

Antibiotic utilization pattern in the emergency medicine ward of a tertiary health care centre: An observational study

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Abstract

Objective: Antibiotics are one of the most important discoveries in the field of medicine and are widely used in reducing the infections. The aim and objective of this study was to review utilization and assess the appropriateness of antimicrobial drug utilization in the medicine ward in a tertiary care hospital in Patna. This was a prospective observational study. Rationality of drug usage was also evaluated by analyzing the drug prescriptions.

Materials and Methods: The data on antibiotic containing prescriptions from each patient was collected from the inpatient department and study was carried out from April to Jun, 2018. The data was collected on antibiotics was subjected for descriptive statistical analysis.

Results: A total of 110 prescriptions were studied, out of which 69 (62.3%) prescriptions were mono therapy and 41(37%) prescriptions had multiple antibiotics. It was observed that out of 110 patients who were prescribed antibiotics, 61 were male (55.45%) and 49 were female (44.54%). The most commonly prescribed antibiotics were Ceftriaxone followed by ciprofloxacin and most of the prescriptions contained mono therapy.

Conclusion: National guidelines for the management of common infections are needed to minimize the overuse and misuse of antimicrobial agents in tertiary care hospitals. Rational prescribing of antibiotics avoids poly-pharmacy and prevents antibiotic resistances. A large surveillance study on antimicrobial prescribing appropriateness in different hospital settings is warranted and aimed at adverse drug reaction, emergence of bacterial resistance, minimizing unnecessary cost.

Keywords: Antibiotics, Drug utilization, Rational antibiotic use, Schedule H1.

Introduction

Poor prognosis of a situation, the main reason is infection. So adequate controlling of infections can prevent certain conditions which lead to mortality or morbidity which can be achieved by utilization of antibiotics. But unfortunately antibiotics also have effects. One is in treatment of infection; the other is the bacterial resistance. For a last decade, the problem of bacterial resistance is rising¹. This led to the utilization of fixed dose combinations with multiple antibiotics in order to have a good control on bacterial infection. Antibiotics most important discoveries in the field of medicine and are mostly used in reducing the bacterial infections². Antibiotic utilization is important as they are widely used drugs in treatment and health care and their inappropriate and excessive prescription and utilization in hospitals and health care facilities lead to the development of bacterial resistance³. The antibiotic use is very high in India and ranges from 24 to 67%⁴. Being the Asian country with highest burden of infectious disease in India has highest prescribing rate of antibiotic leading to their irrational and indiscriminate use which has resulted in increase in rate of antibiotic resistance⁵. For this purpose some guideline was published for the rational use of antibiotics are as follows⁶:

1. Prophylactic and empirical therapy of antibiotics should not be used unless and until in cases of emergency
2. Culture sensitivity tests of antibiotics should be done in order to avoid resistance.
3. Antibiotics are to be prescribed as per the spectrum of antibiotics

4. The dosage of antibiotics should be as per the patient conditions. A gradual increase in the dose is to be done in case if efficacy is not seen.
5. Parenteral therapy is advocated unless until it is necessary (where the patient is not able to take by oral route or in emergency conditions).

Following of the above guidelines minimizes the effects with respect to the antibiotic resistance. Antibiotic utilization analysis is a tool to improve the rationality in prescribing which helps in monitoring the drug efficacy and other factors related to patient safety. It also plays a key role in reducing the adverse drug events occurs due to excessive use of antibiotic in Indian community⁷. Our present study of drug utilization aims to analyses about the antibiotic utilization to identify prescribing practices in emergency conditions and also in promoting rational use of drugs in the community. The present novelty of the study is, it specifies the utilization of antibiotics in the emergency medicine ward in respective hospital, and thereby caution the health care personals is which improves rationality and individual treatment regimen.

Materials and Methods

This observational and prospective study looked at antimicrobial utilization data in tertiary care hospital. An Institutional Ethical committee clearance (Letter no. 21/Acad./ Date-08/01/2018) was obtained to conduct the research. This research was conducted in emergency medicine ward at Indira Gandhi institute of medical science, Patna, which is super specialty tertiary care hospital of

Bihar state. The data on antibiotic containing prescriptions from each patient was collected from the emergency medicine ward and study was carried out from April to Jun, 2018.

Data collection

The data of 110 eligible patients of emergency medicine ward was obtained from case records. Patient data was entered in a well-designed form manually which included the patient demographic data i.e. Gender of patient, age personal history, medication history as well as diagnosis, route of administration, duration of therapy, frequency, and indication. The data were analyzed by performing descriptive statistics. Data were analyzed by using the Microsoft Excel software.

The inclusion and exclusion criteria were as follows-

Inclusion criteria

1. Patients admitted in emergency medical ward from April 2018 to Jun 2018.
2. Patients visited in emergency medical ward from April 2018 to Jun 2018.
3. Patients of age more than 18 years of either sex.
4. Patients on antimicrobial therapy in emergency medical ward.

Exclusion criteria

1. Pediatric, pregnant patients and patients with co-morbid condition with or with complication were excluded during study.
2. Patients of age less than 18 years.

The manual forms of all patients who received at least one antibiotics were reviewed and evaluated by an expert infectious disease consultant on a daily basis. The rationality of antimicrobial use was evaluated, analyzed, and judged based on standard local and international guidelines, and the experience of the evaluating consultant who was blinded to the teams. The collected data was revived and analyzed by simple percentage method to conclude the study results⁸.

Results

The most age group treated by antibiotics were 30-50 year of age which accounts 34(30.90%). While the least age group treated by antibiotics were 18-30 year of age which account 19(17.27%). of the patients, 61(55.45%) were males and 49 (44.54%) were females (Table 1).

Table 1: Socio demographic characteristics of patients

Variables	Frequency	Percentage
Sex		
Male	61	55.45%
Female	49	44.54
Age		
18-30	19	22.72%
30-50	34	30.90%
50-60	24	21.81%
Above 60	27	24.54%

A total of 110 prescriptions were analyzed, Ceftriaxone followed by Ciprofloxacin and most of the prescriptions contained mono therapy. Total of 110 patients, out of which 156 antibiotic were prescribed whether single or in multiple during treatment in emergency medicine ward out of which 67(60.90%) prescriptions were single antibiotic (mono therapy) and 43(39%) prescriptions had multiple antibiotics. The most commonly prescribed antibiotics was Ceftriaxone 34(21.79%) followed by Ciprofloxacin 21(13.46%); Augmentin 19(12.17%) and Cephalexin was least prescribed only for 2(1.28%) patient as shown in table 2.

Table 2: Most commonly prescribed antibiotics in medical ward

Antibiotics Groups	Frequency	Percentage (%)
Ceftriaxone	34	21.79
Ciprofloxacin	21	13.46
Augmentin	19	12.17
Clarithromycin	16	10.25
Ceftriaxone	11	7.05
Ciprofloxacin	07	4.51
Penicillin	03	1.91
Cotrimoxazole	6	3.84
Gentamycin	4	2.56
Cephalexin	2	1.28
Gentamycin	05	3.20
Ampicillin	06	3.84
Other	22	14.10

According to this study Community acquired pneumonia (CAP) was the most commonly disease followed by Urinary tract infection (UTI) acute gastritis (AGE), Sepsis and Meningitis (Table 3).

Table 3: Antibiotic utilized for indication

Disease	Frequency	Percentage
CAP	29	26%
UTI	18	16%
AGE	16	15%
Sepsis	12	11
Meningitis	10	9%
Typhoid	07	6.4%
Cellulitis	06	5.5%
Septic rheumatic arthritis	04	3.7%
Other	7	6.3%

In the study collected prescriptions, 32.72%, were with two antibiotics, followed by single antibiotic prescriptions (32.72%) and 20% with three antibiotic and the remaining 13(11.81%) receive more than three antibiotics. 9.05% prescriptions were with 4-5 antibiotics. It was listed in the table 4 below.

Table 4: Antibiotic number in each patient

Category	No. of prescriptions	Percentage
Single antibiotic	36	32.72
Two antibiotics	40	36.36
Three antibiotics	22	20
More than three antibiotics	13	11.81

In this study, when we see the duration of hospitalization for 110 patients, 42(38.18 %) stay for 1-5 days, 35(31.8%) for 6-10 days, 16(14.54%) for 11-15 days, 12(10.9%) stay for 16-20 days and 5(4.5%) stay for more three weeks (21 days) in hospital.

In this study most of them prescribed in intravenous route (IV) route which account 51(32.6%), followed by IV+PO 23(34.1%), PO 19(34.1%) and IM 9(6.3%) (Table 5).

Table 5: Route of administration of antibiotics

Route	Frequency	Percentage
IV	51	32.6%
IV+PO	23	20.91%
PO	19	17.27%
IM	09	5.7%

The use of antibiotics in emergency medicine ward, it requires a regular review of the utilized drug regimen to maximize the benefit of the patient. In this study, of the total 110 antibiotic drugs utilized in emergency medicine ward, the prevalence of antibiotics use was 97(67.7%). The finding of this study on gender categorization was predominantly male population. Age wise distribution was examined and most of the antibiotic drug utilization 34(30.90%) were in the age group of 30-50 years followed by above 60 years 27(24.54%) and 50-60 years, 24(21.81%).

The reports on number of antibiotics utilized and stay duration was found statistically significant ($p=0.015$). Also compared number of antibiotics utilized with gender, age distribution and route of administration there was statistically significant.

Conclusions

National guidelines for the management of common infections are needed to minimize the overuse and misuse of antimicrobial agents in tertiary care hospitals. Rational prescribing of antibiotics avoids poly-pharmacy and prevents antibiotic resistances. A large surveillance study on antimicrobial prescribing appropriateness in different hospital settings is warranted and aimed at adverse drug reaction, emergence of bacterial resistance, minimizing unnecessary cost.

Conflicts of interest: None.

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