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Original Research Article

Drug use evaluation and rational prescription audit of restricted antibiotics in tertiary care corporate hospital: An interventional study

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ABSTRACT

Introduction: Antimicrobial agent are the biggest contribution to 20th century, which are used to prevent and cure of the infections. Over use of antimicrobials has facilitated the development of resistance. Drug utilization research help in identification of clinical use of drugs in populations and its impact on healthcare system.

Aim: The aim of the study is to identify the overuse/misuse of the antibiotic usage in our intensive care unit. which helps in rationalising the antibiotic prescription and to avoid emergence of drug resistance and to improve better patient's outcome.

Material and Methods: An observational audit has been conducted in inpatient admitted in our set up and has been prescribed with restricted antimicrobials. The audit has been done for 3 months.

Result: The Audit report for 218 patients have been prescribed with Restricted antimicrobials either one or more than one. The audit report shows that Meropenem and Colistin was prescribed more often 81 and 73 respectively. Geriatric Patients have been prescribed more with Antimicrobials than other age groups. 193 patients were on single Restricted antimicrobial therapy, 24 patients were on dual restricted antimicrobial therapy and one patient was on more than 2 Restricted antimicrobial therapy. Out of 218 Prescription having Restricted Antibiotics, 39 prescription were found irrational.

Conclusion: A wide spectrum of clinical diagnoses and a variety of drugs were utilized from various antibiotic classes. Results showed that Carbapenems(Meropenem) antibiotics were extensively used in ICU. Among Colistin and Vancomycin was most commonly prescribed. Policy for rational usage of restricted antimicrobial agents in ICU should be implemented and education needs to be provided.

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1. Introduction

Drug utilization research was defined by World Health Organization in 1977 as "the marketing, distribution and usage of drugs in a society, with special emphasis on the resulting medical, social and economic consequences." A number of other terms or domains like epidemiology, pharmacosurveillance, pharmacoepidemiology, and

pharmacovigilance have been coined. The importance lies in understanding the relationship between the various domains for the effective utilization of this versatile tool.¹ Patient data collection can be used as a means of support for clinical audits by which actual use of drugs can be compared to national prescription guidelines or Hospital antibiotic stewardship policy or local drug formularies and also, this helps in the quality control.² Intensive Care Unit (ICU) patients are a heterogeneous group, who often suffer from severe illness, Immunity weakness, multiple

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organ dysfunction and coexisting medical disorders. These patients have high Morbidity and mortality and require a high level of intensive care.³ Antimicrobial agents are one of the frequently utilized drug classes in an ICU setting. Antimicrobial agents are prescribed very often inappropriately and also inadequately and thus in medical practice, they have become one of the highly abused drugs causing resistance.⁴ Patients in ICU were commonly prescribed multiple broad spectrum antibiotics. Patients with critical illnesses are vulnerable and exposed to multiple invasive procedures and are at higher risk of developing nosocomial infections. Antimicrobials are the most powerful and useful tools to manage these infections. Patients admitted to the Medical Intensive Care Unit (MICU) are seriously ill and are often suffering from chronic critical illnesses. These patients receive multiple medications from a variety of pharmacological classes due to various life threatening diseases.⁵ It is extremely important to evaluate and monitor the prescribing pattern of antimicrobials from time to time for enabling suitable modifications in prescribing patterns to increase the therapeutic benefits and also to decrease the adverse effects for optimizing the health care services.⁶ This widespread and indiscriminate use of antimicrobial agents inevitably has resulted in the emergence of antibiotic resistant pathogens. This practice of indiscriminate prescribing of AMAs also leads to ineffective and unsafe treatment, prolongation of illness, disease exacerbation, distress and harm to the patients. All these issues produced a great concern over the inappropriate and injudicious use of antimicrobial agents all over the globe.⁷ Increasing multidrug resistance with limited availability of newer agents to treat emerging multidrug-resistant clones.⁸ Knowledge of a ICUs most common bacterial isolates (Antibiogram) and their antibiotic susceptibility patterns facilitates effective empirical antibiotic therapy and supports decisions to restrict or reduce the clinical availability of certain antibiotics.⁹ Literature on antimicrobial use abroad and in India bears testimony to the widespread concern about the appropriate use of antimicrobial agents.¹⁰

The aim of the study is to identify the antibiotic usage in our intensive care unit which helps in rationalising the antibiotic prescription and to avoid emergence of drug resistance and to improve better patient's outcome.

2. Objective

1. To assess the prescribing patterns of restricted antimicrobial drugs.
2. Rationality of Restricted antimicrobial use in tertiary care hospital.

3. Materials and Methods

3.1. Study design

An Interventional Study

3.2. Study population

Inpatients

3.3. Study period

Three months

3.4. Inclusion criteria

All patients who were admitted in our tertiary care hospital

3.5. Exclusion criteria

Incomplete data or Restricted antimicrobial justification form not filled completely

3.6. Study tool

1. It was a interventional study with case records of patients admitted in our hospital set up who were prescribed with restricted antimicrobials.
2. Policy on Anti-microbial usage in the hospital.
3. All inpatients admitted to our hospital during the study period were included as the study population.

3.7. Data collection

The demographic and clinical treatment data of patients are collected in the following format

1. Patient's details
2. Total no of restricted antimicrobial agents prescribed in different units
3. Total no of classification in the restricted antimicrobial agents (AMAs)
4. Age wise prescribing frequency of antimicrobial agents (AMAs)

3.8. Rationality

1. (a) The therapy is considered rational if the antimicrobial use and its route of administration, dose, frequency and duration of use were considered appropriate for injection matching with patients indications.
- (b) Therapy is considered irrational if the antimicrobial was used without indication, prophylaxis under circumstances of unproven efficacy or by clearly inappropriate route, dose or preparation for that indication.

4. Statistical Analysis

The collected data were entered in Excel sheet and analyzed with Proportions.

5. Results

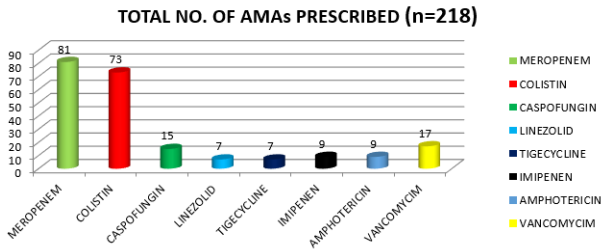


Fig. 1: Total No. AMAs Prescribed (n=218)

DEMOGRAPHIC DETAILS OF PATIENTS (n=218)

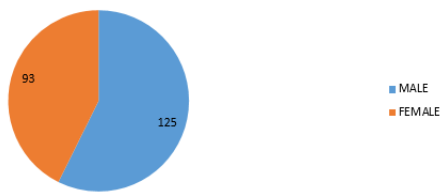


Fig. 2: Demographic details of patients (n=218)

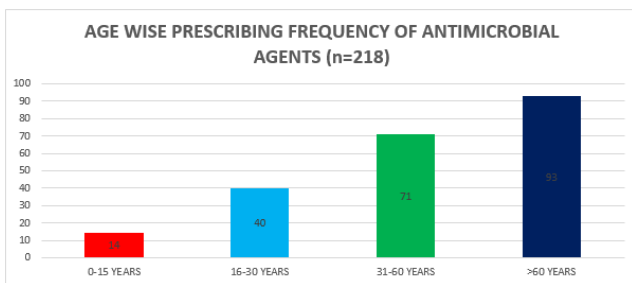


Fig. 3: Age wise prescribing frequency of antimicrobial agents (n=218)

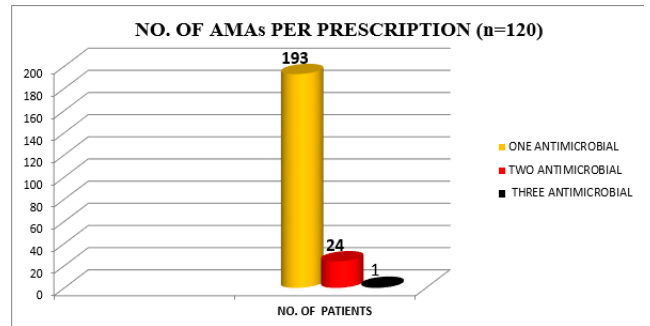


Fig. 4: No. of AMAs per prescription (n=120)

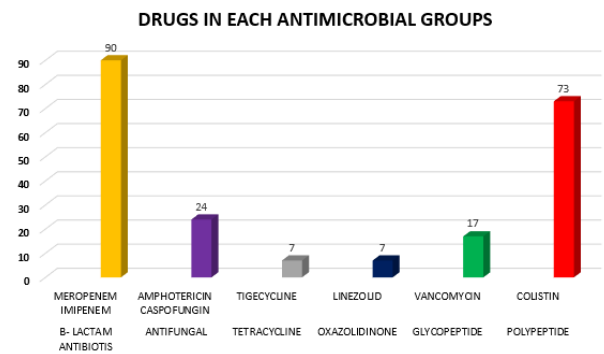


Fig. 5: Drugs in each antimicrobial groups

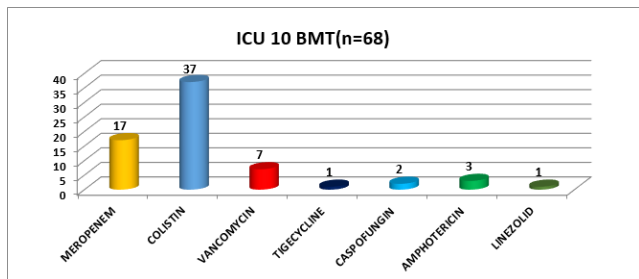


Fig. 6: ICU 10 BMT (n=68)

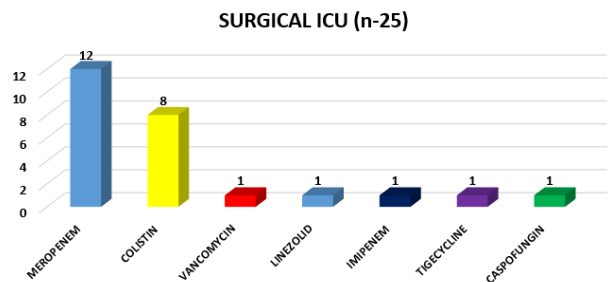


Fig. 7: Surgical ICU (n=25)

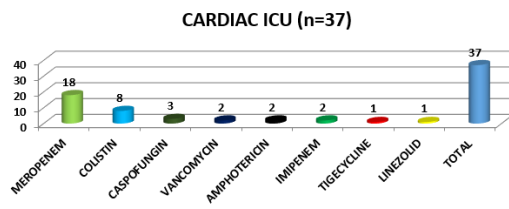


Fig. 8: Surgical ICU (n=39)

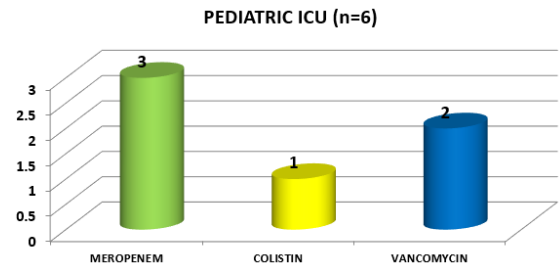


Fig. 13: Pediatric ICU (n=6)

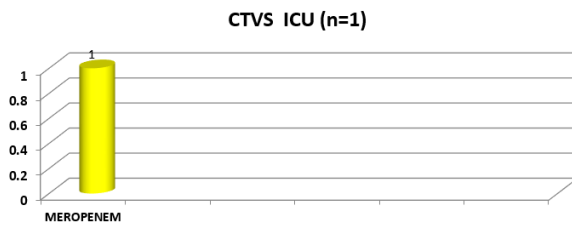


Fig. 9: CTVS ICU (n=1)

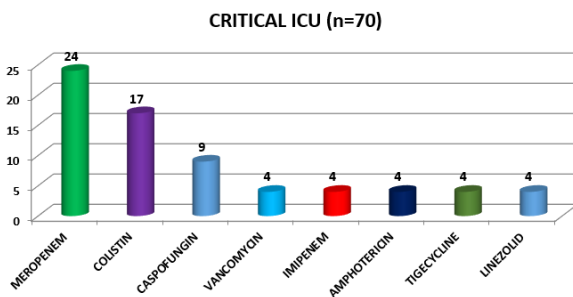
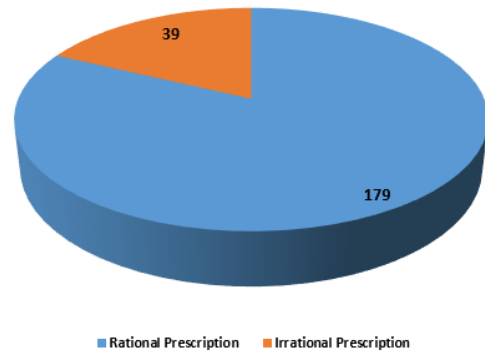


Fig. 10: Critical ICU (n=70)

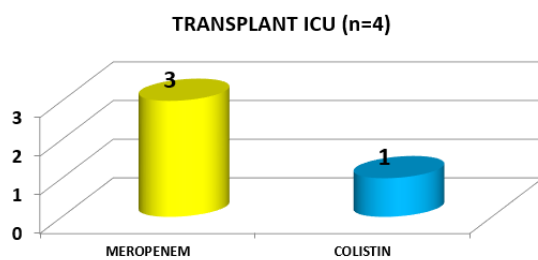


Fig. 11: Transplant ICU (n=4)

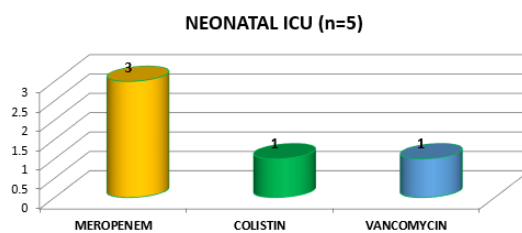


Fig. 12: Neonatal ICU (n=5)

6. Discussion

Restricted antimicrobials are the most frequently prescribed drugs among hospitalized patients especially in intensive care unit. The present study was a interventional study to monitor the antibiotic usage in the medical intensive care unit. Restricted Antimicrobials were extensively used in ICU to treat the complicated cases. Irrational prescription and polypharmacy of antimicrobial leads to emergence of drug resistance and therapy failure and increase the patient morbidity and mortality. Among all the prescribed drugs Crabapenem (Meropenem) were extensively prescribed in the ICU compared to the other group of antibiotics.

7. Conclusion

A wide spectrum of clinical diagnoses and a variety of drugs were utilized from various antibiotic classes. Results showed that carbapenems(Meropenem) was extensively used in ICU. Colistin and Vancomycin was most commonly prescribed after that. Rational usage of Restricted antimicrobial agents in ICU should be encouraged by Policy on Anti-microbial stewardship in the hospital.

This study was aimed to study the restricted antimicrobial usage and compliance audit. The result shows that the P-D-C-A Technique for rational prescription for antimicrobials needs to be strengthened by continuous training of prescribers. The consequences

of Antimicrobials resistance is serious, far reaching, and leading to global health crisis.

8. Source of Funding

None.


9. Conflict of Interest

None.

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