Print ISSN: 2319-2003 | Online ISSN: 2279-0780

IJBCP International Journal of Basic & Clinical Pharmacology

doi: 10.5455/2319-2003.ijbcp20131011

Research Article

Prescription pattern of antimicrobial agents in a teaching hospital of South India

Ajay M. Khade[1]*, M Shakeel M Bashir[1], Savya George[2], Sheethal Annaldesh[2], Kishor A. Bansod[3]

[1]Department of Pharmacology, RIMS, Adilabad, Andhra Pradesh, India
[2]MBBS Student, RIMS, Adilabad, Andhra Pradesh, India
[3]Department of Pharmacology, PDMMC, Amravati, Maharashtra, India

Received: 28 June 2013
Accepted: 21 July 2013

***Correspondence to:**
Dr. Ajay M. Khade,
Email: ajay_khade2000@yahoo.com

ABSTRACT

Background: Use of irrational and unnecessary antimicrobials remains common in the developing countries. The present study was conducted to evaluate the use of antimicrobial agents in the tribal district hospital of Andhra Pradesh India.
Methods: In this retrospective study, 200 hospitalized cases from medicine, surgery, obstetrics and gynaecology and paediatrics departments were randomly selected.
Results: Most common diagnosis was febrile illness (15%) followed by gastroenteritis (10%) and malaria (8%). Antimicrobials were used in 57% cases. All the cases were managed by empirical treatment. Cefixime (40%) was the most common antimicrobial followed by ampicillin (32.50%), metronidazole (30%) and ciprofloxacin (26.50%). Use of antimicrobial monotherapy (41.67%) and 2 drug therapy (36.46%) was common.
Conclusion: Empirical use of higher antimicrobial agents is routine and cheap antimicrobials like ampicillin are still most useful drugs in the region. There is a need of specific essential drug list for the region.

Keywords: Antimicrobials, Drug resistance, Irrational medication

INTRODUCTION

Indiscriminate use of drugs like analgesics, antimicrobials and vitamins are common throughout the world.[1] Inappropriate use of drugs like polypharmacy, non compliance by the patients, use of drugs which are unnecessary, expensive, unrelated to diagnosis and misuse or overuse of antimicrobial are commonly observed problems in the world which are more severe in developing countries.[2] Drugs are prescribed irrationally; it not only increases the cost of disease management but also increases morbidity and mortality and responsible for increase incidence of adverse drug reactions and drug resistance.[3]

One of the major problems of irrational medication is antimicrobial resistance. It is the major preventable concern which we are facing in this century. Use of irrational and unnecessary antimicrobials still remains common problem not only in developing countries but also in developed countries like USA and Britain although many initiatives are taken.[4] In developing nations burden of infectious disease is high and the cost of drugs is a major limiting factor for replacement of older resistant antimicrobials with newer drugs since newer antimicrobials are more costly.[5] This is a major issue in developing country like India in which use of antimicrobials increased about 40% in between 2005 and 2009 with 60% increase in sales of cephalosporins.[6]

Drug utilization studies provide input regarding beneficial and adverse impacts of drugs.[7] It can be evaluated retrospectively by analysis of clinical records in a medical care center.[8] Such types of studies can be used as a tool for evaluation of health care system.[9] Moreover if such types of studies are conducted regularly, it will provide greater view of prevalent situation in that region.

The present study was conducted to evaluate the use of antimicrobial agents in a tribal district tertiary care centre of Andhra Pradesh India which have predominantly tribal and rural population [10] so that the adequate measure can be taken to prevent problem of antimicrobial resistant in the region.

METHODS

The study was carried in a tertiary care centre of north Telangana Region of Andhra Pradesh India. It was a retrospective study conducted in the year of 2011. A total of 200 (81 males and 119 females) hospitalized cases; 50 each from medicine, surgery, obstetrics and gynaecology (OBGY) and paediatrics departments were randomly selected. Case records of the patients were collected from the medical record section of the Institute. The study was permitted by institutional authorities. The case sheet was examined for gender distribution, average age range of patients, diagnosis, number of antimicrobials used, types of antimicrobials used, most common and least common antimicrobials prescribed, culture and sensitivity tests and use of single and multiple antimicrobials.

RESULTS

Out of 200 cases, 58.5% were females and 41.5% were males with majority of females hospitalized in OBGY while in case of male maximum hospitalization was recorded from medicine department (Table 1). Most of the cases were in between the age group of 1 to 20 years (43.5%) followed by 21 to 30 years of age (28.5%) while least cases (6.5%) were in the age group of more than 50 years (Figure 1).

Table 1: Gender distribution.

Departments	Male	Female
	Percentage	Percentage
Medicine	62 %	38 %
Surgery	50 %	50 %
OBGY	0 %	100 %
Paediatrics	54 %	46 %
Total	**41.5 %**	**58.5 %**

OBGY= Obstetrics and Gynaecology

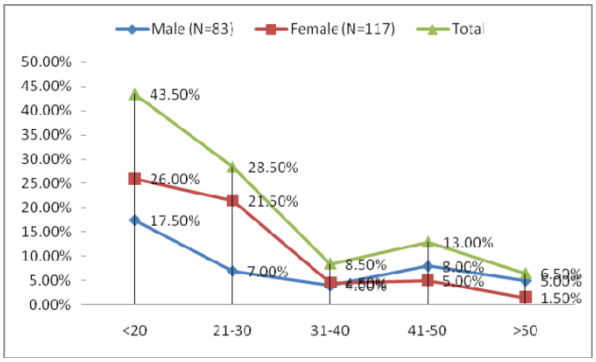

Figure 1: Age distribution.

Commonest cause of hospitalization was other group of disorders (19%) in which each disorder was less than 1% of total diagnosis. Most common diagnosis was febrile illness (15%) followed by gastroenteritis and malaria, 10% and 8% each respectively (Figure 2).

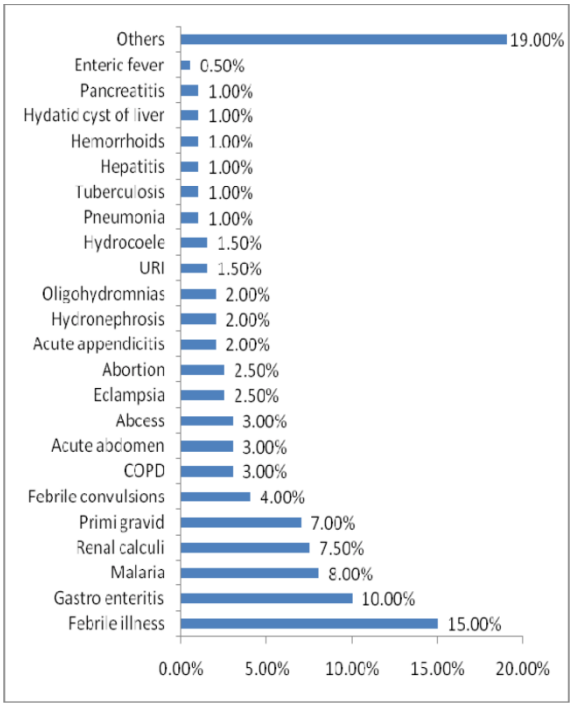

Figure 2: Cause of hospitalization.

In the study, we observed use of antimicrobials in 57% cases. All the cases were managed by empirical treatment. Culture and sensitivity was not done even in a single case of antimicrobial recipients. Inappropriate antimicrobial doses were given to 37.64% cases while frequency of drug administration was inappropriate in 3.05% cases.

Cefixime (40%) was the most common drug among all the antimicrobial agents used followed by ampicillin (32.50%), metronidazole (30%) and ciprofloxacin (26.50%). Amikacin (11%) was the least preferred drug among all the antimicrobials (Table 2).

Table 2: Most commonly used antimicrobials.

Antimicrobials	Percentage
Cefixime	40.00%
Ampicillin	32.50%
Metronidazole	30.00%
Ciprofloxacin	26.50%
Cefuroxime	18.00%
Gentamicin	15.50%
Chloroquine	11.50%
Amikacin	11.00%

We observed that use of single type of antimicrobial agent (41.67%) in an individual case was the most common practice in the centre followed by use of two antimicrobial agents (36.46%) in an individual case. Use of multiple (more than two) antimicrobials was the uncommon practice in the region (Table 3).

Table 3: Number of antimicrobials used in an individual case.

No. of Antimicrobials	Percentage
0	2.08%
1	41.67%
2	36.46%
3	8.85%
4	7.29%
5	2.60%
>5	1.04%

DISCUSSION

Antimicrobial resistance is one of the major global preventable problems. Although numerous studies were conducted globally regarding antimicrobial patterns, even in India lot of studies were conducted but in an individual geographical area results may not be always relevant. By monitoring the antimicrobial pattern in a particular geographical area, we can improve the quality of health care system by proper intervention in that system.[11] So we planned the present study with the intention to know the status of antimicrobial prescription in the region.

Number of female cases were more in comparison to male. It is because of inclusion of fifty cases (all female) from obstetrics and gynecology (OBGY) division. Majority of cases were in between the age group of one year to thirty years. The pattern is due to inclusion of paediatric and OBGY divisions and since most of the OBGY cases were hospitalized for obstetric and related problems.

In our study commonest causes of hospitalization were other disorders, febrile illness, gastroenteritis and malaria. The study population belongs to the tribal cum rural district of Andhra Pradesh with majority of peoples inhabitants of forest and rural areas. The region is relatively less developed on developmental indices in comparison to other districts of the state.[10] Since it is the referral centre of district, complicated cases are treated here. It is the probable reason behind hospitalization of other disorder group cases which are individually less than one percent. Febrile illness, gastroenteritis and malaria are the typical problems of underdeveloped regions. We also found more prevalence of these conditions in the region.

We found that in most of the cases antimicrobials were used for the management of the diseases and in all those cases culture and sensitivity was not done. Dose of antimicrobials was inappropriate in 37.64% cases while frequency was also inappropriate in few cases.

Factors for inappropriate prescribing of drugs include wrong choice of drug with doubtful efficacy/safety for the specific indication, drug misinformation, industry influenced marketing practices, lack of recognition of drug resistant strains, shortage of supplies of appropriate drugs, heavy workload, lack of laboratory facilities for cultures chiefly due to funding.[4,5]

Al Shimemeri et al[12] in their study which was conducted in a general medical ward of a tertiary medical center in Saudi Arabia observed that a high proportion of patients received antimicrobial agents prior to the availability of the results of blood culture tests.

Giri et al[13] in their study conducted in a tertiary care hospital in Nepal found that culture and sensitivity was done only in 32.4% cases of cases suffering from surgical site infections. Thomas et al[14] in India observed that empirical use of antimicrobial agents in primary care centre was 100% and it was 78% in tertiary care centre although culture and sensitivity was done after initiation of therapy in 80% cases of the tertiary care centre.

Above studies indicates that empirical use of antimicrobial agents are common in developing countries. Culture and sensitivity is not always feasible due to cost factor or antimicrobials are prescribed depending upon the clinical experience of the physicians. The pattern may also be due to lack of microbiological facilities or patients are unwilling for tests.[6] In some instance sufficient time is not available for culture and sensitivity and antimicrobials are prescribed to avoid complications of severe bacterial infections.

In our study most preferred antimicrobial was cefixime although ampicillin, metronidazole and ciprofloxacin were also used in substantial number of cases. In the study of Al

Shimememri et al[12] ceftriaxone was the most commonly prescribed antimicrobial agent. While Giri et al[13] observed that ampicillin with cloxacillin combination was the most favored antimicrobial agents followed by metronidazole, ampicillin alone, gentamicin and cefuroxime. Khan FA et al[15] found cefixime and amoxicillin with clavulanic acid were the most commonly prescribed antimicrobials followed by gentamicin, azithromycin, ciprofloxacin and metronidazole in north India. Vaccheri et al[16] in a 3 year survey conducted in five different Italian hospitals observed 18% increase in antimicrobial consumption in which most common drugs were combination of penicillin with β-lactamase inhibitors followed by fluoroquinolones and third-generation cephalosporins. Thus the studies indicate that in a particular geographical area most commonly prescribed antimicrobial is almost different. It reflects that each geographical area needs different drug which is useful for the management of prevalent microbial diseases in the region.

In our study use of antimicrobial monotherapy and two drug antimicrobial therapies were common. Khan et al[15] also found most of the cases on antimicrobial monotherapy and two drug antimicrobial therapies. When critically ill cases are hospitalized in referral centre empirical multiple drug therapy is required. But number of antimicrobials and other drugs should always be kept as low as possible. It is necessary to reduce the chances of drug interaction, adverse effects, cost of treatment and drug resistance.[15]

CONCLUSION

We conclude that empirical use of higher antimicrobial agents is routine and cheap antimicrobials like ampicillin are still most useful drugs in the region. Irrational pattern can be avoided by formulating essential drug list for the region as per the prevalent microorganism and educating the erring doctors. There should also be a drug policy formulating committee. Such type of studies should be carried regularly in future to evaluate the changes in the pattern and its rationality.

Funding: None
Conflict of interest: None declared
Ethical approval: Approved by the Institutional Ethics Committee

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doi:10.5455/2319-2003.ijbcp20131011
Cite this article as: Khade AM, M Bashir MS, George S, Annaldesh S, Bansod KA. Prescription pattern of antimicrobial agents in a teaching hospital of South India. Int J Basic Clin Pharmacol 2013;2:567-70.