Research Article

ANALYSIS OF ANTIBIOTIC USAGE IN INTENSIVE CARE UNIT (ICU) IN A TERTIARY CARE HOSPITAL

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ABSTRACT

INTRODUCTION:
Over the past decade it has been seen that antibiotic use is rising internationally. Recent reports have shown that there is increased antimicrobial resistance in India. It is a well-known fact that antibiotic misuse has been implicated in clinical, economic and environmental burden; which in turn results in development of resistance.

OBJECTIVE:
This surveillance study was done with the objective of describing the antimicrobial prescribing practices in ICU using the WHO prescribing indicators.

METHODS:
This cross sectional study was conducted in the Medical Records Department of a tertiary care hospital in South India. Hundred prescribing encounters from ICU were collected in a random manner from January 2015 – December 2015. These encounters were analyzed using WHO Antimicrobial Use Indicators.

RESULTS:
In our study we found that 66% of the patients who was admitted to the hospital received at least one antibiotic. The average number of antimicrobials prescribed per hospitalization was 21.21%. The percentage of generic prescriptions was 61.35%. Only 73.09% of prescribed doses were administered. The average duration of hospital stay was 10.96 days. Antibiotic sensitivity testing was done in 40.90% of the hospitalized patients who were started on antimicrobials.

CONCLUSION:
The results of this study show that there is a need for strict vigilance of antimicrobial use. Standard treatment guidelines have to be formulated according to the prevalence of diseases and microbial resistance.

INTRODUCTION:

Antimicrobial agents have significantly reduced the burden of common infectious diseases and their use has become mandatory for many medical interventions. [1,2] Over the past decade it has been seen that antibiotic use is on the rise internationally. India ranked first in antibiotic consumption in the year 2010 followed by China. [3] Recent reports have shown that there is increased antimicrobial resistance in India. [4] There are many reasons for the soaring resistance, but studies have shown that both individual and aggregate use of antimicrobials is the contributing factor. [5,6] In India, the relatively few studies have been carried out so far and have reported proportions of prescriptions containing antibiotics varying from 26% [7] to as high as 80%. [8] It is a well-known fact that antibiotic misuse has been implicated in clinical, economic and environmental burden; which in turn results in development of resistance. The greater the volume of antibiotics consumed, more the chances that antibiotic-resistant populations of bacteria will prevail in the contest for survival of the fittest at the bacterial level. Hence this surveillance study was done with the following objectives.

AIMS & OBJECTIVES:

To describe antimicrobial prescribing practices in ICU of a tertiary care hospital using WHO
a) Prescribing indicators
b) Patient care indicators
c) Supplemental indicator

MATERIALS AND METHODS:

- Retrospective observational study.
- Sample size: 100 prescribing encounters (ICU).
- Place: Medical Records Department, Tertiary care hospital, South India.
- Duration: 1 year (January 2015 – December 2015).
- The prescribing encounters were analysed using WHO Antimicrobial Use Indicators.
- Exclusions of antimicrobial classes: Antitubercular drugs and Antiretroviral drugs used for HIV.

WHO Antimicrobial Use Indicators: [9]

A) *Prescribing Indicators*

Indicator 6. Percentage of hospitalizations with one or more antimicrobials prescribed
Indicator 7. Average number of antimicrobials prescribed per hospitalization in which antimicrobials were prescribed
Indicator 8. Percentage of antimicrobials prescribed consistent with the hospital formulary list*
Indicator 9. Average cost of antimicrobials prescribed per hospitalization in which antimicrobials were prescribed
Indicator 10. Average duration of prescribed antimicrobial treatment
Indicator 11. Percentage of patients who receive surgical antimicrobial prophylaxis for cesarean section in accordance with hospital guideline*
Indicator 12. Average number of doses of surgical antimicrobial prophylaxis prescribed for cesarean section procedures*
Indicator 13. Percentage of patients with pneumonia who are prescribed antimicrobials in accordance with standard treatment guidelines*
Indicator 14. Percentage of antimicrobials prescribed by generic name

B) *Patient Care Indicators*

Indicator 15. Percentage of doses of prescribed antimicrobials actually administered
Indicator 16. Average duration of hospital stay of patients who receive antimicrobials

C) *Supplemental Indicator*

Indicator 17. Number of antimicrobial drug sensitivity tests reported per hospital admission with curative antimicrobials prescribed
*Not applicable in this study

STATISTICAL METHODS:

Data were analyzed using Microsoft excel and expressed as descriptive statistics.

RESULTS:

In our study we evaluated hundred prescribing encounters in ICU.

Table 1: WHO Antimicrobial Use Indicators

S. No.	Indicator	Description	Study findings
1	6	Percentage of hospitalizations with one or more antimicrobials prescribed	66%
2	7	Average number of antimicrobials prescribed per hospitalization in which antimicrobials were prescribed	21.21%
3	8	Percentage of antimicrobials prescribed consistent with the hospital formulary list*	Formulary list not available

4	9	Average cost of antimicrobials prescribed per hospitalization in which antimicrobials were prescribed	₹ 8660.07
5	10	Average duration of prescribed antimicrobial treatment	76.71 days
6	11	Percentage of patients who receive surgical antimicrobial prophylaxis for cesarean section in accordance with hospital guideline*	No patients with cesarean section were encountered during the study period
7	12	Average number of doses of surgical antimicrobial prophylaxis prescribed for cesarean section procedures*	Not applicable
8	13	Percentage of patients with pneumonia who are prescribed antimicrobials in accordance with standard treatment guidelines*	No standard treatment guidelines for pneumonia are available
9	14	Percentage of antimicrobials prescribed by generic name	61.35%
10	15	Percentage of doses of prescribed antimicrobials actually administered	73.09%
11	16	Average duration of hospital stay of patients who receive antimicrobials	10.96 days
12	17	Number of antimicrobial drug sensitivity tests reported per hospital admission with curative antimicrobials prescribed	40.90%

DISCUSSION:

In our study we evaluated the use of antimicrobials in ICU of a tertiary care hospital in South India. It was found that 66% of all hospitalizations to ICU received at least one antibiotic during their stay in the hospital. The percentage of patients who received antibiotic is quite on the higher side, because the patients who get admitted to ICU are critically ill patients and the physicians tend to start empirical antibiotic therapy to prevent nosocomial infection.The average number of antimicrobials prescribed per hospitalization was 21.21%. This is in concordance with the WHO prescribing indicator standard (20.0% - 26.8%). [10] This shows that there is no overuse of antimicrobial agents.

In our study we found that the average cost of antimicrobial prescribed was ₹ 8660.07, which is high. This amount of monetary burden cannot be borne by the lower socio-economic class. This cost of therapy is a matter of concern only when therapy is sought in a private institution. The same may not be an issue when treatment is availed from a government hospital where the treatment is rendered without charging money.In our study we found that the average duration of antimicrobial prescribed was 76.71 days, which is very high for any antimicrobial treatment regimen. This could be because that the same patient may have received more than one antibiotic to aid his/her recovery.The percentage of antibiotic that was

prescribed by generic name was only 61.35%. This is much less than the WHO standard which is 100%. [10] The result of our study is in concordance with the study done by Sharma et al [11] in Jammu & Kashmir where the value was much lower, 5.13%.

Every antibiotic therapy has a prescribed regimen to be followed for maximum efficacy and to avoid the development of resistance. In our study we found that only 73.09% of the prescribed antibiotics were actually administered. The reason for the same could be any of the following: a) patient deceased due course of therapy b) patient was discharged due to any reason c) patient did not want the particular therapy d) inadequate documentation.We also found that sensitivity testing was done only for 40.90% of the patients who were admitted to ICU. It seems that the remaining patients were treated with empirical antimicrobial therapy. When facilities are available to check sensitivity of the antimicrobial agent, it should be done wherever applicable in order to minimize the development of resistance. It was found that the average duration of hospital stay was 10.96 days in our study.

CONCLUSION:

The results of this study show that there is a need for strict vigilance of antimicrobial use. Standard treatment guidelines have to be formulated according to the prevalence of diseases and microbial resistance. A hospital formulary has to be formulated for all the

government and private sector healthcare institution for optimal usage of the antimicrobial agents. This would further reduce the economic burden on the patients and also mitigate the adverse effects associated with its usage.

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