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Drug Prescription Analysis at Hospital Discharge for Heart Failure Patients at the Institute of Cardiology of Abidjan

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Abstract

Introduction: Understanding improvement of pathophysiology of heart failure has allowed therapeutic progress over the past two decades in the pathology management. Our patients should benefit from these new drugs that improve survival. Objective: To analyze the treatment of hospital discharge according to ESC (European Society of Cardiology) Guidelines. Methods: We carried out a retrospective and descriptive study which included completed survey of patients hospitalized for heart failure in Medicine Department of cardiology Institut of Abidjan between January 1st 2011 to December 31st 2012. We analyzed the drugs prescription during hospital discharge by using the register of hospitalization. Results: 92.9% of the 532 files retained were included. Patients had a mean age of 54.4 ± 16.4 years old. 36.3% of the cases had a heart failure history with an average of 5.7 ± 3.2 days of hospital stay. At the hospital discharge, patients had for prescription: a diuretic specially Furosemide (100%), angiotensin converting enzyme inhibitor (ACEI) or angiotensin receptor blockers (ARB) (63.7%), a beta-blocker (17.9%) and a mineralocorticoids receptor antagonist (MRA) (51.2%). Diuretic, IEC or ARB and the MRA were prescribed systematically. Beta-blockers were lower prescribed to patients who showed no more signs of congestion. Conclusion: Our prescribing practices were adapted to the guidelines for heart failure management. However, the gaps will be corrected through sensitization and training.

Keywords

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1. Introduction

Heart failure is a serious and frequent disease. Its prevalence is increasing in all continents [1]-[4]. It reaches especially the elderly subjects in Western countries [5]. However, in sub-Saharan Africa, it affects young subjects around fifty [4] [6] with high morbidity and mortality in short and long term [6], thus reducing quality of life and productivity in developing countries. During these last two decades, therapeutic progress in the management of heart failure is mainly drugs (ACEI: Angiotensin-Converting Enzyme Inhibitor, ARB: Angiotensin 2 Receptor Blocker and Beta-blocker) that prolong survival [7].

Facing with the strong hospital and post-hospital morbidity, a track of improving the medicine precrisption would be the optimization of therapeutic after hospitalization discharge. However, fewer studies are carried out on the follow-up of the ambulatory medicine use for heart failure in real life. Two recent published studies agree on the benefit of Beta-blocker and ACEI or ARB combination [8] [9]. The first study carried out on the analysis of the therapeutic managment of 1137 heart failure patients at hospital discharge after cardiac decompensation over 18 months according to the ejection fraction, had concluded with an increase of the use of drugs recommended like ACEI or ARB in heart failure, with in particular, associated to beta-blockers. Indeed, majority of the patients (62%) received combination of beta-blocker and ACEI or ARB, and 56% of them had reached at least 50% of the target dose for each treatment [8]. The second study according to De Groote permitted setting up an observational register whose objective was to assess in liberal cardiology, the ambulatory managment of 5465 chronic heart failure patients with systolic dysfonction, between October 2004 and March 2006, according to the recommended guidelines of the European Society of Cardiology (ESC). The prescription analysis of three principal drugs ACEI-ARB-beta-blocker showed an improvement in time of their rate of prescription. The proportion of patients reaching target dose or 50% of this dose was significant, with a progression amongst patients treated by beta-blocker from 65% to 78% [9]. However, an improvement is still possible with regard to the administered doses.

The lack of adequate follow-up and the access difficulties to care in our health facilities, are one of our limits in heart failure management as well as the practitioners' reserve or fear of using beta-blockers in this condition. Heart failure patients of our Department should benefit such type of therapeutic. The objective of this work was to analyze the treatment of patients at hospital discharge, according to ESC (European Society of Cardiology) guidelines, to improve their drug management during their follow-up.

2. Methods

Material: We used the register of hospitalization where all the patients admitted to the medical service of the Institute of Cardiology of Abidjan (ICA) are recorded. This register includes the following data: age, sex, admission and discharge date and final diagnosis held with. The patient file allowed to collect on a questionnaire designed for this purpose, the socio-demographic, clinical, echocardiographic, biological and therapeutic data.

Study design: This retrospective and descriptive preliminary study from January 2011 to December 2012 related to the analysis of files of patients admitted for decompensation in the medical service of ICA. Were included in this study, patients above 5 years, irrespective of sex, nor of residence area who were hospitalized for depressive heart failure during the study period. In the selected period, we identified patients in the hospitalization register of medical service, starting by the discharge diagnosis. Then we sought out the files from the archives' service for reading and validation. We retained or selected the completed files. The uncompleted, untraceable ones or patients admitted outside of the above-mentioned period, were excluded. The parameters studied were the following: sociodemographic data (age, sex), clinic (heart failure history, type of heart failure, New York Heart Association stages (NYHA), duration of hospital stay; echocardiographic (underlying heart disease, LVTDD, LVEF, SLAP, mitral profile); biological (Natremia, kalemia, NT-ProBNP, serum creatinine, hemoglobin) and therapeutic data (diuretic, ACEI, ARB, beta-blocker, MRA or Mineralocorticoids Receptor Antagonist, etc.).

The collection of inform form is nonapplicable because it is about a retrospective study of files without direct intervention. However, we have respected the declaration of Helsinki and the anonymity of the data. Also, Ethical approval from national ethics service was not sought as this work was a service evaluation of the therapeutics offered by the ICA.

Data collection and statistical analysis: The lack of local data on prescription of beta-blockers for heart failure patients did not permit to calculate the sample size. So we chose an exhaustive sample from the register

of hospitalization. The data were keyed in and analyzed on Epi-Info version 3.5. The data were presented in proportion form for the qualitative variables and average with standard deviation for quantitative variables.

3. Results

Out of the 532 files retained over the study period, 38 were excluded for various reasons (uncompleted files, non-available, children, in course of hospitalization). The 494 completed ones were included and exploited either 92.9% of the files selected.

Patients mean age was 54.4 ± 16.4 years old with a male predominance (53.1%). Less than half had a history of acute heart failure (36.4%). The majority of the patients were admitted for global heart failure (68.3%). The average systolic blood pressure was 131 ± 25 mmHg. The mean duration of hospital stay was 5.7 ± 3.2 days ranging: 01 day and 20 days (**Table 1**).

Echocardiographic data allowed to note an average LVEF of 36 ± 13% with LVEF reduction in 87.8%. Underlying heart disease was dominated by cardiomyopathy (64.3%) followed by ischemic heart disease (13.8%), valvular heart disease (11.8%) and hypertensive heart disease (8.6%). The average SLAP was 53.8 ± 15.6 mmHg (**Table 1**).

Biology exhibited a mean natremia of 133.8 ± 7.8 mEq/l with hyponatremia in 40% of the cases. Hypokalemia was observed in 21.6% of the cases. The average serum creatinine level was 14.8 ± 9.6 mEq/l with kidney function alteration in 6.1% of the cases. Anemia was seen in 11.4% of patients (**Table 1**).

The main treatment during hospitalization was based of furosemide (100%), ACEI or ARB (66.8%), MRA (63.7%) and beta-blockers (18.2%). Other treatment summarized in **Table 2**, included: Digoxin (72.3%), Calcium channel blocker (11.7%), aspirin (12.7%), amiodaron (19.8%), preventive and curative anticoagulant dose (93.9%), nitrate derivatives (11.7%), statins (12.7%), clopidogrel (12.7%). Patients had furosemide, ACEI or ARB and MRA combination in 62% of the cases. Associating furosemide and MRA were observed in 51.4% of the cases. Combination beta-blocker, ACEI or ARB accounted for 18.2% of the cases.

At the hospitalization discharge, patients had a diuretic (100%), an ACEI or ARB (63.7%) with optimal dose achieved in 11.9% of the cases, a weak prescription of beta-blocker (15.6%) with optimal dose achieved in 3.4% of the cases and mineralocorticoids receptor antagonist or MRA (25.5%). Others drugs were often prescribed: Digoxin (44.6%), aspirin (10.3%), anticoagulant (16.6%), amiodaron (23.3%) and amlodipine (15.6%). The majority of patients (63.7%) received diuretic and ACEI or ARB combination. A low proportion (15.6%) received ACEI or ARB, beta-blockers and MRA combination. The optimal dose was achieved respectively in 11.9% and 3.4% for the ACEI or ARB and beta-blockers (**Table 2**).

According to LVEF, heart failure patients with preserved LVEF had more diuretic (12.2%) and ACEI or ARB (12.2%) but fewer beta-blockers (1.9%). Beta-blockers were under-prescribed in both groups (reduced LVEF and preserved LVEF) respectively in 13.7% and 1.9% of the cases. Under prescription of beta-blockers was associated with some factors: lack of completed clinical stabilization state (9.1%), low systolic blood pressure (15%), LVEF > 40% (21.7%), and Digoxin use (44.6%).

4. Discussion

Main drugs (diuretics, ACEI or ARB, beta-blockers and MRA) used in heart failure were prescribed in this study. Diuretics were prescribed to all patients. Indeed, the diuretics provide the basis for the management of congestive heart failure. In addition, patients were almost all in global heart failure. This major congestion state could explain this massive diuretic prescription (87% of the cases) at hospitalization discharge. This result is similar to that of Cohen-Solal [8] who found diuretic prescription in 87% of cases at hospitalization discharge in France. The majority of these patients were admitted at NYHA class II-III.

After hospitalization, patients had also received ACEI or ARB in significant proportion according to the LVEF that is less than 40% as recommended by the Guidelines [7]. But few of them had reached the optimal dose. This is due to the fact that blood pressure did not permit to reach optimal doses. In addition, kidney dysfunction in some patients motivated precaution in prescribing ACEI or ARB, which could affect kidney function [10]. Usually, this renal action was clinically non significant that does not justify stopping the treatment. So ACEI or ARB may be prescribed in heart failure patients with kidney failure with care [11]. They will be stopped in case of sudden drop in the glomerular filtration rate. Moreover, prescription of ACEI or ARB after hospitalization is a predictive factor of compliance or observance [12] [13]. This observance at discharge is

Table 1. Demographic, clinical, echocardiographic and biological characteristics.

Patient characteristics	N = 494	%	Mean ± SD
Demographics			
Age (Years)			54.4 ± 16.4
Sexe (Men)	262	53.1	
Sex ratio			1.13
Clinic			
Heart failure history	179	36.3	
Weight (Kg)			
Admission			67.5 ± 17.7
Outgoing			64.6 ± 15
Type of Heart failure at admission			
Acute pulmonary edema	20	4	
Left Heart failure	36	7.3	
Rigth Heart failure	28	5.7	
Global Heart failure	337	68.2	
Cardiogenic shock	13	2.6	
Echocardiography			
Underlying Heart deseases			
Cardiomyopathies	313	63.4	
Ischemic Heart desease	63	12.7	
Valvular Heart desease	53	10.7	
Hypertensive Heart desease	38	7.7	
Others	27	5.5	
Pulmonary hypertension	19	3.8	
Pericarditis in adiastolie	7	1.4	
Myocardite	2	0.4	
LVEF (%)			36 ± 13
LVEF < 45%	434	87.8	
LVTDD (mm)			
SLBP (mmHg)			53.8 ± 15.6
Outgoing biology			
Hyponatremia (mEq/l)	197	39.9	
Hypokaliemia (mEq/l)	107	21.6	
Reduction of kidney function (>3 mg/l)	30	6.1	
Anemia (M < 13 g/l; F < 12 g/l)	56	11.3	
Lengh of Hospital stay (Days)			5.7 ± 3.2

Table 2. Treatment during hospitalization and at discharge.

Traetment	During Hospitalization	At discharge	
	N (%)	N (%)	LVEF ≤ 40%
Furosemide	494 (100)	494 (494)	434 (87.8%)
ACEI or ARB	182 (36.8)	315 (63.7)	255 (50.9)
Target dose	68 (13.8)	59 (11.9)	22 (4.4)
Betablocker	90 (18.2)	77 (15.6)	68 (13.7)
Target dose	12 (2.4)	17 (3.4)	8 (1.6)
MRA	297 (60.1)	253 (51.2)	253 (51.2)
Digoxin	357 (72.3)	220 (44.6)	41 (8.3)
Calcium Inhibitor	58 (11.7)	69 (13.9)	31 (6.3)
Aspirin	63 (12.7)	51 (10.3)	43 (8.7)
Anticoagulant	464 (93.9)	82 (16.6)	67 (13.5)
Statin	63 (12.7)	63 (12.7)	3 (0.6)
Clopidogrel	63 (12.7)	63 (12.7)	3 (0.6)
Dobutamine	43 (8.7)		
Isosorbide Dinitrate	58 (11.7)	36 (7.3)	13 (2.6)
Amiodaron	98 (19.8)	115 (23.3)	112 (22.6)

ACEI: Angiotensin-Converting Enzyme Inhibitor; ARB: Angiotensin Receptor Blocker; MRA: Mineralocorticoid Receptor Antogonist.

more necessary to maintain effectiveness for improving patient comfort or quality of life.

Beta-blockers were under-prescribed at hospital discharge, in ICA's context working. Beta-blochers use is not common. It had not yet been initiated in the beginning of the last decade [14]. Other drugs were prescribed as digoxin. The results of this study show that the strong prescription of digoxin could be related to the under-prescription of beta-blockers. In fact, the digitalis glycosides still have a salient place in heart failure management in ICA where most patients are diagnosed at NYHA class III-IV. Studies revealed that digoxin reduces the number of hospital readmission, by improving significantly symptoms particularly among patients with atrial fibrillation [7], but it had no effect on survival [7] [15] [16]. However, the effectiveness of beta-blockers has been demonstrated in heart failure in certain conditions [7] [17]. A part from contraindications and intolerance feared by physicians, beta-blockers could be indicated in case of reduced LVEF ≤ 40%. They improve ventricular function, reduce hospitalization and increase survival [7] [18]. Meta-analysis and other studies suggest that beta-blockers are safe and well tolerated for patients with chronic heart failure and that the mortality benefit and other clinically relevant effects [18] [19]. The achievement of optimal dose was negligible of about 3.4%. Patients who had reached the target doses had blood pressure that allowed them and they received beta-blockers at antihypertensive dose. Ambulatory follow up in order to increase doses of beta-blockers, is necessary especially for heart failure patients with reduced LVEF [8].

Mineralocorticoids Receptor Antagonists (MRA) were frequently prescribed at the hospitalization discharge. But this prescription was rather systematic due to congestive state and not in accordance with the ESC Guidelines. MRAs might be used on patients of NYHA class III and IV with LVEF < 35% despite their treatment with ACEI or ARB and beta-blockers or in case of intolerance to ACEI or ARB and in absence of hyperkalemia and kidney failure [7]. The clinical benefits of MRAs are: reducing of mortality and hospitalization, antifibrotic effect and reverse remodeling [20]. According to the Guidelines, there might be reserved in necessity cases.

Isosorbide dinitrate was also used mostly in hospital. Few patients (7.3%) left hospital with this prescription. Despite the effectiveness of isosorbide dinitrate that was demonstrated in heart failure in African American patients with a preserved or reduced LVEF, it remains under prescribed [21]. Isosorbide dinitrate is more indicated

in lung acute edema [7] [22]. That is in conformity with data of this study. Other drugs such as Aspirin, Clopidogrel and statin were prescribed for ischemic heart diseases and anticoagulants for auricular fibrillation, auricular flutter or presence of spontaneous contrast or cardiac intra-cavitary thrombus.

5. Conclusions

This current study has shown that, our practices of prescription are adapted to updated recommendations. Although the beta-blockers remain underprescribed because physicians have been fearing its early contraindication related to bradycardia, we noted that beta-blockers are allowed in our practice at ICA, in the management of heart failure patients. This management associates diuretic, IEC or ARB and beta-blocker according to the recommendations of ESC. However, some deficiencies may be corrected by sensitizing and educating. The optimization of the treatments after hospitalization discharge in order to improve the use of drugs recommended particularly beta-blockers by promoting program of titration might be necessary.

Finally complementary studies especially prospective 6 months or 1-year survival should enable to assess effectiveness of such approach.

Conflict of Interest

There is no conflict of interest.

Acknowledgements

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