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BACTERIOLOGICAL ANALYSIS OF BLOOD CULTUREISOLATES IN DIFFERENT ORGAN SYSTEMS

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ABSTRACT

Bacteria are microscopic, single-cell organisms that live almost everywhere. A blood culture is a laboratory test in which blood, taken from the patient, is inoculated into bottles containing culture media to determine whether infection-causing microorganisms are present in the patient's blood stream. Having these pathogens in bloodstream can be a sign of a blood infection, a condition known as bacteremia. Blood culture is the most widely used diagnostic tool for the detection of bacteremia and fungemia. Materials and Methods: Patient Documentation form, Informed consent form, It is a prospective observational study in a Tertiary care hospital (KIMS) in Kurnool, Study would be conducted over a period of 6 months, Collected Sample size is 132 patients. **Results & Discussion:** A total of 560 patients were taken into the study in which 132 blood culture cases were found to be positive. 61-70 age groups are 17high, 81-90 age groups are 3 less in males, 61-70 age groups are 11high and 31-40 age groups are 1 less in females, high in July 30, low in August 17, Renal system mostly affected by E.coli and CONS, Genitourinary system mostly affected by E.coli, CONS, Respiratory system mostly affected by CONS, K.pneumonia and rarely E.coli, P.aeruginosa, Cardiovascular system mostly affected by E.coli, CONS, K.pneumonia, P.aeruginosa and others, Gastrointestinal system mostly affected by CONS, E.coli and K. Pneumonia, Sepsis mostly caused by E.coli and CONS, Central nervous system mostly affected by CONS, Typhoid mostly caused by S.typhi etc.

KEYWORDS: Blood culture, bacterial isolates, bacteremia, Immune system.

INTRODUCTION

Bacteria are microscopic, single-cell organisms that live almost everywhere. Bacteria live in every climate and location on earth. Some are airborne while others live in water or soil. Bacteria live on and inside plants, animals, and people. The word "bacteria" has a negative impact, but bacteria actually perform many vital functions for organisms and in the environment. **For example**, plants need bacteria in the soil in orderto grow. A bacterial infection is a proliferation of a harmful strain of bacteria on or inside the body. Bacteria can infect any area of the body. Pneumonia, meningitis, and food poisoning are just a few illnesses that may be caused by harmful bacteria. **For example**, runny nose, cough, headache, and fatigue can occur with the common cold (virus) and with a sinus infection (bacteria). A doctor may use the presence of other symptoms (such as fever or body aches), the length of the illness, and certain lab tests to determine if an illness is due to bacteria, or some other pathogen or disease process.

Bacteraemia: The presence of bacteria in the blood It is usually pathological, although transitory asymptomatic bacteraemia can occur during the course of many infections and following surgical procedures. Bacteraemia occurs in diseases such as typhoid fever, brucellosis, leptospirosis and endocarditis.

Types of bacterial infections

Bacterial skin infections: Bacterial skin infections are usually caused by gram- positive strains of Staphylococcus and Streptococcus or other organisms.

Sexually transmitted bacterial infections

Many sexually transmitted diseases are caused by harmful bacteria. Sometimes, these infections aren't associated with any symptoms but can still cause serious damage to the reproductive system. Common STDs caused by bacterial infections include: Chlamydia, Gonorrhea, Syphilis, Bacterial vaginosis.

Other bacterial infections
Harmful bacteria can affect almost any area of the body. Other types of bacterial infections include: Bacterial meningitis, Otitis media, Urinary tract infection (UTI), Respiratorytractinfections include sorethroat, bronchitis, sinusitis, and pneumonia.

Treatment for bacterial infections
Antibiotics are medications that fight against bacterial infections. They work by disrupting the processes necessary for bacterial cell growth and proliferation. It's important to take antibiotics exactly as prescribed. Failure to do so could make a bacterialinfection worse.

Antibiotics don't treat viruses, but they're sometimes prescribed in viral illnesses to help prevent a "secondary bacterial infection." Secondary infections occur when someone is ina weakened or compromised state due to an existing illness.

Blood culture
1. A blood culture is a laboratory test in which blood, taken from the patient, is inoculated into bottles containing culture media to determine whether infection-causing microorganisms are present in the patient's blood stream. A positive blood culture means that you have bacteria in your blood.
2. This type of infection involves the blood that circulates within your entire body. Bacteria that start on your skin or in your lungs, urine, or gastrointestinal tract are common sources of blood infections.
3. An infection can spread to your blood and become systemic if it's severe or if your immune system isn't able to keep it contained. A systemic infection is known as sepsis.

Aim of the test
1. An etiological diagnosis of bacteremia by aerobic and anaerobic cultivation of the blood, with identification and susceptibility test of the isolated organisms.

Blood culture should be made for cases with suspected septicemia, endocarditis, and bacteremia secondary to localized infections (pneumonia, intra-abdominal abscesses, pyelonephritis, epiglottitis, and meningitis). In this case the blood culture mayprovide an etiological diagnosis of the localized
Infection.

Indication of blood culture
Endocarditis, Suspected deep fungal infection, such as histoplasmosis and blasto mycosis. Suspected myco bacteremia caused by Mycobacterium avium. Suspected disseminated gonococcal infection. Suspected candidemia or disseminated cryptococcosis. Suspected Malassezia Furfur infection, an agent of catheter-associated infection in patients receiving intravenous drugs. Patients with fever and leukocytosis or leukopenia, however, a normal white blood cell count does not rule out bacteremia.

MATERIALS AND METHODS

Materials
Patient Documentation form, Informed consent form.

Methods
Study design: It is a prospective observational study.

Study site
Tertiary care hospital (KIMS hospital) Kurnool.

Study period
The study would be conducted over a period of 6 months.

Sample size
Collected Sample size is 132 patients.

Inclusion criteria
All diagnosed cases of diseased Patients with blood culture test. Patientsincludes above 13 years to 90 years are taken.

Exclusion criteria
Children below 13years age groups, Pregnant & Breast feeding women.

Ethical clearance
This study was a duly approved by Institutional Ethics committee,REG.NO: SJCPS/IEC/V PD/2019-20/014.

RESULTS AND DICUSSION

A total of 560 patients were taken into the study in which 132 blood culture caseswerefound to be positive.

Table 1: Gender and Age wise Categorization.

AGE	MALE	FEMALE	TOTAL
13-20	8(9.41%)	8 (17.02%)	16 (12.12%)
21-30	7(8.23%)	8 (17.02%)	15 (11.3%)
31-40	9(10.58%)	12 (12%)	21 (15.9%)
41-50	14(16.47%)	7(14.89%)	23 (17.42%)
51-60	16(18.82%)	7 (14.89%)	23 (17.42%)
61-70	17(20%)	11 (23.40%)	28 (21.2%)
71-80	11(12.94%)	3 (6.38%)	14 (10.6%)
81-90	3 (3.52%)	2(4.25%)	5 (3.7%)
TOTAL	85 (100%)	47(100%)	132 (100%)

Gender and Age wise categorization.

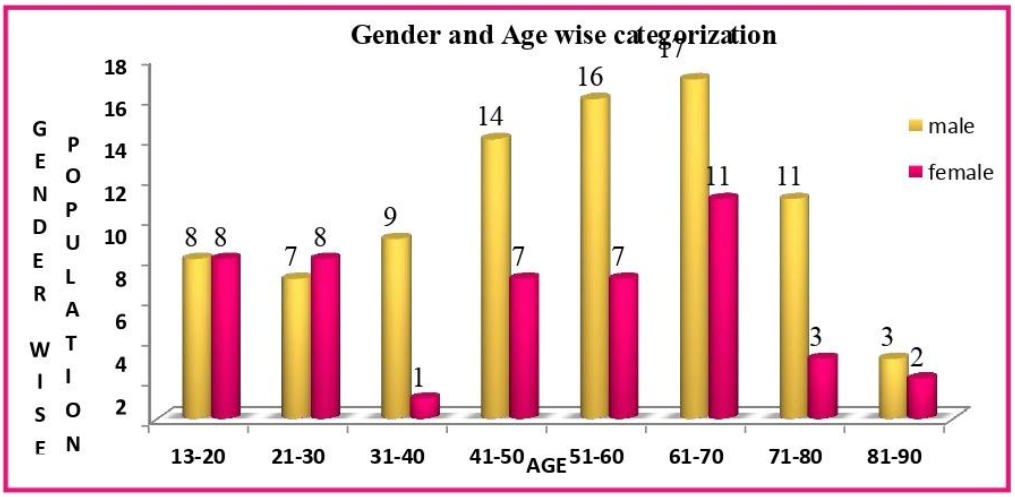


Figure 1: Gender and Age Wise Categorization.

Figure: 1 and Table:1 : Represents males with different age groups are as follows 13-20 years are 8, 21-30 years age groups are 7,31-40 age groups are 9,41-50 age groups are 14,51-60 age groups are 16,61-70 age groups are 17,71-80 age groups are 11,81-90 age groups are 3 in addition of females with different age groups are as follows 13-20 years are8, 21-30 years age groups are 8,31-40 age groups are 1,41-50 age groups are 7,51-60 age groups are 7,61-70 age groups are 11,71-80 age groups are 3,81-90 age groups are 2 was observed in our study. Urinary tract infections are more likely to occur in the elderly. In our study, the age group 61-70 years showed the highest number of cases males and females(20%, 23.4%) compared to other age groups, whereas 3.52%, 4.25% (males, females respectively) of the patients were from the >71-year age group. E.coli was again the predominant organism in the 61-70 yrs group because these age groups are mostly immunocompromised and females are most likely to cause infections because menstrual problems and hormonal imbalances are more.

Table 2: Distribution of Patients Based On Presence of Bacteria.

Bacteria	No.of pattients
E.coli	34 (26%)
Cons	30 (23%)
Nfgnb	9 (7%)
K.pneumonia	13 (10%)
S.aureus	7 (5%)
Acineto-bacter boumanni	3 (2%)
Pseudomonas aeruginosa	11 (8%)
S.typhi	11 (8%)
Others	14 (11%)

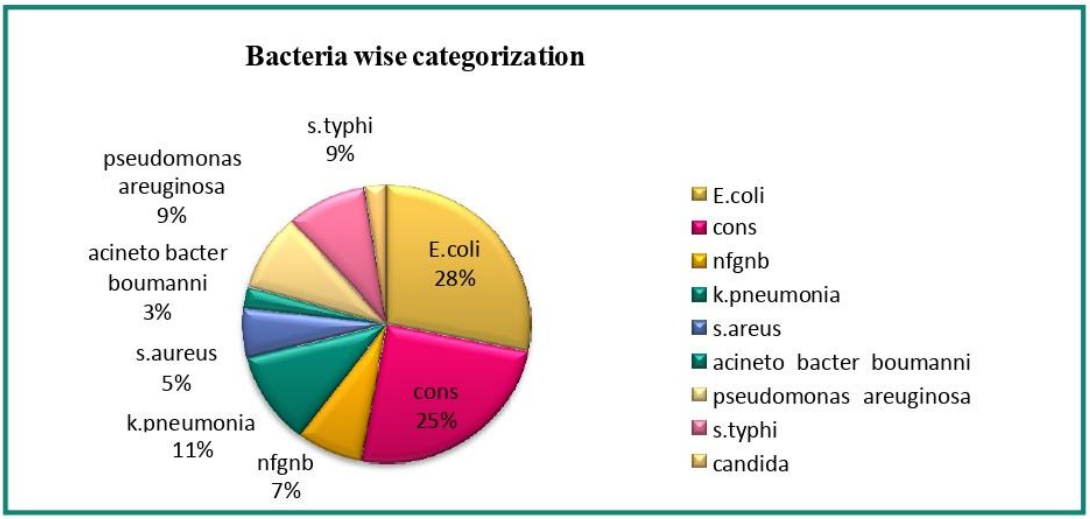


Figure 2: Bacteria Wise Categorization.

Table 2 and Figure 2: Represents Bacteria wise categorization of total 132 blood culture cases were found to be positive in which E.coli were 34[26%], Cons 30[23%], Klebsiella pneumonia 13[10%], pseudomonas

aeruginosa, s.typhi 11[8%], NFGNB 9[7%], S.aureus 7[5%], Acinetobacter boumanii 3[2%], others 14[11%] was observed in our study. Colonization may occur initially from normal resident flora in skin and throat, like staphylococci and streptococci; later organisms from the gastrointestinal tract, like E. coli, Klebsiella, Proteus, etc., may also become involved. In addition, fomites or the hands of personnel may also transmit infection.

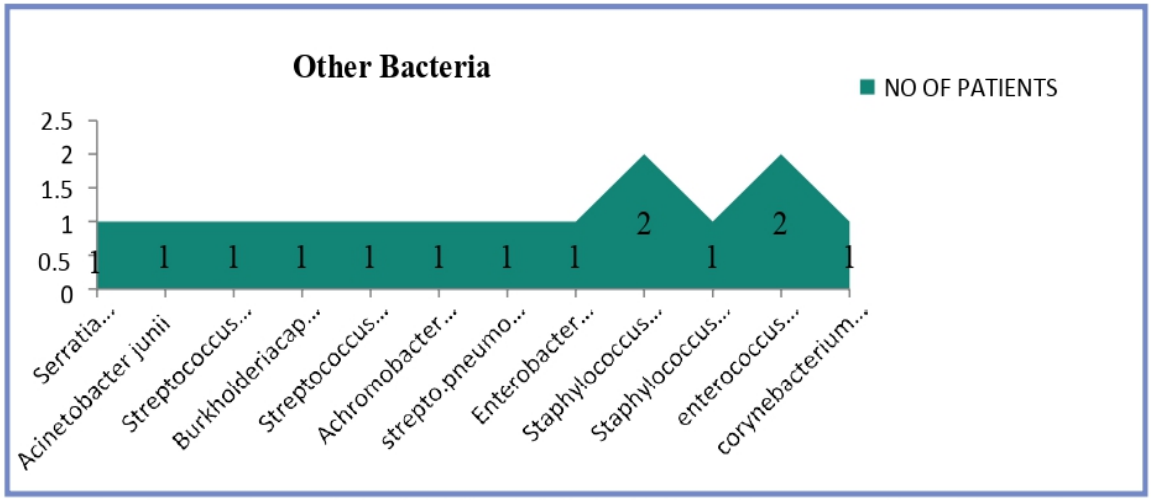


Figure 3: Other Bacteria Includes.

Figure 3: Represents rarely isolated bacteria's include staphylococcus hominis ssp hominis- 2(15%), Enterococcus- faecalis- 2(15%), Serratiaplymuthica-1(7%), Acinetobacter junii - 1(7%), streptococcus agalactiae-1 (7%), burkholderia cepacia -1 (7%),streptococcus gallolyticus sp pasteurianus -1 (7%), achromobacter xylosixidanas -1 (7%), strepto.pneumonia -1(7%) in which enterococcus faecalis are mostly seen in gastrointestinalinfections.

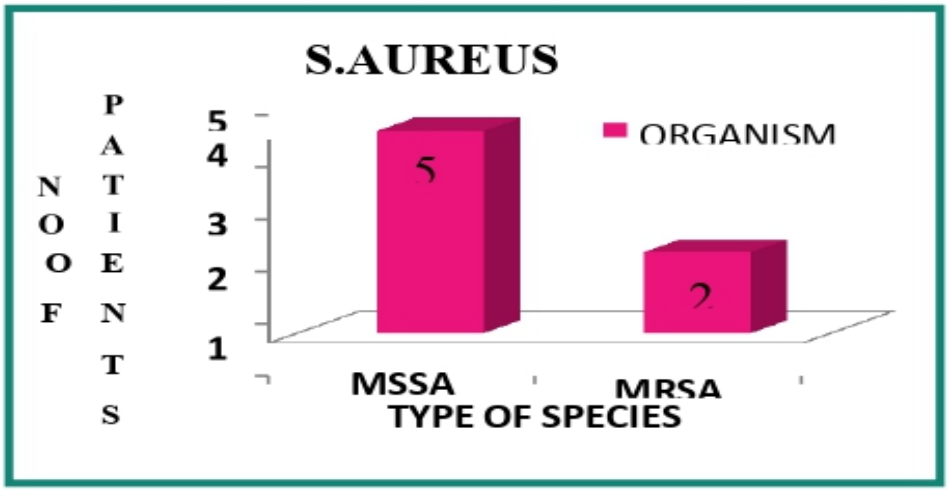


Figure 4: Type of S. Aureus.

Table 3: Type of S. Aureus.

S.Aures	No.of patients	Percentage
MSSA	5	71.4%
MRSA	2	28.6%
Total	7	100%

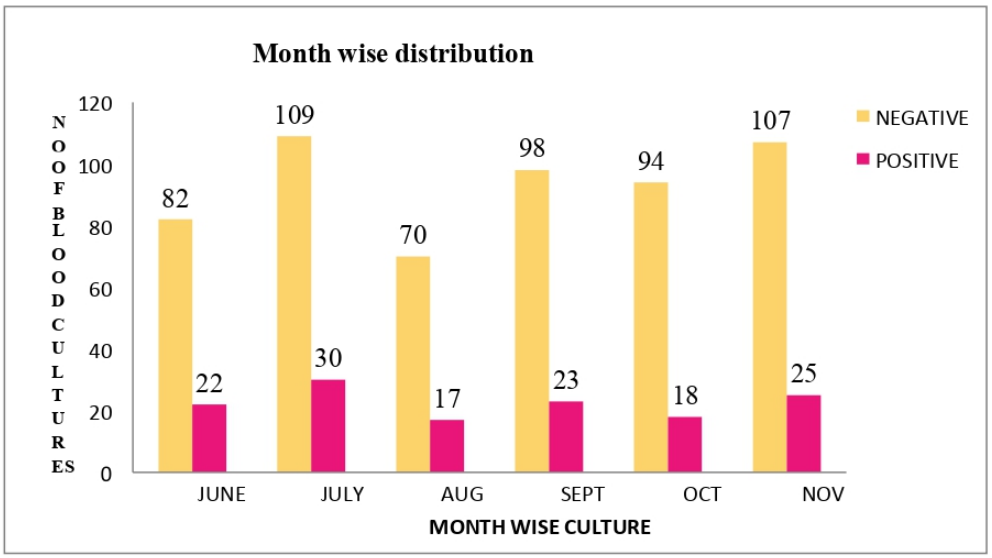
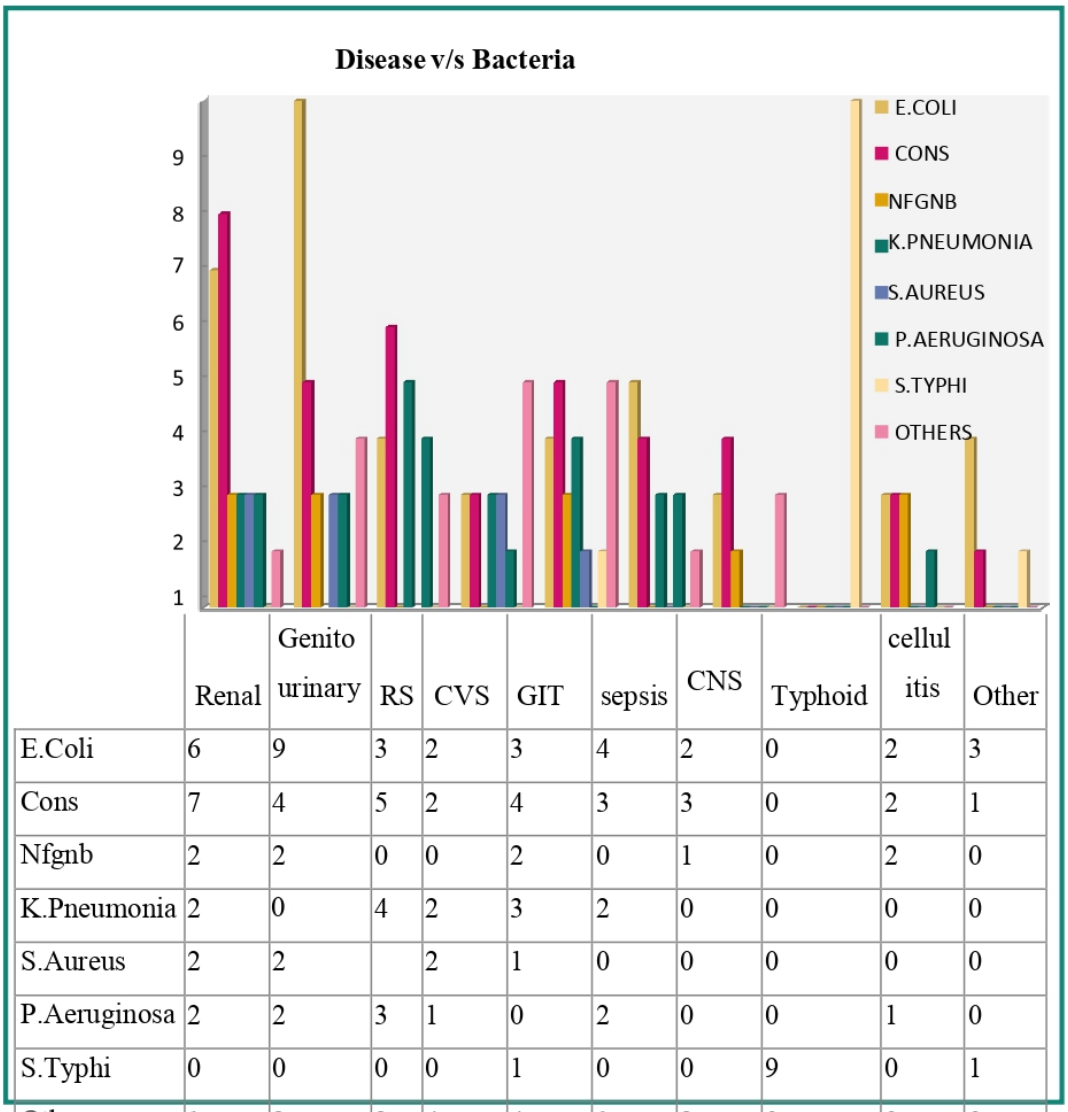


Figure 5: Categorization Based On Month Wise Culture Cases.

Table 4: month Wise Categorization.

Months	Total blood culture	No. of positive blood culture	No. of negative blood culture
June	82	21 (15.9%)	60 (14.01%)
July	109	29 (21.9%)	79 (18.4%)
Aug	70	17 (12.8%)	53 (12.3%)
Sept	98	22 (16.6%)	75 (17.5%)
Oct	94	18 (13.6%)	76 (17.75%)
Nov	107	25 (18.9%)	82 (19.15%)
Total	560	132 (100%)	428 (100%)

Table 4 and Figure 5: Represents Month wise categorization of a total 560 blood culture cases were sent to microbiology department. Out of them 132(24.107%) were blood culture positive cases were included in our study. In the month of June 22(26.8%), July 30(27.52%), August 17 (24.28%), September 23(23.46%), October 18(19.14%) and November 25(23.36%) were collected, in July month more blood cultures were found to be positive because of climatic conditions are more favorable for colonization of bacteria in the host.



	Renal	Genito urinary	RS	CVS	GIT	sepsis	CNS	Typhoid	cellulitis	Other
E.Coli	6	9	3	2	3	4	2	0	2	3
Cons	7	4	5	2	4	3	3	0	2	1
Nfgnb	2	2	0	0	2	0	1	0	2	0
K.Pneumonia	2	0	4	2	3	2	0	0	0	0
S.Aureus	2	2		2	1	0	0	0	0	0
P.Aeruginosa	2	2	3	1	0	2	0	0	1	0
S.Typhi	0	0	0	0	1	0	0	9	0	1
Others	1	3	2	4	4	1	2	0	0	0

Figure 6: Distribution 0f Patients Based On Disease V/S Bacteria.

Fig 6: Represents disease versus bacteria comparison according to organ system.

Renal system mostly affected by E.coli and CONS, Genitourinary system mostly affected by E.coli, CONS, Respiratory system mostly affected by CONS, K.pneumonia and rarely E.coli, P.aeruginosa, Cardiovascular system mostly affected by E.coli, CONS, K.pneumonia, P.aeruginosa and others, Gastrointestinal system mostly affected by CONS, E.coli and K. Pneumonia, Sepsis mostly caused by E.coli and CONS, Central nervous system mostly affected by CONS, Typhoid mostly caused by S.typhi, Cellulitis mostly caused by E.coli, CONS and NFGNB, Others like Electrical burns, OP Poisoning, Quadriparesis, Gangrene, Fracture affected by staphylococcus hominis ssp hominis, enterococcus faecalis, serratia plymuthica, Acinetobacter jejuni, streptococcus agalactiae, burkholderiacapacia, streptococcus gallolyticus ssp pasteurianus, achromobacter xylosixidanas, strepto.pneumonia.

CONCLUSION

Infections are one of the most important causes of morbidity and mortality in medical practice and the introduction of antimicrobials has greatly revolutionized the patient outcome suffering from infection.

E.coli, CONS, Klebsiella spp, Pseudomonas aeruginosa, S.typhi, S.aureus was the leading causes of infectious diseases in our study finding. These bacteria isolates were highly resistant to first- and second-line empiric antimicrobials used at ICU, General Medicine, Genito-Urinary and Nephrology department in which E.coli bacteria are resistant to cephalosporins (ceftriaxone, cefuroxime) and fluoroquinolones (levofloxacin, ciprofloxacin), CONS are resistant to macrolides (azithromycin, clarithromycin) and cephalosporins (cefoxitin, cefuroxime)etc., This is specially seen in

developing countries like INDIA, CHINA etc., because of over the counter availability of antibiotics and no proper legislation of their use.

As the list of antimicrobial is vast and its irrationality may cause unnecessary morbidity and mortality so the rational use of antimicrobials is vital in management of patients with infection with special attention to newer antimicrobials restricting control of drug use, which involves agreement between clinicians and microbiologist. Limiting the use of newest antimicrobials so long, the currently used drugs are effective.

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