, in 1/3 of CARD patients and 41% of INT the data was lacking. NYHA distribution was alike in both subpopulations (Fig. 2).

The great majority of patients had comorbidities (Table 2). Most common was ischemic heart disease (from about 60% in INT patients to about 78% in CARD patients, the difference being statistically significant). Consequently, arterial hypertension was also diagnosed in over 60% of patients from both groups; slightly more often in the INT group. Moreover, diabetes was frequent in the studied populations, reaching 1/3 of the INT group, whereas renal failure was diagnosed in nearly every eighth patient (p = NS); 63.4% of CARD patients and 73.1% of INT patients were diagnosed with other, unspecified non-cardiovascular conditions and the difference was statistically significant.

Pharmacotherapy

Angiotensin converting enzyme inhibitors. On average, 39.2% of the patients were on ACEI prior to hospital admission; significantly more in the CARD group (40.6%) than in the INT group (38%; p = 0.035). During hospitalization the proportions of patients receiving ACE inhibitors increased to 83% and 88%, respectively, with discharge rates as follows: 77% in CARD and 83% in INT (p = 0.05; 81% for the whole population). In the vast majority of cases (94%) ACEI were not changed during hospitalization, and in the remaining 6%, benazepril (33%) and captopril (31%) appeared to be replaced most often. Most frequently drug formulation was replaced due to economic reasons (33.7%), followed by inefficiency or poor tolerance of the previous drug (20.7% and 2.1%, respectively) and other causes (28.3%). In 32.5% of cases the data was not available. Figure 3 shows the final distribution of each ACEI (differences between INT and CARD were insignificant).

Both in CARD and INT groups, doses of all ACEI were increased during hospitalization; however, less than half of the patients received the recommended dose. Based on hospital discharge cards, an average of 39.3% of the patients on ACEI received doses optimal or larger (38% of CARD and 39.4% of INT patients). Figure 4 presents the detailed distribution of ACEI agents. The following factors were pointed out as the most frequent causes of sub-optimal dose administration: too short period of drug use (35.9%), systolic blood pressure < 100 mm Hg (14.1%), lab test results regarding creatinine and electrolyte levels (5%), a history of poor tolerance to higher doses (4.4%), side effects (1.9%), other causes (1.2%), and in 37.5% of cases the data was unavailable.

Table 2. Analysis of comorbidity distribution in studied population.

	Cardiology ward	Internal medicine ward	Whole population
Coronary artery disease with infarction (%)	37.1	32.0	34.3
Coronary artery disease without infarction (%)*	40.9	29.8	34.6
Hypertension (%)	65.4	71.1	68.6
Supraventricular arrhythmia (%)*	53.7	36.0	43.8
Ventricular arrhythmia (%)*	16.6	7.8	11.6
Diabetes (%)	27.7	33.1	30.8
Renal failure (%)	14.3	10.9	12.4
Hyperlipidemia (%)*	26.3	14.0	19.4
Other diseases, non cardiovascular (%)**	63.4	73.1	68.9

*p ≤ 0.001; **p = 0.003; all other p = NS

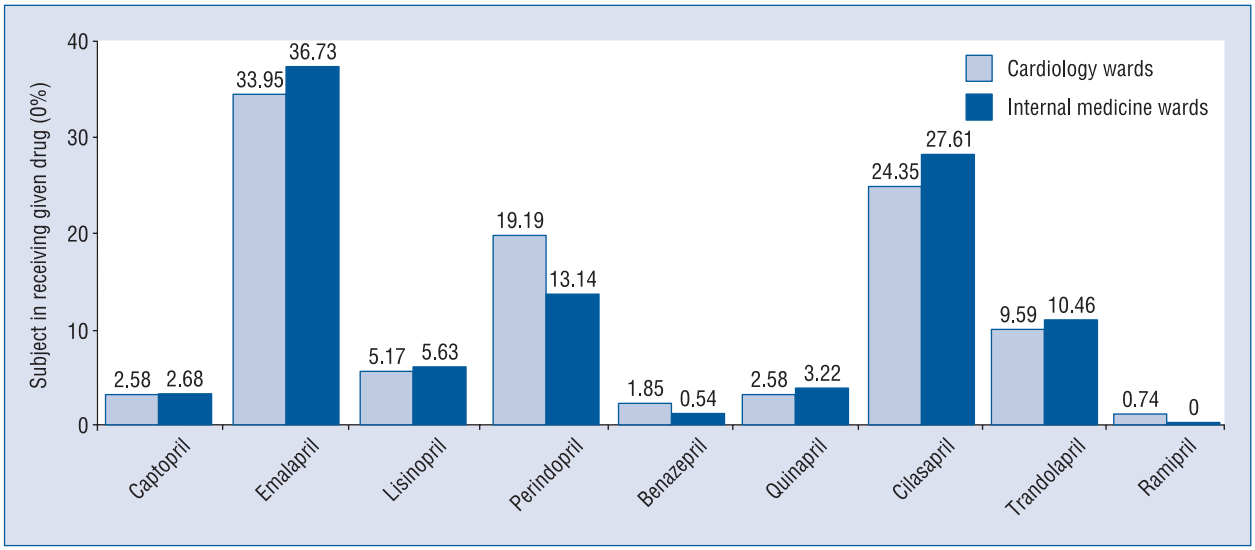

Figure 3. Frequency of angiotensin-converting enzyme inhibitor administration.

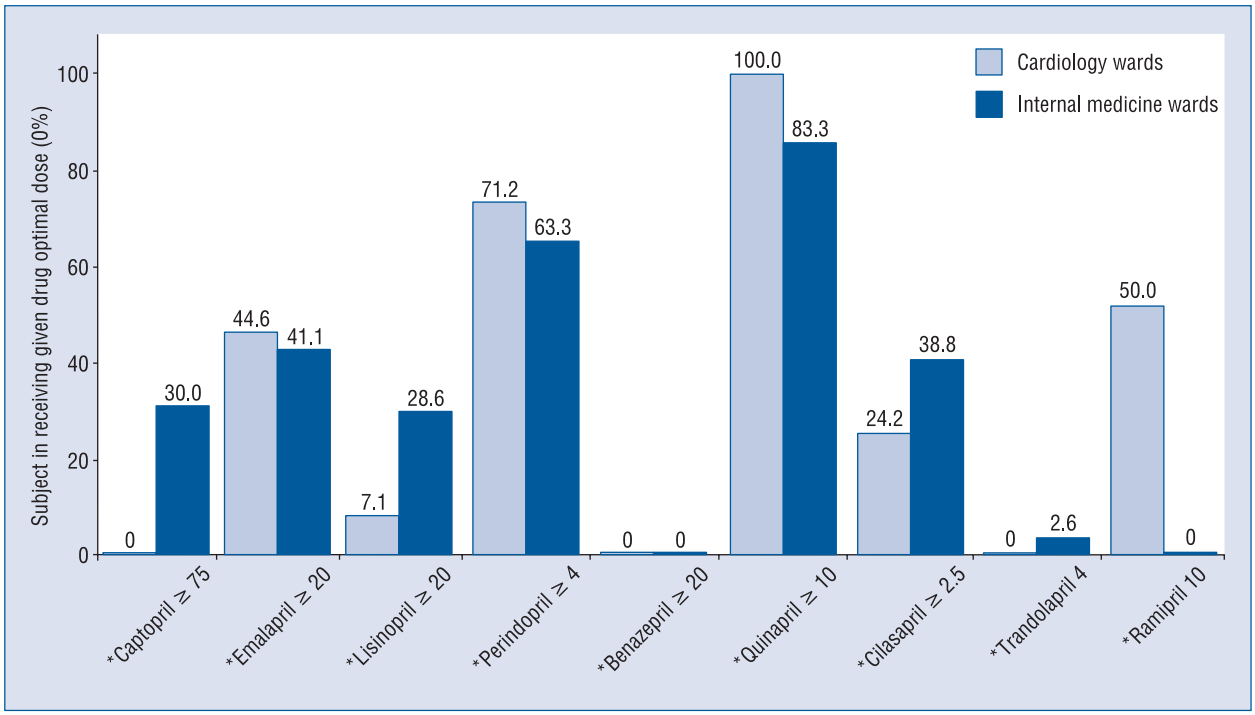

Figure 4. Optimal dosing of angiotensin-converting enzyme inhibitors; *optimal dose of each drug.

Of the patients who did not receive ACEI treatment at discharge, 5.6% of subjects either had begun to receive the drug during hospitalization or had been taking the drug prior to hospitalization and the treatment was later discontinued. There were 14.6% of patients not receiving ACEI during hospitalization. The reasons for not prescribing ACEI during hospitalization or for treatment discontinuation are presented in Figure 5.

Beta-blockers. As in the case of ACEI, BB administration was found to be more prevalent among CARD patients than INT patients (31.4% *vs.* 19.1%, respectively; $p < 0.0001$). Beta-blockers treatment was initiated in a significant percentage of patients during hospitalization; thus the ratio of patients on BBs increased to 61.7% and 50.4%, respectively ($p = 0.0015$). In 13.5% of patients, BB was replaced by another drug from the same class

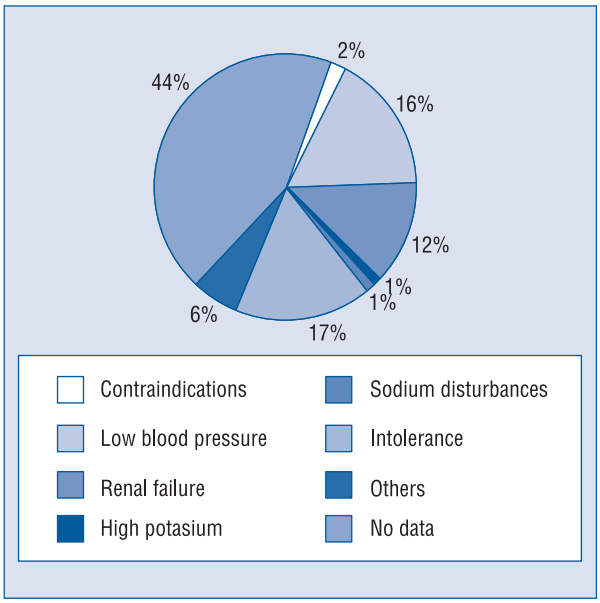

Figure 5. Reasons for not giving angiotensin-converting enzyme inhibitors.

during hospitalization. The most commonly replaced BBs were: propranolol (replaced in 36% of cases), acebutolol (25%), atenolol (25%), metoprolol (17%) and sotalol (13%). At discharge from the hospital the percentage of patients treated with BBs was 55.4% for CARD and 46% for INT ($p = 0.008$). It must be stressed, however, that a significant number of patients still received BBs not approved for the treatment of heart failure (CARD — 17.1%, INT — 14.9%). Figure 6 shows the distribution of BB agents. With respect to dosing, as in the case of ACEI, the doses of all BBs were increased during hospitalization, both for CARD and INT. An analysis of BB doses approved for HF treatment showed that only a marginal proportion of patients received optimal dosing. The rates for EVBM BBs for CARD and INT were as follows: bisoprolol (10 mg) 6.4% and 3.3%, metoprolol (both tartrate and succinate, e.g. in a dose of 100 mg) 21% and 17%, and carvedilol (50 mg) 0% in both groups.

Of the patients with no BBs at discharge, 5.1% either had began receiving the drug during hospitalization or had been taking the drug prior to hospitalization and the treatment was later discontinued. There were 44.5% of patients not receiving BBs during hospitalization. The reasons for not prescribing BBs during hospitalization or for treatment discontinuation are presented in Figure 7.

At discharge 46.6% CARD and 37.8% INT patients (41.6% on average) received a combination of both ACEI and BBs.

Other drugs used in heart failure. Diuretics were used in approximately 1/3 of cases (35.1% of CARD patients and 32% of INT patients; $p = NS$); however, at discharge the ratio increased to 85.1% and 87.3%, respectively ($p = NS$). Interestingly, 71.1% of CARD and 82.8% of INT patients required intravenous diuretic treatment during the analyzed hospitalization.

Oral furosemide was the most commonly used diuretic in both study populations, slightly more often in the INT, followed by indapamide (at total doses of 2.5 and 1.5 mg) (Fig. 8). A small proportion of patients in both subpopulations (about 5%) received concomitant treatment with two diuretics.

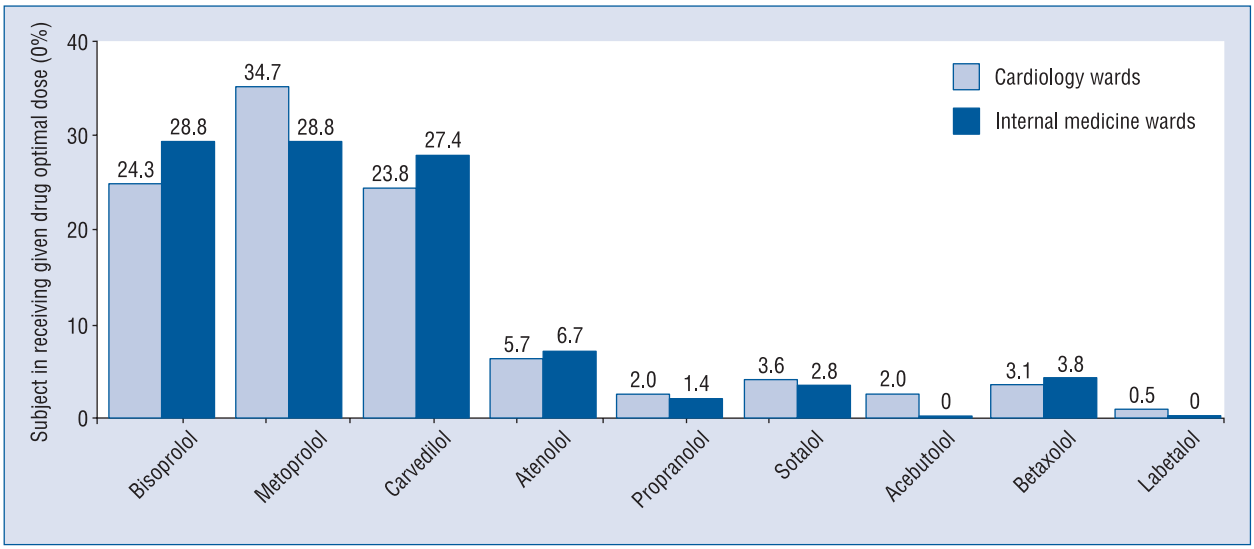

Figure 6. Frequency of beta-blocker administration.

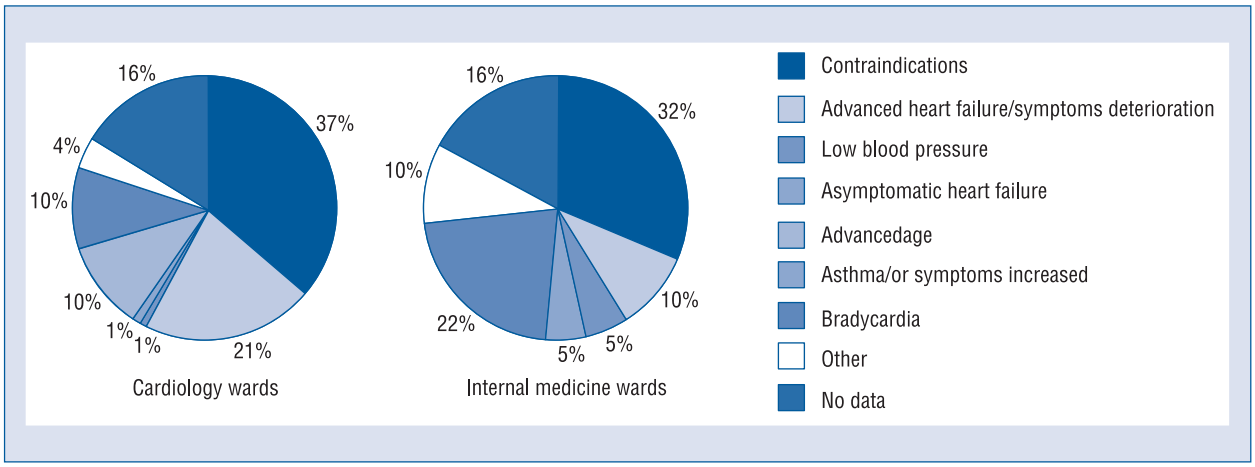

Figure 7. Reasons for not giving beta-blockers.

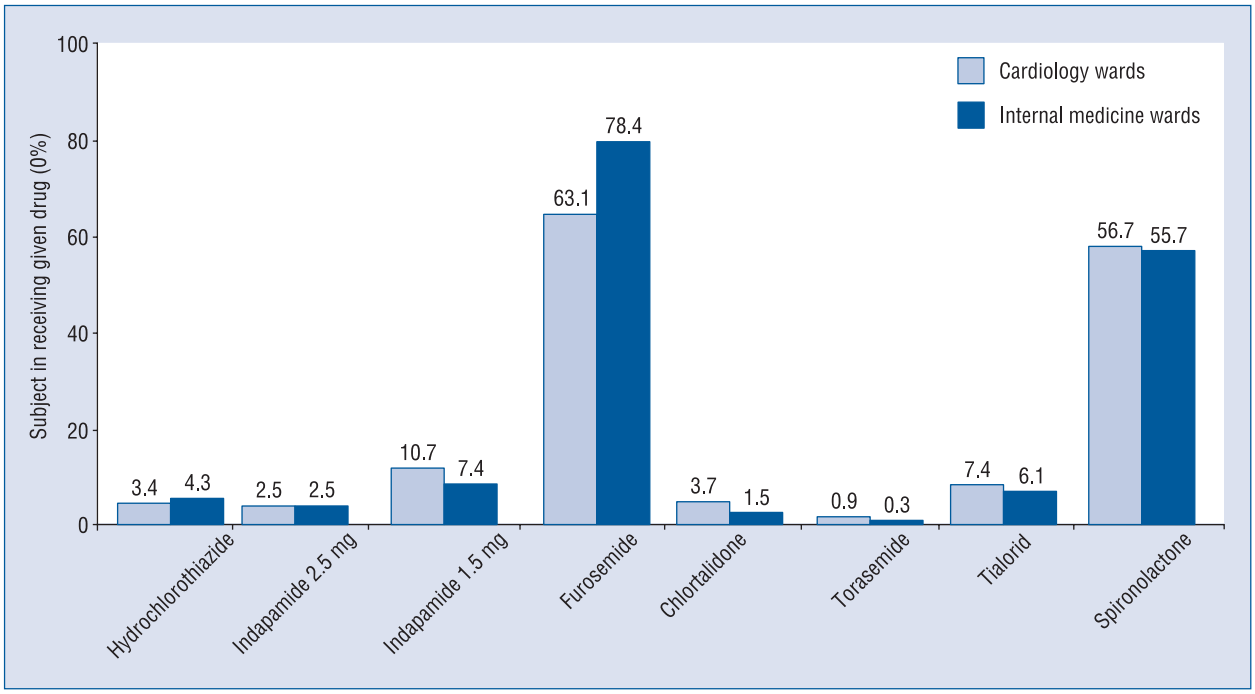

Figure 8. Frequency of diuretics administration.

During the analyzed hospitalization, a significant increase in the frequency of spironolactone use was also observed: from 15.4% among CARD patients and 14.4% among INT patients ($p = 0.0065$) to 48.3% and 48.7%, respectively. Conversely, the proportion of patients receiving digitalis increased from 17.4% and 15.6% (the difference between groups, $p = 0.009$), almost twofold.

Among the other drugs used, acetylsalicylic acid (ASA) (63%) and long-acting nitrates (52%) were the most frequently reported, the latter class being significantly more frequent in the CARD group. Other anticoagulants were recommended in approximately 41% of cases, also more frequently in the CARD group. Conversely to the use of ASA, there was some disproportion in the use of statins, which were recommended in approximately 29% of cases (more commonly in the CARD group) (Table 3).

Discussion

This study is a retrospective epidemiological project describing the characteristics of HF patients admitted to cardiology and internal medicine wards

Table 3. Frequency of drug administration

Medicine classes	Cardiology ward (% of patients in the group)	Internal medicine ward (% of patients in the group)
Sartans	2.0%	1.1%
Long acting nitrates	61.6%	44.2%
Short acting nitrates or molsidomine	32.0%	29.6%
Digitalis	27.7%	30%
Calcium antagonists**	27.7%	16.1%
Alfa antagonists	2.3%	1.1%
Acetylsalicylic acid	63.7%	61.8%
Antiarrhythmic agents*	25.4%	16.7%
Other anticoagulants*	47.8%	35.9%
Statins*	35.4%	23.8%
Fibrates	1.1%	1.3%
Non-steroidal anti inflammatory drugs (NSAID)	10.1%	14.2%

*$p < 0.01$, **$p < 0.0001$, all other p = NS

(first and second level of reference). A group of 800 subjects (with objective confirmation of HF diagnosis) were included in the study. This is particularly important because in most epidemiology studies the diagnosis was based on clinical criteria. The average age of the study population was 70 years and is consistent with findings from previous reports, indicating that HF is a condition most prevalent in the elderly population [2, 12, 13].

Baseline population characteristics

Gender distribution in the analyzed population in both groups was similar, closely resembling that from the EuroHeart Survey conducted in cardiology and internal medicine wards in over 10 European countries [13]. In an observational study of ambulatory patients from several years ago, the percentage of women was slightly greater, reaching 53% [14], and in the IMPROVEMENT studies women constituted 45% [2]. Thus, it can be assumed that HF incidence in the Polish population is similar for both genders.

An interesting issue is the observation of the occurrence of overweight patients and even obesity in this population [15], which seems to be a consequence of not only limited exercise tolerance, but also inadequate patient compliance. Additionally, the high rate of smokers, higher than in other studies (13%) [2, 15], seems to support the notion of insufficient patient cooperation. A relatively consistent finding in the Polish population are elevated systolic blood pressure values, which in the IMPROVEMENT study proved to be among the highest in Europe, despite a comparable proportion of hypertension patients [2], and were higher than in most epidemiology studies [15, 16].

Another clinical issue is the very high average heart rate, nearly 100 bpm, which reflects the level of adrenergic system inhibition and treatment efficacy. In other populations the average heart rate did not exceed 74–76 bpm, but these subject came from ambulatory settings and were generally in better clinical condition, something which may explain the observed differences [12, 15, 16].

The distribution of HF etiologies indicating the main role of coronary artery disease followed by arterial hypertension corresponds with the data for the European population [17] as well as with the results from a population study conducted by Rywik et al. [14]. However, it is believed that soon, due to advances in the treatment of acute myocardial infarction, arterial hypertension, currently listed as the second most common cause of HF, will become the most common.

Considering the specific character of the HF population, the vast majority of cases report numerous comorbidities, which, apart from making the optimal pharmacotherapy difficult, often adversely influence prognosis increasing the risk of rehospitalisation [18]. In our population, as in the EuroHeart study, cardiovascular diseases (coronary artery disease and arterial hypertension) were the most common concomitant diseases, observed most often in the CARD group and determined by the characteristics of these wards. The high prevalence of supraventricular arrhythmias (reported in nearly half of CARD patients and in approximately 1/3 of INT patients) is probably a result of the inclusion

of arterial fibrillation into this category, which is common in the course of HF [13, 16, 17].

Other frequent non-cardiovascular diseases included diabetes and renal insufficiency, which were also shown in earlier population studies [13, 17], a fact that should be taken into consideration while selecting pharmacotherapy, especially with regard to the use of rennin-angiotensin-aldosterone system inhibitors.

Rehospitalisation is frequent among the HF population, with an event rate ranging from less than twenty up to at least 1/3 during a years' observation [19, 20]. Moreover, as was observed in a Swedish population study, hospitalization due to cardiovascular reasons [16] is an unfavourable prognostic factor. Of the studies conducted so far, which have analyzed the causes of hospitalization, the most complete information comes from the EuroHeart Survey [13]. Similarly to our results, the data for the Polish population from EuroHeart Survey shows that the most common cause of analyzed hospitalization was HF decompensation, both for cardiology or internal medicine departments.

This indicates the importance of popularization of HF issues among general practitioners/internal medicine specialists, as HF is becoming a problem extending beyond the cardiology field, also with regard to in-patient treatment. Differences concerning acute coronary syndromes are likely due to administrative reasons and better preparation to handle this group of patients at CARD wards.

It is somewhat surprising that EF ≤ 40% was observed in less than 50% of patients, both in the CARD and INT groups. This situation is probably a consequence of the study methods, which accepted objective verification of systolic dysfunction documented prior to study inclusion. Thus, it cannot be excluded that in some cases of acute cardiovascular episode (acute coronary syndrome, myocarditis, tachycardia, etc.) there was an improvement in left ventricular systolic function after the appropriate treatment was administered. Another factor that should be taken into consideration while interpreting the presented results is the very small proportion of patients with actual available objective assessment of cardiac systolic function. Similar discrepancies have been reported in other studies, in which systolic dysfunction was assessed according to protocol. This includes the IMPROVEMENT study [2], in which EF < 40% was observed in ñ of the patients and the EuroHeart study [13] with comparably low EF values (in 51% of men and only 28% of women).

Pharmacotherapy

The data unequivocally indicates that hospitalization of HF patients resulted in an improvement in treatment quality. An increase in the administration of ACEI (up to 80.5%) and BBs (50.1%) was recorded in all groups, being more pronounced in the INT. The percentage of the general population diagnosed with HF and treated with ACE inhibitors ranged from 44% in the American study from the early 90 s [21] to approximately 60% in both the IMPROVEMENT and a Polish population study [22]. Hence, the most recent publications indicate an increase in the use of these drugs in up to approximately 80% of cases [12]. On the other hand, the data on hospitalized patients indicates that the frequency of ACEI administration was close to 60% in the EuroHeart study, reaching as much as 100% for patients treated in cardiology wards [23]. In most publications, treatment by a cardiologist increased the likelihood of receiving ACEI [23]. Our study showed contrary results, a trend which was also observed in an Italian study [17].

Most authors did not analyze the causes of ACEI treatment discontinuation, except for data indicating age and comorbidities as factors reducing the chances of receiving drugs from this class. In the analyzed group about 20% of patients had contraindications for their use, comparable to previous reports [24]. It must be stressed, however, that in most cases hypotension could be iatrogenic, resulting from the use of other drugs affecting systemic blood pressure. Only a few studies analyzed doses for this class of drugs in relation to guidelines [2, 23–25]. Both in the IMPROVEMENT and EuroHeart studies, the vast majority of subjects were on drug doses lower than recommended [2, 25]. The presented results, showing that nearly 40% of patients received optimal doses (both internal medicine and cardiology wards), seem to be among the highest, although far from what was expected. It is noteworthy that only two of the ACEI used (perindopril and quinapril) were administered to most of the patients (at least 2/3 of the study population) in the recommended doses.

A comparison with previous population studies shows unequivocally a continuous tendency to prescribe BBs too rarely and in insufficient doses. This is likely to be the cause of differences between populations from clinical studies and actual HF patients from the general population. The efficacy of BBs in the aged population of HF patients has been confirmed only recently [26]. However, the results of interesting work by Lenzen et al. [27] indicate

that, even in a population comparable with the clinical study population, BBs are used too rarely and in inadequate amounts. In the previously mentioned study by Rywik et al. [22], drugs of this class were used in approximately 20% of patients, in EuroHeart — in about 37% and in the Italian population in less than 10% in subjects from internal medicine up to 20–40% in patients from cardiology wards [23, 24]. Thus, our results indicate an improvement in treatment quality. Simultaneously, the proportion of patients receiving both ACEI and BBs has increased since the earlier data in both subgroups [22, 25]. An important observation, reported in the EuroHeart study and in our material, is the high proportion of patients (15%) classified as receiving BBs who in fact received agents of which the efficacy was not confirmed in the HF population [25]. The small proportion of BB recipients in most studies regarding hospitalized patients may be the result of HF decompensation as the main cause of admission, consequently leading to a delay in the initiation of treatment. The reasons given as the main cause of drug discontinuation confirm the remaining lack of physicians' experience, especially with regard to the management of patients in advanced stages of the disease. Additionally, the previously mentioned high average heart rate suggests insufficiently intensive BB treatment.

As reported by other authors [17, 22, 24, 25], the high prescription of diuretics in both subgroups is easily justified by the patient distribution (mainly NYHA classes III and IV, with coexisting hypertension). The greatest changes in pharmacotherapy were noted for spironolactone, as there was a threefold increase in the use of this drug in both subgroups during hospitalization, and there use is definitely greater than several years ago [2, 22, 25]. The popularity of spironolactone indicates that there is little concern over its use in the HF population, despite narrow indications and the possibility of hyperkalemia-related complications [10].

A little over a decade ago digitalis was the drug of choice in HF, but at present, according to current guidelines, it should be instituted only in advanced HF or in the early stages as a heart rate control therapy. In comparison with earlier data for the Polish population [2, 25] digitalis was used in approximately every third patient.

Due to the large percentage of patients with ischemic heart disease (over 60%), a considerable proportion of patients would be expected to receive statin treatment. Our results are surprising from this perspective. Moreover, the type of hospital did not affect the treatment. In most studies statin prevalence was not recorded; nevertheless, in one of them (the TEMISTOCLE study) the prescription rate was significantly higher, reaching up to 70% for cardiology wards and approximately 40% in internal medicine wards [17]. Considering the results of the most recent studies, indicating the beneficial effect of this class of drugs in the HF population [28, 29], future publications are likely to report a significantly higher number of patients receiving statin treatment. On the contrary, acetylsalicylic acid was used in about 2/3 of the population without differences between groups, whereas long-acting nitrates were used more often in the CARD population — a consequence of the clinical characteristics of this group of patients. The latter class of drugs, without proven beneficial effects on prognosis (used without combination with dihydralazine), is one of the most commonly used in the majority of studies [17, 22, 24, 30]. In Poland their use is 1.5 fold higher than in other countries. Another constant trend for the Polish population is a significant number of patients receiving calcium channel blockers, higher than in other European studies [17, 30–32]. Nonetheless, it has been cut by almost fifty percent compared to a study conducted several years ago [22].

Limitations of the study

This is a retrospective observational study. As entry criteria, with respect to systolic heart failure, were based mainly on medical records from the past, they might not always be unambiguous within the studied population. Another aspect, which should taken into consideration, is the study period, which covered the years 2002–2003, thus it cannot be excluded that the present situation slightly differs from that described.

Conclusions

The presented results, to our knowledge, provide for the first time extensive information regarding the Polish population of patients diagnosed with HF and hospitalized in cardiology and internal medicine wards. The multicentre character of this study allows the assumption that this data is representative for the Polish population and that HF is equally common among elderly men and women. Coronary artery disease was the most common cause of heart failure in the study group with hypertension being second. Regardless of the type of ward, decompensation of HF was the most common cause of hospitalization. There have been an increasing number of patients receiving ACEI and BB treatment according to EVBM during hospitalization,

including using both agents simultaneously, but 50% of patients still received less than the recommended dose. Compared with the assessment carried out several years ago, there is a noticeable improvement in the quality of standard-based HF treatment. Nonetheless, dose optimalisation and the avoidance of drugs with no positive effect on prognosis in this population still remain unresolved problems.

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References

1. Ho KL, Anderson KM, Kannel WB, Grossman W, Levy D. Survival after the onset of congestive heart failure in Framingham Heart Study Subjects. Circulation, 1993; 88: 107–115.
2. Cleland JGF, Cohen-Solal A, Cosin-Aguilar J et al. for the IMPROVEMENT of Heart Failure Programme Committees and Investigators and the Study Group on Diagnosis of the Working Group on Heart Failure of the European Society of Cardiology: Management of heart failure in primary care (the IMPROVEMENT of Heart Failure Programme): An international survey. Lancet, 2002; 360: 1631–1639.
3. Berry C, Murdoch DR, McMurray JJ. Economics of chronic heart failure. Eur J Heart Fail, 2001; 3: 283–291.
4. CIBIS II Investigators and Committees: The Cardiac Insufficiency Bisoprolol Study (Cibis II): A randomised trial. Lancet, 1999; 353: 9–13.
5. The consensus Trial Group: Effects of enalapril on mortality in severe congestive heart failure: results of the cooperative North Scandinavian Enalapril Survival Study. N Engl J Med, 1987; 316: 1429–1435.
6. The Solvd Investigators: Effect of enalapril on mortality and the development of heart failure in asymptomatic patients with reduced left ventricular ejection fraction. N Engl J, 1992; 327: 685–691.
7. The CAPRICORN investigators. Effect of carvedilol on outcome after myocardial infarction in patients with left ventricular dysfunction: the CAPRICORN randomised trial. Lancet, 2001; 357: 1385–1390.
8. Hjalmarson A, Goldstein S, Fagerberg B et al. Effects of controlled-release metoprolol on total mortality, hospitalizations, and well-being in patients with heart failure: the Metoprolol CR/XL Randomized Intervention Trial in congestive heart failure (MERIT-HF). MERIT-HF Study Group. JAMA, 2000; 283: 1295–1302
9. Granger CB, McMurray JJ, Yusuf S et al. Effects of candesartan in patients with chronic heart failure and reduced left-ventricular systolic function intolerant to angiotensin-converting-enzyme inhibitors: the CHARM-Alternative trial. Lancet, 2003; 362: 772–776.
10. Swedberg K, Cleland J, Dargie H, et al. Task Force for the Diagnosis and Treatment of Chronic Heart Failure of the European Society of Cardiology. Guidelines for the diagnosis and treatment of chronic heart failure: executive summary (update 2005): The Task Force for the Diagnosis and Treatment of Chronic Heart Failure of the European Society of Cardiology. Eur Heart J, 2005; 26: 1115–1140.
11. Hunt SA. The 2005 Guidelines for the Evaluation and Management of Heart Failure Heart Association Task Force on Practice Guidelines (Writing Committee to Update Heart Failure in the Adult: A Report of the American College of Cardiology/American). J Am Coll Cardiol, 2005; 46: 1–82.
12. Fruhwald FM, Rehak P, Maier R, Watzinger N, Wonisch M, Klein W. Austrian survey of treating heart failure — AUSTRIA. Eur Heart J, 2004; 6: 947–952.
13. Cleland JGF, Swedberg K, Follath F. et al. The EuroHeart Failure survey programme — a survey on the quality of care among patients with heart failure in Europe. Part 1: Patient characteristics and diagnosis. Eur Hear J, 2003; 24: 464–474.
14. Rywik SL, Wągrowska H, Broda G et al. Heart failure in patients seeking medical help at outpatient clinics. Part I. General characteristics. Eur J Heart Fail, 2000; 2: 413–421.
15. Mosterd A, Cost B, Hoes AW et al. The prognosis of heart failure in the general population The Rotterdam Study. Eur Heart J, 2001; 22: 1318–1327.
16. Muntwyler J, Abetel J, Gruner C, Follath F. One-year mortality among unselected outpatients with hart failure. Eur Heart J, 2002; 23: 1861–1866.
17. Di Lenarda A, Scherillo M, Maggioni AP et al. Current presentation and management of heart failure in cardiology and internal medicine hospital units: A tale of two worlds-The TEMISTOCELE study. Am Heart J, 2003; 146: e12.
18. Braunstein JB, Anderson GF, Gerstenblith G et al. Noncardiac comorbidity increases preventable hospitalizations and mortality among medicare beneficiaries with chronic heart failure. J Am Coll Cardiol, 2003; 42: 1226–1233.
19. Bhatia RS, Tu Jack V, Douglas S. et al. Outcome of Heart Failure with Preserved Ejection Fraction in a Population-Based Study. N Engl J Med, 2006; 355: 260–269.
20. Koelling TM, Johnson ML, Cody RJ, Aaronson KD. Discharge education improves clinical outcomes in patients with chronic heart failure. Circulation, 2005; 111: 179–185.
21. Senni M, Tribouilloy CM, Rodeheffer RJ et al. Congestive heart failure in the community. A study of all incident cases in Olmsted County, Minnesota, in 1991. Circulation, 1998; 98: 2282–2289.
22. Rywik TM, Rywik SL, Korewicki J, Broda G, Sarnecka A, Drewla J. A survey of outpatients management of elderly heart failure patients in Poland — treatment patterns. Int J Cardiol, 2004; 95: 177–184.
23. Taubert G, Bergmeier C, Andresen H, Senges J, Potratz J. Clinical profile and a management of heart failure: Rural community hospital vs. metropolitan heart center. Eur Heart J, 2001; 3: 611–617.
24. Bellotti P, Badano LP, Acquarone N et al. Specialty-related differences in the epidemiology, clinical profile, management and outcome of patients hospitalized for heart failure. The OSCUR study. Eur Hear J, 2001; 22: 586–604.

25. Swedberg K, Cleland JGF, Aguilar JC et al. The EuroHeart Failure survey programme — a survey on the quality of care among patients with heart failure in Europe. Part 2: Treatment. Eur Heart J, 2003; 24: 464–475.
26. Flather MD, Shibata MC, Coats AJ et al. Randomized trial to determine the effect of nebivolol on mortality and cardiovascular hospital admission in elderly patients with heart failure (SENIORS). Eur Heart J, 2005; 26: 215–225.
27. Lenzen MJ, Boersma E, Wilma JM et al. Under-utilization of evidence-based drug treatment in patients with heart failure is only partially explained by dissimilarity to patients enrolled in landmark trials: a report from the Euro Heart Survey on Heart Failure. Eur Heart J, 2005; 26: 2706–2713.
28. Foody JM, Shah R, Galusha D, Masoudi FA, Havranek EP, Krumholz HM. Statins and mortality among elderly patients hospitalized with heart failure. Circulation, 2006; 113: 1086––1092.
29. Anker A, Clark AL, Winkler R et al. Statin use and survival in patients with chronic heart failure — results from two observational studies with 5200 patients. Int J Cardiol, 2006; 112: 234–242.
30. The Seosi investigator. Survey on hart failure In Italia hospital cardiology units. Eur Heart J, 1997: 1457–1464.
31. Pulignano G, Del Sindaco D, Tavazzi L et al. Clinical features and outcomes of elderly outpatients with heart failure followed up in hospital cardiology units: Data from a large nationwide cardiology database (IN-CHF Registry). Am Heart J, 2002; 143: 45–55.
32. Zannad F, Briancon S, Juilliere Y et al. Incidence, clinical and etiological features and outcomes of advanced chronic heart failure: The EPICAI Study. J Am Coll Cardiol, 1999; 33: 734–742.