Academic Sciences International Journal of Pharmacy and Pharmaceutical Sciences

ISSN- 0975-1491 Vol 4, Issue 2, 2012

Research Article

EVALUATION OF ORAL ANTIBIOTIC UTILIZATION IN MEDICAL INPATIENTS

DR. B. JAYAKAR[1], DR. N.A ALEYKUTTY[2], *DR. SANTHOSH M MATHEWS[3]

***Professor and Principal, Nazareth College of Pharmacy, Tiruvalla, Kerala, India,[3] Faculty of Pharmacy, Vinayaka Missions University, Salem, Tamil Nadu, India[1], Principal, Pushpagiri College of Pharmacy, Tiruvalla, Kerala-689107, India[2]. *Email: santhoshmm@hotmail.com**

Received: 8 April 2011, Revised and Accepted: 18 Sep 2011

ABSTRACT

The study was conducted to evaluate the effectiveness of regulations on antibiotic utilization after oral route of administration. It was performed before and after imposing regulations on antibiotics administration. The uses of all antibiotics were regulated using drug formulary and restrictions in the prescribing pattern. All the hospitalized patients in the medical ward were subjected for evaluation. Significant changes in the total doses of antibiotics consumed in the oral routes were observed. This led to effective and rational use of antibiotics.

INTRODUCTION

Today, antibiotics are one of the most expensive drug expenditure in hospitals accounting for 20% to 50% of total pharmacy spending with intravenous antibiotics accounting for the most expensive category of antibiotics in hospitalized patients[1, 2].Furthermore, patients on intravenous therapy often had prolonged hospital stay to complete antibiotic treatment. A switch from intravenous to oral therapy could favour an earlier discharge and directly save health care costs[3].Although the relationship between duration of intravenous antibiotic therapy and length of hospital stay was well recognized, the delayed switch produced additional costs per hospitalization[4, 5]. These results concur with findings in comparable studies, where saving were achieved with a timely transition from intravenous to oral therapy[6, 7, 8]. Savings were achieved through reduced costs of oral antibiotics and due to a shortened period of hospitalization.

Programmes to optimize antimicrobial use had reduced the cost and volume of therapy while optimizing care[9, 10, 11].The limitation of unnecessary antibiotic administration consists of appropriate diagnosis, acquiring appropriate culture and sensitivity data, implementing the most appropriate treatment, selecting appropriate antibiotics and dosing appropriately[12, 13, 14].Various antibiotic utilization strategies including antibiotic utilization guidelines, formulary restriction and antibiotic cycling or rotation have evolved from our understanding of the impact of changes in antibiotic utilization on subsequent antibiotic susceptibility patterns[15].Drug use evaluation can assess the actual process of medication administration or dispensing like appropriate indications, drug selection, dose, route of administration, duration of treatment and drug interactions[16, 17, 18].It also assesses outcomes of treatment like cure of disease conditions, decreased clinical parameterlevels. The aim of antibiotics utilization evaluation is to determine the pattern (rates and costs) of antibiotic usage in a particularclinical setting[19, 20].

STUDY MATERIAL

The study was performed in the medical ward. The individual patient profiles of all in patients admitted in this ward were studied. Regulations were imposed on the antibiotic prescription pattern and adherence to hospital formulary was strictly implemented. Doses of all antibiotics consumed were recorded. All the collected data were analyzed using chi-square test at 5% level of significance and the differences were tested at $p<0.05$ (two-tailed).

RESULTSAND DISCUSSION

2375 patients were treated with antibiotics during the pre-regulatory period. Out of this 1534 consumed orally. After implementing the regulation on the antibiotic prescription, the study showed that out of 2425 patients treated with antibiotics, 1832 consumed themby oral route.

The total doses of antibiotics consumedorally before and after the regulations were recorded (Table-1).

Table 2: Summary of the Number of Doses of Antibiotics Consumed (Oral Administration)

Antibiotics	Use of antibiotics	
	Before Regulation n(%)	After Regulation n (%)
Total Number of Doses of Antibiotics Consumed (n)	15130	18169
Extended Spectrum Penicillins	3545(23.43)	6202(34.14)
Cephalosporins-First Generation	588(3.89)	891(4.90)
Cephalosporins-Second Generation	1326(8.76)	841(4.63)
Cephalosporins-Third Generation	3125(20.65)	1759(9.68)
Lincosamides	806(5.33)	377(2.07)
Macrolides	1559(10.30)	3082(16.96)
Oxazolidinones	114(0.75)	54(0.30)
Fluroquinolones First Generation	1993(13.17)	3283(18.07)
Fluroquinolones-Second Generation	1860(12.29)	1553(8.55)
Sulphonamides and Trimethoprim	188(1.24)	124(0.68)
Imidazle Derivatives	26(0.17)	3 (0.02)

**p-value calculated using Chi-square test (two tailed, α = 0.05)*

The total numbers of doses of antibiotics consumed orally were 15130 and 18169 before and after the intervention respectively. The study had shown a significant increase(20%) in the total number of doses of antibiotics consumed. Early switching from injection to oral dose was significant after the restricted use. Thenumber of patients who have received antibiotics orallywere increased by 17 %. The drugs whichwere changed to oral route of administration without much delay were the macrolide (Azithromycin), extended spectrum antibiotics like ampicillin, amoxicillin with clavulanate, and first generation fluroquinolone like Ciprofloxacin.

The total numbers of doses of Second and Third generation Cephalosporins, Lincosamides, drugsbelonging to Oxazolidinone category were reduced after the regulations. A reduction in the consumption of Sulphonamides, Penicillin and Imidazole derivatives were also observed after the interventions. These reductions after the regulations justify the rational use.

Theextended spectrum antibiotics were the most commonly prescribed antibiotic during the pre regulatory period. The total numbers of doses of these class of antibiotics were increased in the post regulatory period. Amoxicillin was the most commonly used drug of choice during the period of study for upper respiratory infections particularly for sinusitis. But increase in the resistance against this drug caused an increase in the use of amoxicillin combined with clavulanate. Use of macrolid antibiotics increased mainly due to the increase in the use of Azithromycin for the treatment of bronchitis. Use of first generation fluoroquinolones were increased whereas the consumption of the second generation fluroquinolones did not alter much indicating its selective use in entrobacteriae infections. The increase in the consumption of these oral antibitotics showed that the infections can be treated with these classes rather than drugs belonging to higher class.

CONCLUSION

The evaluation of antibiotics utilization showed that the effective use of oral antibiotics was improved after the regulation. The study emphasizes that strict regulation on the use of antibiotics is essential to promote rationalization of antibiotic therapy. Early switching over from parenteral to oral and reduced use of expensive class of antibiotics leads not only to appropriate use but also made the treatment morecost effective.

REFERENCES

1. Gulbinovic J, Myrback KE, Bytautiene J, et al. Marked differences in antibiotic use and resistance between university hospitals in Vilnius, Lithuania, and Huddinge, Sweden. Microbial Drug Resistance 2001; 7: 383-9.
2. Shrishyla MV, Naga Rani MA, Venkararaman BV. Drug utilization of antimicrobial in the in-patient setting of a tertiary hospital. Indian J Pharmacol 1994; 26: 282-7.
3. Von Gunten V, Amos V, Sidler AL, et al. Hospital pharmacists' reinforcement of guidelines for switching from parentral to oral antibiotics : a pilot study Pharm World Sci 2003; 2:52-5.
4. Ramirez JA, Vargas S, Ritter GW, et al. Early switch from intravenous to oral antibiotics and early hospital discharge: a prospective observational study of 200 consecutive patients with community-acquired pneumonia. Archives of Internal Medicine 1999; 20:2449-54.
5. Siegel RE, Halpern NA, Almenoff PL, et al. A prospective randomized study of inpatient iv. Antibiotics for community-acquired pneumonia. The optimal duration of therapy. Chest 1996;4:965-71
6. Paladino JA, Sperry HE, Backes JM, et al. Clinical and economic evaluation of oral ciprofloxacin after an abbreviated course of intravenous antibiotics. Am J Med 1991; 5:462-70.
7. Amodio-Groton M, Madu A, Madu CN, et al. Sequential parenteral and oral ciprofloxacin regimen versus parenteral therapy for bacteremia: a pharmacoeconomic analysis. Ann Pharmacother 1996; 6:596-602.
8. Chan R, Hemeryck L, O Regan M, et al. Oral versus intravenous antibiotics for community acquired lower respiratory tract infection in a general hospital: open, randomized controlled trial. BMJ 1995; 6991:1360-2.
9. Gross R, Morgan AS, Kinky DE, et al. Impact of a hospital-based antimicrobial management program on clinical and economic outcomes. Clin Infect Dis 2001; 33:289-295.
10. Bamberger DM, Dahl SL. Impact of voluntary vs enforced compliance of third-generation cephalosporin use in a teaching hospital. Arch Intern Med 1992; 152:554-57.
11. Fraser GL, Stogsdill P. antibiotic optimization. An evaluation of patient safety and economic outcomes. Arch Intern Med 1997; 157:1689-94.
12. Ngoh NL, Shepherd MD. The effect of visual aids and advanced organizers on improving the use of antibiotics in rural Cameroon. In: Etkin NL and Tan ML (eds). Medicines: meanings and contexts 1994; 243-263.
13. Dukes MNG. The effects of drug regulation. Lancaster: MTP Press, 1987.
14. World Health Organization. Introduction to drug utilization research.oslo:2003.
15. Daniel PR, Shawn JP, Robert GS.Antibiotic Utilization Strategies to Limit Antimicrobial Resistance.Semin Respir Crit Care Med. 2002; 23(5).
16. Moore W. Medicaid drug utilization review: A critical appraisal. Med Care Rev. 1994; 51:3-37.
17. Soumerai SB, Ross-Degnan D. Experience of state drug benefits programs. Health Aff 1990; 9:36-54.
18. Lipton HL, Bird JA. Drug utilization review: State of the art from an academic perspective. Clin Pharmacol Ther 1991; 50:616-19.
19. Gyssens IC, Blok WL, Van den Broek PJ, et al. Implementation of an educational program and an antibiotic order form to optimize quality of antimicrobial drug use in a department of internal medicine. Eur J Clin Microbiol Infect Dis1997;16:904-12
20. Dickerson LM, Mainous AG, Carek PJ. The pharmacists' role in promoting optimal antimicrobial use. Pharmacotherapy 2000; 20:711-23.