DRUG UTILISATION STUDY IN INTENSIVE CARDIAC CARE UNIT AT A TERTIARY CARE HOSPITAL

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CONTEXT: Worldwide, cardiovascular (CVS) diseases are an important cause of morbidity and mortality. The rising cost of healthcare has generated a growing interest in determining the cost and effectiveness of various treatment modalities available to the patient suffering from cardiovascular disease.

The prescription order is an important therapeutic transaction between the prescriber and the patient. It has been well accepted that inadequate and irrational prescriptions could lead to serious consequences.

The present study was planned to identify the prevailing prescription trend in the Intensive Cardiac Care Unit (ICCU) of Basaveshwar Teaching and General Hospital (BTGH), Gulbarga, Karnataka. This study has made efforts to bridge the gap between clinical pharmacology, rational drug prescribing and analysis of the cost-benefit ratio.

AIMS:

1. Hospital based study with an aim to carry out a complete 'therapeutic audit' and to see what is prescribed, what is the intention and to analyse the cost-effect benefits.
2. Selection of specific drugs.
3. Dose duration and mode of administration.
4. Adverse Drug Reactions (ADR), if any.
5. Patient compliance and cost effectiveness.
6. To suggest measures in order to correct and improve therapeutic modalities.

METHODS AND MATERIALS: The study was carried out from 01-11-2011 to 01-09-2012 after due permission from the Institutional Ethics Committee and the Dean, MR Medical College. A Proforma and an Informed Consent form were provided to all the participating doctors. 110 prescriptions and other data were collected from the ICCU during the course of this study.

RESULTS AND CONCLUSION: In our study, we noted that most of the drugs were correctly prescribed in this ICCU setting barring a few cases of Nitroglycerin, Clopidogrel, Furosemide and Atorvastatin administration.

The rational and cost effective prescribing can be promoted by conducting Pharmacoepidemiological studies. Repeated continuing medical education programmes should be organised to train the doctors.

INTRODUCTION: Worldwide, cardiovascular (CVS) diseases are an important cause of morbidity and mortality. Currently it is the greatest scourge affecting the entire human population¹. The cost of these diseases in terms of human suffering and material resources is almost incalculable.

The rising cost of healthcare has generated a growing interest in determining the cost and effectiveness of various treatment modalities available to the patient suffering from cardiovascular disease².

Therapeutics appears to be the first of the medical sciences to come into existence. Pharmacotherapy which means use of drugs for prevention and treatment of diseases is a major branch of therapeutics^{3,4}. The prescription order is an important therapeutic transaction between the prescriber and the patient⁵. So it should be scientifically legible, unambiguous, adequate and complete. It has been well accepted that inadequate and irrational prescriptions could lead to serious consequences⁶.

The prescriber must remember that a scientific approach does not mean a patient as a mere biological machine but treating the spiritual, psychological and social dimensions of human beings in a rational manner.

Errors in prescription are not uncommon and could be due to ignorance⁷ or inadequate knowledge about the disease⁸ and pharmacology of the drugs prescribed⁹. Erroneous prescriptions are recognised even in the tertiary care hospital¹⁰.

Recently an increased attention has been diverted to rational prescribing and drug utilisation studies play a major role in this regard¹¹. These studies not only detect flaws in the therapy, but also help to find out solution to rectify the same¹².

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/justifiable cost”¹³.

The present study was planned to identify the prevailing prescription trend in the Intensive Cardiac Care Unit (ICCU) of Basaveshwar Teaching and General Hospital (BTGH), Gulbarga, Karnataka. This study also made efforts to bridge the gap between clinical pharmacology, rational drug prescribing and analysis of the cost-benefit ratio.

OBJECTIVES: The present study was carried at BTGH, Gulbarga with the following objectives in mind:

1. Hospital based study with an aim to carry out a complete ‘therapeutic audit’ and to see what is prescribed, what the intention is and to analyse the cost-effect benefits.
2. Selection of specific drugs.
3. Dose duration and mode of administration.
4. Adverse Drug Reactions (ADR), if any.
5. Patient compliance and cost effectiveness.
6. To suggest measures in order to correct and improve therapeutic modalities.

Thus, the objective is to carry out a study of Pharmacoepidemiology and Pharmacotherapeutics by prescription auditing.

MATERIALS AND METHODS: The study was planned to analyse the prescription patterns of drugs utilised in the management of cardiovascular diseases in ICCU setting.

One teaching hospital attached to MR Medical College, Gulbarga was selected, namely Basaveshwar Teaching and General Hospital.

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The study was carried out from 01-11-2011 to 01-09-2012 after due permission from the Institutional Ethics Committee and the Dean, MR Medical College. A Proforma and an Informed Consent form were provided to all the participating doctors.

One hundred and ten prescriptions and other data were collected from the ICCU during the course of this study.

DATA ANALYSIS: A total of 110 prescriptions were collected randomly from the ICCU and analysed. This data was further condensed and a master chart was prepared using MS-Excel. The data was subjected to statistical analysis.

The overall information generated was presented under the following headings:

1. Sex wise distribution of CVS diseases in ICCU patients.
2. Age wise distribution of CVS diseases in ICCU patients.
3. Average hospital stay of patients.
4. Various diagnoses made in the ICCU.
5. Average number of drugs used per patient in ICCU.
6. Adverse drug reactions (ADRs), if any.
7. Average cost of drugs used in ICCU.
8. Comparison of prescribed dose with established standard dose in ICCU.

RESULTS:

Out of the 110 prescriptions studied and analysed, the following results were obtained:

1. Sixty six percent of patients in the study comprised of men, whilst the remainder were females.
2. Maximum number of patients admitted to the ICCU belonged to the age group between 51-75 years.
3. Average hospital stay was between 6-10 days in the ICCU.
4. Inferior wall MI (26.20%) and Anterior wall MI (25.20%) formed the bulk of the diagnoses in the ICCU.
5. Sixty four percent of the patients admitted to the ICCU received anywhere between 6-9 different drugs.
6. Gastritis (15.45%) was by far the most common adverse effect noted amongst the patients admitted to the ICCU.
7. Average cost of drugs used per day in the ICCU of BTGH amounted to approximately Rs 3300/-.
8. A total of 18 cases of irrational drug use surfaced in our study. Rest were adequately well designed prescriptions.

Table -1 Sex wise distribution of ICCU patients

Total number of cases = 110		
Sex	Number of Patients	Percentage according to sex
Male	74	66.90
Female	36	33.10

Chart -1

Table -2 Age wise distribution of ICCU patients

Age in years	Number of patients	Percentage of patients according to age
1-25	1	0.96
26-50	52	47.04
51-75	54	49.12
>75	3	2.88

Chart -2

Table -3 Average duration of stay in ICCU

Total number of cases = 110

Number of days	Number of patients	Percentage of days in ICCU
1 – 5	44	40.30
6 – 10	63	57.00
>10	3	2.70

Chart-3

Table -4 Various diagnoses of ICCU patients

Total number of cases = 110

Diagnosis		Number of patients	Percentage of patients according to diagnosis
Myocardial Infarction (MI)	Anterior wall	28	25.20
	Inferior wall	29	26.20
	Global	3	2.70
	Septal	3	2.70
Angina	Unstable	14	13.50
	Stable	4	3.60
Ischemic heart disease (IHD)		7	6.30
Congestive cardiac failure (CCF)		7	6.30
Left ventricular failure (LVF)		3	2.70
IHD with LVF		3	2.70
Cardiomyopathy		3	2.70
Hypertension (HTN) with LVF		1	0.90
Chronic rheumatic heart disease with atrial fibrillation		1	0.90
Viral myocarditis		1	0.90
Supra ventricular tachycardia		1	0.90
Tubercular myocarditis		1	0.90
HTN		1	0.90

Chart -4

Table -5 Average number of drugs used per day in ICCU

Total number of cases = 110

Number of drugs	Number of patients	Percentage of patients according to number of drugs used per day
1 – 5	31	28.18
6 – 9	71	64.54
>10	8	7.28

Chart -5

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Table -6 Adverse effects of drugs in ICCU

Total number of cases = 110

Adverse effect	Number of patients	Percentage of the adverse effect
Gastritis	17	15.45
Headache	11	10.00
Constipation	3	2.72
Hypotension	3	2.72
Vomiting	1	0.90
Dryness of mouth	1	0.90
Urinary retention	1	0.90
Fever	1	0.90

Chart -6

Table -7

List of drugs used irrationally in the ICCU

Name of drug	Inadequate	Adequate	Excessive	Total cases
Nitroglycerin	0	65	3	68
Clopidogrel	0	63	5	68
Furosemide	2	18	0	20
Atorvastatin	8	0	0	8

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Table -8 List of drugs used in ICCU

Total number of cases = 110

Name of drug		Number of patients	Percentage of the drug used in ICCU
Oral Drugs			
Aspirin		75	68.20
Calcium channel blockers	Total	40	36.6
	Amlodipine	32	80.00
	Nimodipine	6	15.00
	Others	2	5.00
Alprazolam		71	64.50
Clopidogrel		68	61.80
Nitrates	Total	33	30.00
	Isosorbide mononitrate	25	75.75
	Isosorbide dinitrate	8	24.25
Anti-ulcers	Total	45	40.90
	Ranitidine	24	53.33
	Omeprazole	16	35.55
	Others	5	11.12
Beta blockers		35	31.80
Diuretics	Total	33	30.00
	Furosemide	20	60.60
	Hydrochlorothiazide	9	27.27
	Others	4	12.13
ACE inhibitors	Total	22	20.00
	Ramipril	12	54.54
	Enalapril	4	18.18
	Captopril	4	18.18
	Lisinopril	2	9.10
NSAIDs		20	18.10
Digoxin		14	12.70
Hypolipidemic	Total	11	10.00
	Atorvastatin	8	72.72
	Others	3	28.28
Antacids		11	10.00
Laxatives		9	8.10
Oral hypoglycemic agents	Total	6	5.40
	Sulfonylurea + Biguanide	4	66.66
	Pioglitazone	2	33.34
Angiotensin receptor blockers		4	3.60

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Miscellaneous		13	11.70
Parenteral Drugs			
Nitroglycerin		68	61.80
LMW Heparin		62	56.30
Streptokinase		19	17.20
Diazepam		24	21.80
Insulin		17	15.40
Antimicrobials	Total	25	22.50
	Ampicillin + Cloxacillin	12	48.00
	Cefotaxime	6	24.00
	Others	7	28.00
Deriphylline		13	11.80
Dobutamine		12	10.90
Pentazocine		12	10.90
Antiarrhythmics	Total	14	12.60
	Lignocaine	7	50.00
	Amiodarone	4	28.57
	Others	3	21.43
Glucocorticoids		5	4.50
Atropine		4	3.60
Meperidine		4	3.60

DISCUSSION: A patient admitted to an ICCU presents a challenge to the attending doctors. Prompt high level care can make the difference between life and death. Considering the precarious condition of the patient and the sheer number of drugs to be employed in the treatment, the physician has to weigh the pros and cons of each and every drug before using it.

The present study was planned to identify the prevailing prescription trend in the ICCU of BTGH, Gulbarga. Drug utilisation has been defined as “the marketing, distribution, prescription and use of drugs in a society with special emphasis on the resulting medical and social consequences.” In the year 1968, WHO has already established DURG i.e. Drug Utilisation Research Group, to monitor these studies and to prescribe guidelines from time to time ¹⁴. The present study included patients who were admitted to the ICCU for acute cardiac complaints and were randomly selected.

Our findings showed that out of 110 patients admitted to the ICCU, a clear majority of 66.90% were males (Table-1). This is in concordance with earlier findings stating a similar epidemiological trend.

It was also observed that the maximum number of patients were in the age bracket of 51 – 75 years (49.12%), closely followed by patients in the age bracket of 26 – 50 years of age (47.04%) (Table- 2). This disturbing trend of a progressive decline in the affected age group has been noted by other authors too and is well documented in literature¹⁵. Many factors have been implicated in this decline including early detection¹⁶, stressful lifestyle¹⁷ etc.

In our study, we noted the average duration of stay of 6-10 days to be about 57% (Table -3). Nearly 40% of patients had a stay ranging from 1-5 days and only 2.70% of patients required hospitalisation in the ICCU for more than 10 days. Also we see that approximately 97% of our

patients were discharged within 10 days, stressing on the need for early ambulation post deleterious CVS events¹⁸.

According to our study Myocardial Infarction (57%) was by far the most common CVS anomaly resulting in ICCU admission (Table-4). Of this, Inferior Wall MI accounted for 26.20% and Anterior Wall MI for 25.20% of cases.

From our study, we concluded that an overwhelming 64.54% of patients required the daily administration of 6-9 drugs (Table-5). 28.18% of patients required 1-5 drugs per day whilst only 7.28% required more than 10 drugs per day. The use of so many concomitant medications raises many questions of drug interactions, safety etc. All these problems of poly pharmacy need to be properly addressed and the physician should strive to prescribe the lowest number of drugs in the least possible dose for clinical benefit of the patient.

Our study also highlighted the many adverse reactions (Table-6) encountered in the ICCU setting. Gastritis (15.45%) was the most common adverse event encountered and was closely followed by headache (10%). Use of Aspirin as one of the most commonly employed drug in the ICCU has direct correlation with the elevated complaints of gastritis noted amongst the patients¹⁹. In our study we found that 68.20% of patients were prescribed Aspirin (Table-8). Headache has been mostly attributed to the use of IV Nitroglycerin in 61.80% of patients. Headache is a documented adverse effect of nitrates and can often be severe and debilitating²⁰. Proper monitoring of ADRs is a full time job and requires the co-ordinated efforts of the treating clinician, support staff and the pharmacologist as well. Prompt recognition and reporting of ADRs is hugely beneficial in the long run and is a vital arm of Pharmacovigilance.

The average cost of drugs employed in the ICCU of BTGH per day turned out to be approximately Rs 3300/-. On one hand this is too much for a common man to bear, but on the other it is still much lower if we compare to that of the developed countries.

The present study also highlights the shortcomings in treatment by emphasising on the irrationalities in prescription. A higher than normal dose of Nitroglycerin was used in 3 patients (Table-7), this in turn resulted in the adverse effect of headache and hypotension which was observed in these cases. Clopidogrel was used in a higher than required dose in 5 patients. As opposed to a standard dose of 75mg/day²¹, they received 300mg/day of Clopidogrel. A sub-therapeutic dose was employed in the use of Furosemide (2 patients) and Atorvastatin (8 patients), therefore resulting in inadequate response to treatment. Drugs should be administered in a dose which is neither too much nor too less, so that their adequate actions are well appreciated. The doctor has to be careful and should employ medicines in their proper dose so as to have a plasma concentration in which the drug shows its desired effect without the appearance of toxicity.

CONCLUSION: In our study, we noted that most of the drugs were correctly prescribed in this ICCU setting barring a few cases of Nitroglycerin, Clopidogrel, Furosemide and Atorvastatin administration. Irrational prescriptions are harmful because they lead to a number of problems such as increased cost of the therapy, therapeutic failure, adverse drug reactions, dangerous drug-drug interactions etc.

The rational and cost effective prescribing can be promoted by conducting Pharmaco-epidemiological studies. Another way of promoting rational prescribing is by conducting drug utilisation studies, educating and training the doctors adequately regarding the need for rational

prescribing. Repeated continuing medical education programmes should be organised to train the doctors.

Social Pharmacology and Pharmacoeconomics should also be included in the medical curriculum to promote rational drug prescribing.

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