



A STUDY OF BACTERIOLOGICAL PROFILE AND THEIR ANTIBIOGRAM OF SUPPURATIVE INFECTIONS IN DIABETIC PATIENTS IN A TERTIARY CARE HOSPITAL

Clinical Microbiology

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ABSTRACT

Introduction: Hyperglycemia is main factor for increased virulence of microorganisms. Aims and Objectives: To know the bacteriological profile and their antibiogram from various pus samples. **Material And Methods:** A total of 100 pus samples collected were processed from January to June 2022. samples were processed for isolation and identification of organism as per the standard protocol in the laboratory. Antimicrobial susceptibility testing was done as per Clinical Laboratory Standards Institute(CLSI)guidelines 2022.**Results:** Out of 100 samples,92% were culture positive and 8 % Sterile. Out of 119 isolates most common is Pseudomonas aeruginosa 39(32.7%) followed by Staphylococcus aureus(26.8%).Most of the Gram negative bacilli were sensitive to colistin(91.2%), Meropenem (78.36%),Piperacillin and Tazobactam(76.6%). Most of the Gram positive cocci were sensitive to Vancomycin (98.6%), Linezolid (90.6%) and cefoxitin (71.8%).**Conclusion:** This study helps the clinicians to manage diabetic patient with proper antibiotics.

KEYWORDS

Hyperglycemia, Diabetic, Antibiotic, sensitive , isolates.

INTRODUCTION:

Hyperglycaemia is main factor for increased virulence of microorganisms.(1) Higher prevalence of suppurative infections are reported amongst diabetic individuals mostly referring to skin and soft tissue infections which include pyoderma ,folliculitis ,cellulitis, carbuncle ,furunculus ,ulcers ,diabetic foot ,necrotizing fasciitis, gangrene.

Hyperglycaemia has been associated with reduced response of T cells, neutrophil function and disorders of humoral immunity. (10)

These ailments vary depending upon condition of both patient and pathogen. Diabetic patients are more prone to life-threatening infections than nondiabetic patients. therefore they have more antibiotics intervention(9) .Hence, Proper diagnosis of causative agent and their antibiotic susceptibility plays a significant role in preventing morbidity and disability.

AIMS AND OBJECTIVES:

- To isolate and identify pathogens from pus samples.
- To know the aerobic bacteriological profile and Antibiotic sensitivity pattern

MATERIALS AND METHODS:

This is a cross-sectional descriptive study. A total of 100 pus samples were collected from diabetic patients. which were received from King George Hospital and transported to Department of Microbiology, Andhra Medical College Visakhapatnam during the period Jan 2022 to June 2022 ,6 months duration. The samples were collected in sterile screw-capped containers and delivered right away to the lab.(1,9) .For a wound swab, two swabs were taken from each patient, one for Gram's staining microscopy and the other for a standard conventional culture procedure. Additionally, blood was taken for biochemical analysis and glycemic index assessment.(1)

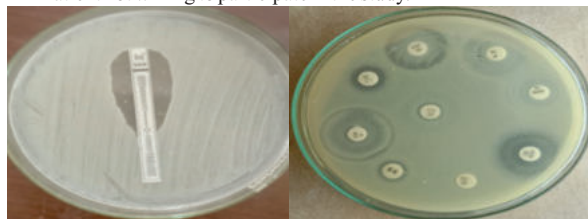
Samples were transferred to the lab with the appropriate labels applied for further analysis. Following guidelines from the Clinical and Laboratory Standards Institute (CLSI), the Kirby Bauer disc diffusion method and E-test for vancomycin sensitivity was used to identify aerobic bacteria and determine their antibiotic susceptibility as per the Clinical Laboratory Standard Institute (CLSI) guidelines.(1,9)

Inclusion Criteria:

- Diabetic patients with lesions.
- All genders and age groups are included.

Exclusion Criteria:

- Patient not willing to participate in the study.



E-TEST for vancomycin sensitivity testing

Kirby Bauer disc diffusion method

RESULTS:

In current study 100 samples were collected in which males are 72(78.26%) and females are 20(21.74%)**TABLE 1.** Age wise distribution of samples most common age group is 56-65 years followed by 46-55 years **FIGURE 1.** Out of 100 samples 92 samples were culture positive ,8% were sterile **FIGURE 2.** Monomicrobial samples are 68 (73.91%) and polymicrobial samples are 24 (26.08%) . In polymicrobial samples dual isolate samples are 21 (87.5%) and Three isolate samples are 3 (12.5%) .

In 119 isolates, Gram negative bacilli 82 (89.13%) higher than Gram positive cocci 37 (40.21%)**TABLE 2.** Most common is Pseudomonas aeruginosa 39(32.7%) followed by Staphylococcus aureus 32(26.8%), Escherichia coli 20(16.80%), Klebsiella species 14(11.7%), Proteus sp 5(4.20%), Enterococcus sp 5(4.20%) and Acinetobacter sp 4(3.36%) **FIGURE 3.** Most of the Gram negative bacilli were sensitive to colistin(91.2%), Meropenem (78.36%), Piperacillin and Tazobactam(76.6%). **TABLE 4** Most of the Gram positive cocci were sensitive to Vancomycin (98.6%), Linezolid (90.6%) and cefoxitin (71.8%). **TABLE 3**

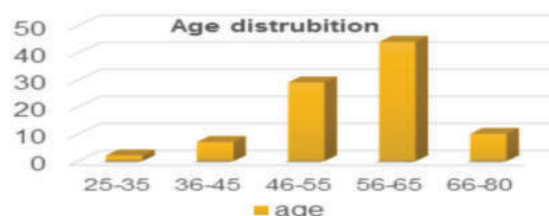
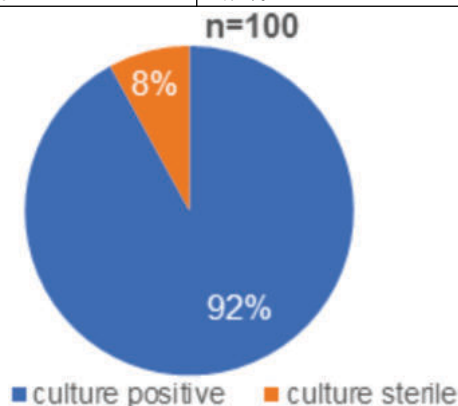


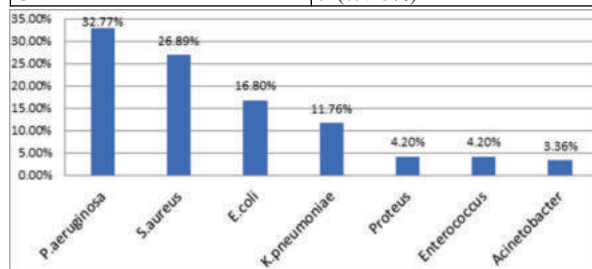
Figure 1: Age wise Distribution Of Samples (N=100)

Table 1 Genedr Distribution (n=100)

Gender	percentage
Male	78.26%
Female	21.74%

**Figure 2:** Distribution Of Culture Positivity**Table 2: Characteristics Of Isolates In Total Culture Positives (N=119)**

Isolates	Number and percentage
GPC	37 (40.21%)
GNB	82(89.13%)

**Figure 3:** Percentage Of Organisms Isolated**Table 3: Antibiotic Susceptibility Pattern Of Gram Positive Cocci**

Antibiotics	<i>Staphylococcus aureus</i> (n=32)
Linezolid	90.62%
Cefoxitin	71.87%
Amikacin	43.75%
Vancomycin	98.6%
Azithromycin	53.12%
Ampicillin	28.12%
Antibiotics	<i>Enterococcus</i> (n=5)
Ampicillin	40%
Vancomycin	100%
Ciprofloxacin	60%
Gentamycin	80%
Amikacin	40%
Azithromycin	40%

Table 4 Antibiotic Sensitivity Pattern Of Gram Negative Bacilli

Antibiotics	<i>Paeruginosa</i> (n=39)	<i>Escherichia coli</i> (n=20)	<i>Klebsiella sp</i> (n=14)	<i>Proteus sp</i> (n=5)	<i>Acinetobacter</i> (n=4)
Gentamycin	71.79%	60%	71.42%	40%	75%
Amoxycillin + clavulanic acid	35.89%	25%	42.85%	40%	50%
Cefotaxime	38.46%	35%	35.71%	20%	25%
Meropenem	78.36%	60%	100%	100%	75%
Piperacillin + Tazobactam	76.92%	80%	64.28%	100%	100%
Levofloxacin	28.20%	40%	50%	80%	-
Colistin	82.45%	75.29%	72.81%	-	91.28%

DISCUSSION:

In this study males are predominant than females ,which is correlating with Sneha keerthi et al1 , Sundarajan et al (8) 80.45% male & 19.55% females and 81.14%&18.86% respectively. In Comparison of age wise

distribution with other studies .In present study ,it is compared to R Shashanka et al(6) 55 – 65 yrs 54% and Otta S et al (5)51 – 60 yrs 45.9%.

When compared with growth isolates current study is correlated with R sree naga sowndary et al 1and Ekta bansal et al7. In our study Gram-negative bacteria are higher as compared with Gram-positive bacterial isolates . *Pseudomonas spp* among gram-negative and *S. aureus* among Gram-positive cocci were the most common pathogens. Other studies from India have also reported Gram-negative bacilli as predominant pathogen in diabetic infections.(9) GNB are more isolated then GPC which is correlating with Ekta Bansal et al 7,Sundarajan et al(8). Out of total isolates MRSA (28.12%) where isolated in this study which is similar to Lohan et al (30.7%).

Table 5: Distribution Of Age Group In Various Studies

STUDY	Age group	Percentage
Otta S et al	51 – 60 yrs	45.9
Zubair M et al	41 – 60 yrs	57.8
Ekta Bansal et al	51 – 70 yrs	56.31
Present study	55 – 65 yrs	44

Table 6: Distribution Of Monomicrobial/polymicrobial Growth In Various Studies

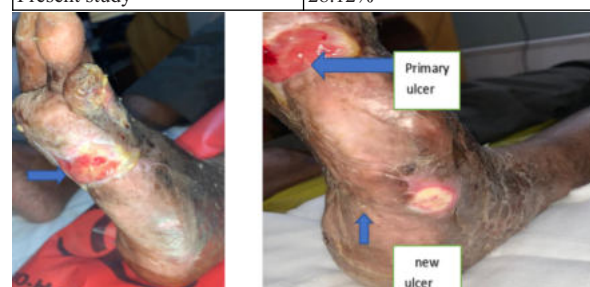
STUDY	Monomicrobial samples	Polymicrobial samples
R sree naga sowndary et al	78.5%	31.5%
Ekta bansal et al	63.93%	26.22%
Sundarajan et al	90.98%	9.02%
Ankur kumar et al	65%	35%
Present study	73.91%	26.08%

Table 7: Comparison Of Isolates With Other Studies

STUDY	Gram negative bacteria	Gram positive bacteria
Ekta Bansal et al	76%	24%
Rsree nagasowndary et al	54.6%	45.4%
Ankur kumar et al	56.7%	40.3%
Sundarajan et al	63.15%	39.85%
Present study	89.13%	40.21%

Table 8: Distribution Of Methicillin Resistant *Staphylococcus Aureus* – A Comparative Study

STUDY	Percentage of MRSA
Lohan et al	30.7%
Dwedat et al	10.1%
Present study	28.12%



Case study: figure: A 60 year old male with diabetic foot ulcer, inspite of treatment with antibiotics a new second ulcer developed on the same foot due to poor glycaemic control

CONCLUSION:

Although the bacterial profile from pus samples has remained consistent across various studies, there is a significant variation in the pattern of their antimicrobial susceptibility, Emphasizing the growing danger of the emergence of resistant organisms and the need for ongoing monitoring of these shifts.

As a result, this research is being conducted to investigate the antimicrobial susceptibility pattern ,observed in pus samples in a tertiary care hospital.

Changing trends are noted in the aspect of emerging drug resistant strains in an ever increasing order .Hence this study may help the

clinician to manage diabetic patient with proper antibiotics.

REFERENCES:

1. Comparative bacteriological profile with antibiotic resistance pattern among diabetic and non-diabetic patients **R Sree Naga Sowndary1** , Kavitha
2. A study on aerobic bacteriological profile and antimicrobial susceptibility pattern of isolates from pus samples in a tertiary care hospital **I Thangavel** , Gomathi Maniyan*, S. Vijaya, C. Venkateswara
3. Clinical and bacteriological profile of diabetic foot infections in a tertiary care Teik Chiang Goh1,2, Mohd Yazid Bajuri1* , Sivapathasundaram C. Nadarajah2 , Abdul Halim Abdul Rashid1 .
4. Gadepalli R, Dhawan B, Sreenivas V, Kapil A, Amini AC, Chaudhry R, et al. A clinico - microbiological study of diabetic foot ulcers in an Indian tertiary care hospital. Diabetes Care .
5. **Otta S, Debata NK**, Swain B. Bacteriological profile of diabetic foot ulcers. CHRISMED J Health Res 2019;6:7-11
6. **Shashanka R**, Rajanna B. Bacteriological Profile of Diabetic Foot Ulcers: A Clinical Study. IJSS Journal of Surgery 2016;2(3):38-41.
7. **Bansal E**, Garg A, Bhatia S, Attri AK, Chander J. Spectrum of microbial flora in diabetic foot ulcers. Indian J Pathol .
8. Sundararajan Thangavel, Gomathi Maniyan*, S. Vijaya, C. Venkateswaran A study on aerobic bacteriological profile and antimicrobial susceptibility pattern of isolates from pus samples in a tertiary care hospital.
9. Performance standards for antimicrobial susceptibility testing 27th information supplement. Clinical Laboratory Standard Institute; 2017.
10. Esmat.M.M, Islam.A.S, Diabetic foot infection bacteriological causes and antimicrobial therapy. J American Sci 2012; 8(10):389-93.
11. Vinita Rawat, Monil Singhai, Ashok Kumar1, Pawan Kumar Jha2, Rajeev Bacteriological and Resistance Profile in Isolates from Diabetic Patients
12. Juliana Casqueiro, Janine Casqueiro, Cresio Alves Infections in patients with diabetes mellitus: A review of pathogenesis Singh N, Armstrong DG, Lipsky BA. Preventing foot ulcers in patients.
13. Shanmugam P, Jeya M, Susan S L. with a special reference to multidrug resistant strains. J Clin Diagn Res 2013;7:441-5. with diabetes. JAMA 2005;293:217-28.
14. Pappu AK, Sinha A, Johnson A. Microbiological profile of diabetic foot ulcer. Calicut Med J 2011;9:e1-4.
15. Gadepalli R, Dhawan B, Sreenivas V, Kapil A, Amini AC, Chaudhry R, et al. A clinico - microbiological study of diabetic foot ulcers in an Indian tertiary care hospital. Diabetes Care 2006.