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Utilization pattern of AMA in orthopedic department in a tertiary care hospital

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Abstract---Bacteria are being unicellular and prokaryotes came to this earth before us and others. They are able to survive anywhere in this earth including soil, water both saline and normal, in all living creatures, hills, sands, ice of north and south poles, sea and desert. Some are helpful and commensals as they not harm us but many of them produce disease in which they survive, these are harmful bacteria, so called pathogenic or disease producing bacteria. Not only bacteria but also a lot of other organism are pathogenic like fungus, virus etc. but here we are limited to bacteria's only. Data's are collected by a self-prepared preformed proforma, which is prepared as per study design and includes Age, Sex, Disease, Unit, Ward, AMA or AMAs prescribed, Average no of AMAs, Dose, Frequency, Route of administration, along with Govt. supply or private purchase and supply chain. This study also focused wide spread drug resistance, mostly multiple drug resistance by many organisms, a matter of great concern along with a shocking challenge for present as well as for future.

Keywords---bacteria, resistance, antimicrobial, wards.

Introduction

Bacteria are being unicellular and prokaryotes came to this earth before us and others. They are able to survive anywhere in this earth including soil, water both

saline and normal, in all living creatures, hills, sands, ice of north and south poles, sea and desert.^[1] Some are helpful and commensals as they not harm us but many of them produce disease in which they survive, these are harmful bacteria, so called pathogenic or disease producing bacteria. Not only bacteria but also a lot of other organism are pathogenic like fungus, virus etc. but here we are limited to bacteria's only.^[2] They remain in colony along with family and friends. When a colony of bacteria reside in a place ex. Gut wall, they defend for their place of living by killing or driving out or not allowing other pathogenic species of bacteria or virus or fungus to dwell with them. This is called BIOSIS by ANTIBIOSIS. ^[3] This is by secreting chemicals called Antibiocins, Bacteriocins. When we collect these substances and use them to kill disease producing offending other bacteria or other microorganisms, we call them Antibiotics^[4] These Antimicrobial agents are many times also synthesized from chemical substances, or modifying structure of original antibiotics-- so all these things in together are called as chemotherapeutic agents or more specifically Antimicrobial agents-- AMAs. ^[5]

An early advocate of a 'germ theory of disease' was the Edinburgh surgeon Lister. Despite the protests of several colleagues who took offence at the suggestion that they might be infecting their own patients, Lister introduced carbolic acid as an antiseptic and sterilizing agent for operating theatres and wards. The improvement in surgical survival rates was significant.^[6] The discovery of antimicrobial agents is considered to be one of the ten great public health Achievements of the twentieth century. These agents have played a pivotal role in the management and control of infectious diseases and in the decrease in infectious disease related Mortalities. Initially, antibacterial were seen as truly miraculous drugs and considered the "panacea" of Medicine, but nowadays the evolution of drug-resistant organisms has greatly Impaired their therapeutic efficacy.^[7] Although antimicrobial resistance has been recognized since the earliest days of antibiotic therapy (it developed rapidly in some bacteria after the first use of penicillin), the process has accelerated and compounded during the last two decades and is now reaching alarming levels in certain pathogens and certain geographical regions. ^[8,9]

Aims and Objectives

To find out rationality of Anti-microbial use in different IPD wards such as ORTHOPEDICs of a tertiary care teaching hospital of eastern ODISHA- SCB.MC & HOSPITAL, CUTTACK, ODISHA

1. To find out the antibiotics commonly prescribed I various conditions.
2. To determine average number of AMA use for patients.
3. To find out judiciousness of combinations of AMAs.
4. To find out judiciousness of AMAs use by determining antibiotics prescribed irrationally and whether they prescribed in accordance to standard treatment guide line.
5. To compare antimicrobial prescriptions, to determine multiple antibiotic prescriptions and disease conditions in which they are prescribed.
6. To collect C/S report and see sensitivity and resistant pattern.
7. To locate AMAs change as per report,

8. To find out whether laboratory investigation were done before or after prescription of AMAs.
9. To find out supply chain management.
10. To find out Govt. supply or private purchase
11. To find out prescriptions in brand and generic name.
12. To find out ADRs in AMAs use.
13. To determine whether prescription was for treatment or for prophylaxis.

Material and Method

Methodology

Review of patient's folders, Asses drug availability from stores and pharmacy records, informal interview with prescribers, scrutiny of laboratory records and observations.

Study Design

Observational and Retrospective survey of AMAs usage.

Place of Study

Orthopedics WARDS of SCBMC & HOSPITAL, Cuttack

It is a 3-tier Medical College and Hospital, in eastern Odisha, providing wide variety of Diagnostics and Specialist OPD and IPD Services as well as Teaching faculty. More than half of Odisha state along with West-Bengal and Bihar, Jharkhand population depend on it.

Study Period----Sept.—2013--- Dec. 2015

Sampling

Data are collected from admitted patient's case sheets from ICUs, surgery, orthopedics and burn indoor wards. Data's are collected by a self-prepared preformed proforma, which is prepared as per study design and includes Age, Sex, Disease, Unit, Ward, AMA or AMAs prescribed, Average no of AMAs, Dose, Frequency, Route of administration, along with Govt. supply or private purchase and supply chain.

Proforma

Patients Name, age, sex, address	
Regd. No. Ward, unit' bed. No. unit head	
Disease Diagnosis	
AMA used Route, dose, Frequency, Duration	
Ward supply	

Yes or, no	
Market purchase Yes, or No	
Availability in ward Distribution point	
Availability in central store Ware house	
Availability in SDMU	
Changed AMA After C/S	

Inclusive Criteria

All Adult patients admitted Orthopedic ward. All prescriptions single or combination of AMAs is included. No age, sex, race, residence, addictions and habituations, socio-economic state, co-morbid condition, height, weight not taken into account, except weight, age and co-morbid conditions such as liver and renal failure taken to determine type and dose of AMAs.

Exclusion Criteria

Topical antibiotics, ointments, combination of antibiotics with steroids for local applications, ATT, HAART, Antineoplastic drugs, Antifungal antibiotics are not taken into study.

Data Collection

By a special self-prepared PROFORMA given above and IPC ADR form. (Indian pharmacopeia commission)

Datas Belongs To

- Patients Demography, addictions, habits
- Patients ward; unit etc.
- Diagnosis and condition of patient.
- Whether Microbiologic investigations, were done and confirmed prior to prescription.
- Whether prescriptions were for treatment or preoperative treatment or for prophylaxis.
- Single or multiple AMAs use.

Logic behind AMAs prescription and combination.

- 1 AMAs change after C/S.
- 2 Patient's compliance and result of treatment.
- 3 ADRs if any.
- 4 Death if any.

Utilization Pattern Of AMA in Orthopedic Dept. --- LIST—2.

Orthopedic Cases

- Coles
- Montazia
- Multiple, Traumatic
- RTA & Commentated Factice
- Frumoacture Shaft of the femur
- Fracture neck of the Femur
- Giant cell Tumor of the bone
- Osteoid osteoma
- Osteogenic sarcoma Femur , Tibia , Humorous
- Contractures
- Tendren transfer
- Tendo Achilles Rupture
- Post Traumatic elbow Arthrodesis
- Intra-condylar Fracture Elbow
- Recurrent Shoulder Dislocation
- Chronic Non healing ulcer with bone involvement
- Acute Osteomyelitis
- Chronic Osteomyelitis
- Parthoogical fractures
- Mal Union
- Non -Union
- Fracture of Rib
- Fracture of Rib with Inside chest Injury
- Pelvis Fracture
- Vertebral Fracture & Dislocations
- Others

Demographic Profile

Chart-1 : Age distribution pattern in orthopedic patients

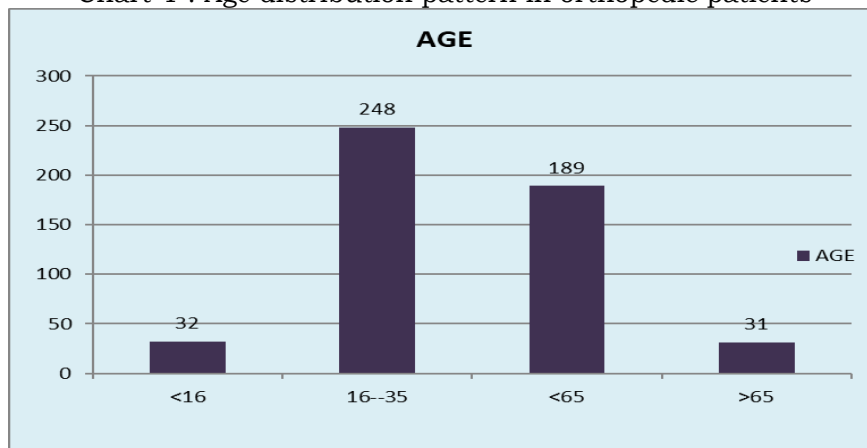


Chart-2 : Sex distribution of study population

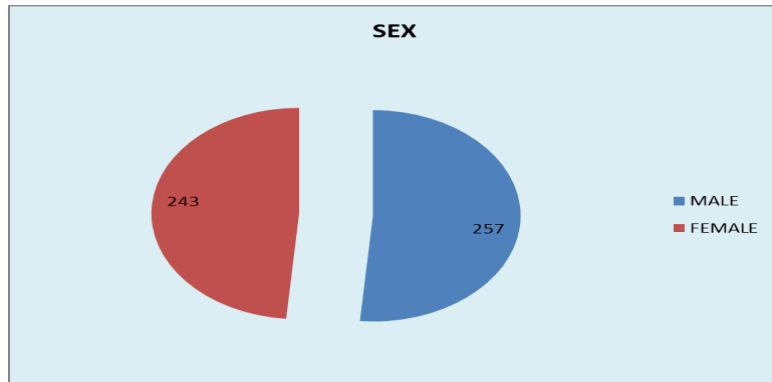


Chart 3 : Education status of orthopedic patients

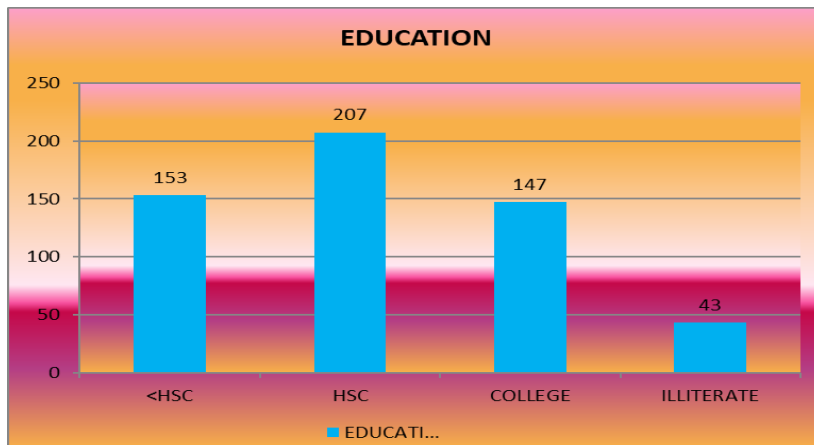


Chart-4 : Income and service particulars of orthopedic patients

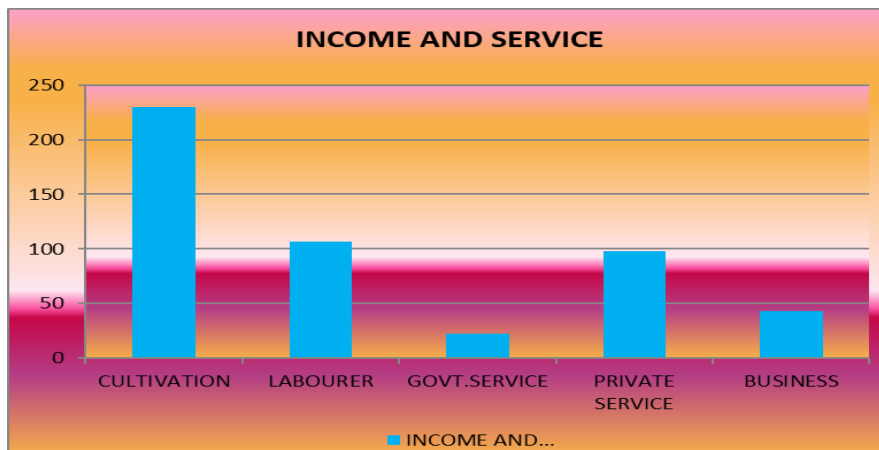


Chart-5 : Showing habits and addictions

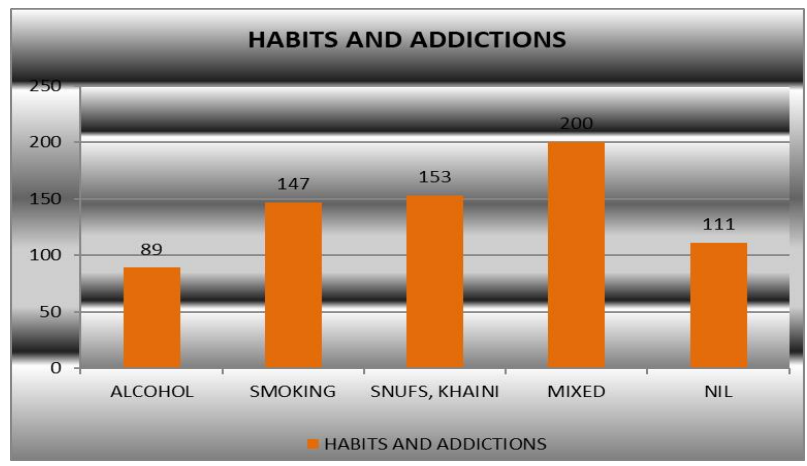


Chart-6 : Showing- presurgery treatment-ortho

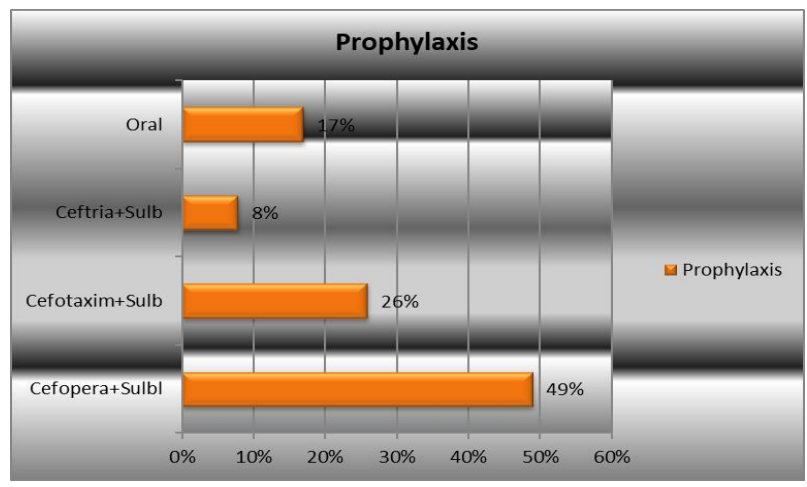


CHART-7: Presurgical AMAs used—prophylaxis and infection treatment in orthopedic ward

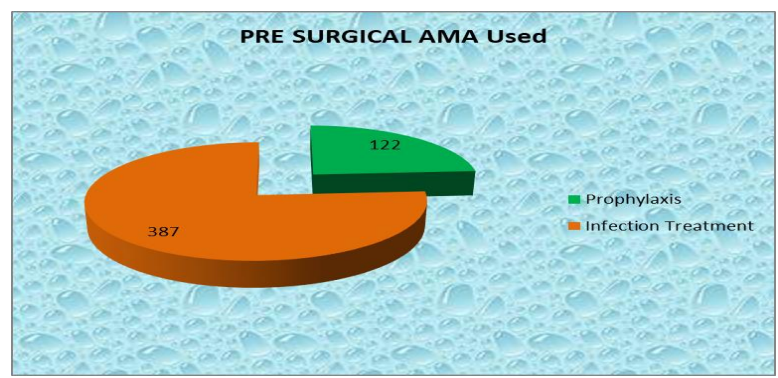


Chart-8 Post Surgical ama used—base line AMAs and type of predominant class of AMA used

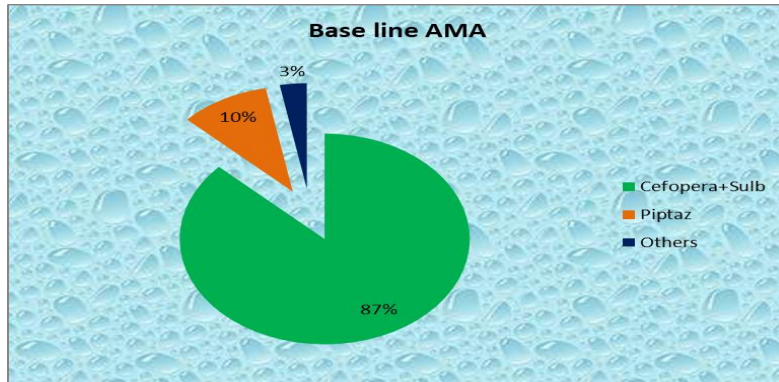


Chart-9: Additional AMAs used along with above base line AMAs

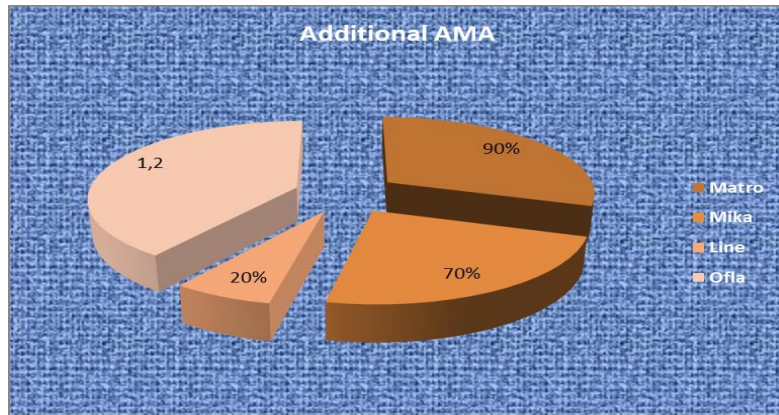


Chart-10 : Commonly used AMAs class in orthopedic ward

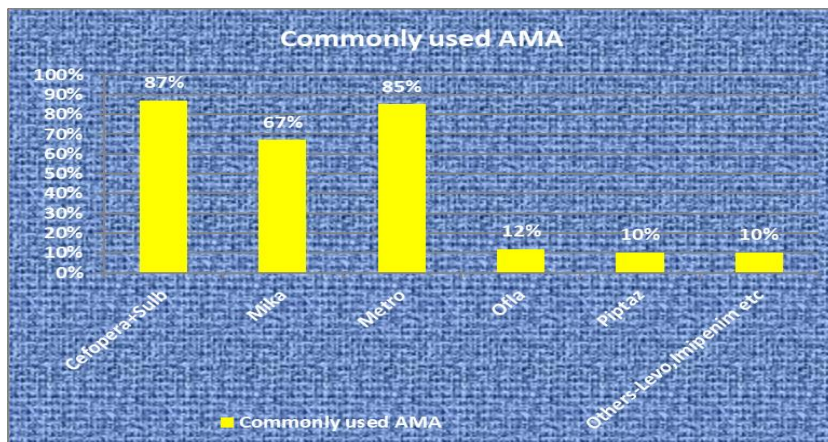


CHART-11: AMAs combination used in orthopedic wards

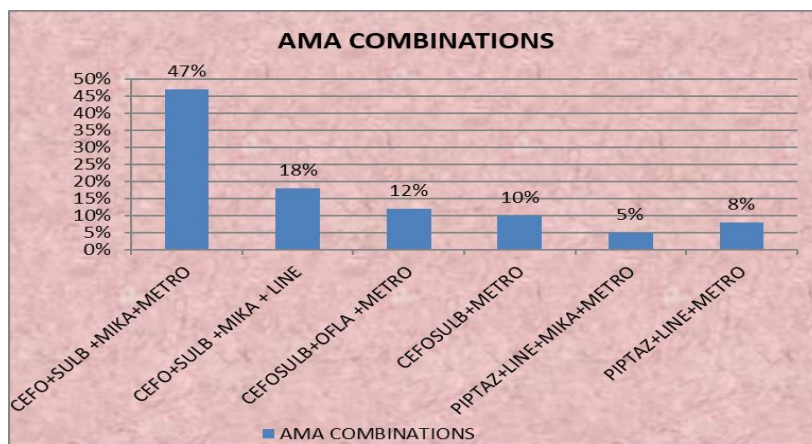


CHART-12 : NO. OF AMAs in combination

Discussion

PART-(1) AMA utilization pattern

Study data

Total duration of this study is 3years and total patients covered as follows-

1. Treatment of infections at Orthopedic post-surgery=500
2. Pre-operative treatment Orthopedic-500=1000
3. Prophylaxis---500 (IV drug-70%, oral-30%).(C-41,28)

Different types of cases handled in the study, only very precise data is given to cut short the voluminous expansion.(L-1,2,3)

Out of 500 patients included in this study—60%--Male and 40% Female

Age—Maximum patients within > 18 yrs. and < 65 yrs.—80%-85%

Education-- <HSC and HSC caters maximum patients, maximum number—Cultivators and laborers .

Age is a vital parameter. In old age reduced GFR, Creatinine clearance, kidney size and mass, decreased nephrons warrants reduced dose of AMAs. Amino glycosides—ototoxicity, vertigo, nephrotoxicity is a better examples. Grey baby syndromes of chloramphenicol, Kernicterus of sulfonamides are some example for babies due to immature organ system. Other parameters like Sex, education, Occupation, Dose, Route, Duration. All have their own importance in own place in medicine. Dose varies with age, weight, body surface area and severity of condition. Eclampsia, PET, uterine rupture is female diseases. Many diseases are there those show sex, male or female preponderance. Ignorance is a serial killer; morbidity and mortality of CANCER, AIDS, TB, DM,APD, INFECTION, and TETANUS are due to ignorance, that's why it is told—KNOW AIDS for NO AIDS. Seeing private nursing homes and hospital who will Swasthya Bima yojona, other

Bima cards along with Health and other insurances helping a people a lot. Comorbidity not only affects treatment, AMAs use differently but also influences any study and patient consequences.(C-1,7,40 / T-1)

Types of AMAs used

From the jungle of AMAs—Only a few groups of AMA are used to combat multi variety of infections—Amino penicillin's--cloxacillin, Ampicillin, Older penicillin's—penicillin-G, penicillin-V, and procaine and longacillins, sulfonamides, chloramphenicol, tetracycline's, erythromycins, Roxithromycins, cephalixin, cephadroxy and many other are not in use, where as 2nd, 3rd, 4th and 5th generations cephalosporin's, piperacillin penicillin's, carbapenims, monobactams, fluoroquinolones, linezolid's along with metronidazole are frequently used. Most used AMA—Beta-lactams. Carbapenim and Fluoroquinolones followed by. The mostly used AMA—Beta- lactam, along with linezolid and metrogl. Then Amino glycosides—Mostly Mikacin, Followed by Fluor quinolones.(C-50)

- Out of Beta-lactam—
 - 50%--2nd and 3rd generation cephalosporin's
 - 25%--Higher penicillins
 - 23%--Carbapenims
 - 2%--others such as teicoplanins, daptomycins
- Base line AMA—Beta-lactam, carbapenims are mostly used
- Additional AMAs---Metrogl—100%, linezolid—85%, Mikacin---56%

Number of AMAs used

- Average no. of AMA per prescriptions—MAXM—3drugs—61-87%, 4 drugs—37.68% , and 5 drugs--0.45%(< ½ %)
- No patients with 1 drugs. No patients were without any AMA
- Route---all IV
- In Pre-operative group—Out of 1000 patients, 3drugs—48%, 4 drugs—32% and 2 drugs—20%
- Route--- all IV
- No patients given > 4 drugs in preoperative group and no patients were without any AMA
- CVA, RTA, SNAKE BTES, HANGINGS, STABINGS-- are with more % of deaths.
- In total 36 deaths—31 patients were alcoholic.

Route of AMAs used

ICU—IV—100%, Post-surgical—IV—92 %
 In pre-operative—IV—100 %
 In prophylaxis--- IV—70%, ORAL---30 %

Summary

There is significant burden of infectious diseases in India, for which selection of AMAs to prescribe to fight the battle, is a scientific and technical maneuver. AMAs are thus prescribed as per

1. Clinical judgment and investigations.
2. Microbiological information.
3. Pharmacological knowledge.

Thus criteria for rational drug prescription is essential and is on basis of

1. Appropriateness
2. Efficacy
3. Safety
4. Cost of therapy
5. Less or nil ADRs.

AMAs are very precious, amongst drugs- ---so need of hour to rationalize use of AMAs, in interest of science, future community.

1. Limited resources of AMAs.
2. Only few drugs are in pipe line
3. TEIXOBACTIN—is the only AMA developed in last 3 decades.

Conclusion

This study also focused wide spread drug resistance, mostly multiple drug resistance by many organisms, a matter of great concern along with a shocking challenge for present as well as for future. Role of Drugs and Therapeutic committee should play an important role regard to this, along with Drug utilization study, prescriptions auditing to improve drugs use in general and life saving managements. This is again a matter of great regret that the many doctors have a mental tendency to use Newer and more expansive, low available drug(a matter of ego that—DR writing and know much that drug only available at Cuttack) as opposed to cost effective, proven and well established AMAs, in local counters.

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