



Research Article

DRUG UTILIZATION STUDY OF ANTIMICROBIALS IN POST-OPERATIVE WARDS IN A TEACHING HOSPITAL

Sapna Patil, L. Padma, Veena D.R, P. Shanmukananda

Department of Pharmacology, Dr.B. R. Ambedkar Medical College, Bangalore

(Received: 20 September, 2012; Accepted: 03 October, 2012; Published: 29 October, 2012)

Corresponding Author's email: sapnapatil75@gmail.com

Abstract: Drug utilization studies are a pre-requisite for the formulation of drug policies. Irrational use of medicines is widespread throughout the world, particularly the antimicrobials. Proper treatment of peri-operative, post-operative, nosocomial and other hospital acquired infections is essential. Hence to investigate the situation in surgical post-operative wards, the present study is undertaken. **Objectives:** The present study is designed to study the current trends in prescribing antimicrobials in the surgical post-operative wards of a tertiary care hospital. **Materials and Methods:** A descriptive prospective study will be conducted in the surgical post-operative wards of Dr. B. R. Ambedkar Medical College, Bangalore. This was done by collecting the prescriptions during the months between June 2012 and August 2012. Information with respect to the age and sex of the patients, performed surgery and the antimicrobials prescribed, was entered in a pre-formed proforma and analysed. **Results:-** A total of 81 prescriptions, belonging to surgical post-operative wards were analysed. The average number of drugs prescribed was 2.5 ± 3.02 . 40 patients were given 2 drug treatment. The most extensively prescribed drugs were the cephalosporins (46.85%), followed by metronidazole (34.96%). Maximum of the patients were hospitalized for 3-5 days. **Conclusion:-** There is scope for improving prescribing habits among the fraternity and minimizing incidence of resistance to antimicrobials.

Key words: Antimicrobials, drug utilization, post-operative**INTRODUCTION**

Drug utilization studies are a pre-requisite for the formulation of drug policies. Irrational use of medicines is widespread throughout the world, particularly the antimicrobials. Drug utilization research was defined by WHO in 1997, as "the studies of marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences."¹

Prescription order is an important transaction between the clinician and the patient. It is an order for a person at a particular time.² Prescribing behaviour of clinicians depends upon various sources. These are academic literature, professional colleagues, government regulations and commercial publicities.³

Antimicrobial agents deserve their place as one of the most powerful pillars of modern medical care.⁴ In India, the prevalence of use of antimicrobials varies from 24-67%.⁵ Antibiotics are one of the pillars of modern medical care and play a major role both in the prophylaxis and treatment of

infectious diseases.⁶ Patients in hospitals nowadays are older, more severely ill and immunocompromised, and are predisposed to contracting bacterial infections requiring frequent antimicrobial therapy.⁷ Inappropriate and indiscriminate use of antimicrobial agents can potentially have a number of problems including emergence of antimicrobial resistant bacteria.⁸

Proper treatment of peri-operative, post-operative, nosocomial and other hospital acquired infections is essential. Hence to investigate the situation in surgical post-operative wards, in our hospital, this study was undertaken.

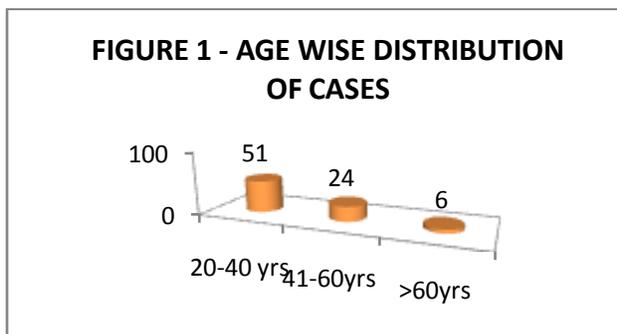
MATERIALS AND METHODS

A descriptive, prospective study was conducted in the surgical post-operative wards of Dr. B. R. Ambedkar Medical College, Bangalore, between the months June 2012 and August 2012. The Institutional Ethics Committee's approval was obtained before starting the study. Prescriptions were collected for a period of 3 months and relevant

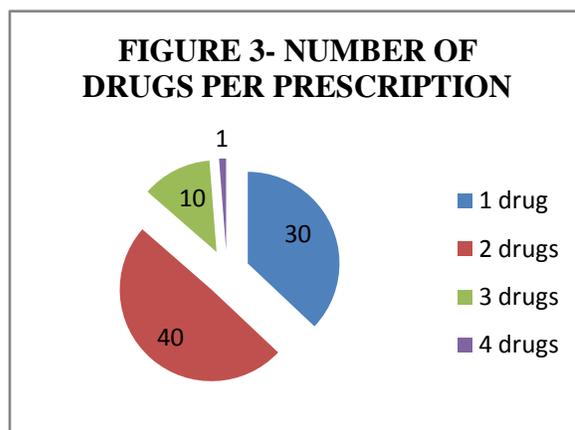
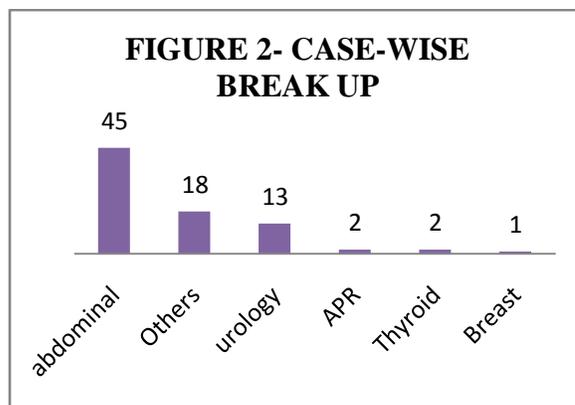
information was entered into preformed proforma .Information with respect to the demographic characteristics (age,sex of the patients),performed surgery and the antimicrobials prescribed was collected.Data was analysed and results were obtained.

RESULTS

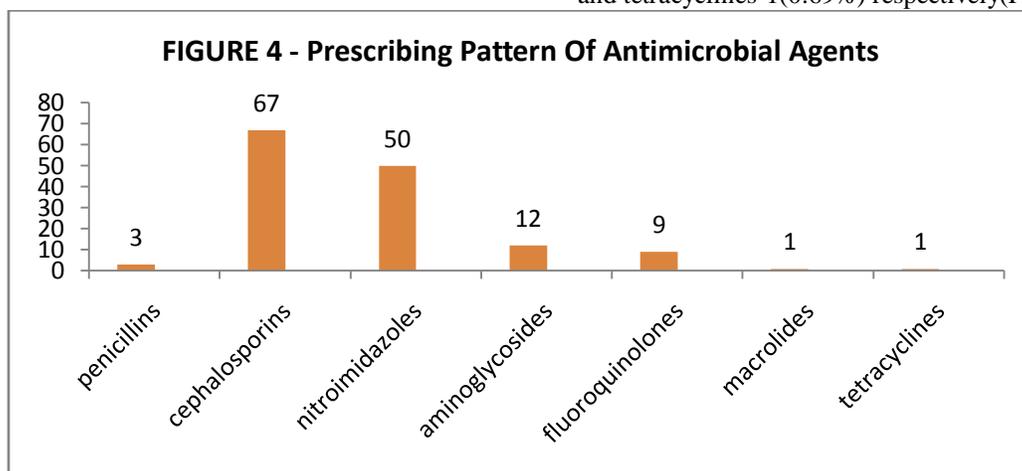
A total of 81 prescriptions,belonging to surgical post-operative wards were analysed. Out of 81 patients,44 were male patients and 37 were females.51 patients(62.96%) were in the age group of 20-40 years while only 6 patients(7.40%) were more than 60years age (Figure 1).



Maximum of the cases i.e. 45(55.55%) were abdominal while one case was that of breast (Figure 2). The average number of drugs prescribed was 2.5±3.02. 40 patients were given 2 drug treatment (Figure 3).

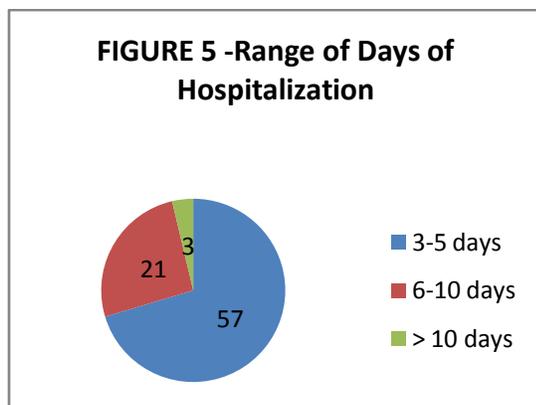


The prescribing pattern of the antimicrobials was penicillins-3(2.09%), cephalosporins-67(46.85%), nitroimidazoles-50(34.96%), aminoglycosides-12(8.39%), fluoroquinolones-9(6.29%),macrolides-1 and tetracyclines-1(0.69%) respectively(Figure 4).



The most extensively prescribed drugs were the cephalosporins followed by metronidazole. Among the cephalosporins ceftriaxone -34(23.77%) was most frequently prescribed followed by metronidazole-48(33.56%) ,among the nitroimidazoles.

The total number of fixed drug combinations was 5,out of which the combination of piperacillin and tazobactam was commonly used. Maximum of the patients were hospitalized for 3-5 days while only 3 patients for more than 10 days(Figure 5).



DISCUSSION

Antimicrobial agents are a very important class of drugs which are essential in treating or preventing development of infections in patients. Patients in surgical wards develop infections post surgery; many of the infections are caused by bacteria that are highly virulent. The use of antibiotics in surgical patients both for prophylaxis and treatment of infections is a justifiable practice that, however, requires a regular review of the chosen regimen on the grounds of efficacy, toxicity, cost and other aspects to maximize the benefits to the patient. The present study attempts to assess the general pattern how antibiotics are used in surgical wards rather than attempting to judge individual prescriptions as appropriate or inappropriate.⁶

In one study, the most commonly prescribed class of antimicrobial agents was cephalosporins which was prescribed in 67 patients (46.85%). The second (34.96%) most common being Metronidazole which was prescribed in 50 patients which covers anaerobic infections. Aminoglycosides, which covers gram -ve aerobic bacteria was prescribed in 12 patients (8.39%). All these above drugs combined constituted 90.20% of all antibiotics prescribed.

One class of drugs which was prescribed the most were Cephalosporins in 67 (46.85%) cases; consistent with similar studies done elsewhere.⁹

Cephalosporins are a very important class of drugs which have been prescribed extensively as an antimicrobial in the treatment of acute and chronic bacterial infections. They have been very successful in treating and controlling infections. However, there are growing numbers of reports of resistance to these agents with increasing use.¹⁰ Inadvertent use of these precious antibiotics is to be prohibited as it may lead to rise of resistant strains.

In a developing country like India, patient compliance is primarily dependent on the cost of treatment. Among the drugs reviewed, the fourth and fifth generation cephalosporins and the fluoroquinolones are examples of relatively expensive drugs and patient compliance is likely to be poor for such medication. In post-operative patients, as parenteral route of administration is required, the second and third generation cephalosporins were chosen and also owing to their cost-effectiveness.⁹

Due to their wide spectrum of activity, good pharmacokinetics, established clinical efficacy and high tolerability, cephalosporins are among the most widely used antibiotics worldwide. The third and fourth generation cephalosporins are predominantly parenteral agents, administered two or three times daily, used in the treatment of a wide range of moderate to severe infections. Ceftriaxone, a third generation cephalosporin, is unique in exhibiting an unusually long elimination half-life that allows for once-daily administration. Ceftriaxone exhibits the widest antibacterial spectrum of third generation cephalosporins and this is reflected in clinical responses. The cephalosporins are well tolerated, with few and generally transient adverse effects; the major exception being haematological abnormalities including blood coagulation disorders associated with cefoperazone. Several pharmacoeconomic studies indicate that the once-daily dosing regimen required for ceftriaxone is the major factor responsible for its cost-effectiveness over third and fourth generation cephalosporins.¹¹ Metronidazole was also prescribed to combat the anaerobic infections.

Another important observation made in this study is the relatively scarcity of prescription of fluoroquinolones (6.29%) which are proven agents for the treatment of soft tissue infections and post surgical prophylaxis.¹² These antimicrobial agents are effective drugs that can be used to treat the infections and replace the cephalosporins group thus decreasing the likelihood of development of resistance.

CONCLUSION

There is a clear need for the development of prescribing guidelines & educational initiatives to encourage the appropriate use of drugs in Surgery.^{13,14} Also there is scope for improving prescribing habits among the fraternity & minimising incidence of resistance to antimicrobials.

References

1. Einarson TR, Bergman U, Wilhelm BE. *Principles and Practice of Pharmacoepidemiology*. In: Speight TM, Holford NMG. *Avery's drug treatment*. 4th ed. Auckland: Adis international; **1996**:371-92
2. Prashant P, Narendranath S, Geetha M et al. Trends in prescribing antimicrobials in post-operative wards in a tertiary care hospital. *Drug Invention Today*, **2011**;3(12):301-304
3. J Mohan, K Madhana Gopal, M Meghanathan et al. A Study on Utilization Pattern of Antibiotics for the Complicated Urinary Tract Infections in a Tertiary Care Centre. *Global Journal of Pharmacology*, **2011**;5(1):01-03
4. Adiga MNS, Alwar MC, Pai MRS, Adiga US. Pattern of antimicrobial agents use in hospital deliveries: A prospective comparative study. *Online J Health Allied Scs*, **2009**;8(4):10
5. Kulshretha S, Aggrawal KK. Survey of pattern of antimicrobial use in teaching hospital. *Ind J Pharmacol*, **2010**;16(1):395
6. Teferra Abula, Mohammed Kadir. The pattern of antibiotic usage in surgical in-patients of a teaching hospital, Northwest Ethiopia. *Etiop J Health Dev*, **2004**;18(1):35-38
7. Kambaralieva B, Bozygunchiev M, Zurdinova A et al. An assessment of antibiotics prescribed at the secondary health care level in the Kyrgyz Republic. *Nagoya J Med Sci*, **2011**;73:157-168
8. D Raveh, Y Levy, Y Schlesinger et al. Longitudinal surveillance of antibiotic use in the hospital. *Q J Med*, **2001**;94:141-152.
9. Gupta N, Sharma D, Garg SK, Bhargava VK. Auditing of prescriptions to study utilization of antimicrobials in a tertiary hospital. *Indian journal of pharmacology*, **1997**;29:411-15
10. Adu A, Armour CL. Drug utilization review of the third generation cephalosporins. Focus on ceftriaxone, ceftazidime and cefotaxime. *Drugs*, **1995**;sept 50(3):423-39
11. Bijie H, Kulpradist S, Manalaysay M, Soebandrio A. In vitro activity, pharmacokinetics, clinical efficacy, safety and pharmacoeconomics of ceftriaxone compared with third and fourth generation cephalosporins: review. *J Chemother*. **2005** Feb;17(1):3-24. Review.
12. Wolfson JS, Hooper DC. The fluoroquinolones: structures, mechanisms of action and resistance, and spectra of activity in vitro. *Antimicrob Agents Chemother*, **1985**;october 28(4):581-586
13. Salman MT, Akram MF, Rahman S et al. Drug prescribing pattern in surgical wards of a teaching hospital in North India. *Indian Journal for the Practising Doctor*, **2008**;5(2):5-8.
14. Arnold FW, McDonald LC, Smith RS, Newman D, Ramirez JA. Improving antimicrobial use in the hospital setting by providing usage feedback to prescribing physicians. *Infect Control Hosp Epidemiol*. **2006**;27(4):378-82.