Retrospective observational study of antimicrobial drugs utilization in medical ICU in a tertiary care teaching hospital of Himachal Pradesh

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Abstract

Introduction: Patients admitted in Intensive Care Units (ICUs) are already sick and they are vulnerable to superadded infections. They suffer from other co-morbidities and also undergo invasive procedures. So these patients are under cover of antimicrobial drugs.

Materials and Method: It was a retrospective observational study, conducted during a period from March, 2016 to July, 2016. Data of 152 patients was collected from the Central Record Section of the hospital. Drug utilization pattern of antimicrobial agents was analyzed.

Results: Out of 152 patients, 100 (65%) were males and 52 (35%) were females. The mean age was 60.05 ± 16.05 years with a range of 20 - 90 years. The mean age of males was 58.72 ± 14.85 years and females were 62.52 ± 17.80 years. Average duration of hospital stay was 2.96 ± 2.57 days with a range of 1 to 20 days. Total of 131 antibiotics were prescribed. Antibiotics prescribed were 3rd generation cephalosporins in 43 patients, macrolides in 27 patients, quinolones in 9, antianaerobics in 8, tetracycline in 5, oxazolidinones, aminoglycosides, antifungals and others in 2 patients each. FDCs were prescribed in 24% prescriptions. Prescription pattern of FDCs was piperacillin + tazobactam in 20 patients, amoxicillin + clavulanic acid in 5 patients, ceftriaxone + sulbactam in 3 patients, polymyxin B + bacitracin + neomycin in 2 patients and ofloxacin + ornidazole in 1 patient.

Conclusion: Drug utilization studies provide us prescription pattern in the medical ICU. We can minimize the incidence of antimicrobial resistance by following the standard guidelines of antimicrobial prescription.

Keywords: Drug utilization, Antimicrobials, ICU.

Introduction

Patients admitted in ICU are seriously ill. These patients require monitoring and nursing care round the clock. So these patients receive multiple medications from a variety of pharmacological classes [(1)] and these patients undergo invasive procedures. So these patients are usually prescribed broad spectrum antimicrobial agents. The widespread use of broad spectrum antibiotics has led to the emergence of several resistant strains of microbes. This contributes significantly towards rise in the health care costs and patient morbidity and mortality.[(2,3)]

Objectives

To study the antimicrobial drugs utilization pattern in medical ICU in a tertiary care teaching hospital.

Materials and Method

It was a retrospective and observational study, conducted during the period from March, 2016 to July, 2016. Data of 152 patients was collected from the Central Record Section (CRS) of the hospital. The data was analyzed for demographic distribution, disease pattern and antimicrobial drugs use.

Statistical analysis: The data was entered in MS Excel sheet and results were presented as tables and figures. Drug utilization data was presented as percentage.

Results

Total 152 patients were enrolled in the study. Out of 152 patients, males were 100 (65%) and females were 52 (35%). (Fig. 1).

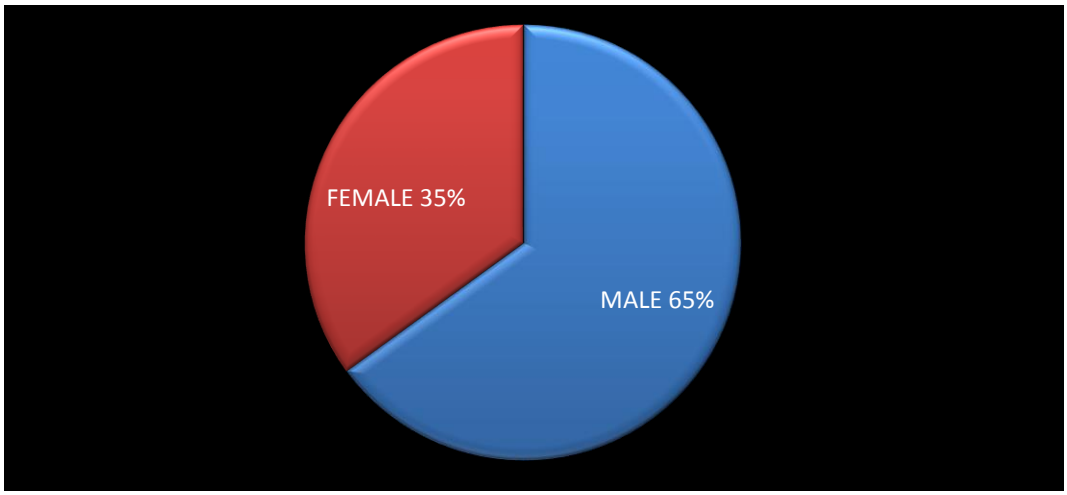

Fig. 1: Gender wise distribution of patients

The mean age of males was 58.72 ± 14.85 years and females was 62.52 ± 17.80 years. Maximum 42 (28%) patients were from the age group 61-70 years. **Age Wise Gender Distribution** most of the patients were in age group of 41 to 80 years (Fig. 2).

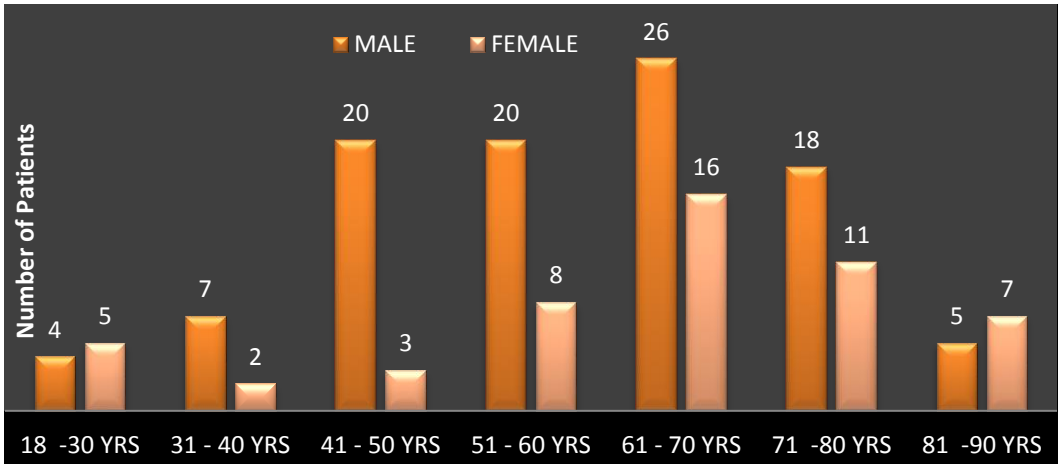

Fig. 2: Age wise gender distribution of patients

System Wise Morbidity diabetes and hypertension were most common co-morbidities in 77 cases (51%).
Disease Pattern: CVS system was affected in 121(80%), followed by respiratory system in 10 (6%), excretory system in 6 (4%), GIT in 4 (3%), CNS in 3 (2%) and others in 8 (5%) patients. (Fig. 3).

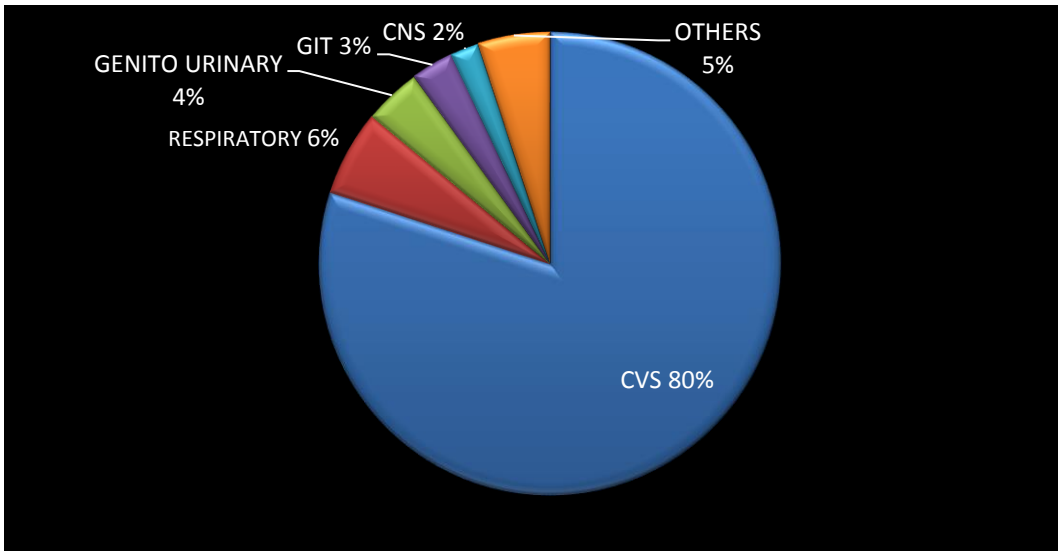

Fig. 3: System wise distribution of patients

Duration of Hospital Stay was 3 days in 115 patients, 4 to 7 days in 32 patients and more than 7 days in 5 patients. (Fig. 4).

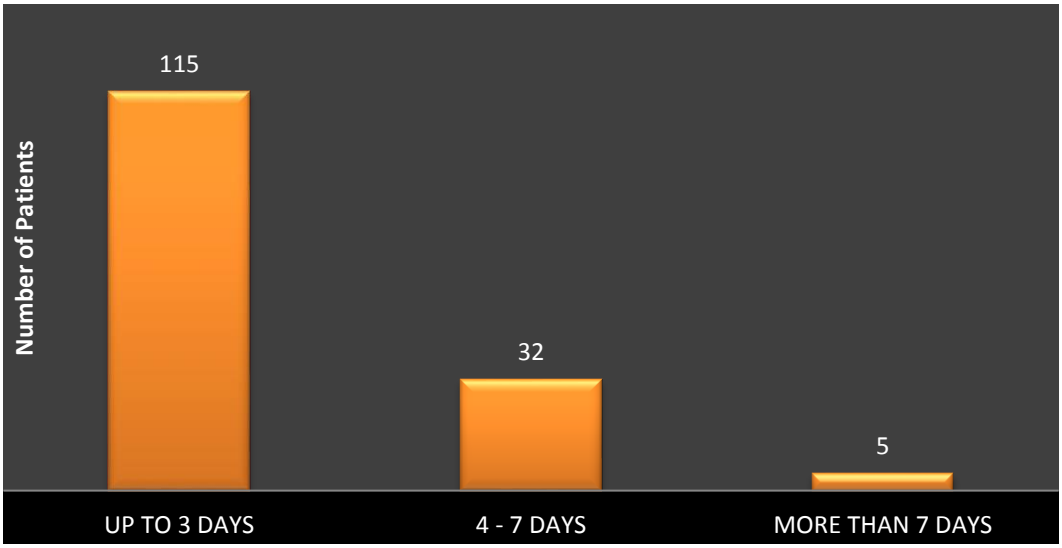

Fig. 4: Duration of hospital stay

Antimicrobials Prescription in 152 patients total of 131 antibiotics were used. Most commonly 3rd generation cephalosporins were prescribed in 43 patients, macrolides in 27 patients, quinolones in 9 patients, antianaerobics in 8 patients, tetracycline in 5 patients, oxazolidinones, aminoglycosides, antifungal and others in 2 patients each. (Fig. 5).

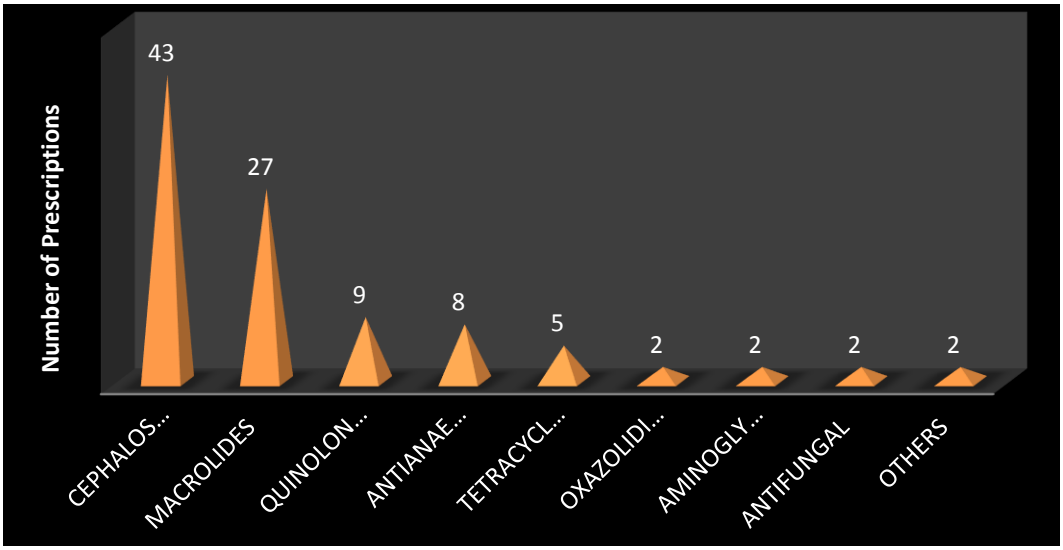

Fig. 5: Antimicrobial prescriptions

FDCs Prescription: Total of 31 (24%) FDCs were prescribed. They were piperacillin + tazobactam in 20 patients, amoxicillin + clavulanic acid in 5 patients, ceftriaxone + sulbactam in 3 patients, polymyxin B + bacitracin + neomycin in 2 patients and ofloxacin + ornidazole in 1 patient. (Fig. 6).

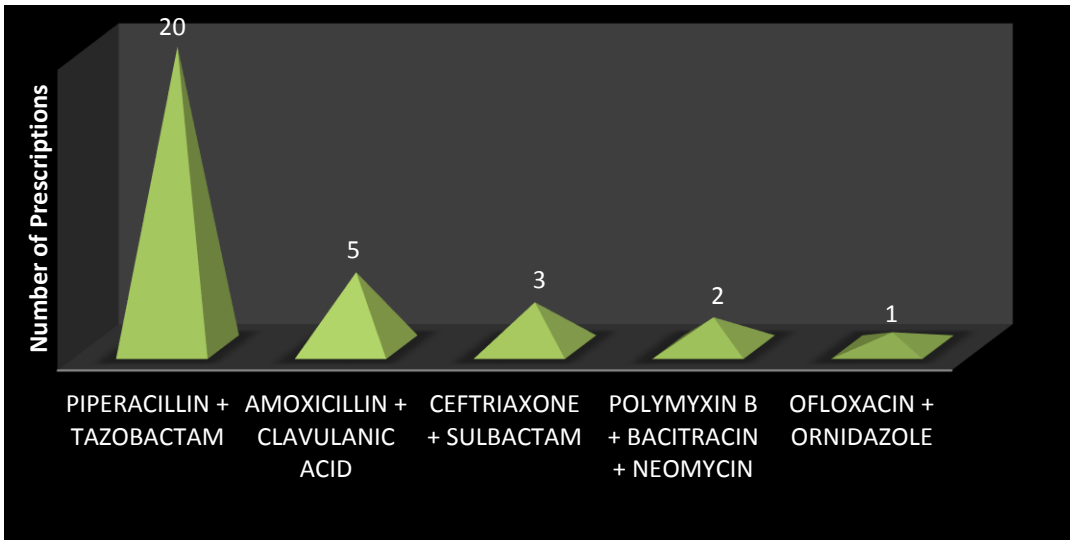

Fig. 6: FDCs prescription (n=31)

Outcome: 87 (57%) patients were referred, 55 (36%) patients were discharged and 10 (7%) patients left against medical advice (LAMA). (Fig. 7)

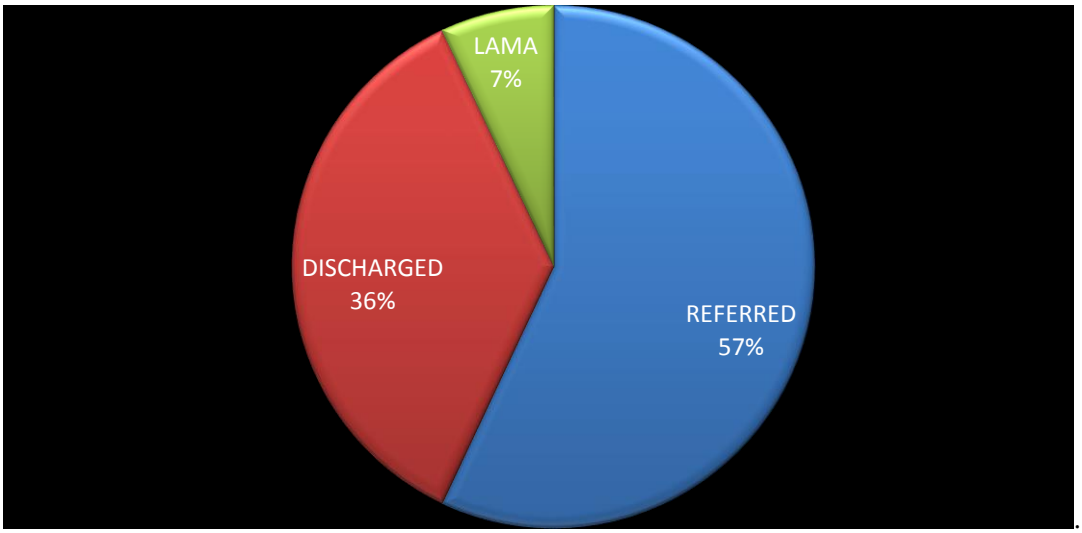

Fig. 7: Outcomes

Table 1: Antimicrobial prescription pattern

Class	Drugs Name	Number of Patients
3rd Generation Cephalosporins	Ceftriaxone (37)	(43)
	Cefixime (5)	
	Cefotaxime (1)	
Macrolides	Azithromycin	(27)
Quinolones	Ciprofloxacin (5)	(9)
	Levofloxacin (3)	
	Ofloxacin (1)	
Antianaerobes	Metronidazole	(8)
Tetracyclines	Doxycycline	(5)
Oxazolidinones	Mupirocin Linezolid	(2)
Aminoglycosides	Gentamicin	(2)
Antifungals	Fluconazole	(2)
Others	Rifaximin	(2)

Table 2: Fixed Dose Combinations (FDCs) prescription. (N=31)

FDCs	Percentage (%)
Piperacillin + Tazobactam	20 (64.51%)
Amoxicillin + Clavulanic acid	5 (16.12%)
Ceftriaxone + Sulbactam	3 (9.67%)
Polymyxin + Bacitracin + Neomycin	2 (6.45%)
Ofloxacin + Ornidazole	1 (3.22%)

Discussion

Most of the patients were from middle age group. This was similar to studies carried out in 2005 in Nepal[4] and Iran.[5]

Number of male patients was more as compared to female as reported by another study in ICU in an Indian setting[6] the reason may be that females are reluctant to utilize health care facilities even if they are critically ill; especially from the lower socio economic strata.

3rd generation cephalosporins were most commonly prescribed because they have augmented activity against gram –ve Enterobacteriaceae. Among the cephalosporins, ceftriaxone was most commonly prescribed; the reason may be its cost-effectiveness, broad spectrum coverage and low toxicity. Similar results are reported from studies done in medicine ICU in central India.[7]

Fluoroquinolones' antimicrobial spectrum includes E. coli, salmonella, shigella, Enterobacter, pseudomonas etc.[8]

In the FDCs piperacillin + tazobactam was commonly prescribed because of wide spectrum and efficacy in cephalosporin resistance.

Conclusion: All physicians must follow best clinical practice guidelines to minimize the antimicrobial resistance.

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Conflict of interest: None declared.

Ethical approval: The study was approved by the IEC vide letter No (No. IEC/10/2017).

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