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Sushanta Kumar Das
Associate Professor & Coordinator, Department of Pharm. D, (Attached with Gandhi Medical College & Hospital), CMR College of Pharmacy, Medchal, Hyderabad, Telangana, India

Dr. J Satyanarayana
Professor and Head, Department of Orthopedics, Gandhi Medical College & Hospital, Secunderabad, Telangana, India

Corresponding Author:
Dr. J. Satyanarayana
Professor and Head, Department of Orthopedics, Gandhi Medical College & Hospital, Secunderabad, Telangana, India

A prospective observational study on Antibiotic prescription and their switch pattern in various orthopedic wounds in a tertiary care teaching hospital

Sushanta Kumar Das and Dr. J Satyanarayana

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Abstract
Introduction: Orthopedic wounds are traumatic wounds due to hard and/or soft tissue trauma. Antibiotics are most commonly and frequently prescribed drugs for long periods in orthopedic department. Use of antibiotics depends on clinical need of patient, known sensitivities to infecting organism and also depends on the evidence gathered by the orthopedic surgeons throughout their clinical practice. Hence our study aimed to identify various antibiotics prescribed in the orthopedic wound and also to highlight the switch patterns of these antibiotics.
Methodology: A prospective observational study was conducted for a period of eight months; data was collected and analyzed according to inclusion and exclusion criteria and ANOVA was applied to obtain the statistical outcome of results.
Discussion: Out of total 115 cases, Closed fractures (44.34%) and Open fractures (41.74%) had high incidence. Total 17 antibiotics were prescribed for 365 times, with Cefotaxime (25.50%), Cefuroxime (17.8%) and Amikacin (14.52%) were most frequent. 9 Different types of drug switches (1-1, 1-2, 1-3, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3) were present in the study which are mainly due to antibiotic resistance & sensitivity, wound status (size, severity, type) and type of micro organism to obtain better therapeutic outcome.
Conclusion: Our study concludes that, frequency of antibiotic(s) prescription is quite high in the department. Furthermore lack of serology assay makes it difficult to choose appropriate antibiotic and leads to increased number of antibiotic switch. This study highlights 5, 6 & even 7 antibiotics per case also. A systemic approach must be initiated to streamline the appropriate antibiotic prescription and a standard antibiotic guideline for the department must be formulated.

Keywords: Orthopedics, wound healing, antibiotics, switch

Introduction
A wound can be described in various ways; by etiology, anatomical location, acute or chronic type, method of closure, along with presenting symptoms or definitely by the form of the predominant tissue types in the wound bed. All descriptions are necessary with a critical purpose for the assessment and proper management of the wound with symptom resolution and healing. A wound by true definition is a breakdown in the protective function of the skin; the loss of continuity of epithelium, with or without loss of underlying connective tissue (i.e. muscle, bone, nerves) following injury to the skin or underlying tissues/organs caused by surgery, a blow, a cut, chemicals, heat/cold, friction/shear force, pressure or as a result of disease, such as leg ulcers or carcinomas [1]. Wound healing is body's response to injury; in an attempt to restore normal structure and functions which involves mainly two processes: – regeneration and repair [2].
Orthopedic wounds are a form of traumatic wounds with or without need of surgical intervention and occurs in response to hard and/or soft tissue trauma which includes; bone, muscle, ligament and tendons trauma. The most common orthopedic wounds include:

- Infection with discharge (Osteomyelitis & post operative osteomyelitis).
- Fractures (Open & closed).
- Surgical (Implants, prosthetics, amputation and non implant surgery like deformity correction).

Antibiotics are most often and frequently prescribed medicine for longer duration in orthopedic department, antibiotics are prescribed both as prophylactic (before orthopedic surgical intervention) or to manage present infection [3]. Prophylactic antibiotics can reduce the risk of wound infection and have been regularly prescribed in orthopedic surgery for decades. Despite their extensive application, selection of antibiotics and their timing, duration of administration and switch to other group remain an unsolved question. The health economic costs associated with orthopedic wound infections are significant but sensible and suitable use of antibiotics can reduce this many fold [4]. Initial choice and switch of antibiotics depends on clinical need of patient as well as on known sensitivities of the infecting organism [3]. For a while the selection of antibiotic also depends on the experience and evidence gathered by the orthopedic surgeons throughout their clinical practice. Hence we want to identify various antibiotics prescribed in the orthopedic wound condition and also to highlight the switch patterns of these antibiotics in the department.

Methodology

This prospective case analysis study was conducted for a period of 8 months between August 2017 and March 2018 in Department of Orthopedics, Gandhi Hospital, Secunderabad with prior Approval from Institutional Ethical Committee, CMR College of Pharmacy and with necessary permission from Department of Orthopedics, Gandhi Hospital, Secunderabad. Selected Cases were collected and documented in a structured data compilation form from the in-patient department of orthopedics on a daily basis according to inclusion criteria, which includes; patient of all ages and both genders, cases diagnosed with various orthopedic clinical condition in which wound is positive & with definite antibiotic(s) prescription, patients for whom orthopedic implant, prosthetic, amputation or deformity corrections were planned or performed, Cases with complete information till discharge. Study exclusion criteria includes; patient diagnosed with non-wound orthopedic diseases and/or clinical condition like, rheumatoid arthritis, osteoarthritis, anterior cruciate ligament tear etc., cases with incomplete information or without a proper discharge summary, if patient do not want to participate in the study after describing the study process, HIV positive cases and if patient absconded or expired. A total of 115 cases with justified inclusion criteria were collected during the study period which was reviewed on a regular basis to update and further follow-up till discharge. Outcome was framed after interpreting the data gathered from case documentation forms; according to various category and parameters. Further results were discussed thoroughly with orthopedic surgeons in a regular manner to accomplish the outcome.

Statistics

The interpreted data were statistically analyzed by using 'Graph Pad Instat' software. ANOVA, Tukey-Kramer multiple comparison test and one sample T test were performed to analyze various parameters to obtain the statistical significance of each parameter [5].

Results

Table 1 shows the demographic details of the collected cases. Out of 115 cases, it indicates male predominance (87%) in this study. Maximum number of cases falls within the age group of 21-40 years (53.92%) followed by 41-60 years (27.82%) & up to 20 years (13.92%). Disease wise distribution indicates that maximum number of cases with fractures, both open (44%) and closed fracture (42%) have almost equal occurrence. Other conditions have very minor presence in the study. Figure 1, Figure 2 and Figure 3.

Table 2 indicates that Cefotaxime (25.50%) is the drug of choice in the orthopedic department followed by Cefuroxime (17.8%), Amikacin (14.52%), Metronidazole (11.8%), Amoxicillin-Clavulanic Acid (10.42%), Pipercillin-Tazobactum (8.5%), whereas Ceftriaxone and Cefixime were prescribed in limited cases and Gentamycin, Vancomycin, Ciprofloxacin, Azithromycin, Streptomycin, Imepenem, Faropenem, Meropenem and Clarithromycin were prescribed in very few cases.

Table 3 reflects the number of antibiotic(s) per case. It shows almost equal number of cases (approximately 30) has either 2, 3 or 4 Antibiotics prescribed; surprisingly 6 antibiotics were also prescribed in 8 cases and 7 Antibiotics in one case.

Table 4 indicates the antibiotic switch pattern, majority of antibiotic route switch was found to be parenteral – oral (85%). This table further indicates predominance in 1 switch of antibiotics (28.58%) followed by 2 switches (24.10%), 3 switches (20.53%), 4 switches (11.60%), 5 switches (6.26%), No switch (6.26%), 7 switches (1.78%) and 6 switches (0.89%).

Table 5.1 shows a Cefuroxime to Cefotaxime (19.6%) switch as the maximum number of 1-1 type of drug switch in antibiotics followed by Cefotaxime to Cefuroxime (12.88%), Cefotaxime to Amoxicillin-Clavulante (6.07%).

Table 5.2 indicates drug switch from Cefotaxime to Cefuroxime & Amikacin (25%) are the maximum, followed by Cefotaxime to Cefotaxime & Amikacin (12.50%), Ciprofloxacin to Ciprofloxacin &Metronidazole (12.50%) in 1-2 type of antibiotic drug switch.

Table 5.3 indicates the drug switch from Piperacillin-Tazobactam to Cefuroxime, Amikacin & Metroindazole is seen in two cases and the other switches are seen in only one case each in 1-3 type of antibiotic drug switches.

Table 5.4 indicates drug switch from cefuroxime & Amikacin to Cefuroxime (10.42%) as the maximum in 2-1 type of antibiotic drug switch.

Table 5.5 indicates drug switch from Ceftriaxone & Amikacin to Cefixime & Amoxicillin-Clavulanate is seen in two cases and the other switches are seen in only one case each in 2-2 type of switch.

Table 5.6 indicates drug switch from Cefotaxime & Metronidazole to Piperacillin - Tazobactam, Amikacin & Metronidazole is seen in two cases and the other switches are seen in only one case each in 2-3 type of switch.

Table 5.7 indicates drug switch from Cefotaxime, Metronidazole & Amikacin to Cefotaxime (30%) as the maximum in 3-1 type of antibiotic drug switch.

Table 5.8 indicates drug switch from Cefotaxime, Metronidazole & Amikacin to Cefotaxime & Metronidazole is seen in five cases and the other switches are seen in only one case each in 3-2 type of switch.

Table 5.9 indicates that all the drug switches are with equal percentages (25%) in 3-3 type of antibiotic switch.

Table 1: Demographic details of collected cases (n=115)

Gender categorization:			
S. No	**Gender**	**No. of Patients**	**Percentage (%)**
1	Male	100	87.0
2	Female	15	13.0

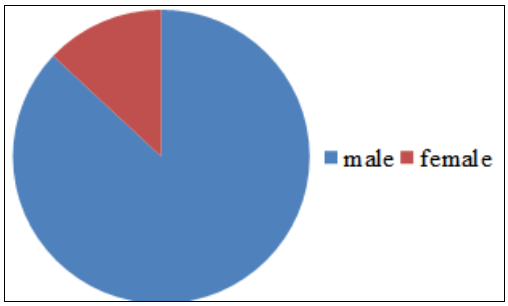

Fig 1: Demographic details of collected cases

Age wise distribution

S. No	Age (Yrs)	No. of Patients	Percentage (%)
1	Up to 20	16	13.92
2	21-40	62	53.92
3	41-60	32	27.82
4	≥ 60	05	4.34

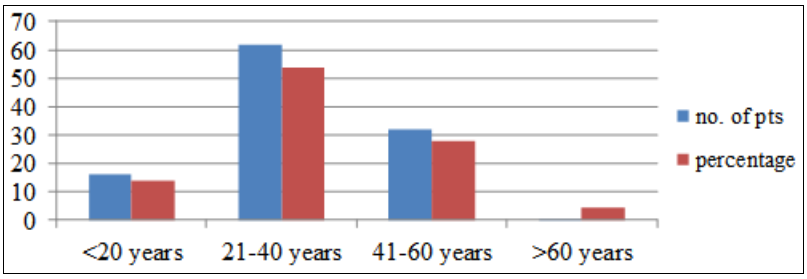

Fig 2: Age wise distribution

Distribution of cases based on various orthopedic wounds

S. No	Disease/Clinical condition	No. of cases	Percentage (%)
1	Closed fractures	51	44.34
2	Open fractures	48	41.74
3	Chronic osteomyelitis (OM)	06	5.22
4	Implants	04	3.48
5	Amputations	04	3.48
6	Acute osteomyelitis	02	1.74

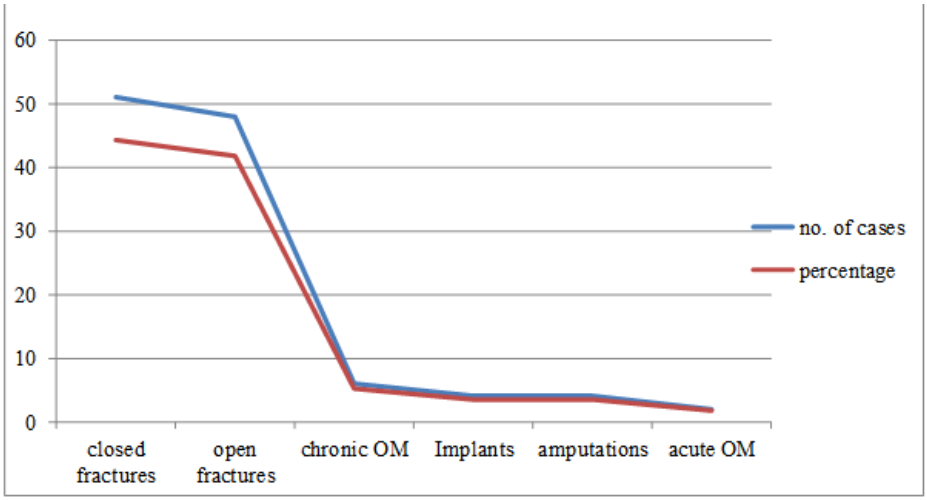

Fig 3: Distribution of cases based on various orthopedic wounds

Table 2: Distribution of total Antibiotics frequency prescribed in collected cases (n=365)

S. No	Name of Antibiotic	Frequency	Percentage (%)
1	Cefotaxime	93	25.50
2	Cefuroxime	65	17.80
3	Amikacin	53	14.52
4	Metronidazole	43	11.80
5	Amoxicillin-Clavulanic Acid	38	10.42
6	Pipercillin-Tazobactum	31	8.50
7	Ceftriaxone	18	4.93
8	Cefixime	10	2.73
9	Gentamycin	03	0.82
10	Ciprofloxacin	03	0.82
11	Vancomycin	02	0.54
12	Azithromycin	01	0.27
13	Streptomycin	01	0.27
14	Imepenam	01	0.27
15	Faropenem	01	0.27
16	Meropenem	01	0.27
17	Clarithromycin	01	0.27

Table 3: Number of Antibiotics prescribed per case (n=115)

S. No	No. of Antibiotic prescribed/Case	No. of cases	Percentage (%)
1	Only 1 Antibiotic	10	8.70
2	2 Antibiotics	28	24.34
3	3 Antibiotics	31	27.20
4	4 Antibiotics	32	27.80
5	5 Antibiotics	05	4.34
6	6 Antibiotics	08	6.95
7	7 Antibiotics	01	0.67

Mean - 3.278, SD - 1.367
SEM - 0.1275, P value - < 0.005

Table 4: Antibiotic switch distribution

Distribution based on frequency of parenteral – oral and oral - parenteral switch of antibiotics (n=164)			
S. No	**Type of switch**	**Frequency**	**Percentage (%)**
1	Parenteral-Oral	140	85.37
2	Oral-Parenteral	24	14.63
Distribution based on drug-drug switch of antibiotics in collected cases (n=115)			
S. No	**Type of switch**	**No. of cases**	**Percentage (%)**
1	No Switch	10	8.70
2	1 Switch	32	27.83
3	2 Switches	27	23.48
4	3 Switches	23	20.00
5	4 Switches	13	11.31
6	5 Switches	07	6.08
7	6 Switches	01	0.86
8	7 Switches	02	1.74
		Mean - 2.417, SD - 1.475	
		SEM - 0.1375, p value - < 0.05	

Table 5: Detail description of different types of Antibiotic switch

Table 5.1: 1 drug – 1 drug type of antibiotic switch (n=132)

S. No	Drug 1	Drug 1 switch	No. of switches	Percentage (%)
1	Cefuroxime	Cefotaxime	26	19.70
2	Cefotaxime	Cefuroxime	17	12.88
3	Cefotaxime	Amoxicillin-Clavulante	08	6.07
4	Piperacillin-Tazobactam	Cefotaxime	07	5.30
5	Cefuroxime	Amoxicillin-Clavulante	07	5.30
6	Cefotaxime	Cefixime	07	5.30
7	Ceftriaxone	Cefotaxime	04	3.03
8	Piperacillin-Tazobactam	Amoxicillin-Clavulante	04	3.03
9	Cefotaxime	Ceftriaxone	04	3.03
10	Cefixime	Amoxicillin-Clavulante	03	2.27
11	Piperacillin-Tazobactam	Ceftriaxone	03	2.27
12	Metroindazole	Amoxicillin-Clavulante	03	2.27
13	Amoxicillin-Clavulante	Cefotaxime	02	1.51

14	Vancomycin	Cefotaxime	02	1.51
15	Cefuroxime	Piperacillin-Tazobactam	02	1.51
16	Cefotaxime	Amikacin	02	1.51
17	Amikacin	Amoxicillin-Clavulante	02	1.51
18	Cefotaxime	Piperacillin-Tazobactam	02	1.51
19	Cefuroxime	Cefixime	02	1.51
20	Cefotaxime	Amoxicillin-Clavulante	02	1.51
21	Cefuroxime	Metroindazole	02	1.51
22	Cefixime	Cefuroxime	01	0.76
23	Cefuroxime	Amoxicillin-Clavulante	01	0.76
24	Metroindazole	Faropenem	01	0.76
25	Cefuroxime	Amoxicillin-Clavulante	01	0.76
26	Metroindazole	Cefuroxime	01	0.76
27	Cefuroxime	Vancomycin	01	0.76
28	Piperacillin-Tazobactam	Cefuroxime	01	0.76
29	Ceftriaxone	Amikacin	01	0.76
30	Cefuroxime	Amikacin	01	0.76
31	Cefixime	Ceftriaxone	01	0.76
33	Ceftriaxone	Cefixime	01	0.76
34	Azithromycin	Cefotaxime	01	0.76
35	Piperacillin-Tazobactam	Cefixime	01	0.76
36	Piperacillin-Tazobactam	Amikacin	01	0.76
37	Metroindazole	Piperacillin-Tazobactam	01	0.76
38	Ceftriaxone	Amoxicillin-Clavulante	01	0.76
39	Metroindazole	Piperacillin-Tazobactam	01	0.76
40	Amoxicillin-Clavulante	Cefixime	01	0.76
41	Cefixime	Cefotaxime	01	0.76
42	Ceftriaxone	Ciprofloxacin	01	0.76
43	Cefuroxime	Gentamycin	01	0.76

Table 5.2: 1 drug – 2 drug type of antibiotic switch (n=16)

S. No	Drug 1	Drug 1 + Drug 2 switch	No. of Switches	Percentage (%)
1	Cefotaxime	Cefuroxime + Amikacin	03	18.75
2	Cefotaxime	Cefotaxime + Amikacin	02	12.50
3	Ciprofloxacin	Ciprofloxacin + Metroindazole	02	12.50
4	Faropenem	Cefuroxime + Amikacin	01	6.25
5	Imipenem	Cefotaxime + Piperacillin-Tazobactam	01	6.25
6	Ceftriaxone	Piperacillin-Tazobactam + Metroindazole	01	6.25
7	Piperacillin-Tazobactam	Cefotaxime + Amikacin	01	6.25
8	Ceftriaxone	Ceftriaxone + Amikacin	01	6.25
9	Ceftriaxone	Cefotaxime + Amikacin	01	6.25
10	Cefotaxime	Amikacin + Cefuroxime	01	6.25
11	Cefixime	Cefotaxime + Amikacin	01	6.25
12	Cefotaxime	Cefuroxime + Metroindazole	01	6.25

Table 5.3: 1 drug – 3 drug type of antibiotic switch (n=4)

S. No	Drug 1	Drug 1 + Drug 2 + Drug 3 switch	No. of Switches	Percentage (%)
1	Piperacillin- Tazobactam	Cefuroxime + Amikacin + Metroindazole	02	50.0
2	Ceftriaxone	Cefotaxime + Amikacin + Cefixime	01	25.0
3	Cefuroxime	Cefotaxime + Gentamycin + Metroindazole	01	25.0

Table 5.4: 2 drugs – 1 drug type of antibiotic switch (n=49)

S. No	Drug 1 + Drug 2	Drug 3	No. of Switches	Percentage (%)
1	Cefuroxime + Amikacin	Cefuroxime	05	10.42
2	Cefotaxime + Metronidazole	Cefotaxime	05	10.42
3	Cefuroxime + Amikacin	Cefotaxime	04	8.39
4	Cefotaxime + Piperacillin-Tazobactam	Cefotaxime	03	6.25
5	Cefotaxime + Amikacin	Cefotaxime	03	6.25
6	Cefuroxime + Cefotaxim	Cefotaxime	02	4.20
7	Cefuroxime + Amikacin	Amoxicillin-Clavulanate	02	4.20
8	Cefotaxime + Amikacin	Cefixime	02	4.20
9	Ciprofloxacin + Ceftriaxone	Piperacillin-Tazobactam	01	2.08
10	Piperacillin-Tazobactam + Metronidazole	Cefotaxime	01	2.08
11	Cefotaxime + Amikacin	Cefixime	01	2.08
12	Piperacillin-Tazobactam + Metronidazole	Cefotaxime	01	2.08
13	Cefotaxime + Amikacin	Metronidazole	01	2.08
14	Amikacin + Metronidazole	Metronidazole	01	2.08

15	Cefuroxime + Metronidazole	Cefuroxime	01	2.08
16	Amoxicillin-Clavulanate + Metronidazole	Cefotaxime	01	2.08
17	Amoxicillin-Clavulanate + Cefotaxime	Amoxicillin-Clavulanate	01	2.08
18	Piperacillin-Tazobactam + Metronidazole	Cefuroxime	01	2.08
19	Piperacillin-Tazobactam + Amikacin	Cefotaxime	01	2.08
20	Ciprofloxacin + Metronidazole	Ciprofloxacin	01	2.08
21	Ciprofloxacin + Metronidazole	Cefuroxime	01	2.08
22	Ceftriaxone + Metronidazole	Ceftriaxone	01	2.08
23	Cefotaxime + Amikacin	Amoxicillin-Clavulanate	01	2.08
24	Ceftriaxone + Amikacin	Ceftriaxone	01	2.08
25	Cefixime + Metronidazole	Cefixime	01	2.08
26	Gentamycin + Vancomycin	Azithromycin	01	2.08
27	Ciprofloxacin + Cefotaxime	Cefotaxime	01	2.08
28	Ceftriaxone + Amikacin	Amoxicillin-Clavulanate	01	2.08
29	Ceftriaxone + Metronidazole	Cefixime	01	2.08
30	Cefuroxime + Metronidazole	Piperacillin-Tazobatam	01	2.08
31	Cefuroxime + Metronidazole	Cefotaxime	01	2.08

Table 5.5: Table 13: 2-2 Type of antibiotic switch (n=10)

S. No	Drug 1 + Drug 2	Drug 1 + Drug 2	No of Switches	Percentage (%)
1	Ceftriaxone+ Amikacin	Cefixime + Amoxicillin-Clavulanate	02	20.0
2	Cefotaxime + Amikacin	Metronidazole + Amoxicillin-Clavulante	01	10.0
3	Ceftriaxone + Metronidazole	Cefixime + Metronidazole	01	10.0
4	Ceftriaxone + Metronidazole	Gentamycin + Vancomycin	01	10.0
5	Cefotaxime + Amikacin	Cefotaxime + Amoxicillin-Clavulanate	01	10.0
6	Cefotaxime + Amikacin	Cefotaxime + Metronidazole	01	10.0
7	Metronidazole + Cefotaxime	Piperacillin-Tazobactam + Streptomycin	01	10.0
8	Ceftriaxone + Amikacin	Cefuroxime + Amikacin	01	10.0
9	Piperacillin-Tazobactam + Metronidazole	Cefotaxime + Piperacillin-Tazobactam	01	10.0

Table 5.6: 2 drugs – 3 drugs type of antibiotic switch (n=5)

S. No	Drug 1 + Drug 2	Drug 1 + Drug 2 + Drug 3	No of Switches	Percentage (%)
1	Cefotaxime + Metronidazole	Piperacillin-Tazobactam + Amikacin + Metronidazole	02	40.0
2	Cefotaxime + Metronidazole	Cefuroxime + Amikacin + Metronidazole	01	20.0
3	Cefotaxime + Amikacin	Ceftriaxone + Metronidazole + Ciprofloxacin	01	20.0
4	Piperacillin-Tazobactam + Streptomycin	Cefotaxime + Streptomycin+ Imepenem	01	20.0

Table 5.7: 3 drugs – 1 drug type of antibiotic switch (n=20)

S. No	Drug 1 + Drug 2 + Drug 3	Drug 1	No of Switches	Percentage (%)
1	Cefotaxime + Metronidazole + Amikacin	Cefotaxime	06	30.0
2	Cefuroxime + Amikacin + Metronidazole	Cefuroxime	05	25.0
3	Cefuroxime + Amikacin + Metronidazole	Cefotaxime	01	5.0
4	Amikacin + Metronidazole + Piperacillin - Tazobactam	Cefotaxime	01	5.0
5	Cefotaxime + Streptomycin + Imepenem	Imepenem	01	5.0
6	Amikacin + Metronidazole + Piperacillin - Tazobactam	Piperacillin- Tazobactam	01	5.0
7	Amikacin + Metronidazole + Piperacillin - Tazobactam	Metronidazole	01	5.0
8	Cefuroxime + Gentamycin + Metronidazole	Cefotaxime	01	5.0
9	Piperacillin-Tazobactam + Gentamycin + Metronidazole	Amoxicillin- Clavulante	01	5.0
10	Cefotaxime + Piperacillin-Tazobactam + amikacin	Piperacillin-Tazobactam	01	5.0
11	Cefotaxime + Piperacillin-Tazobactam + Metronidazole	Cefotaxime	01	5.0

Table 5.8: 3 drugs – 2 drugs type of antibiotic switch (n=10)

S. No	Drug 1 + Drug 2 + Drug 3	Drug 1 + Drug 2	No of Switches	Percentage (%)
1	Cefotaxime + Metronidazole + Amikacin	Cefotaxime + Metronidazole	05	50.0
2	Cefotaxime + Metronidazole + Amikacin	Amikacin + Metronidazole	01	10.0
3	Cefuroxime + Amikacin + Metronidazole	Metronidazole + Piperacillin-Tazobactam	01	10.0
4	Piperacillin-Tazobactam + Amikacin + Metronidazole	Amikacin + Metronidazole	01	10.0
5	Piperacillin-Tazobactam + Amikacin + Metronidazole	Amikacin + Piperacillin- Tazobactam	01	10.0
6	Cefuroxime + Amikacin + Metronidazole	Cefuroxime + Metronidazole	01	10.0

Table 5.9: 3 drugs – 3 drugs type of antibiotic switch (n=4)

S. No	Drug 1 + Drug 2 + Drug 3	Drug 1 + Drug 2 + Drug 3	No of Switches	Percentage (%)
1	Cefuroxime + Amikacin + Metronidazole	Piperacillin-Tazobactam + Amikacin + Metronidazole	01	25.0
2	Cefuroxime + Amikacin + Metronidazole	Cefotaxime + Amikacin + Metronidazole	01	25.0
3	Cefotaxime + Amikacin + Metronidazole	Cefuroxime + Amikacin + Metronidazole	01	25.0
4	Piperacillin-Tazobactam+ Gentamycin + Amikacin	Piperacillin-Tazobactam + Gentamycin + Metronidazole	01	25.0

Discussions

A total of 115 cases were identified, included and analyzed for the study from In-patient units of Department of Orthopedics, Gandhi Hospital, Secunderabad. From the study we observed that a total of 17 different types of Antibiotic were prescribed throughout the collected cases with total frequency of 365. Amongst them 3 antibiotics were prescribed repeatedly i.e., Cefotaxime, Cefuroxime and Amikacin which contradicts the result of previous study where Ceftriaxone was most prescribed antibiotic (62%) conducted by Das SK (2016) [6] in the same department. In our study, frequency of antibiotic prescription was found to be 365, which is quite a high number in terms of antibiotic, as antibiotic prescription should be precise and definite rather than trial & error method which was also reported by Leekha S (2011) [7] suggesting appropriate use, need and timing of Antimicrobials during the therapy. From our study it was found that male of 21-40 yrs age group are predominant and a total of 6 various orthopedic clinical conditions were documented, out of which; Fractures are higher in incidence. Both this findings were previously reported by Rajarathna K (2014) [8]. This may be the reason that male of this particular age group are frequently mobile with the use of personal transport (especially two-wheeler). From our study we found that number of Antibiotic prescribed per prescription are mostly 3 and 4, which was contradicted by Reji S (2015) [9] which reports Single Antibiotic use. From our study we observed that both oral and parenteral routes are preferred for administration of Antibiotic, similar finding was also reported by Ubedulla S (2013) [10] this is mainly due to initiation of antibiotics with IV route followed by switch to oral route once the effectiveness is established. From our study we observed that, parenteral to oral switch are predominant in Antibiotic administration, whereas oral to parenteral switch was. This is mainly due to severity of the condition and need of faster drug effect, once the condition gets stabilized or normalized, drugs switch to oral route. In this study we found that a total of 7 different drug switches per prescription, of which 1 drug switch per prescription was predominant this trend is also supported by – NHS policy **[11]**. 9 Different types of drug switches (1-1, 1-2, 1-3, 2-1, 2-2, 2-3, 3-1, 3-2, 3-3) are present in our study which are mainly done due to antibiotic resistance, sensitivity profile, wound status (Size, severity, type), culture sensitivity report, type of micro organism to obtain better therapeutic outcome as reported in Zhenjun (2002) [12].

Conclusion

Our study concludes that, frequency of antibiotic(s) prescription is quite high in the department. Furthermore lack of serology assay makes it difficult to choose appropriate antibiotic and leads to increased number of antibiotic switch. More than 3 antibiotics in a single case must be avoided to prevent antibiotic resistance but our study shows even 7 antibiotic per case also. A systemic approach must be initiated to streamline the appropriate antibiotic prescription and a standard antibiotic guideline for the department must be formulated with culture and sensitivity tests as a reference. Additionally clinical pharmacist should also play an important role to identify and report any prescription error to the concern doctor to improve patient outcome.

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