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 + clavulamic 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).
The mean age of males was $58.72 \pm 14.85$ years and females was $62.52 \pm 17.80$ 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).

**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).
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).

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).
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).

Outcome: 87 (57%) patients were referred, 55 (36%) patients were discharged and 10 (7%) patients left against medical advice (LAMA). (Fig. 7)
Table 1: Antimicrobial prescription pattern

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

3rd generation cephalosporins were the 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.

**Funding:** No funding sources.

**Conflict of interest:** None declared.

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

**References**

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