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# RESEARCH ARTICLE

## BACTERIOLOGICAL PROFILE OF PUS INFECTION AND ANTIBIOTIC SUSCEPTIBILITY PATTERN – A POPULATION STUDY OF EAST GODAVARI DISTRICT, COASTAL ANDHRA PRADESH

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**ABSTRACT**

Pus infections are one of the most common Nosocomial infections accounting for 38% of all infections in post surgical patients. Its antibiotic susceptibility pattern under sterile aseptic precautions, pus exudate was collected using 2 sterile cotton swabs for aerobic culture. It was inoculated onto blood and MacConkey agar and Nutrient agar media. The samples were processed as follows, direct microscopic examination of gram stained smear, preliminary identification by colony morphology, biochemical test for characterisation of species and antibiotic sensitivity testing. Out of 75 cases, 44 were male patients and 31 female patients with infection rate more in males. Culture positive were 52 and culture negative were 23. In the culture positive, all are aerobic . Among the aerobic isolate Staphylococcus, was the most common gram positive organism isolated and Pseudomonas aeruginosa was the most common gram negative organism isolated. Intervention aimed at reducing pus infection would provide cost savings and improve the efficiency of health care system.



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# INTRODUCTION

Pyogenic infection is responsible for several local inflammations. It usually presents with pus formation. These are generally caused by one of the pyogenic bacteria. Pyogenic infections may be endogenous or exogenous. The human skin and soft tissue infections (SSTIs) are caused by microbial pathogens during or after trauma, burn injuries, and surgical procedures and these result in the production of pus. Both aerobic and anaerobic bacteria have been implicated in wound infections which commonly occur under hospital environment resulting in significant morbidity, prolonged hospitalization and huge economic burden. Coagulase positive Staphylococcus aureus has been found to be more dominant organism in pus. Antibiotic resistance among bacteria is becoming more and more serious problem throughout the world. It is said that evolution of bacteria towards resistance to antimicrobial drugs, including multidrug resistance, is unavoidable because it represents a particular aspect of the general evolution of bacteria that is un-stoppable. Antibiotic resistance emerges commonly when patients are treated with empiric antimicrobial drugs. Monitoring of resistance patterns in the hospital is needed to overcome these difficulties and to improve the outcome of serious infections in hospital settings. The emergence of antibiotic resistance pathogenic bacteria are considered as grave threats to the public health worldwide. During the last few decades, multidrug-resistant Gram-negative bacterial strains such as Acinetobacter baumannii, E. coli, Klebsiella pneumoniae, Pseudomonas aeruginosa and Gram-positive methicillin-resistant Staphylococcus aureus (MRSA) were increasingly associated with pus infections under hospital settings due to extensive overuse and inadequate dose regimen of antibiotics. Rapid emergence of multidrug-resistant bacteria poses a serious threat to public health globally due to the limited treatment options and discovery of new classes of antibiotics. Therefore, this present study was undertaken to see bacteria in pus with their resistant pattern.

# MATERIALS AND METHODS

Total 75 pus samples were collected by sterile syringe aspiration and by sterile swabs, from inpatients and outpatients of different wards of "KIMS HOSPITAL", over a period of 2 months. After taking informed consent detailed history was taken from the patient. The technique, risks, benefits, results and associated complications of the procedure were discussed

with all patients. Pus samples were collected from skin (furuncles, pustules, and abrasions), nasal wounds, ears, legs, Pus samples were kept in Cary-Blair transport medium and transport to microbiology department of "KIMS HOSPITAL" for Gram staining and culture. The samples were aseptically inoculated on nutrient agar, blood agar (with 5% sheep blood) and MacConkey agar plates, incubated aerobically at 35°C–37°C for 24–48h.

Primary identification and characterization of isolates were performed on the basis of Gram staining, microscopic characteristics, colony characteristic, and secondary identification were done with the help of biochemical tests such as tripal sugar iron agar, Hydrogen sulfide test, Carbohydrate fermentation test,Phenylalanine deaminase test, Methyl red test, Nitrate reduction test, Urease test, Voges proskauer, Citrate utilization test, Indole test by using standard microbiological methods.

**ANTIMICROBIAL AGENTS**

Antibiotics discs containing amikacin (30 µg), amoxicillin-clavulanic acid (30 µg), azithromycin (30 µg),, ceftriaxone (30 µg), cefotaxime (30 µg), cefuroxime (30 µg), cephalexin (30 µg), ciprofloxacin (1 µg), clindamycin (2 µg), cloxacillin (30 µg), erythromycin (15 µg), gentamicin (10 µg), imipenem (10 µg), levofloxacin (5 µg), linezolid (30 µg), meropenem (10 µg), ofloxacin (5 µg), piperacillin-(100/10 µg),, tetracycline (30 µg), and vancomycin (30 µg).

**ANTIBIOTICS SUSCEPTIBILITY TEST**: Antibiotic susceptibilities of bacterial isolates were determined according to the Disc diffusion methods. Briefly, inoculums were prepared for each bacterial isolate and spread on Muller-Hinton agar plates.

**IDENTIFICATION TEST:** Primary plates were observed for any visible growth after 24 hours. Colonies were examined macroscopically using a magnifying lens and the colony characteristics were recorded. Smear was made form isolated colonies, stained by gram staining and examined Under oil immersion objective for the size, shape, gram reaction, arrangement.

**Nutrient agar**: After 24 hours of incubation, colony characteristics like size, shape, surface, margin, margin, edge, consistency, pigmentation, etc were noted.

**MacConkey agar**: After 24 hours of incubation, colony characteristics like size, form, elevation, colour, margin, surface, consistency were noted along with colour to detect the lactose utilizing properties of the organisms. On gram staining, often gram negative bacilli and sometimes pleomorphic and coccobacillary forms were seen.

**Blood agar**: After 24 hours of incubation, colony characteristics like size, form, elevation, colour, margin, surface and consistency were observed. The plates were examined to detect haemolytic reaction in the agar. Convex 2-3 mm white opaque colonies with entire edges, often beta haemolytic colonies were seen. On gram staining gram positive cocci arranged in pairs, chains, clusters were seen. All members of above observations, organisms were grouped into gram positive (cocci or bacilli) and gram negative (cocci or bacilli). They were identified by standard procedures.

**Gram negative bacilli were confirmed by**

**Catalase test:** 1ml of 3% hydrogen peroxide was in a sterile test tube. Few colonies were taken from the nutrient agar plate with a thin glass rod. The was inserted into the hydrogen peroxide solution. Thee production of immediate and sustained effervescence indicates positive test.

**Oxidase test:** (dry filter paper method) A small amount of colony was streaked onto moistened filter paper disks, impregnated with freshly prepared 1% tetramethyl para phenylene diamine dihydro chloride. An intense deep blue colour, appearing within 5-10 seconds was taken as positive reaction.

**Motility test:** Motility was tested by hanging drop preparation method.

**BIOCHEMICAL TEST:** a) Indole test, b) Methyl red test, c) Voges Proskauer, d) Citrate utilization, e) Urease production, f) Sugar fermentation, g) kligler iron test, h) mannitol motility test

**IMVIC TESTS**

**Indole test**: Inoculating the test organisms in 2-3ml of peptone water and incubating for 18 to 24 hours at 35°c. To this kovac's reagent (0.5ml) was added and shaken gently. The test was interpretated as positive if there was change in colour to red or negative if there was no change in colour.

**Methyl red test**: A pure culture of the test organisms was inoculated into 5ml of glucose phosphate broth which was incubated for 48-72 hours at 35°c and 5 drops of methyl red reagent was added. The development of bright reed colour indicated a positive test and negative was yellow.

**Voges Proskauer test:** Glucose phosphate broth (5ml) was inoculation with a pure culture of the test organisms and incubated at 35°c for 24 hours and to the 3ml of 5% solution of alpha naphthol followed by 1ml of 40% KOH was added and shaken gently acetoin formation was indicated by the appearance of eosin pink colour in 10-15 minutes.

**Citrate utilization test**: A well isolated colony was picked up from the MacConkey agar plate and inoculated onto the slant surface of Simmon's citrate agar medium and incubated at 35°c for 24 to 48 hours.

Colour change of the medium from green to deep blue with visible colony growth along the streak line was interpretated as positive.

**Urease test:** The surface of Christensen's urease agar was slant was inoculated with loopful of pure culture of test organism and incubated at 35°c for 18 to 24 hours. Colour change of the medium from original yellow to purple pink and growth is along the streak line was taken ass positive.

**Sugar Fermentation Test:** A single colony or a drop of liquid culture was inoculation into 5 ml of peptone water containing 1% sugar (glucose, lactase, sucrose, maltose, mannitol, etc), indicator bromothymol blue and Durham's tube and incubated at 35°c for 24 to 48 hours.

**Interpretation**

**Acid production:** Blue coloured medium turns yellow due to acid production.

**Gas production:** Presence of gas bubbles in Durhams tube.

**Kligler Iron Agar test:** Using a straight wire thee colony was first stabbed into the but of the KIA agar (Glucose, Lactose, Ferric salts and Phenol red indicator) extending to within 3-5mm of its bottom and when the inoculating wire was removed from the deep of the tube, slant surface was streaked with back and forth motion and incubated at 35°c for 18-20 hours. Phenol red was used as indicates which shows different colour at different PH.

**Interpretation**

**Alkaline (K) / Alkaline (K)**: No fermentation of carbohydrates, characteristics of non fermenting bacteria such as pseudomonas.

**Alkaline (K) / Acid (A):** Glucose fermented and, lactose non fermented characteristic of non lactose fermenting bacteria such as shigella and salmonella.

**Alkaline (K)/ Acid (A) with H2S:** Glucose fermented and lactose non fermented with H2S produced characteristic of non lactose fermenting H2S producing bacteria such as Citrobacter, proteus, salmonella.

**Acid(A)/Acid(A):** Glucose and lactose fermented characteristic of lactose fermentation.

Bubbles: Gas produced.

**Blackening of medium:** H2S produced.

**Mannitol motility test:** Straight wire was used to touch a pure colony growing on the agar medium and stabbed about half the depth of medium in the middle of the tube containing mannitol motility Test medium which was incubated for 18-24 hours at 35°c .

**Interpretation**

**Motile:** Diffuse zone of growth flaring out from the streak line.

**Non motile**: organisms were confined to line of inoculation.

**Blood agar**: After 24 hours of incubation, colony characteristics like size, form, elevation, margin, surface, density and consistency were studied.

**GRAM POSITIVE COCCI**

**Catalase test:** Catalase test were done by picking up few colonies from nutrient agar plate. Appearance of immediate and sustained effervescence indicates positive test.

**Slide coagulase test**: A colony suspected to be staphylococcal species is emulsified in sterile saline on a clean glass slide to form a milky suspension. A drop of citrated human plasma was added to the suspension. A similar suspension was made with know staphylococcus strains to test the proper reactivity of plasma. Presence of coarse clumping of cocci within 10 seconds indicates that organisms was slide coagulase positive. It was confirmed by tube coagulase test

**Tube coagulase tests**: Few colonies from blood agar plates were mixed with 0.5 ml of diluted plasma in the test tube. Positive control, negative control and a tube of undiluted plasma were also set up. Tubes were incubated at 35°c for 4 hours. They were examined at 1, 2 and 4 hours for clot formation. The plasma was converted into a stiff gel that remained in place when the tube was tilted. If no clot was seen, the tube was re-incubated at room temperature and it was read again at 18 hours. Clot formation confirmed the slide test and the organisms was identified as staphylococcus aureus.

**Mannitol fermentation test:** colonies of staphylococcus aureus was streaked onto mannitol salt agar (1% mannitol, 7.5% sodium chloride and phenol red and peptones) and incubated for 24-48 hours at 37°c . High salt concentration of medium allows the growth of staphylococci and inhibits the growth of other organisms ( except enterococci)

**Interpretation:** Yellow zone around colonies indicating acid production from mannitol

**Detection of Enterococci**

**Bile esculin test**: Few colonies from 18-24 hours pure culture were inoculated onto the surface of bile esculin agar slant . ferric ammonium citrate was used as an indicator and incubated for 24-48 at 35°c.

**Antibiotic sensitivity test:** Antibiotic sensitivity of the isolation were tested using modified kirby Bauer Disk diffusion method. Two to three colonies were taken from the primary culture plates with sterile bacteriological loop and suspended in a sterile saline in a test tube and the turbidity was compared and adjusted to 0.5 McFarland stranded.

**McFarland stranded preparation**: 0.5 McFarland stranded is prepared by adding 0.05ml of 1% anhydrous $BaCl_2$ to 1% $H_2SO_4$ in a test tube. A sterile swab was dipped into the inoculum. Excess inoculum was removed by pressing the swab onto the side of the tube, above the level of the inoculum. The swab was streaked into Muller Hinton Agar plates. The plates was dried for few minutes with lid closed. Commercially available disk obtained from Hi-Media laboratory ltd, were used. Using a pair of sterile forceps the antibiotic disks were placed on the inoculated at 37°c. After 16-18 hours of incubation the diameter of each zone was measured with scale, recorded in mm and interpretated as sensitive or resistant according to the indications of disk manufacture.

# RESULTS AND ANALYSIS

**In the present study 75 clinically diagnosed case of pus samples were studied for a period of 2 months. In all age groups and both genders**

**Table 1. Incidence of patient with pus**

| Total no : of specimens Investigation | Culture positive | | Culture negative | |
|---|---|---|---|---|
| | Number | Percentage | Number | Percentage |
| 75 | 52 | 69.3% | 23 | 30.7% |

**Age and Gender distribution of patients with pus**

**Table 2. Gender wise distribution**

| MALE | | FEMALE | |
|---|---|---|---|
| Number | Percentage | Number | Percentage |
| 44 | 58.6% | 31 | 41.4% |

**Table 3. Culture positive Gender wise distribution of patient with pus**

| MALE | | FEMALE | |
|---|---|---|---|
| Number | Percentage | Number | Percentage |
| 29 | 55.7% | 23 | 44.3% |

**Table 4.Types of infection in relation of gender (single / mixed)**

| MALE | | | | FEMALE | | | |
|---|---|---|---|---|---|---|---|
| Single | | Mixed | | Single | | Mixed | |
| No | % | No | % | No | % | No | % |
| 29 | 100% | - | - | 23 | 100% | - | - |

In study, patient were divided into 5 age groups and pus was found to be more in the 40-60 age group comparable to that of Narsinga etal, Patel Sachin *et al*, who showed high pus rate in above 40 age group and it was due to more no of cases admitted for surgery in this age group and due to various factors such as malnutrition, low immunity and mal absorption, which is more common in older age group. While studying the gender wise distribution of pus, it was found that out of 75 cases, 52 (69.3%) were male and 23 (30.7%) were female with infection rate more in male patients than female. The culture results of study showed that, out of 75 cases 52 (69.3%) were culture positive and 23 (30.7%) were negative. In which in Lilani SP study, out of 17 cases, 14 (82 . 36%) were culture positive and 3 (17 . 64%) were culture negative. Soleto etal, also showed 75.6% culture positivity and in the study of Gayathri naik etal, out of 300 samples 216 (72%) were culture positive, 84 (38%) were negative. Among the 40 culture positive cases, 52 were mono bacterial.

**Table 5. Distribution of Organisms in Relation to Gender & Age Group**

| ORGANISMS | Male age group | | | | | Female age group | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0-20 | 21-40 | 41-60 | 61-80 | 81-100 | 0-20 | 22-40 | 41-60 | 61-80 | 81-100 |
| Acinetobacter spp | - | - | 13.44% | 26.88% | - | - | - | - | | - |
| Klebsiella | - | - | 2 6.88% | 1 3.44% | - | 1 4.34% | 1 4.34% | 1 4.34% | | - |
| Proteus spp | - | - | 1 3.44% | 1 3.44% | - | - | - | - | | - |
| Pseudomonas aeruginosa | - | 1 3.44% | 3 10.32% | 1 3.44% | - | - | - | 1 4.34% | | - |
| E coli | - | 1 3.44% | 3 10.32% | 3 10.32% | - | - | 1 4.34% | 1 4.34% | | - |
| Streptococcus spp | - | 1 3.44% | - | - | - | - | - | - | | - |
| Staphylococcus aureus | - | 2 6.88% | 7 24.8% | - | - | - | - | 6 26.4% | 2 8.68% | - |
| Citrobacter | - | - | - | - | - | - | - | - | 1 4.34% | - |

**Table 6. Isolated Organisms from pus**

| Gram positive | | | Gram negative | | |
|---|---|---|---|---|---|
| Organisms | No | % | Organisms | No | % |
| Staphylococcus aureus | 17 | 32.69% | Klebsiella spp | 8 | 15.38% |
| Streptococcus spp | 1 | 1.92% | Pseudomonas aeruginosa | 8 | 15.38% |
| | | | Acinetobacter spp | 3 | 5.76% |
| | | | Proteus spp | 3 | 5.76% |
| | | | E coli | 11 | 21.15% |
| | | | Citrobacter | 1 | 1.92% |
| Total | 18 | 34.61% | | 34 | 65.38% |

**Antibiotic Sensitivity pattern of Organisms**

**Table 8. Antibiotic sensitivity of Gram Positive Organisms**

| S/NO | ANTIBIOTICS | ORGANISMS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Staphylococcus spp | | | | Streptococcus spp | | | |
| | | Total | Sensitive | Intermediate | Resistance | Tatal | Sensitive | Intermediate | Resistance |
| 1 | Amoxicillin- clavulanate (AMC) | 17 | 13(76.47%) | 2(11.76%) | **2(11.76%)** | 1 | 1(100%) | - | - |
| 2 | Azithromycin (AZM) | 17 | 7(41.17%) | 1(5.88%) | 9(52.94%) | 1 | - | - | 1(100%) |
| 3 | Cefoxitin (CX) | 17 | 7(41.17%) | - | 10(58.82%) | 1 | - | - | 1(100%) |
| 4 | Cefotaxime (CTX) | - | - | - | - | 1 | - | 1(100%) | - |
| 5 | Ciprofloxacin (CIP) | 3 | 1(33.33%) | - | 2(66.66%) | 1 | - | 1(100%) | - |
| 6 | Ceftriaxone (CTR) | - | - | - | - | 1 | - | 1(100%) | - |
| 7 | Clindamycin (CD) | 14 | 8(57.14) | 1(7.14%) | 5(35.71%) | - | - | - | - |
| 8 | Doxycycline (DO) | 16 | 14(87.5%) | 1(6.25%) | 1(6.25%) | - | - | - | - |
| 9 | Erythromycin (E) | 4 | - | 1(25%) | 3(75%) | 1 | - | - | 1(100%) |
| 10 | Gentamicin (GEN) | 15 | 8(53.33%) | 1(6.66%) | 6(40%) | 1 | 1(100%) | - | - |
| 11 | Linezolid (LZ) | 17 | 17(100%) | - | - | 1 | 1(100%) | - | - |
| 12 | Minocycline (MI) | 17 | 17(100%) | - | - | 1 | 1(100%) | - | - |
| 13 | Vancomycin (VA) | 12 | 10(83.33%) | 2(16.66%) | - | 1 | 1(100%) | - | - |

# DISCUSSION

The present study, the total number of cases included in the study was 75, out of 75, 23 cases was sterile and 52 cases was positive. All age groups and both genders were included in the study.

In various other studies by Kownhar H and Lilani SP, mixed organisms were isolated from 28.8%, 14.29% cases respectively.In the present study the isolated organisms are gram positive and gram negative organisms. such as gram positive organisms are staphylococcus aureus, streptococcus pyogenes. Gram negative organisms are klebsiella, proteus,

**Table 9. (1) Antibiotic sensitivity pattern for gram negative organisms**

| S/No | ANTIBIOTICS | ORGANISMS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Acinetobacter spp | | | | Klebsiella spp | | | |
| | | Total | Sensitive | Intermediate | Resistance | Total | Sensitive | Intermediate | Resistance |
| 1 | Amoxicillin-clavulanate(AMC) | 2 | - | - | 2(100%) | 7 | 1(14.28%) | 1(14.28%) | 5(71.42%) |
| 2 | Ceftazidime(CAZ) | 2 | - | 2(100%) | - | 7 | - | 1(14.28%) | 6(85.71%) |
| 3 | Ceftazidime-Avibactam(CZA) | 2 | - | - | 2(100%) | 8 | 3(37.5%) | 2(25%) | 3(37.5%) |
| 4 | Ceftriaxone(CTR) | 2 | - | - | 2(100%) | 6 | 1(16.66%) | - | 5(83.33%) |
| 5 | Cefoperazone-sulbactam(CFS) | 2 | - | 1(50%) | 1(50%) | 7 | 2(28.57%) | 1(14.28) | 4(57.14%) |
| 6 | Cotrimoxazole (COT) | 2 | - | - | 2(100%) | 5 | 1(20%) | - | 4(80%) |
| 7 | Ciprofloxacin(CIP) | - | - | - | - | 1 | - | - | 1(10%) |
| 8 | Doxycycline(DO) | 2 | - | - | 2(100%) | 3 | 2(66.66%) | - | 1(33.33%) |
| 9 | Erythromycin(E) | 2 | 1(50%) | - | 1(50%) | 1 | - | - | 1(100%) |
| 10 | Levofloxacin(LE) | 2 | - | - | 2(100%) | 4 | 2(50%) | - | 2(50%) |
| 11 | Meropenem (MRP) | 2 | - | - | 2(100%) | 6 | 3(50%) | 3(50%) | - |
| 12 | Tetracycline (TE) | - | - | - | - | 2 | 2(100%) | - | - |

| S/No | ANTIBIOTICS | ORGANISMS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Proteus spp | | | | Citrobacter spp | | | |
| | | Total | Sensitive | Intermediate | Resistance | Total | Sensitive | Intermediate | Resistance |
| 1 | Amoxicillin- clavulanate(AMC) | 1 | 1(100%) | - | - | 1 | 1(100%) | - | - |
| 2 | Ceftazidime(CAZ) | 2 | 2(100%) | - | - | 1 | 1(100%) | - | - |
| 3 | Ceftazidime-Avibactam(CZA) | 3 | 2(66.66%) | 1(33.33%) | - | 1 | 1(100%) | - | - |
| 4 | Ceftriaxone(CTR) | 3 | - | 1(33.33%) | 2(66.66%) | 1 | 1(100%) | - | - |
| 5 | Cefoperazone- sulbactam(CFS) | 3 | 3(100%) | - | - | 1 | 1(100%) | - | - |
| 6 | Cotrimoxazole (COT) | 3 | 1(33.33%) | - | 2(66.66%) | 1 | 1(100%) | - | - |
| 7 | Ciprofloxacin(CIP) | - | - | - | - | - | - | - | - |
| 8 | Doxycycline(DO) | 2 | 1(50%) | - | 1(50%) | - | - | - | - |
| 9 | Erythromycin( E) | 1 | - | - | 1(100%) | - | - | - | - |
| 10 | Levofloxacin(LE) | 3 | 2(66.66%) | - | 1(33.33%) | 1 | - | 1(100%) | - |
| 11 | Meropenem(MRP) | 3 | - | 2(66.66%) | 1(33.33%) | 1 | 1(100%) | - | - |
| 12 | Tetracycline (TE) | - | - | - | - | 1 | 1(100%) | - | - |

| S/NO | ANTIBIOTICS | ORGANISMS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Escherichia Coli spp | | | | Pseudomonas Aeruginosa spp | | | |
| | | Total | Sensitive | Intermediate | Resistance | Total | Sensitive | Intermediate | Resistance |
| 1 | Amoxicillin - clavulanate (AMC) | 11 | 2(18.18%) | - | 9(81.81%) | 8 | - | - | 8(100%) |
| 2 | Ceftazidime (CAZ) | 11 | - | 1(9.09%) | 10(90.90%) | 8 | 3(37.5%) | 1(12.5%) | 4(50%) |
| 3 | Ceftazidime (CZA) | 11 | 7(63.63%) | 4(36.36%) | - | 1 | - | - | 1(100%) |
| 4 | Ceftriaxone (CTR) | 10 | - | 1(10%) | 9(90%) | 8 | - | 2(25%) | 6(75%) |
| 5 | Cefoperazone - sulbactam (CFS) | 11 | 4(36.36%) | 2(18.18%) | 5(45.45%) | 8 | 7(87.5%) | - | 1(12.5%) |
| 6 | Cefepime (CPM) | - | - | - | - | 7 | 1(14.28%) | - | 6(85.71%) |
| 7 | Cotrimoxazole (COT) | 11 | 3(27.27%) | - | 8(72.72) | 4 | - | 1(25%) | 3(75%) |
| 8 | Ciprofloxacin (CIP) | 2 | - | - | 2(100%) | 4 | 2(50%) | - | 2(50%) |
| 9 | Doxycycline (DO) | 5 | 1(20%) | 3(60%) | **1(20%)** | 4 | - | - | 4(100%) |
| 10 | Erythromycin (E) | 2 | - | - | 2(100%) | 2 | - | - | 2(100%) |
| 11 | Gentamicin ( GEN) | - | - | - | - | 4 | 4(100%) | - | - |
| 12 | Levofloxacin (LE) | 11 | - | - | 11(100%) | 1 | - | - | 1(100%) |
| 13 | Meropenem (MRP) | 11 | 6(54.54%) | 5(45.45%) | - | 7 | 5(71.42%) | 1(14.28%) | 1(14.28%) |
| 14 | Minocycline (MI) | - | - | - | - | 6 | - | 1(16.66%) | 5(83.33%) |
| 15 | Tetracycline (TE) | 6 | 4(66.66%) | - | 2(33.33%) | 1 | - | - | 1(100%) |
| 16 | Tobramycin (TOB) | - | - | - | - | 7 | 5(71.42%) | - | 2(2858%) |

pseudomonas, Escherichia coil, Acinetobacter, Citrobacter. All the cultured organisms are aerobic organisms. Out of 52 cultured organisms the most commonest organisms was staphylococcus aureus 17 (94.4%), followed by pseudomonas aeruginosa 8 (23.5%), Escherichia coil 11(33.3%) proteus 8 (8.8%), Acinetobacter 3 (8.8%), klebsiella spp 8 (23.5%) streptococcus pyogenes 1 (5.6%) citrobacter 1 (2.9%). In the present study, on the whole positive bacilli were the isolated from were 18. Among them the gram positive staphylococcus aureus 17 (94.4%), streptococcus pyogenes 1 (5.6%) were isolated. In the present study, predominance of staphylococcus aureus in pus is consists with report from other studies. Lilani etal., and chia JYH reported that staphylococcus aureus was the common organisms isolated from post operative wound infection.

Garibaldi Richard *et al*., Jido *et al*., and Giacometti *et al*., also reported similar finding. On the whole gram negative bacilli were the predominant organisms isolated from were 34. Among the gram negative bacilli, pseudomonas aeruginosa was the most common isolated organism. Organisms isolated in the gram negative bacilli, pseudomonas aeruginosa 8 (23.5%), Escherichia coil spp 11 (32.3%), proteus spp 3 (8.8%), Acinetobacter spp 3 (8.8%), klebsiella spp 8 (23 5%), Citrobacter 1 (2.9%). In the study conducted by Avikar etal., staphylococcus aureus organisms were isolated which is accordance with our study. In the present whole study out of 52 positive cultured cases. The Antibiotic sensitivity pattern of isolated organisms were as followed; Staphylococcus aureus (17) was 100% sensitive to Linezolid and 87.5% is sensitive to Doxycycline and 76.47% sensitive to Amoxicillin –

clavulanate and 100% sensitive to Minocycline and 33.33% sensitive to Ciprofloxacin and 53.33% sensitive to Gentamicin and 41.17% sensitive to Azithromycin and 57.14% sensitive to Clindamycin and 83.33% sensitive to Vancomycin. Streptococcus pyogenes (1) was sensitive in Gentamicin, Linezolid, minocycline, vancomycin, Amoxicillin- clavulanate. Acinetobacter spp (3) was 50% sensitive in Erythromycin. Klebsiella spp (8) was 100% sensitive in Cefoperazone – sulbactam, 50% sensitive in Doxycycline, 33.3% sensitive in Cotrimoxazole, 66.6% sensitive in levofloxacin, 100% sensitive in Amoxicillin- clavulanate, 100% sensitive in ceftazidime, 66.6 sensitive in ceftazidime- Avibactam, 33.3% sensitive in cotrimoxazole. Proteus spp (3) was 66.6% sensitive in Ceftazidime - avibactam, 50% sensitive in Doxycycline, 100% sensitive in Cefoperazone-sulbactam, 100% sensitive in Ceftazidime, 100% sensitive in Amoxicillin-clavulanate, 33.3% sensitive in Cotrimoxazole, 66.6% sensitive in Levofloxacin. Escherichia coil (11) 20% sensitive in Doxycycline, 66.6% sensitive in Tetracycline, 54.4% sensitive in Meropenem, 36.3% sensitive in Cefoperazone-sulbactam, 63.6% sensitive in Ceftazidime, 27.2% Sensitive Cotrimoxazole, 18.1% sensitive in Amoxicillin-clavulanate. Pseudomonas aeruginosa (8) 100% sensitive in Meropenem, 87.5% sensitive in Cefoperazone-sulbactam, 14.2% sensitive in Cefepime, 71.4% sensitive in Tobramycin 100% sensitive in Gentamycin, 50% sensitive in Ciprofloxacin, 37.5% sensitive in Ceftazidime. Citrobacter (1) was sensitive in Amoxicillin-clavulanate, ceftazidime, ceftazidime- Avibactam, ceftriaxone, cefoperazone- sulbactam, cotrimoxazole, meropenem, tetracycline. Thus gram positive organisms are highly sensitive to Linezolid and Minocycline and gram negative organisms are highly sensitive to Ceftazidime, Cefoperazone-sulbactam, Meropenem.

# CONCLUSION

Inappropriate and misuse of antibiotics can cause resistance to commonly used antibiotics. Thus usage of antibiotics should be based on local and current trends on prevalent pathogens and its sensitivity pattern. The post-operative wound infection rate can be reduced to a minimum level by adapting aseptic and antiseptic measure and proper antibiotic policy is a must for each infection. Thus Hospital infection control committee plays a major role in a preventing NOSOCOMAL INFECTION of which, pus forms a part among others. Proper infection control measures and antibiotic policies should be implemented and monitored by the HICC in order to prevent the emergence of enormous proportion. This study has given us knowledge about pus infections and their incidence in our hospital and also helped us in finding out, the Bacteriological profile of organisms causing pus infections and their Antibiotic Sensitivity pattern. Among the culture positive cases, staphylococcus aureus was the most common positive organism isolated and pseudomonas aeruginosa was the gram negative organism isolated. Most of the Gram positive organisms are highly sensitive to Linezolid and Minocycline and Gram negative organisms are highly sensitive to Ceftazidimen Cefoperazone-sulbactam, Meropenem.

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