

## DIABETIC FOOT INFECTION DUE TO PSEUDOMONAS AERUGINOSA, PESHAWAR

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### **ABSTRACT:**

### **OBJECTIVES:**

*The objectives of this study were to evaluate the diabetic foot infection due to pseudomonas aeruginosa in Peshawar.*

### **METHODOLOGY:**

*A tenth month study was conducted at Khyber Teaching Hospital Peshawar from April 2019 to February 2020. All diabetic foot patients, admitted at surgical ward with outpatients were also enrolled in the study. The study was conducted on 109 patients with both genders.*

### **RESULTS:**

*The result of male to female ratio was equal. Out of 109, fifty-five (55) were male and fifty-four (54) were female. A total of 109 bacteria were isolated from those patients. Age ranges from 40 years to 85 years. All 109 patients is present with 1 pathogen, none of it is present with multiple pathogen. Gram-positive organisms were found only in 37 (32%) patients, while other are gram negative. Staphylococcus aureus was most prominent isolated bacteria in 37 (32%) patients, followed by E.coli 29 (27%), enterobacter 20 (18%), pseudomonas 12 (11%), citrobacter species 12 (11%), and proteus species in 01 (01%) patient.*

### **CONCLUSION:**

*This study concluded that Staphylococcus is most dominant gram-positive organism isolated about 32%, followed by other gram-negative organism. Patient ages between 51-60 were most in number i.e. 43 out of 109. The mean age is 54±5.*

**KEYWORDS:** Staphylococcus, Gram-positive, E. coli, Bacteria, Antibiotics

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### **INTRODUCTION:**

Diabetes mellitus is long term; serious chronic condition that occurs when raised level of glucose in blood occurs and their body cannot produce enough insulin. Insulin deficiency leads to high levels of blood glucose (hyperglycemia), which is the clinical

sign of diabetes. Diabetes is a major health issue today that has gained alarming level, nearly half a billion people are affected with diabetes worldwide<sup>1</sup>. There is strong association between the foot problems and diabetes. World Health Organization reported that nineteen million of the India is diagnosed with diabetes and in year 2025 it would be increase to fifty-seven million<sup>2</sup>. The Symptoms of foot infection is the fever and leukocytosis/pus secretions. Other local symptoms are warmth, redness, pain, and tenderness<sup>3</sup>. It can affect people at any age, but usually develops in children or young adults<sup>4</sup>. In Diabetes at early stages the

symptoms are reduced, and the hyperglycemia level increases gradually, so usually left undiagnosed<sup>5</sup>. There should be increase or normal level of insulin in this form of diabetes. High insulin level can be due to the high blood glucose level which indicates that  $\beta$ -cell functioning is normal<sup>6</sup>. This results in disturb level of insulin secretion and resistance. Prolonged complications of diabetes include peripheral neuropathy with foot ulcers risks, retinopathy with potential loss of vision amputations, and Charcot joints, nephropathy leading to renal failure and autonomic neuropathy causing gastrointestinal, genitourinary, and cardiovascular symptoms and sexual dysfunction<sup>7</sup>. Diabetic patients usually come across with the foots infection and is difficult to manage the infection<sup>8</sup>. The most affected area is the lower limbs, around fifteen per cent of the patients are diagnosed with foot ulcer for their life time<sup>9</sup>. These problems causes disability and hospitalization<sup>6,10</sup>.

#### METHODOLOGY:

A tenth month study is conducted at Khyber Teaching Hospital Peshawar from April 2019 to February 2020. All the patients have diabetic foot admitted at surgical ward and OPD were enrolled in the study. The study was carried on 109 patients with diabetic foot ulcer. Pus or discharges from the ulcer base and debrided necrotic tissue were obtained. Sterile swab samples were obtained, following the removal of debris-containing tissues and cleansing the wound and peri-wound with sterile normal saline. Deep tissue samples were obtained from the viable and non-viable tissue junction using a curette or punch biopsy material. Bone specimens were obtained during surgical debridement using a rongeur whenever possible. The specimens were taken immediately to the microbiology laboratory and processed without any delay. The specimens were subjected to Gram staining and were simultaneously inoculated on blood agar and MacConkey agar for isolation of aerobic bacteria. After 24 hours incubation at 37°C, the bacterial isolates were identified based on standard bacteriological methods. Specimens were incubated at 37°C for 24 to 48 hours on eosin methylene blue, chocolate and 5% sheep blood agars. The laboratory

performed microorganism identification and antibiotic sensitivity testing.

The microorganisms were identified by standard methods based on the morphology of the colonies, microscopic appearance of bacteria, Gram staining, and by using rapid Gram-positive and negative identification kits.

#### RESULTS:

The result of male to female ratio was equal. Out of 109, 55 were male and 54 were female. The age ranges from 40 to 85 years. Bacteria were isolated from those patients. All 109 patients presented with 01 pathogen, none of is present with multiple pathogens.

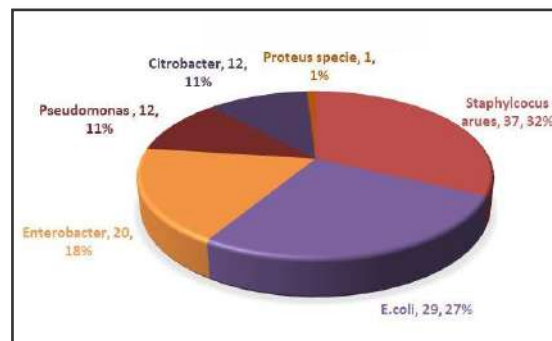


Figure 1: Bacteria Isolated from Diabetic Foot Ulcers

#### DISCUSSION:

Diabetic patients often having chronic non-healing foot ulcers due to several underlying factors such as neuropathy, peripheral arterial diseases and high plantar pressures<sup>11</sup>. Such chronic long-standing ulcers are more prone for infection, which further delays the wound healing process. A wide range of bacteria can cause infection in these patients<sup>12</sup>. In this study, gram-negative bacteria were the predominant pathogens. Staphylococcus aureus was most prominent isolated bacteria in 37 (32%) patients, followed by E. coli 29 (27%), Enterobacter 20 (18%), pseudomonas 12 (11%), citrobacter species 12 (11%), and proteus species in (01%) patient. In Earlier studies have documented gram-positive bacteria as the predominant organisms associated with diabetic foot infections<sup>13</sup>. Therefore, there seems to be a changing trend in the organisms causing diabetic foot infections, with gram-negative bacteria replacing gram-positive bacteria as

commonest agents<sup>14</sup>. All patients have mono microbial infection; poly microbial infection was observed in none of the patient. It is concluded that bacteria are one of leading cause of diabetic foot infection<sup>15,16</sup>. We also assume that monotherapy may not be the best management for causal microbes. Thus, choosing empiric antibiotic therapy for diabetic foot infections can be based on a number of conditions: (a) the severity of infection, (b) the extent and depth of involvement of infection, and (c) the local pattern of bacterial etiology and their antibiogram<sup>17</sup>. The infection can be treated with the following amoxy/Liavlani acid ampicillin/sulbactam, and cefuroxime. If the infection is severe and involves deep tissue and bone, caftazidine, imipenem, and some are meropenem, and levofloxacin are more appropriate, with their sensitivities reaching 98-100%<sup>18</sup>.

## CONCLUSION:

Our study concluded that *Staphylococcus* is most dominant gram-positive organism followed by another gram-negative organism. As *P. aeruginosa* infection may be that pathogen which exhibit high degree of resistance to a broad spectrum of antibiotics.

**CONFLICT OF INTEREST:** None

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## REFERENCES:

1. Umadevi S, Kumar S, Joseph NM, Easow JM, Kandhakumari G, Srirangaraj S, et al. Microbiological study of diabetic foot infections. *Indian J Med Spec.* 2011;2(1):12-7.
2. Coffey L, Mahon C, Gallagher P. Perceptions and experiences of diabetic foot ulceration and foot care in people with diabetes: a qualitative meta-synthesis. *Int Wound J.* 2019;16(1):183-210.
3. Mishra SC, Chhatbar KC, Kashikar A, Mehndiratta A. Diabetic foot. *BMJ.* 2017;359:j5064.
4. Ramakant P, Verma AK, Misra R, Prasad KN, Chand G, Mishra A, et al. Changing microbiological profile of pathogenic bacteria in diabetic foot infections: time for a rethink on which empirical therapy to choose?. *Diabetologia.* 2011;54(1):58-64.
5. Chapman S. Foot care for people with diabetes: prevention of complications and treatment. *Br J Community Nurs.* 2017;22(5):226-9.
6. Mullan L, Driscoll A, Wynter K, Rasmussen B. Barriers and enablers to delivering preventative and early intervention footcare to people with diabetes: a scoping review of healthcare professionals' perceptions. *Aust J Primary Health.* 2020;25(6):517-25.
7. Pankhurst CJ, Edmonds ME. Barriers to foot care in patients with diabetes as identified by healthcare professionals. *Diabetic Med.* 2018;35(8):1072-7.
8. Huda N, Sukartini T, Pratiwi NW. The impact of self-efficacy on the foot care behavior of type-2 diabetes mellitus patients in Indonesia. *J Ners.* 2019;14(2):181-6.
9. Abdulrazak A, Bitar ZI, Al-Shamali AA, Mobasher LA. Bacteriological study of diabetic foot infections. *J Diabetes Complications.* 2005;19(3):138-41.
10. Lipsky BA. Medical treatment of diabetic foot infections. *Clin Infect Dis.* 2004;39(Supplement\_2):S104-14.
11. Shanmugam P, Jeya M, Linda-Susan S. The bacteriology of diabetic foot ulcers, with a special reference to multidrug resistant strains. *J Clin Diagn Res.* 2013;7(3):441-5.
12. Lipsky BA, Berendt AR, Embil J, DeLalla F. Diagnosing and treating diabetic foot infections. *Diabetes/Metab Res Rev.* 2004;20(S1):S56-64.
13. Shankar EM, Mohan V, Premalatha

- G, Srinivasan RS, Usha AR. Bacterial etiology of diabetic foot infections in South India. *Eur J Intern Med.* 2005;16(8):567-70.
14. Machado C, Teixeira S, Fonseca L, Abreu M, Carvalho A, Pereira MT, et al. Evolutionary trends in bacteria isolated from moderate and severe diabetic foot infections in a Portuguese tertiary center. *Diabetes Metab Syndr: Clin Res Rev.* 2020;14(3):205-9.
  15. Miyan Z, Fawwad A, Sabir R, Basit A. Microbiological pattern of diabetic foot infections at a tertiary care center in a developing country. *J Pak Med Assoc.* 2017;67(5):665-9.
  16. Khawaja N, Abu-Shennar J, Saleh M, Dahbour SS, Khader YS, Ajlouni KM. The prevalence and risk factors of peripheral neuropathy among patients with type-2 diabetes mellitus; the case of Jordan. *Diabetol Metab Syndr.* 2018;10(1):1-10.
  17. Gogia S, Rao CR. Prevalence and risk factors for peripheral neuropathy among type-2 diabetes mellitus patients at a tertiary care hospital in coastal Karnataka. *Indian J Endocrinol Metab.* 2017;21(5):665-9.
  18. Chandrashekar S, Muralidhar S. A study on the prevalence of risk factors and presence of diabetic foot ulcers in T2DM patients in KR Hospital, Mysuru. *Int Surg J.* 2017;4(9):2983-6.

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