Topic : Pharmacy

Identification of Drug Related Problems in Congestive Heart Failure Patients in Panembahan Senopati Public Hospital During January to May 2015

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Abstract

Congestive Heart Failure (CHF) is a progressive clinical syndrome caused by inability of the heart to pump sufficient blood to meet the body's metabolic needs. The treatment of CHF varies widely from patient to patient in order to cause the incidence of drug related problems (DRPs). Therefore, the necessary of DRPs identification to achieve patient's therapy outcome. The main aim of this research study was to determine the description of cardiovascular pharmacotherapy in patients with congestive heart failure as well as to determine the incidence of Drug Related Problems and to analyze the Drug Related Problems (DRPs).

This research was conducted by a non-experimental descriptive study with retrospective data collection of 20 medical record with CHF during January to May 2015, then the DRPs were analyzed using literature analysis, such as hospital standards of medical services, Pharmacotherapy Handbook 9th edition 2015, New York Heart Association (NYHA), Drug Interaction Facts (DIF), and Persatuan Kardiologis Indonesia (PERKI).

Based on this research study, there were 20 patients who had 42 DRPs. The DRPs consist of one adverse drug reaction (2.38%), 26 drug choice problems (61.90%), one drug use problems (2.38%), 14 drug interactions (33.33%), and no dosing problems were found.

Keywords: Congestive Heart Failure (CHF); Drug Related Problems (DRP); Panembahan Senopati Public Hospital; Inpatients; Cardiovascular pharmacotherapy.

1. Introduction

Heart failure is in the fourth rank out of the top 10 leading causes of death in Yogyakarta Special Province (Yogyakarta Health Office, 2013). Koshman et al (2008) explains that there were 1,977 patients in 11 RCT studies, including statistically significant 3 studies showing that the duration of heart failure inpatient would be prolonged if there is no pharmaceutical care.

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Pharmaceutical care was conducted a pharmacist who has a role and function to identify Drug Related Problems (DRPs), overcomes actual DRPs which happen, and prevents potential DRPs (Adusumilli and Adepu, 2014).

Based on a research conducted by Hadiatussalamah (2013) related to DRPs in 143 patients with congestive heart failure, the result shows that the prevalence of DRPs incidence was 32.87% (47 patients). DRPs research which was also done by Endah (2014) in congestive heart failure patients with 26 cases (37.14%), there were 32 episodes of DRPs incidences. From these two studies, it it can be seen that the percentage incidence of DRPs in patients with congestive heart failure is quite high, and almost every hospital estimated that the number is quite high. One of them is estimated to occur at Panembahan Senopati Bantul Hospital that is taken as the study site by researchers.

2. Material and Method

2.1 Research Equipments

The equipments used in the study are data collecting sheets, Pharmacotherapy Handbook 9th edition year 2015, books, journals, and other literatures related to congestive heart failure, drug related problems, medical service standards at Panembahan Senopati Bantul Hospital.

2.2 Population and Sample

The population of the study was hospitalized patients diagnosed with CHF in Panembahan Senopati Bantul Hospital from January to May 2015. The samples are all patient in the population who had met the inclusion criteria.

2.3 Data analysis

The data will be obtained and analyzed using descriptive non-experimental methods. The data include:

- An overview of patient's characteristics based on sex, age, comorbidities and inpatient duration.
- The data that had been collected, grouped, and numbered as well as the presented results presented.
- The calculations for the percentage of each of the DRPs identification done by counting the number of patients in each of the DRPs then divided by the total number of existing DRPs multiplied by 100% (Equation below).

$$\frac{\sum each\ DRPs}{\sum overall\ incidence\ of\ DRPs} \times 100\%$$

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3. Results And Discussion

3.1 Characteristics of the Patients Based on Sex

The characteristic of the patients based on gender is presented in Figure 1. There were incidents on women as with 45% (9 patients) and on men with 55% (11 patients) of total patients 100% (20 patients). It means that in this study the prevalence of CHF in women is lower than in men.

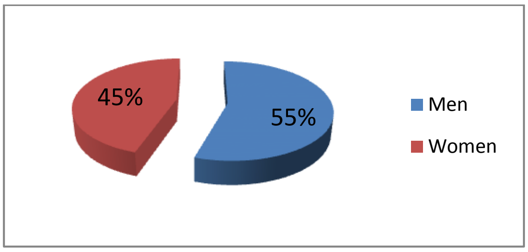

Figure 1. Characteristics based on sex

Based cohort study in the USA, 2-5 of 1000 people annually suffer from CHF, and CHF incidence in men is higher than in women (Bui et al., 2011).

3.2 Characteristics of the Patients Based on Age

Based on age, among 20 patients becoming the respondents could be categorized in a varied age range (Figure 2), and the data were taken based on data from Data Center and Information of Health Ministry (2014).

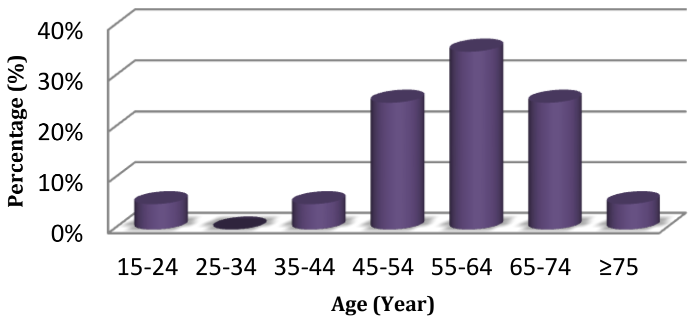

Figure 2. Characteristics based on age

The percentage obtained by Figure 2 shows that patients suffering from CHF were found in patients with the age range 45-54 years, age 55-64 and age 65-74 years. Based on the Framingham Heart Study, the incidence of heart failure is higher in the elderly (Bui et al., 2011). Most of the patients with CHF were in the age group of 65 years or more, while in the age group <65 increase from 23% to 29% (Hall et al, 2012)

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3.3 Characteristics of the Patients Based on Morbidities

According to the table 1 it can be seen that the highest percentage on the group ≥ 3 comorbidities (50%), meaning that the risk of complications in patients with CHF is huge. The morbidities that become the most widely experienced by patients in this study were Ischemic Heart Disease (IHD) or Coronary Artery Disease (CAD). New England Journal of Medicine reported that in the last 20 years there were > 43 000 patients, and 65% among them suffered from CAD that becomes the main cause of heart failure based on 24 multicenter studies on heart failure therapy (Gheorghiade et al., 2006).

Table 1. Characteristics of Morbidities

Number of Morbidities	Morbidities	Number of Patients	Percentage
1 Morbidities	Bronkopneumonia	1	5%
2 Morbidities	Hypertension type II, chest pain obstruction	1	45%
	SIRS, hipokalemia	1	
	Atrial fibrilasis, Acute bronkhitis	1	
	IHD, atrial fibrilasis	1	
	IHD, bronkospasme	1	
	IHD, acute bronkhitis	1	
	IHD, atrial fibrilasis	1	
	IHD, gout artritis	1	
	Cardiomegali, DM type II	1	
≥3 Morbidities	Hypertension type II, hipoalbumin, DM type II	1	50%
	IHD, hipertension, DM	1	
	IHD, hepatitis A, hypertension, DM	1	
	IHD, vertigo, GERD	1	
	Cardiomiopati, ca mammae IV, shock septis, DM type II	1	
	Cardiomegali, ca mammae IV, candidiasis oral	1	
	IHD, atrial fibrilasis, hyperurisemia, GERD	1	
	IHD, DM type II, obesity, renal failure ec nefropati, hypertension type II, ulcer	1	
	IHD, shock cardiogenic, migrain, candidiasis oral	1	
	IHD, dilipidemia, hyperurisemia	1	
TOTAL	20	100%	

3.4 Characteristics of the Patients Based Inpatient Duration

Patient characteristics based on Length of Stay (LOS) or inpatient duration in the study were classified into 2; those are LOS < 6 days and LOS ≥ 6 days. The percentage of

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patients with Length of Stay <6 days was higher (55%) than in patients with length of stay ≥ 6 days (45%) (Table 2).

Table 2. Characteristics of the Patients Based on Length of Stay

Length of Stay	Total	Percentage
< 6 days	11	55%
≥ 6 days	9	45%
TOTAL	**20**	**100%**

Bueno et al (2010) explains that during 2006, there were approximately 493,554 patients who were hospitalized with a diagnosis of heart failure that had been analyzed. The average length of stay (LOS) was for 6:33 days. The criteria that affect the length of stay of patients in the study varied widely, and the most significant one was the reduction or disappearance of dyspnea symptoms.

3.4 Identification of Drug Related Problems (DRPs)

DRP classifications used in this study followed the classification of PCNE (2006). The results of the study are presented in Table 3. Based on Table 3, DRPs choice drug problem was on the first place with the percentage 61.90% (26 incidents). Drug interaction was the second with a total percentage of 33.33% (14 incidents).

Table 3, DRPs choice drug problem

DRPs Classification	Explanation	Number of Incidence	Percentage
Adverse drug reaction (ADR) or unexpected reaction	Unexpected side effect (allergic or non-allergic) Experienced toxic effect	1	2.38%
Drug choice problem	Unsuitable indicated drugs. Unsuitable drug availability. Duplication on therapy group or active medicine. Contraindication drugs (on pregnant or breastfeeding). Non-therapy indication.	26	61.90%
Dosing problem	Lack drug dosage or unsuitable dosage regiment. Too high drug dosage or too often drug. Drug giving duration whether it has slow or fast response	-	-
Drug use problem	Drug provision mistake	1	2.38%
Drug interaction	Potential or actual interaction	14	33.33%
TOTAL		**42**	**100%**

3.4.1 Adverse Drug Reactions

Adverse drug reactions or unexpected reactions happened in 1 incident; it was the use of captopril. Captopril is one of the drugs known as Angiotensin Converting Enzyme Inhibitors (ACEI) working on the track of Renin Angiotensin Aldosterone (RAA)

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inhibiting the Angiotensin Converting Enzyme (ACE) and able to reduce cardiac remodeling. ACE inhibition is not only affecting the RAA lines but also influencing the inactivation lines of bradykinin (Ceconi et al., 2007). Inhibited bradykinin inactivation can lead to accumulation of bradykinin and stimulate chemoreceptors on the respiratory tract, consequently arises a sense of tingling and itching that leads to cough response (Golias et al., 2007).

3.4.2 Drug Choice Problem

Drug choice problem or the problem in the selection of drugs was found in all patients who became the subjects of the study. Each category of drug choice problem was found in the same patient. The results of the incidence of drug choice problem is presented in Table 4.

Table 4. Incidence Rate of DRPs on drug choice problem

Drug Choice Problem	Explanation	Patient's Number	Numbers of Patient
Unsuitable indicated drug	Alloprinol, Furosemid	3	11
	Allopurinol, Ranitidin	8 , 19	
	Allopurinol, Candistatin	13	
	Furosemid, Ranitidin	12, 20	
	Ranitidin, Cisplatin	18	
	Allopurinol	9	
	Furosemid	5 , 6	
	Ranitidin	16	
Non therapy indication	No digoksin provision	1, 2, 3, 6, 11, 13, 18, 19, 20	14
	Fever and Pain	4	
	DM and ca mammae stage IV	7	
	Cough with phlegm	8, 12	
	Hyperurisemia and cardiogenic shock	14	
Duplication	Valsartan and Captopril	2	1

The findings of the drugs that did not follow the indication in this study (Table 4) was on the use of allopurinol. However, the laboratory results did not show increasing levels of uric acid (hyperuricemia). Provision of furosemide was not in accordance with the indication because the patient did not experience edema. Patients in this study did not show any indication that they had to get therapy with ranitidine (this drug is not appropriate with the indication). Candistatin (Nystatin) is also a drug that is not in accordance with the indications. Data from Alpha Diagnostic International (2011) mentions that candistatin is an antifungal that will be effective against candidiasis. The patient's diagnosis did not find candidiasis or other fungal infections. The next finding of drug choice problem was there was a patient complaining for the fever, but there was no drug given. Pain is also one of the main complaints of patients and had not been treated. In addition, other than dyspnea and edema, the symptoms experienced by patients with

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CHF also the complaint of pain requiring palliative therapy (Adler et al., 2009). The findings indicated that there was no further therapy in patients with hyperuricemia. Larina et al. (2011) explained that there were 60% of CHF patients who were hospitalized experienced hyperuricemia as a result of cardiac decompensation. Therapy in patients with hyperuricaemia as a first-line of the drugs is the drug in the group of xanthine oxidase inhibitors such as allopurinol (Khanna et al, 2012). The findings showed duplication in the treatment group. Patients receiving valsartan and captopril can have increasing risk of hyperkalemia and hypotension if the medicines are given together (Tatro, 2010).

3.4.3 Drug Use Problems

Giving ceftriaxon was the contraindication for patients given treatment CaCO3 and calcium polystyrene sulfonate. There is possibility of toxicity to the organs caused by the precipitation of calcium as well as the possibility of embolic events in patients receiving ceftriaxon, CaCO3dan calcium polystyrene sulfonate (Steadman, 2010).

3.4.4 Drug Interaction

Drug interactions become one of the issues that needed to be evaluated since the adverse effects can arise as the impact of it. The results of the incidence of drug interactions can be seen in Table 5.

Table 5. The Finding of drug interactions

Drug Interaction	Total of Patient	Information
Spironolakton+Valsartan	1	Significance: 1 Onset slow interaction Severe rate: mayor
Spironolakton+KSR	1	Significance: 1 Onset slow interaction Severe rate: mayor
Captopril+KSR	2	Significance: 4 Onset slow interaction, Severe rate n: moderate
Gentamisin+Furosemid	4	Significance: 1 Onset slow interaction Severe rate: mayor
Allopurinol+Captopril	8, 9, 10, 15, 18, 19	Significance: 4 Onset slow interaction Severe rate: mayor
Warfarin+Ceftriakson	9	Significance: 2 Onset slow interaction, Severe rate: moderate
Digoksin+Omeprazol	10	Significance: 4 Onset slow interaction, Severe rate: moderate
Aspirin+Clopidogrel	17	Significance: 1 Onset slow interaction Severe rate: mayor
Warfarin+Allopurinol	10	Significance: 4 Onset slow interaction, Severe rate: moderate

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The first finding of drug interactions is that patients received spironolactone therapy, valsartan therapy and potassium chloride therapy (Table 5). It happens because spironolactone can increase the levels of potassium serum with the mechanism of action as a non-selective antagonist aldosterone. The risk of hyperkalemia also increased by the use of valsartan. Other drug interaction was found in patients receiving furosemide and gentamicin. Xia (2013) also explained that there were 17 mice experienced impaired hearing after being given combination of gentamicin and furosemide, and only 16 mice could survive. Drug interaction was also seen in some patients receiving allopurinol and captopril. Tatro (2010) in the book of Drug Interaction Facts explained that interaction between allopurinol and captopril should be monitored toward hypersensitivity reactions in patients, but it is not certain about the mechanism of interaction. The use of ceftriaxone and warfarin also became the part of drug interactions. Baillargeon et al (2012) explained that the administration of antibiotics, which one of them is the group of sefalosforin, can increase the risk of bleeding in most patients who also receive warfarin therapy. Drug interaction was also found on digoxin therapy and omeprazole. The use of digoxin altogether with omeprazole may increase the absorption of digoxin itself caused by the working mechanism of omeprazole as a proton pump inhibitor (Lahner et al., 2009). The next drug interaction was in the patients receiving aspirin and clopidogrel. McQuaid and Laine (2006) based on meta analysis explained that the risk of gastrointestinal bleeding increases in the provision of low-dose aspirin and clopidogrel simultaneously.

Conclusion

Based on data of the research and the discussion identification of DRPs in patients diagnosed with Congestive Heart Failure (CHF) at inpatient ward of Panembahan Senopati Bantul Hospital January to May 2015 period, it can be concluded that the total incidence of DRPs were 20 patients with the main diagnosis of CHF becoming inpatient at Panembahan Senopati Bantul Hospital during January to May 2015 period with 42 events consisting of adverse drug reaction (ADR) or unexpected reactions with 1 occurrence (2:38%), drug choice problem with 26 events (61.90%), dosing problems with no occurrence, drug use problems with 1 occurrence (2:38%) and drug interaction with 14 incidences (33.33%).

Acknowledgment

The financial support to the author from Universitas Muhammadiyah Yogyakarta is highly acknowledged.

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