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Research Article

A prospective study of drug utilization pattern in cardiac intensive care unit at a tertiary care teaching hospital

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ABSTRACT

Background: Cardiovascular diseases remain the most common cause of sudden death. Appropriate drug therapy in cardiac intensive care unit (CICU) is crucial in managing cardiovascular emergencies and to decrease morbidity and mortality. The present study was conducted to observe the emergency cardiac diseases which are most frequently being treated and to study the prescribing prevalence among inpatients in CICU.
Methods: A prospective, observational study was carried out among 102 patients admitted in CICU at a tertiary care teaching hospital, Karnataka, for a period of 3 months. Demographic data, clinical history, and complete drug therapy received during their stay in CICU was noted.
Results: In our study, males (64.7%) had a higher incidence of cardiovascular emergencies than females (35.3%). Hypertension (32.4%) and Type 2 diabetes mellitus (28.4%) were the frequently associated co-morbid conditions. Antiplatelet drugs 80 (78.4%) was most commonly prescribed, followed by hypolipidemic drugs 75 (73.5%) and anticoagulants 65 (63.7%). The mean duration of stay in the hospital was 4.79±1.9 days. The average number of drugs per prescription was 7.8±2.2. Percentage of drugs prescribed by generic names was 52.9%. The percentage of drugs prescribed from essential drug list was 75.1%.
Conclusions: Antiplatelet drugs were the most frequently prescribed drug group. Mean number of drugs per prescription were high. The prescribing pattern could be improved by reducing the number of drugs per prescription and by prescribing generic drugs to reduce the economic burden of the patients.

Keywords: Cardiac intensive care unit, Cardiovascular diseases, Prescription

INTRODUCTION

Cardiovascular diseases (CVDs) are the most frequent cause of morbidity and mortality throughout the world.[1] "Prescription" is defined as a written order, especially by a physician, for the preparation, and administration of a medicine or other treatment.[2]

Rational drug prescribing is defined as the use of the least number of drugs to obtain the best possible effect in the shortest period and at a reasonable cost.[3]

Polypharmacy is a major problem with cardiovascular inpatients admitted for a prolonged period of time.[3] Appropriate utilization of prescription drugs ensures favorable outcome of the patient and decreases mortality and morbidity.[4]

Studies on cardiac inpatients are rare and incomplete though risks of CVDs are frequently monitored. A prescription based survey is the most effective method to assess and evaluate the prescribing attitude of physicians.[1]

Hence, the present study aims at identifying the patient parameters, associated co-morbid conditions and the pattern of drug prescription among patients admitted in the cardiac intensive care unit (CICU) of a tertiary care teaching hospital.

The present study was conducted to observe the emergency cardiac diseases, which are most frequently being treated and to study the prescribing prevalence among inpatients in CICU.

METHODS

This was a prospective, observational study carried out among patients admitted in CICU at a tertiary care teaching hospital, Karnataka, between months of November 2014 and January 2015.

The study was initiated after approval from the Institutional Ethics Committee. The data were collected from medical records of patients irrespective of their gender, age, and diagnosis. The collected data were analyzed with respect to demographic profile and drugs prescribed as following:

- Most common cardiovascular emergencies which are treated
- Drug related details: most common drug groups, dosage form, strength, route, frequency, duration of administration
- WHO criteria for prescription like average no of drugs per prescription, percentage of drugs prescribed by generic name, percentage of drugs with injections prescribed, and percentage of drugs prescribed from the WHO essential drugs list.

Statistical analysis

Data were entered into Microsoft Excel (Windows 7; Version 2007) and analyses were done using the Statistical Package for Social Sciences (SPSS) for Windows software (version 18.0; SPSS Inc., Chicago). Descriptive statistics such as frequencies and percentages were calculated for categorical variables. Mean and standard deviation were computed for continuous variables. Graphic representation is used for visual interpretation of the analyzed data.

RESULTS

The data of total 102 patients was obtained. Among them, males (64.7%) had a higher incidence of cardiovascular emergencies than females (35.3%). The mean age in years was 58.1±13.8 (Table 1). The incidence was higher in patients of age ≥55 years (65.7%).

Out of 102 patients, 61 (59.8%) had myocardial infarction (MI), 16 (15.7%) patients suffered from congestive heart failure (CHF), and the incidence of angina pectoris was 6 (5.9%) (Figure 1). Hypertension (32.4%) and Type 2 diabetes mellitus (28.4%) were the frequently associated co-morbid conditions.

Antiplatelet drugs 80 (78.4%) were most commonly prescribed, followed by hypolipidemic drugs 75 (73.5%), and anticoagulants 65 (63.7%) (Table 2).

Among antiplatelet drugs, aspirin 69 (67.6%), clopidogrel 59 (57.8%), and their combination 15 (14.7%) were prescribed, more often both drugs being preferred simultaneously. Streptokinase (100%) was the fibrinolytic

Table 1: Socio-demographic profile of patients.

Bio-social characteristics	Number	Percentage
Age (in years)		
≤35	12	11.8
36-45	9	8.8
46-55	14	13.7
56-65	38	37.3
>65	29	28.4
Mean±SD	58.1±13.8	
Range	20-80	
Gender		
Male	66	64.7
Female	36	35.3
Locality		
Urban	24	23.5
Rural	78	76.5
Marital status		
Married	96	94.1
Unmarried	6	5.9

SD: Standard deviation

Table 2: Different categories of drugs prescribed to the patient.

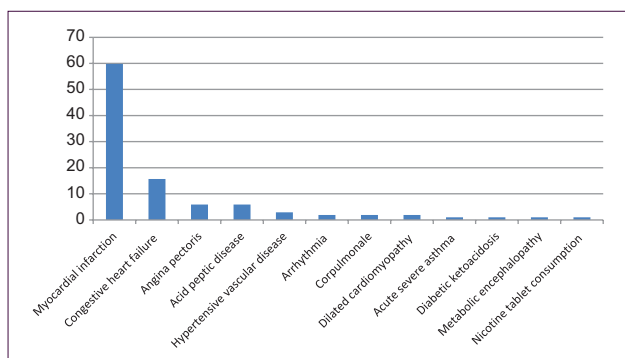| Treatment	Number	Percentage
Antiplatelets	80	78.4
Hypolipidemic	75	73.5
Anticoagulants	65	63.7
Drugs to reduce gastric acid secretion	57	55.9
ACE inhibitors	54	52.9
Antianginal drugs	50	49.0
Antibiotics	41	40.2
Beta blockers	39	38.2
Diuretics	36	35.3
Insulin and OHDs	34	33.3
CCBs	18	17.6
Inotropic drugs	14	13.7
Alpha blocker	08	07.8
Cardiac glycosides	08	07.8
Fibrinolytics	06	05.9
AT antagonists	05	04.9
Miscellaneous drugs	56	54.9

ACE: Angiotensin converting enzyme, OHD: Oral hypoglycemic drugs, CCBs: Calcium channel blockers

administered. Atorvastatin 73 (97.3%) and rosuvastatin (2.7%) were the hypolipidemic drugs prescribed. Low molecular weight heparin (100%) was the anticoagulant prescribed. Drugs prescribed to lower gastric acid secretion were pantoprazole 65 (84.4%) and ranitidine 12 (15.6%).

Among angiotensin converting enzyme (ACE) inhibitors, enalapril 33 (51.6%), and ramipril 28 (43.8%) were more commonly prescribed. Metoprolol 22 (56.4%), atenolol 12 (30.7%), and carvedilol 3 (7.7%) were the beta blockers prescribed. The calcium channel blockers (CCBs) prescribed were amlodipine 15 (83.3%) and diltiazem 3 (16.7%). Glyceryl trinitrate 47 (94.0%), Isosorbide dinitrate 4 (8.0%), and Isosorbide mononitrate 2 (4.0%) were the drugs prescribed under antianginals.

Furosemide 31 (75.0%) was the most common diuretic used, followed by spironolactone 3 (7.5%), mannitol 3 (7.5%), torasemide 2 (5.0%), and metolazone 2 (5.0%). Ceftriaxone 28 (68.3%), cefotaxime 10 (24.4%) were commonly prescribed drugs under antibiotic drug group. Dopamine 12 (85.7%) was the most common inotropic drug administered, followed by dobutamine 2 (14.3%). Digoxin (100%) was the prescribed cardiac glycoside for CHF. Among miscellaneous drug groups, analgesics (23.2%), methylxanthines (14.3%), and corticosteroids (12.5%) were routinely used.

The mean duration of stay in the hospital was 4.79±1.9 days. Table 3 gives the number of drugs prescribed per patient. The average number of drugs per prescription was 7.8±2.2. The

Figure 1: Morbidity pattern of cardiovascular emergencies.

Table 3: Number of drugs prescribed per patient (n=102).

Number of drugs prescribed per patient	Number	Percentage
4	04	03.9
5	03	02.9
6	16	15.7
7	20	19.6
8	31	30.4
9	17	16.7
10	08	07.8
11	01	01.0
20	02	02.0
Mean±SD	7.8±2.2	

SD: Standard deviation

dose, dosage form, route of administration, frequency, and duration were mentioned for 85.7%, 92.2%, 93.8%, 89.6% and 93.4% of drugs, respectively. Percentage of patients who were given injectable drugs was 100%. Percentage of drugs prescribed by generic names was 52.9% and percentage of brand names was 47.1%. The percentage of drugs prescribed from essential drug list was 75.1%.

DISCUSSION

The drug utilization study is been conducted widely and it is being carried out in different health care setups. Such studies are helpful to determine the behavior of the use of medicines in a society.[5] A survey based on prescription is considered to be one of the most cost effective methods to determine the prescribing approach of physicians.[6]

The present study is an attempt to evaluate the pattern of prescriptions of the patients admitted in CICU in a government set-up tertiary care teaching hospital.

A total of one hundred and two patient's prescriptions were analyzed during 3 months period. Results indicated that male (64.7%) patients had a high frequency of cardiovascular incidences as compared to female (35.3%) patients which were in accordance with a study conducted by Al-Junid et al.[7] and Sreedevi et al.[8]

Out of 102 patients, 61 (59.8%) had MI, 16 (15.7%) patients suffered from CHF, and the incidence of angina pectoris was 6 (5.9%). Hypertension and diabetes were the two most common co-morbid conditions found in most of the patients, which were in accordance with study conducted by Dawalji et al.[9] and Christian et al.[10]

In a study conducted by Dawalji et al. it was found that most commonly prescribed drug classes were antiplatelet drugs followed by antihyperlipidemics.[9] Similar results were found in our study, as most commonly prescribed medication was Antiplatelet drugs 80 (78.4%), followed by hypolipidemic drugs 75 (73.5%). Among antiplatelet drugs, aspirin 69 (67.6%), clopidogrel 59 (57.8%), and their combination 15 (14.7%) were prescribed.

The beta-agonists such as dobutamine and dopamine are widely used to improve hemodynamics, in acutely decompensated chronic heart failure patients.[11,12] In our study, Dopamine 12 (85.7%) was the most common inotropic drug administered, followed by dobutamine 2 (14.3%).

A study was conducted by Muhit et al.[13] on cardiovascular disease prevalence and prescription patterns in Bangladesh. In this study among the lipid-lowering agents, atorvastatin was given to most of the patients whereas the second choice was rosuvastatin. Similarly in our study atorvastatin 73 (97.3%) was most commonly prescribed, followed by rosuvastatin (2.7%).

In the present study, low molecular weight heparin and streptokinase was the anticoagulant and fibrinolytic administered respectively.

The use of the ACE-inhibitors (52.9%) was higher than that of the β-blockers (38.2%) and the CCBs (17.6%). This was for keeping up with the increased use of ACE-inhibitors because of their beneficial effect on the morbidity and mortality in MI and ischemic heart disease patients, even after a long-term use. Furthermore, the ACE-inhibitors had a beneficial effect against fibrosis and cardiac remodelling.[14] These observations were in correlation with a study conducted by Pendhari et al., where ACE-inhibitors were most commonly prescribed compared to β-blockers and CCBs.[1]

Results showed that the average number of drugs prescribed in this study is 7.8±2.2, which is comparable to studies conducted by Al-Junid et al. (7.56±3.37)[7] and Muhit et al. (6.35±1.56).[15] Fixed-dose combinations (FDCs) are one of the strategies to reduce the number of drugs prescribed and to improve patient compliance. Increasing requirement of drugs when more than one disease is found in a patient justifies the use of FDCs.[16,17]

The overall percentage of generic drugs prescribed is 52.9%, which was found to be higher than the previous studies conducted by Al-Junid et al. (45.2%)[7], Dawalji et al. (2.33%)[9], and Tasneem et al. (6%).[18]

The average number of drugs in each prescription was 7.8±2.2, percentage of drugs prescribed by generic name was 52.9%, percentage of injectables was 100%, and percentage of drugs prescribed from essential drug list was 75.1%, none of them were in compliance with WHO recommendations of ≤2, 100%, 10%, and 70%,[19,20] respectively for each variable except for drugs prescribed by generic name.

Our study has several limitations; study duration was small, single centered with a small sample size. Since the study was done in a single government hospital, results of the study cannot be extrapolated to the general population.

The study would have been better if other regional hospitals of the city be included.

CONCLUSION

Antiplatelet drugs followed by hypolipidemic drugs were the most frequently prescribed drug group. Mean number of drugs per prescription were high. The prescribing pattern could be improved by reducing the number of drugs per prescription and by prescribing generic drugs to reduce the economic burden of the patients as these drugs are used for long time. Prescription Indicators recommended by the WHO can help the Health Care Centers to obtain better organization and improve healthcare attention to the public.

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