Original Article

Prescribing pattern of antimicrobial agents in in-patients of a tertiary care center A study on the goals of antimicrobial therapy

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ABSTRACT

Introduction: The development of antimicrobial resistance and also down in the process of development of newer drugs are the major challenges to the health sectors in the new millennium. Hence the knowledge of the disease pattern and the rational use of drugs play a significant role in overcoming the above challenges.

Aim: The present study was focused to know the pattern of utilization of the different group of antimicrobials along with the goal for antimicrobial therapy.

Materials and methods: The present study was done in 260 patients who were admitted as in-patients in the medicine and surgery departments of Velammal Medical College Hospital, Madurai.

Results: The goal of antimicrobial therapy in the medicine in-patient department was empirical (81%) and in surgery was prophylactic (78%). The most commonly administered group of antimicrobials was the cephalosporins (42.1%).

Conclusion: The health care professionals may give importance for more rational and judicial use of antimicrobial drugs show that the emergence of antimicrobial resistance can be reduced.

Key words: Antimicrobial agents, Antimicrobial resistance, Utilization pattern, Irrational, Cephalosporins.

INTRODUCTION:

Health care personnel need to have an approach which is constructive to successfully overcome the problems due to the availability of various groups of antimicrobial agents (AMAs). This task also requires the knowledge about the pattern of antimicrobial agents being used to treat the bacterial infections. Otherwise an irrational prescription causes additional economic burden and also leads to serious morbidity and the mortality.[1,2] It is recommended to the hospitals to bring down the incidence of emergence of antimicrobial resistant strains by monitoring the antibacterial use and the susceptibility trends. When an individual develops resistance, it becomes a significant threat to the community health apart from increasing the chances of an unsuccessful outcome of the treatment.[3,4]

Goals of chemotherapy can be broadly divided into prophylactic, empirical and definitive therapy. Prophylaxis is given either to slow down the progress of an infection or prevents it in some individuals. Definitive therapy is for a known pathogen, but more often the bacterial infections are challenged initially by empirical therapy guided by the clinical picture of the disease. This is because it takes 1-3 days to obtain the culture and sensitivity reports.[5,6]

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MATERIALS AND METHODS:

This study was undertaken at the medicine and surgery inpatient departments of Velammal Medical College Hospital, Madurai for 3 months from February 2016 to April 2016. All the patients admitted to the above said departments were included for the study. The exclusion criteria's were those who got discharged against medical advice, age below 16yrs and hospital stay of less than 2 days. Total of 260 patients were enrolled for the study based upon the inclusion and the exclusion criteria's. The institutional ethical committee had approved the study and the informed consent was obtained from all the patients. Information regarding the goals of antimicrobial agents being used in a particular patient had been collected from the case file.

RESULTS:

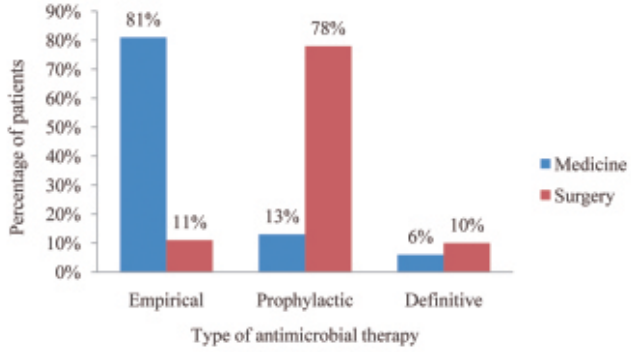
The observations from the individual patients were pooled and analyzed in the Microsoft excel sheet. Out of the 260 patients enrolled for the study, 159 were males and 101 were females. The male: female ratio was 1.57:1. The numbers of patients from the medical department were 126 (48.5%) and the surgical department was 134 (51.5%). Among the total patients, 185 (71%) received antibiotics while the remaining 75 (29%) were not administered any antibiotic. In the total 185 individuals who received antimicrobials, 70 (56%) were from the medicine department and 115 (85%) were from the surgery department (Table 1).

Table 1. Comparison of various parameters

Parameter	Medicine	Surgery
Number of patients enrolled (n=260)	126 (48.5%)	134 (51.5%)
Number of patients who received antimicrobials	70 (56%) n=126	115 (85%) n=134
Number of patients who received single AMA	33 (47%) n=70	30 (26%) n=115
Number of patients who received > 1 AMA	37 (53%)	85 (74%)

The goal of therapy for the administration of antimicrobial agents to the inpatients in the descending order of priority wasmedicine (n=70): empirical 57 cases (81.4%), prophylactic 9 cases (12.9%), and definitive 4 cases (5.7%). In surgery (n=115) prophylactic 90 cases (78.3%), empirical 13 cases (11.3%) and definitive 12(10.4%)(Fig1).

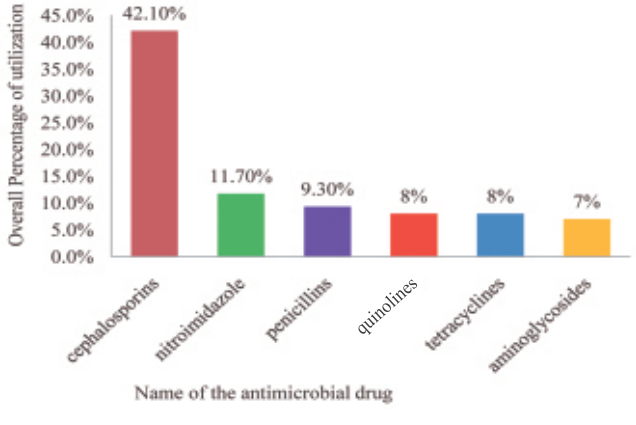
Figure 1. Objective of antimicrobial use



In medicine (n=70), 47% (33) of the patients were treated with single antimicrobial drug and 53% (37) were treated with 2 or more AMAs. In surgery (n=115), 30(26%) were given single drug whereas 85 (74%) received poly AMAs.

The overall utilization pattern of antimicrobials to the inpatients were cephalosporins (42.1%), metronidazole (11.7%), penicillins (9.7%), quinolones (8%), tetracyclines (8%) and aminoglycosides (7%) (Fig2).

Figure 2. Utilization of different group of antimicrobial agents.



Individual drug wise pattern of usage in the departments were as follows. Medicine; ceftriaxone (30%), doxycycline (20%), cefotaxime (15%), amoxicillin (15%), metronidazole (10%)(Fig 3) and surgery; cefoperazone (40%), metronidazole (30%), amoxicillin (28%), cefotaxime (22%), cefixime (19%) and ceftriaxone (18%) (Fig4).

Figure 3. Frequency of antimicrobial prescribing in medicine department.

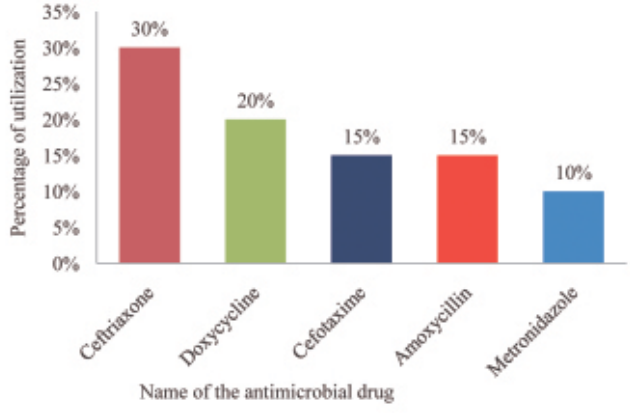
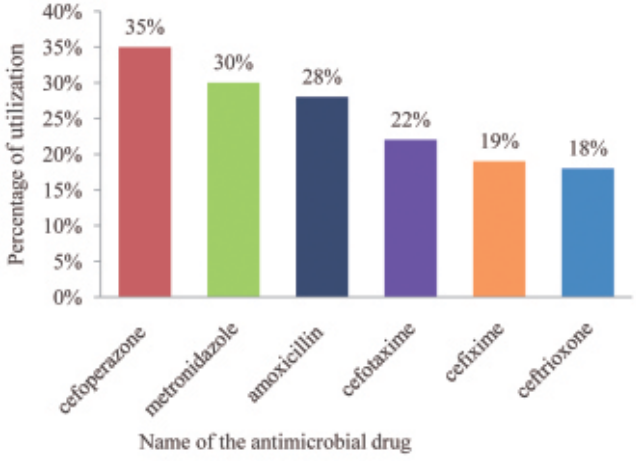


Figure 4. Frequency of antimicrobial prescribing in surgery department.



DISCUSSION:

The male gender dominant ratio observed in this study (1.57:1) was almost similar to a study done by AazedJaved Khan et al. The reason for this may be that the men being the dominant partner and the bread winner of our family set up, usually gets more medical care than women unless or otherwise the disease in the female is serious enough to cause a morbidity.[7] Antimicrobial agents remain to be one of the frequently prescribed drug among the general population.[8] It was observed (table.1) that more percentage of patients from the surgical wards received antimicrobials (85%) than the medical ward (56%). This result was found to be contrary to the study results by Asuman et al and Alexia Cusini et al. The possible explanation may be that the surgical departments encounter more admissions which require surgical interventions.[9,10]

It was found (Fig1) that in the medicine department, the AMA's were predominantly administered as an empirical therapy and at the same time it is as a prophylaxis in the surgery. But the most important factor for our concern is that very few patients (less than 10%) in both departments had been referred for the microbiological test (culture and sensitivity) and received drugs based on the report. Culture and sensitivity results of few patients had been neglected while selecting the AMA's. This was also confirmed by earlier studies.[11] The ratio of single antimicrobialversus2 or more AMAs was almost equal in medicine in-patients where as in surgery only 1/3 rd of the patients received single AMA and the remaining received > 1.Similar result was seen in a study by Younis Bilal Bin et al.[12]

Cephalosporins (3rd generation) remain the most commonly prescribed AMA in this study (figure.2) which had been emphasized by many earlier studies like AsawariRaut et al and Maheswari et al.[13] The results of the Figure 3 & 4 show that ceftriaxone was the most commonly used

antimicrobial in the medicine ward where as in the surgery ward it was the cefoperazone. Surgeons had generally preferred the combination of a beta lactamase inhibitor (sulbactum) with cefaperazone.[14,15] In the medicine department, amoxicillin was usually given as a fixed dose combination with a beta lactamase inhibitor (clavulanic acid).

CONCLUSION:

The emergence of new resistant micro organisms along with unfortunate slowdown in the development of new AMA's during the last two decades have been a great concern to the medical profession. Pending the identification of new targets and compounds, the physicians will have to depend on the currently available group of drugs. In this background, it becomes the need of the hour for more judicious, rational use of existing AMAs in addition to promoting definitive antimicrobial therapy to known pathogens.

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