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BACTERIOLOGICAL PROFILE AND ANTIBIOTIC SUSCEPTIBILITY PATTERN OF THE PUS ISOLATES FROM GANDHI HOSPITAL IN 2016

Microbiology

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ABSTRACT

PURPOSE: Pyogenic wound infection is major cause of morbidity. Hence it is mandatory for every pus samples to undergo culture and sensitivity. To Identify and isolate aerobic bacteria from pus samples and to study antibiotic profile of isolate.

OBJECTIVES: 1.To know the percentage of aerobic bacteria from the pus samples sent to the laboratory.
2. To study antibiotic susceptibility profile of isolates

METHODOLOGY: The Study Was Conducted in the Department of Microbiology, Gandhi Hospital, Secunderabad. Total of 1372 Pus samples send from different departments from January2016 to November 2016 were included in the study. Culture & Sensitivity Was Performed. Antimicrobial Profiling of isolated strains was determined by Kirby-Bauer Disc-Diffusion Method.

RESULTS AND DISCUSSION: In our study among 1372 pus samples ,442 (32%)were found to be positive for aerobic culture , Staphylococcus aureus -124 isolate (28%) is the most common isolate followed by Klebsiella pneumoniae-115 isolates (26%) , Escherichia coli-86 isolates (19%) , Pseudomonas aeruginosa -40 isolates (9%), Coagulase negative Staphylococcus-27 isolates (6%) Proteus mirabilis-2 isolates 4 (5%), Proteus vulgaris-17 isolates (4%) ,Streptococcus pyogenes (groupA)-10 isolates (2%) . Among Gram positive organisms Amikacin ,Gentamicin levofloxacin , linezolid, tigecyclin, teicoplanin and vancomycin were susceptible drugs and were resistant to ampicillin while among Gram negative organisms amikacin, imipenem ,amoxiclav, azithromycin, pipercillin +tazobactum were found to be susceptible and resistant to ampicillin,amoxicillin

CONCLUSIONS: Changing antimicrobial resistances pose challenge in treating pyogenic infections. Appropriate and judicious selection of antibiotics would limit emerging drug resistant strains in future to treat these clinical conditions successfully

KEYWORDS

Pus, Antibiogram,Staphylococcus Aureus

INTRODUCTION

Pyogenic wound infection is major cause of morbidity owing to the development of multidrug resistance pathogens.Treatment of such infections is difficult. It is very important to have empirical choice of antibiotics. Pyogenic infection causes local inflammation, formation of pus, generally caused by one of the pyogenic bacteria, which result in the aggregation of dead leukocytes as well as pyogenic bacteria commonly known as pus.

Surgical site infections (SSI) are the third most frequently reported nosocomial infections accounting for 14-16% of all the infections in hospitalised patients. Among surgical patients SSI are the most common nosocomial infections(1). These remain a complication of surgical procedures resulting in increased morbidity, mortality and cost(2). The risk of developing a surgical site infection depends upon the balance between factors determining the number of bacteria contaminating the site and the factors determining the resistance of the site against infection(3,4).

The pathogens isolated from infections differ depending on the underlying problem, location and type of surgical procedure. Most common organisms encountered are Staphylococcus aureus, Klebsiella spp. Escherichia coli, Pseudomonas spp., Proteus spp., Enterococci spp.(5) Enterobacter, Proteus spp, Candida and Acinetobacterspp. S. aureus is a most important pathogen in skin as well as soft tissue infections. Methicillin resistant S. aureus (MRSA) is prevalent in majority of the countries wherever it is sought for. MRSA is one of the important pathogen in hospital acquired infection.

The spread of multi-drug resistant bacteria pathogens has added a new angel to the problem of wound infections. This is particularly worse in resource poor countries where sale of antibiotics is under poor control. The present study made an effort in identifying aerobic bacteria responsible for wound infection as well identify the antibiotic susceptibility pattern of The isolated organism.

MATERIAL AND METHODS

Study Centre:
Department of Microbiology, Gandhi Hospital, Secunderabad.
Study Period:
Eleven months from January 2016 to November 2016.
Study Type:
Cross sectional study. pus samples send for aerobic culture and sensitivity from different departments to Department of Microbiology from January 2016 to November 2016 were included in the study.
Sample Size And Samples:
1372 Pus samples sent from various departments.

STUDY TOOLS AND TECHNIQUES:

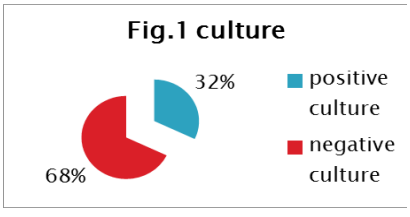
the pus samples were processed aerobically by inoculating on blood agar(BA), mac conkeys agar(MA), nutrient agar(NA) and incubated at 370C for 24 hours aerobically. After incubation, identification of bacteria from positive cultures will be done with a standard microbiological technique which includes studying the colonial morphology, Gram stain as well as biochemical reactions.4 The antibiotic sensitivity testing of all isolates will be performed by modified KirbyBauer's disc diffusion method on Mueller Hinton agar using antibiotics as per CLSI guidelines. 9 The following drugs were tested.

For Gram positive cocci- Ampicillin (10µg), Amoxyclavulanic acid (30 µg), Erythromycin (15µg), Ciprofloxacin (5µg), Ofloxacin (2µg), Gentamicin (10µg), Amikacin (30µg), Cefalexin (30µg), Cefoxitin (10µg), Cefuroxime (30 µg), Linezolid (10µg), Vancomycin (30µg), Teicoplanin (30µg), Tetracycline (30µg).

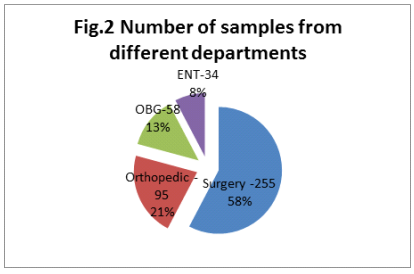
For Gram negative bacilli- Ampicillin (10µg), Amoxyclav (30 µg), Amikacin (30 µg), Cotrimoxazole (25 µg), Ciprofloxacin (5 µg), Gentamicin (10 µg), Azithromycin (30 µg),

RESULT :

Total of 1372 pus samples were send for aerobic culture and sensitivity to department of microbiology, Out of 1372 samples received 442(32%) samples were positive for aerobic bacterial culture and 930 was negative for aerobic bacterial culture. **Fig.1**.



Maximum positive culture samples were received from Department of Surgery followed by Department of Orthopedics. **Fig.2**



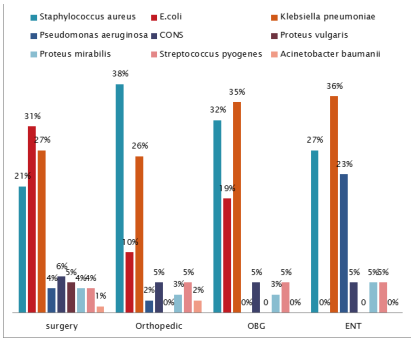
Out of 442 culture positive isolate 124 (28%) were Staphylococcus aureus (one isolae was MRSA) contributing maximum, followed by Klebsiella Pneumoniae 115 (26%), E.Coli 86 (19%) as shown in **Table 1.**

Table.1 Different Bacterial Isolates From Pus Samples

Bacterial isolates	Number positive n=442	Percentage (%)
Staphylococcus aureus (one isolate was MRSA)	124	(28%)
Klebsiella pneumoniae	115	(26%)
Escherichia coli	86	(19%)
Pseudomonas aeruginosa	40	(9%)
Coagulase negative Stapylococcus	22	(5%)
Proteus mirabilis	24	(5%)
Proteus vulgari	17	(4%)
Streptococcus pyogenes	10	(2%)
Acinetobacter baumanii	4	(1%)

Maximum number of Staph.aureus isolates were from Orthopedics department that is 38%, followed by OBG department that showed 32%, where as klebsiella pneumonia were found to be second highest organism reported 36% from ENT department, followed by 35% from OBG department and 27% from surgery department. Among these E.coli were the 3rd highest from 31% from surgery department. **Fig 3**

Fig.3 Department Wise Distribution Of Isolates



All isolated Staphylococcus aureus 124, CONS 22 , and Sreptococcus pyogenes (10) were 100% sensitive to Vancomycin and linezolid.**Table.2**

Table.2 Antibiotic sensitivity pattern of Gram Positive Cocci

Antibiotics	Staphylococcus aureus(124)	Coagulase negative Staphylooccus (22)	Streptococcus pyogenes(10)
Ampicillin	28.5(23%)	10(38%)	10(100%)
Amoxycillin-clavunate	65(53%)	13(60%)	10(100%)
Erythromycin	80(65%)	15(70%)	8(83%)
Ciprofloxacin	8(7%)	13(60%)	10(100%)
Ofloxacin	50(40%)	10(38%)	10(100%)
Gentamycin	75(61%)	20(75%)	10(100%)
Amikacin	90(73%)	15.6(71%)	10(100%)
cefalexin	50(40%)	10(45%)	8(80%)
Cefoxitin	123(99.9%)	-	-
Cefuroxime	37.2(30%)	10(45%)	8(80%)
linezolid	124(100%)	22(100%)	10(100%)
Vancomycin	124(100%)	22(100%)	10(100%)
Teicoplanin	99(80%)	22(100%)	10(100%)
Tetracycline	115(93%)	22(100%)	10(100%)

Antibiotic susceptibility pattern of Gram negative bacteria, Imipenem found to be 100% sensitive to proteus vulgaris 17(100%), followed by pseudomonas aeruginosa 40 isolates out of which 37 that is 94% were sensitive, klebsiella pneumonia 102 out of 115 (89%) and E.coli 75 of 86 that is (87%) were sensitive to imipenem.**Table.3**

Table.3 Antibiotic susceptibility pattern of Gram negative bacteria

Antibiotics	Klebsiella pneumoniae(115)	Escherichia coli(86)	Pseudomonas aeruginosa (40)	Proteus mirabilis (24)	Proteus vulgaris (17)	Acinetobacter baumanii (4)
Cefuroxime	8(7%)	1.7(2%)	1.6(2%)	7.2(30%)	6(38%)	0(0%)
Cefaclor	57(50%)	0(0%)	0(0%)	0(0%)	4(20%)	0(0%)
Ceftriaxone	26(22%)	8(9%)	0(0%)	0(0%)	2(10%)	2(50%)
Ceftazidime	17.25(15%)	19(22%)	7(17.5)	12(50%)	10(60%)	0(0%)
Cefepime	29(25%)	15(17%)	20(50%)	12(50%)	8.5(50%)	0(0%)
Imipenam	102(89%)	75(87%)	37(94%)	17(70%)	17(100%)	2(50%)
Pipercillin tazobactum	46(40%)	22(25%)	27(67%)	17(70%)	8(50%)	0(0%)

DISCUSSION:

This study was conducted in department of microbiology in a tertiary care hospital of Secunderabad.Pus samples received from different departments of our hospital were 1372, Out of 1372 samples received 442(32%) samples were positive for aerobic bacterial culture and 930 was negative for aerobic bacterial culture. A. Biradar et al done a similar study in Karnataka in 2016 and quoted 41% posiive aerobic growth(6), whereas Jain et al in Bhopal 2015 reported 33.6% culture positivity(7).

Majority of positive samples belongs to department of Surgery amounting to 255(58%), followed by Orthopedics with 95(19%). Similar observation was quoted by Vikas Jain et al.(7),followed by Prajuli et al from Karnataka 2014 reported 63% of the samples were from the surgery department.(8)

Most common isolate in our study is Staphylococcus aureus 124 (28%), similar observations were found by Rao et al (10) in Rajahmundari in 2015 about 24.29%, whereas Mahmood et al reported 50% in his study in Karachi in 2000.(9)

In the current study Staphylococcus aureus(including 1 isolate of MRSA) are 100% susceptible to Linezolid and Vancomycin. Rao et al (10) from rajahmundary in 2015, and A.Biradar et al (6) from Karnataka in 2016 reported similar observation

In our study more of gram negative bacteria 256(57.91%) isolated compared to gram positive 186(42.08%). Our findings are matching to other studies like Jain et al.(7), Ghosh et al.(11) in their study isolated more of gram positive bacteria compared to gram negative.

We got the result of antibiogram of Gram negative organisms as most susceptible to Carbepenam, Pipercillin – Tazobactum, similar findings were reported from Mahmood et al in Karachi 88%-Carbapenam, 77%-Pipercillin –Tazobactum (9)

CONCLUSION:

Staphylococcus aureus is one of the most important bacteria isolated among pyogenic wound infection.Emerging antibiotic resistance among bacteria has a negative impact in treatment of pyogenic wound infection.

Empirical and appropriate use of antibiotics is very crucial in preventing emergence of multidrug resistant bacteria.

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