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RESEARCH ARTICLE

Evaluation of Prescribing Pattern and Rational Use of Antibiotics at Surgery Department in a Tertiary Care Teaching Hospital

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ABSTRACT

Antibiotics are medicines that fight bacterial infections in people and animals. They work by killing the bacteria or by making it hard for the bacteria to grow and multiply. An antibiotic is a type of antimicrobial substance active against bacteria and is the most important type of antibacterial agent for fighting bacterial infections. These medications were widely used in the treatment and prevention of infections. Hence, there should be combined effort from all the health-care professionals and pharmacist to diversify the prescribing pattern of antibiotics, ideally by formulating prescribing guidelines, to make the prognosis and therapy more effective and for the ultimate goal of welfare of patient. This study concluded that, the ANTIBIOTIC use was found to be reasonable and rational in all the cases, all the antibiotics were prescribed from inside the essential drug list.

Keywords: Antimicrobial, Antibiotic, Bacterial infection

INTRODUCTION

- An antibiotic is a type of antimicrobial substance active against bacteria and is the most important type of antibacterial agent for fighting bacterial infections.
- A limited number of antibiotics also possess anti-protozoal activity.
- These medications were widely used in the treatment and prevention of infections.
- They may either kill or inhibit the growth of microorganisms at very low concentrations.

Classification

- Based on mode of action.
- Based on spectrum of action.
- Based on mechanism of action.
- Based on chemical structure.

List of common diseases in surgery ward during the study period

- Appendicitis.
- Diabetic foot ulcer.
- Cellulitis.
- Gangrene.
- Hernia

Prescription pattern monitoring study (PPMS)

- PPMS is a method to analyze the prescribing, dispensing and distribution trends of medicine in health-care setting.
- They help to assess the need for modifications in the prescribing habit thus making the

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prescribing rational and cost effective. It helps in preventing the abuse or misuse of drugs.
- Prescription pattern explain the extent and profile of drug use, trends quality of drugs.

Rational use of antibiotics

- Antibiotics are most commonly prescribed drugs their therapeutic uses increasing the bacterial resistance.
- Irrational use of antibiotics is a common problem which leads to antibiotic resistance and adverse reactions, it is necessary to take several steps to improve the appropriate use of antibiotic.
- Appropriate antibiotic selection can reduce the both cost and resistance to the patient.
- When the patient receives medications tailored to their individual clinical requirements, with proper dose, frequency, and duration then it could be regarded as rational use of medicines.

Antibiotic resistance

- Antibiotics today are one of the most commonly prescribed drugs in the world.
- Indiscriminate and improper prescribing of antibiotics have led to emergence to antibiotics and organisms which are resistant to the drugs.
- Inappropriate choice of drug and dose contribute to the problem.
- Lack of proper adherence to prescribing guidelines and increased self-medication is contributing to this problem in developing countries.
- The World health organization (WHO) strongly recommends that governments focus control and prevention efforts.
- WHO/international network for rational use of antibiotics developed drug use indicators (core drug use indicators) to measure the rational use of drugs in primary care.
    1. Prescribing indicators: Rational prescribing, therefore, involves a right decision of the prescriber.
    2. Patient care indicators: This will eventually encourage the patient to take medication and comply with the prescription
    3. Health facility indicators: This will reduce ineffective and unsafe treatment prolonging illness, distress, and harm to the patient at higher cost.
- Promoting the rational use of medicines would definitely help mankind to fight the disease and the illness for a better tomorrow

METHODOLOGY

Study design[1-4]

The study was prospective observational study at the Department of General surgery, Narayana Medical College and Hospital, Chinthareddy Palem, Nellore.

Study site

This study was conducted at the Department of general surgery, Narayana Medical College and Hospital, Chinthareddy Palem, Nellore.

Study period

The study was conducted over a period of 6 months

Study population

The study was done in 150 patients.

Study procedure

The data were collected from the patient's case sheets using:
- Data collection form (Annexure-I)
- Patient informed consent form (Annexure-II).

Study criteria

Patients are enrolled in to the study, based on inclusion criteria and exclusion criteria.

Inclusion criteria

The following criteria were included in the study:
- Patient's undergone surgery.

- Post-operative patient's.
- Age >18 years.
- Hospitalized for complications.
- Patients who are infected by microbial contamination.
- Patients who are having diabetic wound infection.

Exclusion criteria

The following criteria were excluded from the study:[5-8]

- Patient of age below 18 years.
- Pregnant and lactating women.
- ICU patients.

RESULTS

Patient distribution based on gender

S. no	No. of patients (%)	No. of Male patients (%)	No. of Female patients (%)
1	150 (100)	77 (51.3)	73 (48.7)

Patient distribution based on age groups

S. no	Age group of patients	Total no. of male patients	Total no. of female patients	Total No. of patients (*n*=150)
1	21–30	12 (8%)	10 (6.6%)	22
2	31–40	7 (4.7%)	10 (6.6%)	17
3	41–50	11 (7.4%)	16 (10.6%)	27
4	51–60	27 (18%)	16 (10.6%)	43
5	61–70	15 (10%)	12 (8%)	27
6	71–80	5 (3.4%)	6 (4%)	11
7	81–90	0	3 (2%)	3

Patient distribution based on disease

S. no	Disease	No. of Male patients	No. of Female patients	Total No. of Patients (*n*=150)
1	Cellulitis	29 (19.34%)	25 (16.66%)	54
2	Hernia	16 (10.66%)	17 (11.33%)	33
3	Appendicitis	9 (6%)	12 (8%)	21
4	Gangrene	6 (4%)	6 (4%)	12
5	Diabetic foot ulcer	14 (9.34%)	16 (10.66%)	30

Patient distribution based on type of drug regimen

S. no	Drug regimen	No. of patients (*n*=150)	% of patients
1	One antibiotic	73	48.7
2	Two antibiotics	59	39.3
3	Three or more than three antibiotics	18	12

Distribution based on percentage of most common prescribed antibiotics

S. no	Drug and Percentage	Drug	% of prescription
1	Penicillins (56.47%)	Amoxicillin	23.91
		Piperacillin	3.17
		Clavulanic acid	23.91
		Sulbactam	2.31
		Tazobactam	3.17
2	Cephalosporins (16.99%)	Cefotaxime	2.3
		Cefixime	2.59
		Ceftriaxone	4.6
		Cefoperazone	7.5
3	Aminoglycosides (2.87%)	Amikacin	2.59
		Gentamicin	0.28
4	Quinolones (3.44%)	Ciprofloxacin	2.35
		Levofloxacin	0.28
		Ofloxacin	0.86
5	Antiamoebics (14.69%)	Metronidazole	14.41
		Ornidazole	0.28
6	Lincosamide (3.17%)	Clindamycin	3.17
7	Tetracycline (1.15%)	Doxycycline	1.15
8	Anthelmintics (0.86%)	Albendazole	0.86
9	Carbapenems (0.28%)	Meropenem	0.28

Distribution based on antibiotics prescribing pattern

S. no	Drug regimen	No. of patients	% of patients
1	Single therapy	116	77.3
2	Dual therapy	34	22.7

Distribution based on combination of antibiotics

S. no	Combination of antibiotics	No. of prescriptions	% of prescriptions
1	Amoxicillin+Clavulanic acid	83	71.5
2	Cefoperazone+Sulbactam	17	14.5
3	Ceftriaxone+Sulbactam	8	0.7
4	Piperacillin+Tazobactam	8	0.7

Distribution based on percentage of antibiotics prescribed for male and female patients

S. no	Antibiotics	No. of drugs Prescribed to Males (%)	No. of drugs Prescribed to Females (%)
1	Penicillins	128	91
2	Cephalosporins	26	34
3	Antiamoebics	16	35
4	Quinolones	4	8
5	Lincosamide	3	8
6	Aminoglycosides	5	5
7	Tetracyclines	2	2

8	Anthelmintics	1	2
9	Carbapenems	0	1

Distribution based on age-wise prescribing frequency of antibiotics in male and female patients

Age group	Penicillins	Cephalosporins	Antiamoebics	Quinolones
21–30	14	14	15	4
31–40	13	8	7	1
41–50	22	13	12	1
51–60	38	11	9	4
61–70	25	12	5	1
71–80	8	1	2	1
81–90	3	1	0	0

Lincosamide	Aminoglycosides	Tetracyclines	Anthelmintics	Carbapenems
1	2	0	0	1
2	2	0	0	0
2	4	0	0	0
4	2	2	3	0
1	0	2	0	0
1	0	0	0	0
0	0	0	0	0

Distribution based on route of administration of antibiotics

S. no	Route of Administration	No. of Patients	% of patients
1	Parenteral	118	78.7
2	Oral	32	21.3

Therapeutic outcome based during the study

S. no	Therapeutic outcome	No. of patients	% of patients
1	Controlled	91	60.7
2	Cured	59	39.3

DISCUSSION

- Antibiotic resistance is a global threat to developing countries.[9,10] Prescribing pattern of drugs reflects the attitude of the physicians. Antibiotics are supposed to be considered as the second most commonly prescribed drugs in the world. A majority of infectious diseases can be treated with antibiotic therapy. As the antibiotic drug resistance is on the raise there is need for taking steps to promote rational antibiotic use. It is necessary to take action improve prescribing habits to reduce the unnecessary usage of antibiotics thus enhance rational antibiotic use.
- In this study, antibiotic prescriptions of patients in tertiary care teaching hospital were studied. Total 150 patients, patient disseminated according to gender. Male patients were higher than female as they were 77 (51.3%), than female as they were 73 (48.7%).
- In the present study, number of patients belonged to the age group of 21–30 years and followed by 31–40 years and so on, may be due to the lifestyle were more probable to be ill. Majority of 43 (28.6%) patients were found in between 51 and 60 years, followed by 27 (18%) in 41–50 years and 61–70 years, 22 (14.6%) in 21–30 years, 17 (11.3%) in 31–40 years, 11 (7.3%) in 71–80 years, and 3 (2%) in 81–90 years.
- Out of 150 patients included for the study, 54 (36%) patients had cellulitis, 33 (22%) patients had Hernia (Epigastric, Umbilical, Inguinal, and Incisional), 30 (20%) patients had Diabetic Foot Ulcer, 21 (14%) patients had Appendicitis, and 12 (8%) patients had Gangrene (Dry and Wet).
- In the present study, among 150 patients, 73 (48.7%) patients received one antibiotic, 59 (39.3%) received two antibiotics, and 18 (12%) patients received three or more than three antibiotics. This indicates that to reduce resistance single antibiotic was prescribed more.
- Among all group the most common antibiotics, Penicillins was found to be prescribed to the largest percentage (56.47%) of patients, followed by Cephalosporins (16.99%), Antiamoebics (14.69%), Quinolones (3.44%), Lincosamide (3.17%), Aminoglycosides (2.87%), Tetracycline's (1.15%), Anthelimintics (0.86%), and Carbapenems (0.28%). This indicates that trend of Penicillins shifting upward which may be due to more availability. Penicillins usage is more in 51–60 age groups followed by 61–70 age groups.
- In this study, 77.3% of patients were treated with a single antibiotic therapy and the other 22.7% of patients were treated with combination of two antibiotics (mainly Amoxicillin + Clavulanic acid).
- Out of 150 cases, four different combinations of antibiotics had been prescribe, out of

which Amoxicillin + Clavulanic acid (71.5%) was the most commonly prescribed regimen followed by Cefoperazone + Sulbactam (14.6%), Ceftriaxone + Sulbactam (0.7%) and Piperacillin + Tazobactam (0.7%).

- Furthermore, the present study revealed that the percentage of penicillins prescribed to male (52.03%) were much higher than female (37%), whereas percentage of Cephalosporins, Antiamoebics, and Quinolones prescribed to female were much higher than males.
- In the current study also reflect younger and adult patients (21–30, 41–50, and 51–60) were commonly associated with the highest prescribed antibiotics in both male as well as female patients.
- Majority of the 118 (78.7%) patients in our study was prescribed antibiotics by the parenteral route and 32 (21.3%) patients were prescribed by oral route.
- In terms of therapeutic outcome, two categories - controlled, cured were classified and found that most of the patients 91 (60.7%) in our study had their diseases controlled and 59 (39.3%) patients were cured, respectively.

CONCLUSION

- From this study, we concluded that, prescription of PENICILLINS was high in the study area, which might also contribute to anti-microbial resistance.
- Hence, there should be combined effort from all the health-care professionals and pharmacist to diversify the prescribing pattern of antibiotics, ideally by formulating prescribing guidelines, to make the prognosis and therapy more effective and for the ultimate goal of welfare of patient.
- This study concluded that the ANTIBIOTIC use was found to be reasonable and rational in all the cases, all the antibiotics were prescribed from inside the essential drug list.

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