



Aerobic bacteriological profile in various clinical specimens and their antibiotic sensitivity pattern in a teaching hospital (NMC & RC)- Raichur

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Abstract:

Background: Misuse of antibiotics in the treatment of infections leads to nosocomial infection as well as community infections. The objective of the study was to know the aerobic bacteriological profile of clinical specimen and antimicrobial sensitivity pattern of bacteria isolated from various clinical specimens which provides a basic profile of bacteria and their sensitivity pattern. **Materials and Methods:** Study design included 200 samples which were processed (excluding blood samples) they were pus, urine, sputum, throat swab, stool etc. All the isolates were identified by their colony morphology on nutrient agar, MacConkey agar and blood agar. The organism was identified by direct gram stain, gram stain. It was phenotypically identified by conventional biotyping. Antimicrobial sensitivity pattern was done by disc diffusion method according to CLSI guidelines. **Results:** 200 samples that were cultured from various departmental OPD's of which 95(47.5%) were positive for culture. The samples that were processed were Pus (90 no), Urine (19 no), sputum (43 no), throat swab (24 no), stool (13 no), gastric aspirate (11 no). Age group 1 to 10 yrs (40 no) followed by 21-30 yrs (41 no), preponderance is in females than males. Common organisms isolated are Staph aureus & Klebsiella spp. Antibiotic sensitivity pattern was processed by CLSI guidelines among gram positive organism (staph aureus) showed sensitivity to vancomycin 48%, CO (41%) Tetracycline (22%) followed by Klebsiella spp (GNB 37 no), I (13.5%), Gaf (8%) CP (8%) CFS (5.5%) AL (5.5%) followed by Pseudomonas aeruginosa (19n): I- 53% sensitivity to CAZ 42% G (31.6%) Tob cb, gat (10.5%) followed by CONS – (6 no)- AMC (16.6%) CP 33% Va- 33% followed by Streptococcus pyogenes (4no), Bacitracin (50%), Va (25%) & CP – (25%). **Conclusion:** This study gives us the baseline data for prescription for the patients, more research is needed to find association of culture and sensitivity reports with the antibiotics used in the hospital and the practical utility of such data for the hospital and even other hospitals in the community. Gram positive organisms are more sensitive to Vancomycin & GNO to Imipenem.

Key words: Antibiotics, antimicrobial, hospital, infection, prevention, sensitivity

Introduction

Misuse of antibiotics in the treatment of infection leads to nosocomial infection as well as community infections. Nosocomial infections are surgical wound infections, respiratory infections, genitourinary infections, as well as gastrointestinal infections. These infections are often caused by breaches in infection control practices and procedures, unclean and non-sterile environmental surfaces, and/or ill employees. We have the experience to understand and ascertain the facts behind these hospital acquired nosocomial infections. These infections can be acquired in the hospital, nursing home, rehabilitation centers, as well as extended care facilities. Immunocompromised patients, the elderly and young children are usually more susceptible than others. These infections are transmitted through direct contact from the hospital staff, inadequately sterilized instruments. Nosocomial infections are often caused by breaches of infection control practices and procedures, unclean and non-sterile environmental surfaces, and/or ill hospital staff. Prevention of nosocomial infections includes proper personal hygiene and hand washing on the part of the hospital staff, complete sterilization of medical equipment, and providing a clean, sanitary environment in the health care facilities.

The organism was identified by direct gram stain. It was phenotypically identified by conventional biotyping [1]. Antimicrobial sensitivity pattern was done by disc diffusion method according to CLSI guidelines [2]. GPC & GNB are important organisms from bacteriological point of view for the cause of infections in the community & nosocomial. This study was taken to know the GPC and GNB isolates & their sensitivity pattern & which age group this infection is predominant. The common isolates that are prevalent from various samples, this study was done for a period of 3 months (1-10-11 to 31-12-11).

Material and Methods

200 various samples Pus(90 no), urine (19 no), sputum (43 no), throat swab (24 no), stool (13 no), GA(11 no) were processed by using MacConkey agar, blood agar and nutrient agar, CLED agar was used for urine samples. The colonies were identified & processed by conventional bio typing [1], and processed further for antibiotic sensitivity pattern by disc diffusion method by CLSI guidelines, on Muller Hinton Agar. Ethical committee permission was taken from IEC.

The following antimicrobials were used.

Antibiotic	Content
AK	30mcg
AC	30 mcg
AT	15mcg
B	10 units
Cb	100 mcg
Cb	30 mcg
CN	30 mcg
Cf	5mcg
G	10mcg
Gf	5mcg
I	10mcg
M	5mcg
Nt	30mcg
Nf	300mcg
Nx	10mcg
P	10 units
Pt	100 mcg
Pb	100 units
Tb	10 mcg
Va	30 mcg

Cfs- cefaperazone salbactam, Clox- cloxacillin, T-tetracycline, B- Bacitracin, CAZ- Ceftazidime, Net-Netilmicin, AK- Amikacin. Please change NP to NF- Nitrofurantoin,

The standard reference strains staph aureus (ATCC 2600)

E. coli (ATCC25922 & *Pseudomonas aeruginosa* (ATCC 27853) were used to assure testing performance of the potency of antibiotic discs.

Results:

Table 1: Age Group

Age group	Samples
1-10 yrs	46 no
11-20 yrs	17 no
21-30 yrs	41 no
31- 40 yrs	29 no
41- 50 yrs	28 no
51-60 yrs	34 no
61-70 yrs	18 no

Highest group at high risk per infection is 1-10 yrs(46 no) followed by 21-30 yrs(41 no) ($P>0.001$)

Table 2: The antibiotic sensitivity pattern shows the following pattern

Organisms	Antibiotics sensitivity & resistance pattern for commonly used antibiotics
Staphylococcus	Sensitive: Va, M, Ac, Co, Nx, Tb, Cfs, Pt, T, GF, I Resistance: P, Clox, G
CONS	Sensitive: Ac, Va, Clox, Cf
Streptococci pyogenes	Sensitive: B, Va, G, C Resistance: P
Klebsiella spp	Sensitive: I, Nx, Cfs, Gf, Cf, Resistance: P, Ac, Co, Clox, Ak, Caz, Pt
E.coli	Sensitive: Nx, Caz, G, I, Cfs Resistance: Tb, Net, Cb
Pseudomonas aeueginosa	Sensitive: Pt, Caz, I, CP, Cb, Tb, Cb, Atz, Gf Resistance : Ak, Nx, Cf, Net, Lev

Va – Vancomycin , **Tb** – Tobramycin, **Pt** – Piperillin Tagobactum, **P** – Pencilin G, **Nx** – Noxfloxacin, **M** – Methicillin, **Lev** – Levofloxacin, **I** – Imipenem, **GF**– Gatafloxacin, **G** – Gentamycin, **CP** – Ciprofloxacin, **Co**- Co-Trimoxazole, **Cu**-Cefuroxine, **Cb** – Carbencillin, **Atz**-Azithromycin, **Ac**-Amoxyclav, NP-Nitro

Table 3: Number of isolates (total no 130)

Name of the isolate	No. of isolates (%)
Staph aureus	37
Klebsiella spp	37
Pseudomonas aereuginosa	19
E.coli	16
CONS	6

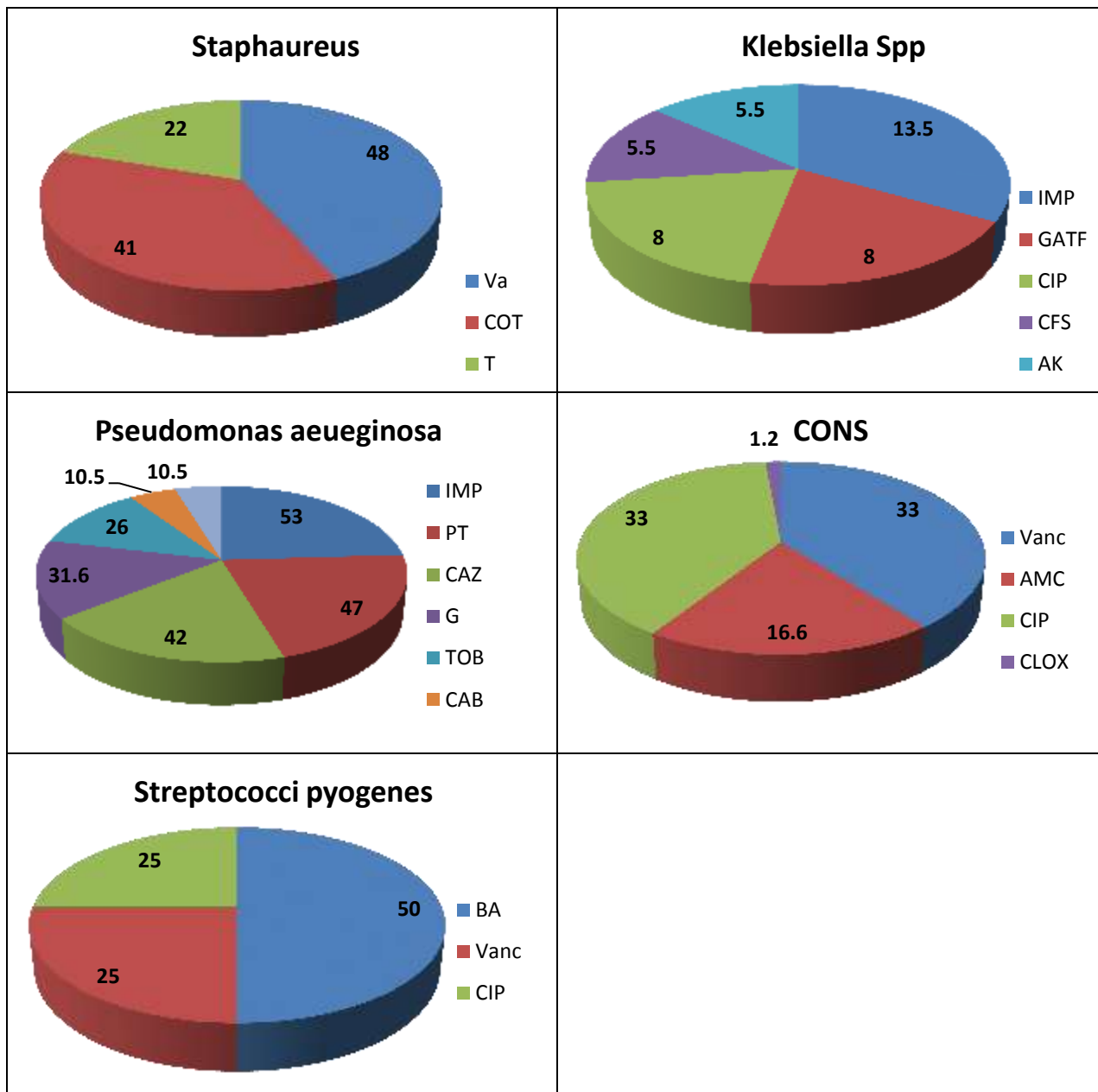
Citrobacter spp	4
Streptococci pyogenes	4
Proteus vulgaris	2
Enterobacter spp	4
Acinetobacter spp	1
Polymicrobial	30
	Total No. 130

Table 4: Total number of Samples Processed

Sample	Total no. (n) 200
Pus	90(45%)
Urine	19(9.5%)
Sputum	43(21.5 %)
Throat swab	24(12%)
Stool	13(6.5%)
Gastric aspirate	11(5.5%)

Table 5: Organisms isolated and their susceptibility

Organism isolated	Susceptibility (%) to antibiotics
Staphauerus	Va(48%), CO(41%), T(22%)
Klebsiella spp	I(13.5%), GF(8 %), CF(8%), CFS(5.5%), AK(5.5%)
Pseudomonas aeueginosa	I(53%), PT(47%), CAZ(42%),G(31.6%), Tb(26%), CAB & GF(10.5%)
CONS	V(33%), AC(16.6%), CP(33%), CLOX(6.6%)
Streptococci pyogenes	B(50%), Va(25%), CF(25%)



Discussion:

In this study children (1-10 yrs) are more susceptible followed by 21-30 yrs, than 50-60 yrs groups. It indicates paediatric OPD patients of our hospital has drawn plenty of children with infections like carbuncles, abscess, throat infection, GIT infection, ear discharges followed by robust age group though it should have minimum infections because of immunity. But on the controversy, this study shows decreased immunity in individuals indicating childhood immunization is deficit. The maximum samples drawn are pus samples, gastric aspirate, the highest number of gram positive organism isolated is Staph aureus followed by CONS

and streptococcus pyogenes. Among gram negative organism klebsiella species followed by pseudomonas aeruginosa & E.Coli and other G.N organisms. The antibiotic which is highly sensitive to staphaureus is vancomycin, followed by cotrimoxazole. Klebsiella species are sensitive to imipenem followed by piperacillin and tazobactam and ceftazidime, streptococcus pyogenes is sensitive to bacitracin followed by vancomycin and CONS to amoxyclav followed by cloxacillin. Henceforth we can conclude that in our staphaureus is sensitive to vancomycin, klebsiella spp. Pseudomonas aeruginosa are sensitive to Imipenem.

The major contributing factor for isolation of *Esch.coli* is due to urine stasis pregnancy which favours for *E.coli* strain colonization. *Pseudomonas aeruginosa* is a major cause of nosocomial infection, and was around 6-7% in multi centric studies. Tiwar and P Kaur reported that the most common bacteria isolated in 35% for samples were vancomycin sensitive staph aureus [3]. In study done in ICU patient in Kolkata, Goshal et al reported that GN infection were common oral bout incidence of GP infection was very I multi drug resistant GP infection are rising [4]. In six years surveillance at a paediatric ICU in Taiwan, lee CY et al observed that staph aureus was the most common isolate among GP organisms, while *pseudomonas aeruginosa*, *esschi* and *klebsiella pneumoniae* were the gram negative isolate [5]. In a 5 years study of bacterial profile in burn, wound infection, Agnihotria N et al documented that *pseudomonas aeruginosa*, 59% followed by staph aureus (17.9%) [6].

Conclusion:

Only use an antimicrobial when clearly indicated. Select an appropriate agent using local antimicrobial prescribing prophey. Prescribe correct dose, frequency & duration. Limit use of broad spectrum antibiotics & multifaceted strategies can address and decrease antibiotic resistance in hospitals.

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