

ANTIMICROBIAL PRESCRIBING PATTERN IN AN INDIAN TERTIARY HOSPITAL

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Abstract : 550 prescriptions of the indoor patients receiving antimicrobial drugs in the Departments of Internal Medicine, Surgery, Urology and Paediatrics were analysed for drug utilization studies. The prescribing frequency of one antimicrobial per prescription was maximum in Surgery and Urology (52.52%) and Internal Medicine (50.51%) whereas prescribing frequency of two antimicrobials was maximum in Paediatrics (59.9%).

In all the departments, quinolones, aminoglycosides, cephalosporins and penicillins were frequently prescribed among which amikacin, ciprofloxacin, cefotaxime and cloxacillin were most preferred drugs, with a general tendency of prescribing newer antimicrobials. In majority of cases selection of antimicrobials was not based on microbiological confirmation. It is suggested that the use of newer and expensive antimicrobials should be kept reserved only for serious and life threatening situations.

Key words : medical audit prescription drug utilization

INTRODUCTION

Information about patterns of usage of antimicrobial drugs is necessary for a constructive approach to problems that arise from the multiplicity of antibiotics now available (1). Many surveys include an assessment of how rationally the antibiotics used had been prescribed (2). Excessive and inappropriate use of antibiotics in hospitals contributes to the development of bacterial resistance and to increased hospital costs. This is the reason for intensive drug

utilization evaluations (3). Auditing of prescriptions also form part of drug utilization studies.

In the present study, we studied the prescribing pattern of antimicrobials in the indoor patients admitted in the department of Internal Medicine, Surgery, Urology and Paediatrics of Postgraduate Institute of Medical Education and Research, Chadigarh. The study forms a part of prescription audit for different classes of antimicrobial drugs.

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METHODS

During the period of study indoor patients, admitted at PGIMER, Chandigarh and receiving antimicrobial agents were 200 patients with 289 prescriptions from the department of Internal Medicine, 186 patients with 238 prescriptions from General Surgery and Urology, 200 patients with 222 prescriptions from the department of Paediatrics. Prescriptions of the following antimicrobials were analysed: quinolones, penicillins and cephalosporins, aminoglycosides, metronidazole, macrolides and nitrofurantoin. The proforma included: age and sex (patient information), name of the drug and quantity prescribed (drug information). The drugs were analysed by their generic name classified according to ATC index (5). The quantity was the number of dosage units prescribed, one dosage unit being the form and strength in which the drug was dispensed.

The number of antimicrobials prescribed in each prescription was taken into account to calculate the incidence of use of more than one antimicrobial per prescription. Prescribing frequency was expressed as percentage of the number of prescriptions for each drug out of total number of prescriptions. Culture sensitivity tests performed in individual patients were evaluated. Drug utilization was expressed as DDD/1000/day (6).

RESULTS

The percentage use of more than one antimicrobial per prescription was analysed for different departments. Single drug treatment was 52.52% in Surgery and

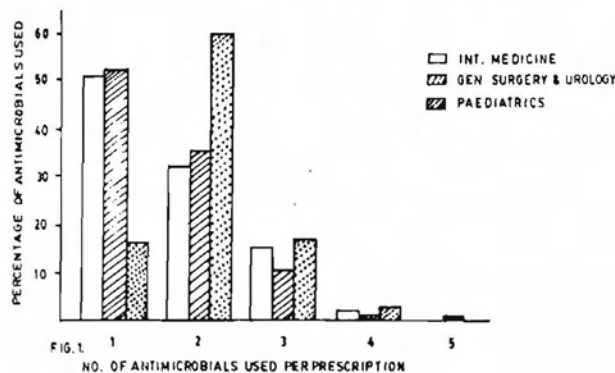


Fig. 1 : Percentage and number of antimicrobials used per prescription.

Urology; 50.51% in Medicine and 16.22% in Paediatrics. Two drug treatment was more common in Paediatrics (59.9%) followed by Surgery and Urology (35.71%) and Medicine (32.87%).

Table I shows average prescribing frequency of antimicrobials under study. The prescribing frequency of penicillins was maximum (48.73%) in Internal Medicine, quinolones (68.2%) in Surgery and Urology. In Paediatrics the prescribing frequency of aminoglycosides (76.56%) was maximum.

In all the four departments 239 were quinolones, 257 aminoglycosides, 238 penicillins and cephalosporins, 8 vancomycin and 4 nitrofurantoin, of these culture sensitivity test was positive in 22, 23, 31, 3 & 4 respectively (Table II).

Table III depicts the DDD/1000/day of different antimicrobials prescribed. Tetracycline, chloramphenicol, erythromycin, vancomycin and nitrofurantoin were used to lesser extent as compared to other antimicrobials.

TABLE I : Percentage of prescribing frequency.

<i>Name of Drug</i>	<i>Int. Medicine</i>	<i>Gen. Surgery & Urology</i>	<i>Paediatrics</i>
Penicillins	48.73	7.98	60.70
Cloxacillin	11.41	2.52	36.00
Amoxicillin	13.80	5.46	2.70
Ampicillin	4.84	-	22.00
PenicillinG	18.68	-	-
Cephalosporins	15.20	5.86	46.33
Cefotaxime	11.41	4.60	35.53
Cephalexin	-	1.26	-
Ceftriaxone	3.10	-	10.80
Cefuroxime	0.69	-	-
Quinolones	30.44	69.20	14.82
Norfloxacin	3.46	2.94	-
Ciprofloxacin	26.98	68.06	14.82
Pefloxacin	-	4.20	-
Metronidazole	25.25	30.32	4.50
Aminoglycosides	31.78	21.42	76.56
Amikacin	18.33	14.70	62.16
Gentamicin	9.30	4.62	9.00
Streptomycin	2.42	-	3.15
Neomycin	-	2.10	-
Netilmicin	1.73	-	2.25
Macrolides	-	1.26	1.80
Erythromycin	-	1.26	1.80
Tetracycline and Chloramphenicol	4.83	-	3.15
Oxytetracycline	0.34	-	-
Doxycycline	1.03	-	-
Chloramphenicol	3.46	-	3.15
Vancomycin	1.03	-	2.25
Nitrofurantoin	-	1.68	-

TABLE II : Culture sensitivity test in patients receiving antimicrobial drugs.

<i>Antimicrobials</i>	<i>Int. Medicine</i>				<i>Gen. Surgery and Urology</i>				<i>Paediatrics</i>			
	<i>No* of Pts.</i>	<i>+ve</i>	<i>-ve</i>	<i>not done</i>	<i>No. of Pts.</i>	<i>+ve</i>	<i>-ve</i>	<i>Not done</i>	<i>No. of Pts.</i>	<i>+ve</i>	<i>-ve</i>	<i>Not done</i>
Quinolones	73	9	22	42	139	10	64	65	27	3	7	17
Aminoglycosides	76	7	37	32	46	11	3	32	135	5	43	87
Penicillins and Cephalosporins	45	11	13	21	20	6	7	7	163	14	49	100
Vancomycin	2	0	1	1	1	1	0	0	5	2	2	1
Nitrofurantoin	1	1	0	0	3	3	0	0	-	-	-	-

*(One patient may be getting more than one antimicrobial).

TABLE III : DDD/1000/day.

<i>Antimicrobial</i>	<i>ATC code</i>	<i>Int. Medicine</i>	<i>Gen. Surgery</i>	<i>Paediatrics</i>
Cloxacillin	J01HB02	8.90	166.60	12.50
Amoxicillin	J01CA04	6.87	127.27	166.60
Cefotaxime	J01DA10	5.70	12.50	12.60
Cephalexin	J01DA01	—	500.00	—
Ceftriaxone	J01DA13	5.15	—	41.66
Amikacin	J019B06	3.50	29.41	7.24
Gentamicin	J01KD03	2.89	90.90	50.00
Neomycin	A07AA01	—	250.00	—
Streptomycin	J01GA01	10.80	—	142.85
Netilmicin	J01GB07	0.72	—	200.00
Ciprofloxacin	J01MA02	10.90	6.25	30.30
Norfloxacin	J01MA06	10.90	142.85	—
Pefloxacin	J01MA03	—	100.00	—
Metronidazole	G03AF01	13.15	12.98	90.90
Oxytetracycline	J01AA06	47.60	—	—
Doxycycline	J01AA02	25.97	—	—
Chloramphenicol	J01BA01	71.40	—	142.85
Erythromycin	J01FA01	—	333.33	250.00
Vancomycin	J01XA01	250.00	1000.00	200.00
Nitrofurantoin	G04AC01	1000.00	333.33	—

DISCUSSION

Many new potent, effective and expensive drugs have been introduced in recent decade which has led to a steady increase and often misuse of drugs. Other important reasons are that (a) giving a patient antimicrobial relieves the fear the clinician has that he might have overlooked a possible bacterial infection which could respond to antimicrobials (b) that the patients expect medicines when they are ill, and have come to regard receiving them as a kind of social right (c) and finally the pressure on doctors to do something positive for the patient (7, 8, 9)

Average number of drugs per prescription is an important index of prescription audit. It is preferable to keep the number of drugs per prescription as low as possible to minimize the risk of drug

interaction, development of bacterial resistance and increased hospital costs (3).

In the present study, the prescribing frequency of antimicrobials per prescription was mostly one drug in the departments of Medicine (50.51%) and Surgery & Urology (52.52%) whereas prescribing of two antimicrobials was common in Paediatrics (59.9%).

Another important aspect in prescribing of antimicrobials is the excessive use of newer and expensive drugs. This not only affects the cost of the treatment and compliance but also increase the incidence of bacterial resistance to newer drugs. In the present study, it was observed that newer and expensive antimicrobials e.g. quinolones (ciprofloxacin), aminoglycosides (amikacin), cephalosporins (cefotaxime) and newer penicillins (cloxacillin) were

frequently prescribed.

Although one can justify the use of newer antimicrobials on the assumption of the development of bacterial resistance to the existing antimicrobials, but in majority of cases, newer antimicrobials were used without culture sensitivity test. This could have been avoided wherever possible, especially when alternate drugs were available. Metronidazole was prescribed in about 25% of prescriptions of the department of Medicine and Surgery for the treatment of associated protozoal infections or for surgical prophylaxis of anaerobic infections postoperatively.

ATC/DDD methodology has been used for prescribing drug consumption. The ATC index is an anatomical-therapeutic-chemical (ATC) classification system which assigns code letters and number to all drugs on an ATC basis (4,5). The defined daily dose (DDD) concept was developed to overcome objections against traditional units of measurement of drug consumption. DDD for a given drug is established on the basis of assumed average use per day of the drug in adults. It provides

a rough estimate of drug consumption (6). The DDD methodology does not indicate the exact number of patients who have been treated with a drug. This concept assumes that every person prescribed a particular drug is taking the specific DDD everyday, ignoring alteration of dosage by disease and patient related factors. Further, drugs prescribed for brief period can have their prescribing prevalence underestimated (10). Variations in dosage pattern, duration of study, the scatter of population over different age groups etc. can therefore contribute to difference in audit reports using DDD methodology to determine prevalence of prescribing. The information provides the trends in prescribing antimicrobials which will help in intervention and improvement in prescribing pattern of antimicrobials.

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