Kathmandu University Medical Journal (2005), Vol. 3, No. 4, Issue 12, 370-375

Original Article

Antimicrobial utilization pattern in out patient services of ENT department of tertiary care hospital of Eastern Nepal

Das BP[1], Sethi A[2], Rauniar GP[1], Sharma SK[3]
[1]Additional Professor, [2]Assistant Professor, [3]Associate Professor, Department of Pharmacology, BP Koirala Institute of Health Sciences, Ghopa, Dharan, Nepal

Abstract

Objective

The objective of this study was to monitor the antimicrobial utilization in ENT out patient services in a tertiary care hospital of Nepal.

Materials & Methods

A total of 191 prescriptions were randomly audited at varying time interval from the department of ENT in the year2003. The data was collected in customized Performa in the form of antibacterial audit questionnaires. It also contained Patient particulars, diagnosis, investigations, drug details and information from the prescriber regarding the indication for prescribing antimicrobial agent, suspecting organism underlying infection, duration of therapy and details of any concomitant medications.

Results

The incidence of use of antimicrobial agents (AMA) in 191 prescriptions was analyzed from the enrolled prescriptions, a total of 218 antimicrobials i.e.1.4 antimicrobial agent per patient were prescribed. .The AMAs were indicated therapeutically in 73.29% of patients & 19.37% patients for prophylaxis. The AMAs were advised for more than 72 hours for prophylaxis in 86.48%. In the concomitant medications antihistaminic were prescribed in 32.62% and NSAIDS in 21.98% cases. Most of patients reported with upper respiratory tract infections (URTI-32.56%), Chronic Suppurative otitis Media (CSOM-18.3%), sinusitis (6.28%), tonsillitis (5.75%),. Pharyngitis (3.66%), Acute Suppurative Otitis Media (ASOM-2.61%) and others. The diagnosis was established clinically in 42.40% and confirmative in 35.60%. In 21.46% the diagnosis was not disclosed. Out of 191 patients, culture sensitivity tests were performed for only 31 patients and 13 patients depicted a positive culture sensitivity tests. The common microbes isolated from the culture were staphylococcus aureus (69.2%). Streptococcus (7.7%), Enterobacteriacae (7.7%), Pseudomonas auroginosa (7.7%) & psendomanas mirabilis (7.7%). Clinically suspected organism were mentioned in only 32 prescriptions and most prescriber presumed the infections due to staphylococci & pseudomonas (43.75%), streptococci (21.8%),Gram negative organisms (12.5%) and H influenza (9.3%).The use of a single drug was abundant (89.52%), two drugs (9.94%), and three drugs (0.52%)prescriptions. Ciprofloxacin (23.85%) was preferred, followed by amoxycillin (20.06%), combination of ampicillin + cloxacillin(9.17%), doxycyclin (5.96%). Erythromycin (4.58%) and cotimoxazole (4.58%). Expensive drugs i.e azithromycin (2.75%), roxithromycin (1.37%) and cephalosporins (3.21%) were also prescribed. The causative microbes were sensitive to amoxycillin (53.84%), cloxacillin (53.84%) ciprofloxacin (46.15%), gentamicin (46.15%), and cephalosporin (46.15%). But resistant to erythromycin, tetracycline, cotrimoxazole and norfloxacin)

Conclusions-Majority of patients were prescribed drugs irrationally with misleading indications without confirming the bacteriological culture and sensitivity.

Keywords: AMAs (Antimicrobial Agents), URTI (upper respiratory tract infection), Drug utilization

Many infectious diseases have been controlled in 20th century by improving living conditions, public health measures and with the use of antimicrobial agents (AMAs). Early optimism about the end of all infections with the introduction of antimicrobials has faded with time. Infect, there has been an increase in infectious disease morbidity and mortality with these AMAs[1].

Recently there has been an alarming concern over the injudicious use of antimicrobials world wide. This practice of indiscriminate prescribing of AMAs has led to ineffective and unsafe treatment, exacerbation or prolongation of illness, distress and harm to the

Correspondence
Dr B. P. Das
Additional Professor & Deputy Hospital Director,
B.P.Koirala Institute of Health sciences, Dharan, Nepal
Email : bpdas2000@yahoo.com

patient as well as an additional burden of an expensive medical cost for the patient[2]. Apart from the patient compromise there are instances of antimicrobial resistance which expresses trepidation by world authorities. Irrational prescriptions by the medical practitioners and incentives provided by the drug companies for promotion of the sale of their products, also add to this health hazards by antimicrobials. The National Health Service circular (UK), formulated a drive against over utilization of AMAs, it was based on four elements of strategy, surveillance, prudent antimicrobial use and infection control[3].

These concerns were to treat the patient as well limiting the use of antimicrobials to prevent insurgence of resistant microbes. It is extremely imperative to evaluate and monitor the drug utilization patterns from time to time, to enable suitable modifications in prescribing patterns to increase the therapeutic benefit and decrease the adverse effects to optimize the medical services for the patient[4].
Baksaas et al[5] and Pradhan et al[6] have stressed the importance of drug utilization studies in evolving a comprehensive drug policy for better health care delivery. Common diseases such as acute diarrhoea and acute respiratory tract infections which are mostly due to viral invasion are targeted with the overuse of antimicrobials[7]. However inappropriate treatment of acute upper respiratory tract infections and conditions i.e. tonsillitis with excessive use of antibiotics and symptomatic medicines remains a serious problem[8, 9].

Mainous et al reviewed the trends in the antimicrobial prescribing for bronchitis and URI from 1993-1999, among children and adults taking in account of awareness before and after of National Pediatric practice recommendations over use of AMAs. It was observed that though there was a decrease in antimicrobial prescribing for these two conditions but there was enormous increase i.e. from 10.6% to 40.5% in prescribing of broad spectrum antimicrobials[10].In another study it was observed that antimicrobials were prescribed in 315 patients of a total of 356 patients diagnosed with pharyngotonsillitis[11]. The viral infection has attributed for majority of cases of acute tonsillitis[8,9] and is self-limiting in nature requiring only supportive treatment which is inexpensive[12.] Despite the lack of evidence of efficacy of antibiotic agents for treating upper respiratory tract infection (URI) symptoms (i.e., acute cough, sore throat, purulent nasal discharge, bronchitis, and the common cold), primary care providers frequently prescribe AMAs for patients presenting with such symptoms. Far from being a harmless practice, prescribing AMAs for conditions for which there is no proven benefit of such therapy contributes to a number of adverse consequences, including development of bacterial resistance and to increased hospital costs for treating resistant microbes.

The primary aim of this study was to generate up to date information on antimicrobial use in the ENT outpatient service of our hospital and indications for its use, source of infection, utilization of clinical microbiological markers and aptness of its use. This would encourage good evidence based practice and facilitate appropriateness of antimicrobials.

Materials and Methods
191 prescriptions were randomly audited at varying time interval from the department of ENT of B.P Koirala Institute of Health Sciences, Nepal in the year 2003. The data was collected in customized Performa in the form of a antibacterial audit questionnaire. It also contained Patient particulars, diagnosis, investigations, drug details and information from the prescriber regarding the indication for prescribing antimicrobial agent, suspecting organism underlying infection, duration of therapy and details of any concomitant medications.

Results
The incidence of use of antimicrobial agents (AMA) in 191 prescriptions was analyzed from the enrolled prescriptions. Total 218 antimicrobials i.e. 1.4 antimicrobial agent per patient were prescribed. The AMAs were indicated therapeutically in 73.29% of patients & 19.37% patients for prophylaxis. The AMAs were advised for more than 72 hours for prophylaxis in 86.48%. In the concomitant medications antihistaminic were prescribed in 32.62% and NSAIDS in 42(21.9%) prescriptions.

Most of patients reported with URTI (32.56%), CSOM (18.3%), sinusitis (6.28%), tonsillitis (5.75%), furuncle (4.71%). Pharyngitis (3.66%), abscess (3.14%), ASOM (2.61%) and miscellaneous (19.37%). The patients were diagnosed clinically in 81 cases and in 68 cases both clinical examination and relevant investigations [radiological (58) & laboratory (10)] were used.

Out of 191 patients, culture sensitivity tests were performed for only 31 patients and 13 patients depicted a positive culture sensitivity tests. The common microbes isolated from the culture were staphylococcus aureus (69.2%). Streptococcus

(7.7%), Enterobacteriacae (7.7%), Pseudomonas auroginosa (7.7%) & psendomanas mirabilis (7.7%).

Clinically suspected organism were mentioned in only 16.76% prescriptions and most prescribers presumed the infections due to staphylococci & pseudomonas (43.7%), streptococci (31.25%), Gram negative organisms (12.5%) and H influenza (9.3%) in prescriptions.

The use of a single drug was more frequent (89.52%), two drugs (9.94%), and three drugs (0.52%) in the prescriptions. Ciprofloxacin (23.85%) was preferred, followed by amoxycillin (20.06%), combination of ampicillin + cloxacillin (9.17%), doxycyclin (5.96%). Erythromycin (4.58%) and cotimoxazole (4.58%). Expensive drugs i.e azithromycin (2.75%), roxithromycin(1.37%) and cephalosporins (3.21%)were also prescribed.

The causative microbes were sensitive to amoxycillin (53.84%), cloxacillin (53.84%) ciprofloxacin (46.15%), gentamicin (46.15%), and cephalosporin (46.15%). But resistant to erythromycin, tetracycline, cotrimoxazole and norfloxacin)

Table 1: Prevalence & indication of antimicrobials

Indicators	**No. of Patients (%)**
Prevalence of use	
• Total No. of Prescription	191
• Total No. of AMAs prescribed	218
• Mean No. of AMAS	1.4
Purpose of use of AMAs	
• Therapeutic	140 (73.29)
• Prophylactic	37 (19.37)
• Both	14 (7.32)
Disease in which AMAs prescribed	
• URTI	45 (32.56)
• CSOM	35 (18.32)
• Sinusitis	12 (6.28)
• Tonsillitis	11 (5.75)
• Furuncle	9 (4.71)
• Pharyngitis	7 (3.66)
• Parapharyngeal abeess	6 (3.14)
• ASOM	5 (2.61)
• Others	37 (19.37)
Duration of administration as prophylaxis(n=37)	
Less than 72 hrs	5 (13.5)
More than 72 hrs	32 (86.48)

Table 2: Culture & sensitivity of AMAs

Bacteriological Investigation (n=191)	
Yes	31 (16.23)
No	120 (62.82)
Not mentioned	40 (20.94)
Bacteria Isolated (n=31)	
Yes	13 (41.9)
No	18 (58.1)
Prevalence of Isolated Bacteria (n = 13)	
Staphylococcus anreus	9 (69.2)
Streptococcus Sp.	1 (7.7)
Enterobacteriaeae	1(7.7)
Pseudomonas auroginosa	1(7.7)
Pseudomonas mirabilis	1 (7.7)
Prevalence of clinically suspected Bacteria (n =32)	
Staphylococcus+Pseudomonas	14 (43.7)
Streptococcus	7 (21.8)
Gram-ve organisms	4 (12.5)
Fungus+ pseudomonas	2 (6.2)
Mycobacterium tuberculi	1 (3.1)
H. influenxae	3 (9.3)
E. coli	1 (3.1)

Table 3: Antimicrobials Sensitivity &Resistance pattern(n=13)

S. No.	Drug	Sensitivity	Resistance
1.	Amoxycillin	7(53.84)	1
2.	Cloxacillin	7(53.84)	-
3.	Ciprofloxacin	6(46.15)	-
4.	Gentamycin	6(46.15)	-
5.	Cephalosperin	5(38.46)	-
6.	Ampicillin	4(30.76)	
7.	Amikacin	3(23.07)	
8.	Ofloxacin	2(15.38)	7
9.	Norfloxacin	1(7.69)	8
10.	Cotrimoxazole	-	8
11.	Tetracyline	-	4
12.	Erythromycin	-	8

Table 4: Antimicrobials prescribed(n=191)

S. No.	Antimicrobials	Number (%)
1.	Ciprofloxacin	52(23.85)
2.	Amoxycillin	45(20.06)
3.	Ampicillin + Cloxacillin	20(9.17)
4.	Doxycycline	13(5.960
5.	Cotrimoxazole	10(4.58)
6.	Erythromycin	10(4.58)
7.	Cephosporin	7(3.21)
8.	Azithromycin	6(2.75)
9.	Ampicillin	5(2.29)
10.	Cloxacillin	4(1.83)
11.	Roxuthromycin	3(1.37)
12.	Crystalline penicillin	6(2.75)
13.	Others	37(16.97)

Discussion

Much concern has been devoted to the use of AMAs in past two decades to the widespread use of AMAs especially broad spectrum antibiotics. It has been recurrently demonstrated that 30-60% of their use is not designated[9]. Drug use evaluations complement these efforts and may provide valuable information on actual drug use.

As average number of drug is an important indicator for assessing rationality of prescription .Hence, it is preferable to keep the mean number of drugs per prescription as low as possible since higher figures always lead to increased risk of drug interactions[13], development of bacterial resistance and increased cost [14,15].

In this study, it was observed that the average prescribing frequency of antimicrobials per prescription was mostly one (89.52%) and two antimicrobials in 9.94% prescriptions. It was further observed that an average of 1.4 AMAs were prescribed per patient, which is low.

Mostly, the drugs were prescribed for diseases like upper respiratory tract (URTI) chronic suppurative otitis media (CSOM), sinusitis (6.28%), pharyngitis (3.66%) & tonsillitis (5.75%). This use is inexcusable as most of these conditions are viral in origin and there is no evidence supporting the use of AMAs in these conditions[8-10]. Schwartz et al pointed out that despite the concern over injudicious use of AMAs in acute purulent rhinitis; it was observed 77% of the prescribers continue to prescribe AMAs in this condition[16].

AMAs were prescribed therapeutically in 73.29% of patients & 19.37% patients for prophylaxis. In 86.48% of prescriptions where AMAs were prescribed for prophylaxis, the duration of AMAs was greater than 72 hours.

Out of 191 patients, culture and sensitivity test was performed only in 31 patients out of which only 13 showed growth of bacteria and sensitivity towards antimicrobials. Drugs were prescribed even when there was no growth of bacteria in culture. The microbial spectrum was sensitive to amoxycillin in most of cases thus the use of amoxycillin is rational. On the other hand, drugs like cephalosporin, Azithromycin despite of demonstrating resistance were habitually prescribed for patients. This irrational practice can lead to flaring of antimicrobial resistance.

As pointed out, physicians do not prescribe in a rational way based on the awareness of the arbitrary use of AMAs & available bacteriological studies on the local sensitivity/resistance pattern even if available to them.

Error of omissions of needed information in prescribing is a common problem. In the present study duration of treatment was not cited especially when AMA were prescribed for therapeutically. More, structuring and strict vigilance of the out patient prescribing form is required to provide comprehensive information to the patient.

The commonly prescribed antimicrobials were ciprofloxacin (23.85%), followed by amoxycillin (20.06%), combination of ampicillin + cloxacillin(9.17%), doxycyclin (5.96%). Erythromycin (4.8%) and cotimoxazole(4.58).Expensive drugs i.e azithromycin(2.75%) ,roxithromycin(1.37%) and cephalosporins (3.21%) were also prescribed which offered no additional benefit in the management of these infections but escalate the cost of total therapy.

In a developing country like Nepal, patient compliance is primarily dependent on the cost of treatment; the use of expensive AMAs limits the affordability of our community. Thus, the study points to practice of frequent use of costly and broad spectrum AMAs which is unacceptable.

The results of the present study illustrate that an improvement is required in the prescribing patterns in the management of dominant ENT infections to depreciate use of antimicrobials. Hospital based antimicrobials evaluation Committee should be formulated for the safe & effective use of AMAs in a particular setting. Implementation of educational program's to change the attitude of prescribers for improving antimicrobials utilization is the demand of present scenario. Antibiotic cycling can be reinforced to decrease antimicrobial resistance and preventing the overuse to single AMA. Standard therapeutic Guidelines can be formulated for the common ENT infections.and followed universally; this would promote rational use of AMAs.

Nevertheless, regular prescription audit monitoring with reviewing of microbial sensitivity pattern in all indoor and outdoor patients at varying time interval in a particular location, would give the feedback on the use of antimicrobials and would help to formulate the hospital guidelines for rational use of antimicrobials.

References

1. Resistance to antibiotic and other antimicrobial agents. House of Lords Select Committee on Science and Technology. 7th Report. London
2. Guide to good prescribing: programme WHO/DAP 94.11.1994.
3. Department of Health Standing Medical Advisory Committee, The path of least resistance. Report of Sub-group on Abntimicrobial resistance, London March 1999.
4. Krishnaswamy K, Dinesh Kumar B, Radhaiah G. A drug survey precepts and practices. Eur J clin pharmacol 1985;29:363-370.
5. Baksaas L, Lunde PKM. National drug policies. The need for drug utilization studies. Trends pharmacol smi 1986;7:331-334.
6. Pradhan SC, Ahewade DG, Shashindran CH, Bapna JS. Drug utilization studies. The National Medical Journal of India 1988;1(4):185-189.
7. Soumerai SB,Ross-Degfman D. Drug prescribing in pediatrics: challenges for quality improvement. Pediatrics, 86:782.
8. Coleman BH. Hall and coleman's Diseases of the nose, Throat and ear and Head and Necl. Churchill living stone, Oxford University Press 1995;97-98.
9. WHO: Case management of acute respiratory infection in children for developing countries. Manual for doctors and other senior health workers. Acute Respiratory Infections Control Program 1989.
10. Mainous AG 3rd, Hueston W J, Davis MP, Pearson WS. Trends in antimicrobial prescribing for bronchitis and upper respiratory infections among adults and children. Enfrem nfece Microbial Clin. 2003 October; 21(8); 410-416.
11. Lazaro A, OchoaC, IngladaL, Eiros JM et al. Practice variation and appropriateness study of antimicrobial therapy of acute pharyngotonsillitis in adults: Enferm Infece Microbial Clin. June-Jul;1999;17(6):292-299
12. Perez CR, Munoz O, Gutierrez G. Patrones de presctiptoin therapeutica in infection respiratoria agenda Y diarrea agnda in dos instituciones de salud (IMSS, SSA): IV: charecteristicas de la prescription medica, Gac. Med. Mex 1992;128:531.
13. Nies SA. Principles of therapeutics. In: Gilman GA, Rall WT, Nies SA, Taylor P (eds). The pharmacological basis of therapeutics. 8th edn. New york. Pergamon Press, 1990;62-83.
14. Atanasova I, Terziivanov D. Investigations on antibiotics in a hospital for a one year period. Int J clin pharm ther 1995;33:32-33.
15. Till B, Williams L, Oliver SP, Pollans PI. A survey of inpatient antibiotic use in a Teaching Hospital. S Afr Med J 1991;8:7-10.
16. Schwartz RH, Freij BJ, Ziai M, Sheridan MJ. Antimicrobial prescribing for acute purulent rhinitis in children: a survey of pediatricians and family practitioners. Pediatr Infect DisJ1997feb;16(2):185-190.