Research Article

ASSESSMENT OF DRUG RELATED PROBLEMS IN STROKE PATIENTS

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ABSTRACT

Drug related problems represent the categorization and definition of clinical problems related to the use of medications in the field of pharmaceutical care. Drug related problems can occur at any stage of prescribing, dispensing and administration of drugs. Hence, it is necessary to identify and resolve the drug related problems to improve the patient's safety, therapeutic outcomes and patient quality of life. The objectives are to study the occurrence, types and clinical significance of drug related problems in stroke patients and to evaluate whether the drugs are prescribed according to the guidelines. Methodology: A prospective study was conducted in the neurology ward of a tertiary care hospital from August 2018 to January 2019 i.e., six months. Necessary demographic and clinical data was collected. The treatment data was analyzed to determine the occurrence, types and clinical significance of DRP's in stroke patients. Results: Among 201 patients, 163 DRP's were identified and frequency of occurrence of DRP is 0.8 per patient. The highly reported drug related problem was drug interactions (42.2%) followed by untreated condition and patient non-compliance. Conclusion: Identification of drug related problems may improve the therapeutic outcomes in stroke patients. Developing and adopting policies regarding the drug administration, dispensing and prescribing would minimize the drug related problems in stroke patients. Participation of clinical pharmacists in patient care was proven to improve patient's quality of life, while decreasing DRP's by continuous monitoring.

Keywords: Drug Related Problems, Stroke, Clinical Pharmacist, Quality Of Life.

INTRODUCTION

The initiation of treatment plan in any disease is to optimize drug therapy with minimum safety related problems with in the frame work of pharmaceutical care plan.[1] Pharmaceutical care is the provision of drug therapy by a responsible pharmacist for the purpose of achieving a definite outcome to improve the patient's quality of life. The goal of pharmaceutical care is to optimize the drug therapy, achieve positive clinical outcomes within realistic economic expenditures and improve patient's health related quality of life.[2] A Drug related problem (DRP) is defined as an any event or circumstance involving drug treatment that interferes or potentially interferes with the patient achieving an optimum outcome of medical care.[3] An actual DRP is an event that has already occurred in a patient, whereas a potential DRP is an event that is likely to develop if pharmacists do not make any appropriate interventions.[4] Studies have shown that majority (50-80%) of drug related problems can be prevented. Data suggest that there is a significant need for the improvement in the use of drugs for hospitalized patients as medication related adverse events may lead to negative clinical and economic outcomes.[5,6] Pharmacists can play an important role in identifying DRP's, resolving actual DRP's and preventing potential DRP's through pharmaceutical care practices.[7] Various classifications were published in the literatures regarding definition and classification of DRPs.[8] Among all the classifications cipolle/morley/strand classification was widely accepted and used classification for DRPs

Cipolle/morley/strand classification:

1. Untreated indication
2. Drug use without an indication
3. Improper drug selection
4. Sub therapeutic dosage
5. Over dosage
6. Medication error/noncompliance
7. Drug interactions, and
8. Adverse drug reactions.[9]

According to WHO Stroke is the most common cause of death worldwide and is the leading cause of long-term disability in adults of age > 50, with 90% of survivors having residual deficits. Stroke incidence increases with age, hypertension and dyslipidemia.[10,11] Physicians adopt better ways to achieve functional recovery in stroke patients and reduce the devastating impact of stroke on the society[12]. Several studies have shown that patients with stroke are among those at high risk for the development of DRPs due to elderly age, co morbidities and poly pharmacy[13]. Therefore, identifying and resolving DRP's is an important priority for health care professionals for improving the therapeutic benefits and health related quality of life in stroke patients.[14,15]

MATERIALS AND METHODS

Study design and settings

The present study was a prospective, observational study conducted in the neurology ward of 600 bedded tertiary care hospital from August (2018) to January (2019).

Ethics committee approval

The study protocol was prepared and submitted to the institutional human ethical committee. The study was conducted as per ICH-GCP guidelines. The study was approved and issued ethical clearance for the same (IHEC/SIMS/2018/029).

Inclusion criteria

Patients of both sexes of age above 30 years with complaints of Stroke alone and Stroke along with other co-morbidities (hypertension, diabetes, coronary artery disease) in neurology department.

Exclusion criteria

Pregnant and lactating women were excluded. Patients who are not willing to participate in the study. Some patient's records were excluded due to incomplete information.

Study procedure

The present study was a prospective study conducted in the neurology ward in a tertiary care hospital consisting of 600 beds. The study was approved by Institutional Ethics Committee. A suitable data collection form was designed to collect demographic details of patients which includes age, sex, date of admission, date of discharge, reasons for admission, diagnosis and medications used along with name of the drug, dose, route, frequency of administration, duration and indication for use. The data was analyzed and the DRPs were identified which abides Cipolle's classification[17] and clinical significance of DRPs were jotted down.

RESULTS

Over the 6 months study period, total 210 patients were included. Of these, 9 were drop-outs, for various reasons. Among them, 3 were deceased during treatment, 4 were unresponsive and 2 patients were shifted to another hospital due to financial crisis. Complete intake data were available on the remaining 201 patients. In total 201 stroke patients, the DRP's were found in 163 (81.5%) patients. Among total patients included in the study the maximum number of patients were in the age group of 51-60 years and minimum number of patients are in the age group of 81-90 years. Among the total patients the maximum numbers of patients were males when compared to females. Among the total no: of patients the maximum number of patients are suffering with S + HTN + DM and the minimum number of patients were suffering with S + HTN + CAD and when compared to no: of stroke (old) patients, the no: of stroke (new) patients were more in number. Upon study regarding, distribution of drugs in stroke alone patients, among first line prescribed drugs, Heparin (58%) was highly prescribed drug followed by Atorvastatin (50%) and among second line prescribed drugs in stroke patients Pantoprazole (90%) and Nimodipine (2%) were found to be highly and least prescribed drugs respectively. Similarly regarding distribution of drugs in S + HTN patients, among first line drugs prescribed, Atorvastatin (75%) was highly prescribed drug followed by Anti-HTNs (69%) and among second line

prescribed drugs Pantoprazole (85.3%) was highly prescribed drug followed by Antibiotics (57.8%) and Anti-DM (3.1%) was least prescribed drug. In S + DM patients, among first line prescribed drugs, Clopidogrel (65%) was highly prescribed drug and among second line drugs, Anti-DM (90%) was highly prescribed drug followed by Pantoprazole (85%). In S + HTN + DM patients, among first line prescribed drugs, Atorvastatin (75%) was highly prescribed drug followed by Anti-HTN (72%) and among second line drugs, Pantoprazole (100%) was highly prescribed drug and Nimodipine (6.3%) was least prescribed drug. In S + HTN + CAD patients, among first line prescribed drugs, Atorvastatin (80%) was highly prescribed drug and Clopidogrel + Aspirin (0%) was found to be least prescribed drug and among second line drugs, Levetiracetam (100%) was highly prescribed drug followed by both Antibiotics and Multivitamins (60%). In S + HTN + DM + CAD patients, Anti-hypertensives (71.4%) drugs were highly prescribed drugs and among second line drugs, Anti-DM (71.4%) and Pantoprazole (71.4%) were highly prescribed drugs. The prevalence of stroke along co-morbidities (75.12%) was more when compared to stroke alone (24.87%). Distribution of drugs among total population was given in Table 4 (4.1 and 4.2).

In 201 patients, as per our study, most of the population (182 patients) was prescribed according to guidelines provided by fifth edition of the National Clinical Guideline for Stroke in association with WHO-2016 and 19 prescriptions were deviated from the guidelines. Among 163 reported DRP's, mostly occurred DRPs were Type-7 i.e., Drug Interactions (42.2%), Type-1 i.e., Untreated Condition (18%) and Type-6 i.e., Non Compliance (9.4%) as shown in Table 5 (Distribution of patients based upon type of DRP). Drug – drug interactions were highly occurred. Of them the mostly observed interaction was Atorvastatin + clopidogrel. The untreated conditions found were DM, HTN, Hypothyroidism and Anemia. Patient non-compliance observed was - Patient was known hypertensive, yet not taking treatment for HTN since 2 years. Distribution of Type of DRP's among total population was given in Table 6. Among distribution of drugs in total no: of patients, the highly prescribed first line drug was Atorvastatin (66.1%) and Pantoprazole (88%) was highly prescribed second line drug.

DISCUSSION

In our study, the maximum and minimum numbers of patients are in the age group of 51-60 years and 81-90 years respectively. Most of the patients are males (62.6%) when compared to females (37.4%) as risk factors like hypertension, smoking, alcoholism, diabetes are likely to be more common in males, this is in accordance with the other study[16], where the results showed that among 163 patients, males were more, i.e. 107 (65.6%), than females 56 (34.4%).

At the end of our study we observed that, patients suffering with stroke along with other co-morbidities (hypertension, diabetes mellitus and coronary artery disease) are more when compared to stroke alone in which again the men are having the higher hand. This could be ascertained because of the same risk factors discussed above.

While looking for the incidence of the stroke and the age of occurrence, we found that newly diagnosed stroke patients are evidently more when compared to recurrent stroke patients; and the age of onset of stroke has come to below 50 years. This could be due to the modernization, sedentary work environments, decreased physical activity and stress etc.[17]

In a nutshell, as the lifestyle has changed drastically, leading to conversion of risk factors to causes among individuals, which have led to early occurrence of stroke among males.

In the present study, among the first line drugs most of the patients were prescribed Dyslipidemics–statins {Atorvastatin (66.1%)} followed by Anticoagulants {Heparin (55.7%)}.
a. Dyslipidemics - By reducing levels of LDL, Statins help prevent plaque formation and in turn helps to reduce formation of clot.
b. Anticoagulants - used to prevent the blood from forming clots that result in a stroke. Often called "blood thinners,"

Among the second line drugs most of the patients were prescribed proton pump inhibitors {Pantoprazole (88%)} followed by Antibiotics (53.2%).
a. Proton pump inhibitors – as the patients of stroke involves multiple drug therapy they are at high risk of occurrence of gastric problems so PPI's are prescribed as prophylaxis.

b. Antibiotics – in case if the patient is suffering with any infection antibiotics are used.

As per our study, most of the population was prescribed according to Standard guidelines provided by WHO-2016.[18]

According to this study, a total of 163 DRPs were identified in 201 patients as the stroke treatment involves multiple drug therapy, this is not in accordance with the study[19,20]; where a total of 254 DRPs were identified in 133 patients. The DRPs in supportive study was more because their study was conducted in a government general hospital.

As per our study, the highly reported drug related problem was drug interactions (42.2%) followed by untreated condition (18%) and patient non- compliance (9.4%). This is not in accordance with the study[21], where the primary reported event was same, missing by the secondary and tertiary reported events being drug use without indication and adverse drug reaction respectively.

Table 1: Distribution of patients based on their age group

Age group (years)	Total no: of patients (N = 201)
30-40	23
41-50	37
51-60	57
61-70	41
71-80	29
81-90	13

Table 2: Distribution of patients based on gender

Total population	Gender	
	Male	Female
201	126	74

Table 3: Distribution of patients based on prevalence of diagnoses

Diagnosis	No: of stroke (New) patients (N = 178)	No: of stroke (Old) patients (N = 23)
S	45	5
S + HTN	52	12
S + DM	20	0
S + HTN + DM	44	4
S + HTN + CAD	5	0
S + HTN + DM + CAD	12	2

Table 4: Distribution of Drugs in total no: of patients

Table 4.1: Distribution of First Line drugs in total no: of patients

Total no. of patients	H	CL	AS	CL+AS	M	AT	Anti-HTN
201	112	86	83	59	58	133	102

Table 4.2: Distribution of Second Line drugs in total no: of patients

Total no. of patients	CIT	CIL	ANTI-DM	PAN	LE	NIM	VIT	Antibiotics
201	87	43	71	177	85	13	91	107

Table 5: Distribution of patients based upon type of DRP

Total no. Of cases	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	Type 8
201	36	13	0	3	0	19	85	7

Table 6: Distribution of type of DRP's among total population

Diagnosis	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	Type 8
STROKE	1	0	0	0	0	2	19	0
S + HTN	6	3	0	0	0	3	25	1
S + DM	8	3	0	1	0	2	12	1
S + HTN + DM	12	3	0	2	0	9	17	0
S + HTN + CAD	3	2	0	0	0	1	6	3
S + HTN + DM + CAD	6	2	0	0	0	2	6	2

CONCLUSION

With increased modernization, sedentary lifestyle associated with social factors like alcoholism, smoking etc., have been increased that have led to clinical risk factors like hypertension, diabetes, coronary artery disease that ultimately causes stroke. In our study, drug related problems were identified to occur at a frequency of 0.8 per patient and the most common type of the drug related problems was observed to be Drug-drug interactions (42.2%). Multiple drug therapy was found to be a potential risk factor for developing drug related problems. Early detection of drug related problems improve the therapeutic outcomes. Developing and adopting the guidelines regarding the drug administration, dispensing and prescribing would minimize the drug related problems. Participation of clinical pharmacists in patient care was proven to improve patient's quality of life, while decreasing DRP's by continuous monitoring. Hence active involvement of clinical pharmacist is necessary for better pharmaceutical care.

ABBREVIATIONS

Stroke = S
Hypertension = HTN
Diabetes mellitus = DM
Coronary artery disease = CAD
World health organisation = WHO
Drug Related Problems = DRP's

Heparin (H), Clopidogrel (Cl), Aspirin (As), Atorvastatin (At), Metaprolol (M), Anti-hypertensives (Anti-HTN), Citicholine (Cit), Cilindipine (Cil), Nimodipine (Nim), Multivitamins (Vit), Anti-diabetics (Anti-DM), Pantoprazole (Pan), Leviteracetam (Le)

ACKNOWLEDGEMENT

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Cite this article as: