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Drug utilization patterns in acute coronary syndrome at a tertiary care teaching hospital: A retrospective, non interventional and observational study

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Abstract

Background: Drug utilization studies play crucial role in the health sector and ultimately provides insight into the efficiency of drug use and results of such research can be used to help to set priorities for the rational use of medicines and allocation of health care budgets. Acute Coronary Syndrome (ACS) is an emergency condition where usage of many drugs during its management in the Intensive Care Units is common. This could be a potential cause for Polypharmacy, Drug-Drug Interactions and increased Cost Burden on patients. Keeping in view of this scenario, our study was undertaken to analyze the drug utilization patterns in ACS.

Methods: The study was conducted at Viswabharathi General Hospital, after obtaining permission from the Institutional Ethics Committee. We have collected data of 68 case records of the patients diagnosed with Acute Coronary Syndrome and evaluated for prescribing patterns in consonance with WHO prescribing indicators. The results were analyzed using Descriptive Statistics and T- test.

Results: In this study we analysed total of 68 case records of the patients diagnosed with Acute Coronary Syndrome (ACS) out of that 47 (69.11%) belongs to male patients and 21 (30.88%) were of female patients. The mean age of patient was 57 years; most of the patients belonging to age group of 51-60 years (36.76%). Number of patients undergoing thrombolysis were 30 (44.11%) and 38 (55.88%) underwent percutaneous coronary intervention (PCI). Total 526 drugs were prescribed in 68 patients. Most frequently prescribed drugs were antiplatelet drugs like Clopidogrel and Aspirin, also Statins like Atorvastatin in 100% encounters. Average number of drugs per encounter was 7.73. Percentage of drugs prescribed by Branded name was 89.73%.

Out of total drugs 283 (53.61%) were prescribed from National list of essential medicines 2015 and the Fixed Dose Combinations (FDC) were 22.43%.

Conclusions: The present study provides valuable insight about the overall pattern of drugs used in Acute Coronary syndrome. We observed Polypharmacy and prescription of drugs with Branded names so Physician should be encouraged to prescribe drugs with generic name. Rational prescription is the need of the hour.

Keywords: Acute coronary syndrome, Drug utilization studies, Poly pharmacy, WHO prescription indicators

Introduction

Cardiovascular diseases (CVDs) are the number one cause of death globally, more people die annually from CVDs than any other cause [1]. An estimated 17.7 million people died from CVDs in 2015, representing 31% of all global deaths. Of these deaths, an estimated 7.4 million were due to coronary heart disease and 6.7 million were due to stroke. Out of the 17 million premature deaths (under the age of 70) due to non-communicable diseases in 2015, 82% are in low- and middle-income countries, and 37% are caused by CVDs [2]. Concerning the cardiovascular mortalities, projected number was more than 24 million expected by the year 2030 [3].

Incidence of CVD found to be greater than non-communicable diseases particularly occupied by three quarter portion of deaths about 86% of global burden of CVD reported among various developed countries [4].

Acute coronary syndrome (ACS) considered as one of the leading causes of mortality and morbidity worldwide. Acute coronary syndrome (ACS) is composed of ST elevation myocardial infarction, non ST elevation myocardial infarction, or unstable angina [5]. The mortality rate with ACS is approximately 30% with more than half of these deaths occurring before the individual gets emergency care.

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An acute coronary syndrome may occasionally occur in the absence of electrocardiographic changes or elevations in biochemical markers, when the diagnosis is supported by the presence of prior documented coronary artery disease or subsequent confirmatory investigations [6]. In addition to primary prevention efforts, joint guidelines by the American College of Cardiology (ACC) and the American Heart Association (AHA) in 2010 suggest secondary drug prevention measures to be used in patients with ACS [7]. In conjunction with diet and lifestyle modifications, these guidelines suggest the use of Statins, Beta-blocker, and Renin-Angiotensin Aldosterone system inhibitor drug therapies in ACS patients [8]. Long term survival rate in post-acute coronary syndrome (A.C.S.) patients depends to a large extent on how well post A.C.S. period is managed.

Drug utilization services practically appreciated in different clinical settings, health care management programs, hospitals and communities by considering therapeutic drug class and disease condition to assess the fundamental part of patient care system [9]. The World Health Organization (WHO) regarded drug utilization as promotion, distribution, prescribing pattern and use of drugs within health care organization with main emphasis on therapeutics, societal and financial consequences.

Methods

This project is a retrospective, non interventional and observational study. The study was conducted at Viswa bhārathi General Hospital, after obtaining permission from the Institutional Ethics Committee. We have collected data of 68 case records of the patients diagnosed with Acute Coronary Syndrome (ACS) after getting permission from officer of medical record department.

Selection Criteria

Inclusion- only those case records of the patients admitted with Acute Coronary Syndrome were included in the study.

Exclusion-case records of patients diagnosed with other Cardiovascular diseases and prescriptions of outpatients were excluded from the study.

The selected case records were evaluated for prescribing patterns in consonance with the WHO indicators and other parameters like Age wise distribution of diseases and incidence. The WHO indicators are average number of drugs per encounter, percentage of drugs prescribed by generic names, number of fixed dose combinations, percentage of drugs prescribed from Essential Medicine List and different drug formulations etc. All the case records were analyzed accordingly and results were tabulated by using simple statistical measures like percentages, averages, divisions and multiplications.

Results

In this study we evaluated 68 patients case records during period of 2 months. Out of 68 patients 47 (69.11%) were male and 21(30.88%) were female patients. The mean age of patient was around 57years, most commonly belong to age group of 51-60 years (36.76%) followed by age group of 41-50 years (22.05%), 61-70 years (20.58%), 71-80 years (11.76%), >80years(2.94%). {Table.1 and Figure.1}, {Table.2

and Figure.2} explains about the Gender wise and Age wise Distribution of Acute Coronary Syndrome.

In our study majority of ACS were of the patients of myocardial infarction, 62 in number of this 52 were STEMI (ST segment elevated Myocardial Infraction), 8 Cases were NSTEMI and others were of Unstable Angina. [Table.3, Figure.3} Only 30 (44.11%) number of patients underwent thrombolytic therapy while others 38 (55.88%) had undergone percutaneous coronary intervention (PCI). Our study found that Risk factors like Obesity (55.88%), (Smoking 45.58%), Hypertension (41.17%), Type-2 Diabetes Mellitus (26.47%) etc have strong association for the development of Atherogenesis and further Acute Coronary Syndrome {Table.4}

Total of 526 drugs were prescribed in 68 patients. Most frequently prescribed group of drugs were from Antiplatelets (100% of the cases), Statins (100%), Thrombolytics (44.11%) etc explained in Table.5 and Figure.4. If we observe the individual drug usage the lions share is taken by the antiplatelet agents like Clopidogrel and Aspirin, Statins like Atorvastatin in 100% of cases. Among the analgesics Tramadol was given in (52.94%) patients and Fentanyl was given in (17.64%) patients. Heparin, an anticoagulant was prescribed in (50%) patients (Table No.6).

When we observe the status of other WHO Prescribing Indicators, the results are as follows Average number of drugs per encounter was 7.73. Percentage of drugs prescribed by branded name was 472 (89.73%). Out of total drugs 283 (53.61%) were prescribed from National list of essential medicines 2015 and the Fixed Dose Combinations (FDC) were 22.43%.

Table 1: Gender wise distribution of patients with Acute Coronary Syndrome.

Male	Female	Male
47	21	47
69.11%	30.88%	69.11%

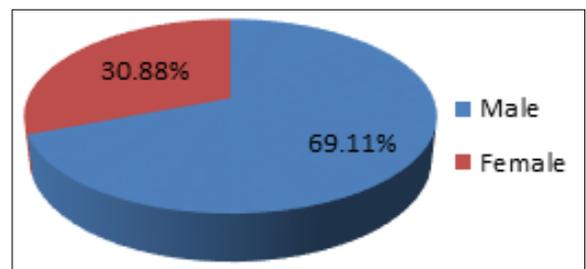


Fig 1: Gender wise distribution of patients with Acute Coronary Syndrome.

Table 2: Age wise distribution of patients with ACS.

Age in Years	No. of Patients	Percentage
31-40 years	4	5.88
41-50years	15	22.05
51- 60 years	25	36.76
61-70 years	14	20.58
71-80 years	08	11.76
>80years	02	3

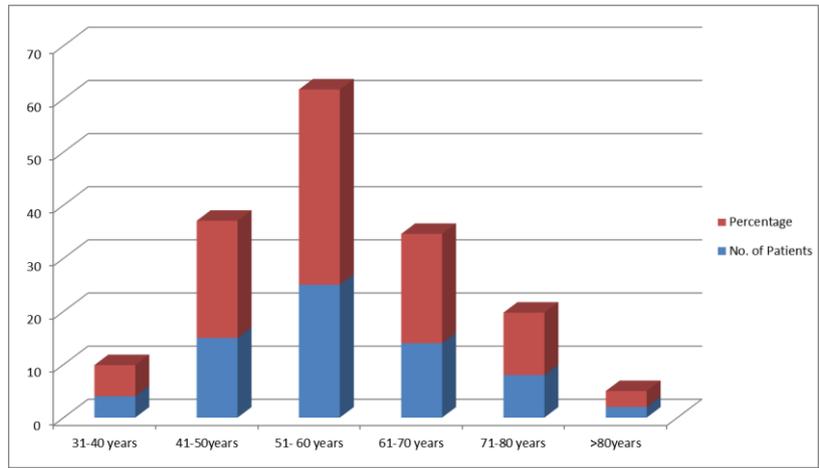


Fig 2: Age wise distribution of patients with ACS.

Table 3: Distribution of types of ACS

Type of ACS	Number of Patients	Percentage
STEMI	54	79.41
NSTEMI	08	11.76
Unstable Angina	06	8.82

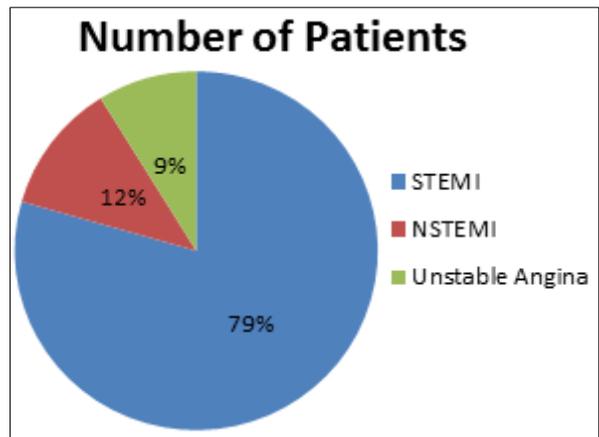


Fig 3: Distribution of types of ACS.

Table 4: Distribution of Selected Risk factors.

Risk factor	Number	%
1. Tobacco consumption in any form	31	45.58%
2. H/O Hypertension	28	41.17%
3. H/O Type 2 DM	18	26.47%
4. H/O Dyslipidemia	07	10.29%
5. Family h/o		
a. Hypertension	08	11.76%
b. Type 2 DM	06	8.82%
c. CAD	7	10.29%
6. Obesity (BMI ≥ 25)	38	55.88%

Note: H/O- History of, DM-Diabetes Mellitus, CAD-Coronary Artery Disease

Table 5: Frequently used group of drugs in treatment of ACS.

Group of drugs	No. of patients	%
Antiplatelet	68	100%
Statins	68	100%
Antacids	59	87%
Opioids	51	75%
Anti emetics	47	69%
Anti coagulants	40	59%
B blockers	36	53%
Thrombolytic	30	44%
Ace-inhibitors	28	41%

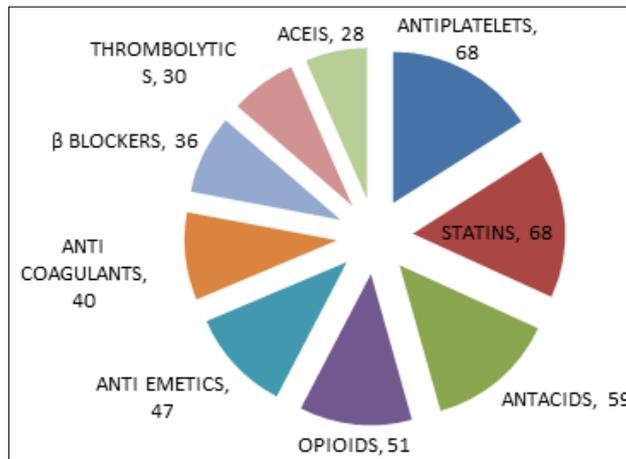


Fig 4: Frequently used group of drugs in treatment of ACS.

Table 6: Most frequently used individual Drugs in Treatment of ACS.

Group of drugs	Name of drug	No of patients
Antiplatelet	Aspirin	68
	Clopidogrel	68
Statins	Atorvastatin	68
Opioids analgesics	Tramadol	36
	Fentanyl	12
Anticoagulants	Heparin	34
Beta blocker	Metoprolol	24
	Atenolol	06
	Carvedilol	08
Thrombolytic	Streptokinase	30
ACE inhibitors	Ramipril	25
Anti-Angina	Isosorbide dinitrate	16
	Nitroglycerine	04
	Ivabridine	06
	Nicorandil	02
Antacids	Pantoprazole	58
	Ranitidine	04
Anti-emetics	Ondansetron	48

Table 7: Other drug utilization parameters.

Drug utilization parameter	Number (%)	Percentage
Fixed dose combinations(FDCs)	118	22.43
Average no. of Drugs per prescription	7.73	
Drugs from National Essential Medicine List (NEML)	282	53.61
Drugs prescribed by brand names	472	89.73

Discussion

In our study mean age of patient is 57.61±11.09 which is comparable to other study having mean age 57.05 ± 11.92 years [10].

Most common age group was of 51-60 years (36.76%) which is similar to another study observed that a maximum number of patients, i.e., 39% were in the age group of 51-60 years.14 This shows that risk of acute coronary syndrome is common in older age group [11].

In our study most patients had myocardial infarction and only 3 had of unstable angina. We found that out of 68 patients 30 (44.11%) patients treated with thrombolytic therapy and 38 patients (55.88%) were undergone Percutaneous Coronary Intervention. This is comparable to other studies which shows increasing trends of PCI in Acute coronary syndrome [12] early reperfusion is key to management of patients presenting with STEMI. If the Hospital is well equipped with the facilities, primary percutaneous coronary intervention (angioplasty with stenting) is treatment of choice for patients with STEMI [13].

In acute coronary syndromes there is drift towards early invasive treatment and this is reflected in marked increase in cardiac care (catheterization laboratories and cardiac surgery centers) facilities throughout India.

In our study most frequently prescribed drugs were Antiplatelet agents Clopidogrel and Aspirin in 100% encounters, which is comparable as in other studies [14]. The association of physicians of India recommends that all patients with MI, should receive dual antiplatelet therapy.

In our study Atorvastatin was the preferred Hypolipidemic drug given to all patients (100%) as similar to another study [15]. ACE inhibitors and Beta blockers were prescribed in 29.58% and 39.39% of patients which shows underutilization of this drugs in ACS.

Further our study shown the other WHO prescribing indicators as follows; Average number of drugs prescribed per case record was 7.73 which is less than that found in other studies. 89.73% of drugs were prescribed with branded name and only 10.26% of drugs with generic name, which is very

low in our study. Increasing generic prescribing would rationalize the use and reduce the cost of drugs. Out of total drugs 53.16% of drugs were prescribed from National list of essential medicines 2015 ^[16]. 19 The primary purpose of NLEM is to promote rational use of medicines considering the three important aspects i.e. cost, safety and efficacy.

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