EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 1
Issue: 2
546-550
Year: 2014

MULTIDRUG RESISTANT POLYMICROBIAL INFECTION IN DIABETIC FOOT ULCER IN A TERTIARY CARE HOSPITAL: A CASE REPORT

Dr Kalidas Rit*, Dr Hirak Jyoti Raj, Dr Saswati Chattopadhyay, Dr Parthasarathi Chakrabarty

Assistant professor, Department of Microbiology, Institute of Post-Graduate Medical Education & Research. 244 AJC Bose Road. Kolkata-700020.

Article Received on 25/08/2014 **Article Revised on 17/09/2014** **Article Accepted on 09/10/2014**

***Correspondence for Author**
Dr. Kalidas Rit
Assistant professor, Department of Microbiology, Institute of Post-Graduate Medical Education & Research. 244 AJC Bose Road. Kolkata-700020.

ABSTRACT

Diabetes Mellitus is one of the most critical health conditions in India not only in terms of number of people affected, disability, and premature mortality, but also in regards to the health care cost involved in management of its complication. Foot ulcers are among the leading causes of morbidity in diabetes and are most common indication for admission in this population. Devitalized tissue is the site where the bacteria responsible for nonhealing ulcers inflict damage. Infectious agents are associated with amputation of the infected foot if not treated promptly. Here we review a unique presentation of a multidrug resistant (MDR) polymicrobial diabetic foot ulcer infection involving vancomycin resistant *Enterococcus fecalis* (VRE), methicillin resistant *Staphylococcus aureus* (MRSA) and *Corneybacterium amycolatum*.

KEYWORDS: diabetic foot ulcer, multidrug resistant, polymicrobial infection.

INTRODUCTION

Diabetes is a common disease in India with a prevalence of 12-17% in the urban population and 2.5% in the rural population.[1] In diabetic patients the devastating complication is non-traumatic lower limb amputation and 90% of lower limb amputations are preceded by diabetic foot infection.[2] Diabetic foot infections are often polymicrobial involving multi-

drug resistant (MDR) strains of methicilin resistant *Staphylococcus aureus*, vancomycin resistant *Enterococcus* species (VRE), *Corneybacterium* other than diptheriae, multiresistant *Streptococcus pneumoniae* and other gram negative organism like *Psedumonas spp, Acinetobacter spp, Klebsiella pneumoniae* and *Enterobacter* species.[3] Thereby it is necessary to determine the bacteriological profile of hospitalized patients to decrease the high rate of amputation and mortality.

CASE REPORT

A 77 year old male presented to the Dermatology OPD with a chief complaint of an ankle injury and foot non-healing ulcer (fig-1) sustained from road traffic accident three months back. The patient also had diabetes for approximately 12 years with irregular treatment to control the disease. During the initial consultation, the patient related receiving of two courses of oral antimicrobial therapy (first ciprofloxacin/tinidazole bd×7days, after one week cefuroxime bd × 7days) in sub divisional hospital for his nonhealing wound of left foot. The patient was admitted and further clinical and medical imaging revealed occurrence of neuroischemic ulcer complicated with infection and oesteomyelitis (Fig.1). The presence of vascular compromise and oesteomyelitis were diagnosed by macroscopic visualization of a large area of tissue necrosis along with abscess and radiological analysis respectively. Laboratory investigation revealed haemoglobin 8.5 mg/dL, white cell count $22\times10^3/mm^3$, granulocyte percentage 83%. The differential count showed a segmented neutrophil percentage of 80%. The fasting plasma glucose level corresponded to 295 mg/dL with HbA1c value 8.5% thus reflecting poor glycemic control.

After admission a consultation was made for wound debridement and obtaining wound specimen for bacterial culture and antibiogram. The wound was thoroughly cleaned and irrigated by using 0.85% sterile sodium chloride (Nacl) solution. Then all the necrotic tissue enclosing the ulcer was removed with help of a sterile scalpel blade. The wound was again irrigated with 0.85% sterile Nacl solution. After that wound culture material was obtained from ulcer base via tissue biopsy. The collected specimen was immediately send to the Microbiology laboratory and duly processed using protocols recommended by Murray et al.[4] The specimen was then inoculated in selective MacConkey agar, blood agar, and liquid culture media brain heart infusion broth (Hi-Media, Mumbai), followed by incubation at conventional atmosphere at 37^0C for 24 hours. Biochemical tests were then performed to identify bacteria at species level. Susceptibility to cefoxitin, ampicillin, amoxyclav, linezolid,

cefoperazone/sulbactum, piperacillin/tazobactum, chloramphenicol, ciprofloxacin, levofloxacin, clindamycin, erythromycin, azithromycin oxacillin, vancomycin, gentamicin, tetracycline and trimethoprim/sulfamethoxazole was determined using the disc diffusion test. All assays were performed in accordance with clinical and laboratory standard institute guidelines. [5] *Staphylococcus aureus* (ATCC 25923) was included as control strains. Susceptibility of *S.aureus* to oxacillin was determined using oxacillin-salt-screen-agar containing 6ug/ml oxacillin and 4% Nacl, followed by the use of cefoxitin (30ug) agar disc diffusion. Final microbiological analysis revealed a polymicrobial infection caused by MDR strains of MRSA, vancomycin resistant *Enterococcus fecalis* (fig-2, 3), and *Corneybacterium amycolatum*(4). Finally the affected limb was amputated on 14th hospitalization day.

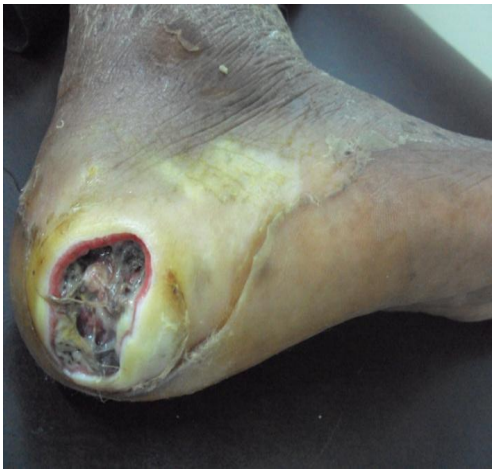

Fig-1 Non healing diabetic foot ulcer

Fig-2 Colony of E.fecalis on MacConkey agar plate

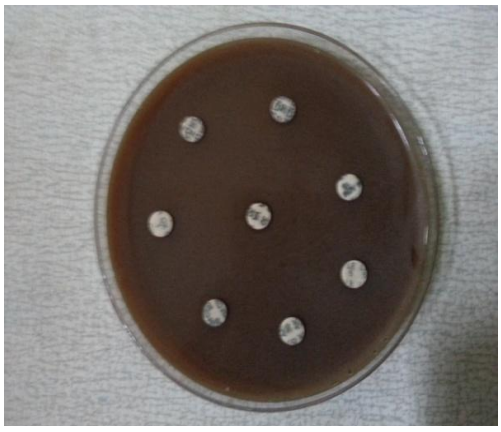

Fig3. Antibiotic sensitivity test showing VRE.

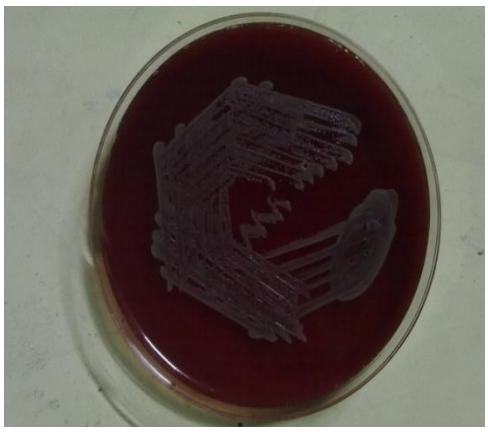

Fig-4 C.amycolatum colony on blood agar

DISCUSSION

Some patients with type 2 diabetes can remain asymptomatic for 10 years or longer and in many cases the first manifestation is the appearance of a chronic complication. Here the patient had diabetes for approximately 12 years and another fact should be taken into consideration was the patient's lack of proper knowledge regarding his disease and the importance of proper foot care. The Wagner's classification which was chosen in this case study was classified as 3**.** Here wound culture material was obtained from ulcer base via tissue biopsy as swabbing the ulcer for culture material is not recommended.[6]

The bacterial species isolated in this study were MRSA, vancomycin resistant *Enterococcus fecalis*, and *Corneybacterium amycolatum*, all with multi-drug resistance phenotype. Methicillin resistant *Staphylococcus aureus* strains represent a chronic problem in hospital environment with prevalence of 40-55% in India. [7] Since the 1980, several cases of community acquired MRSA infection were reported. It has been shown that MRSA persists in some patients for several years ensuring the spread of these strains. Here isolated MRSA strain only showed intermediate susceptibility to vancomycin being resistant to other antimicrobial.

Enterococci have evolved from being an intestinal commensal organism of little clinical significance to becoming the second most common nosocomial pathogen associated with significant morbidity and mortality.[8] In recent years, there has been a rapid increase in the incidence of infection and colonization of patients with VRE. Here isolated vancomycin resistant *Enterococcus fecalis* showed resistant to the all other antimicrobial agents tested.

Corneybacterium species, other than *Corneybacterium dipthaerae* though generally present as skin commensal have been reported with an increasing frequency as nosocomial pathogen particularly in case of immunocompromised patients. They are commonly associated with genitourinary tract infection, surgical/skin wound infection, indwelling device associated infection, and septicaemia. [9] They are predominantly resistant to β-lactum group of drugs. Here the isolated strain of *Corneybacterium amycolatum* was susceptible only against vancomycin.

Bacterial resistance is becoming increasingly common in diabetic foot infection and related to previous antibiotic therapy, frequency of hospitalization for same wound and presence of oesteomyelitis. Here the patient reported of having used antibiotics prior to his

hospitalization. Therefore it could be suggested that the natural selection imposed by antibiotics led to the elimination of susceptible species, leaving only the resistant strains in the damaged tissue. The existence of bioflim on chronic difficult to heal wound complicates the clinical use of antimicrobial, favouring the emergence of resistant bacteria. So the treatment strategy should be based on isolating the causative agent and on determining the sensitivity profile in regards to antimicrobial agents.

REFERANCES

1. Mohan V, Sandeep S, Deepa R, Shah B, Varghese C. Epidemiology of type 2 diabetes: Indian scenario. Indian J Med Res., 2007; 125: 217-230.
2. Vijay V, Satyavani K. Pattern and causes of Amputation in Diabetic patients – A multicentric Study fromIndia. JAPI, 2011; 59: 148-151.
3. Hartemann-Heurtier A, Robert J, Jacqueminet S, Ha Van G, Golmard JL, Jarlier V, et al. Diabetic foot ulcer and multidrug-resistant organisms: risk factors and impact. Diabet Med., 2004; 21: 710–5.
4. Inderlied CB, FC, Yolken RH, eds. Manual of clinical microbiology, 7th ed. Washington, DC: ASM Press; 1999, pp. 1601– Salfinger M. Antimicrobial agents and susceptibility testing: mycobacteria. In: Murray PR, Baron EJ, Pfaller MA, Tenover 23.
5. Clinical and Laboratory Standards Institute (2009). Performance standards for antimicrobial susceptibility testing. 9th ed. Approved standard M100–S19. Wayne PA: CLSI.
6. Bader MS. Diabetic foot infection. Am Fam Physician, 2008; 78: 71-79.
7. Rajaduraipandi K, Moni KR, Panneerselvam K, Mani M, Bhaskar M, Manikandan P. Prevalence and antimicrobial susceptibility pattern of methicillin resistant Staphylococcus aureus: a multicentre study. Indian J Med Microbiol, 2006; 24: 34-8.
8. Coley M. B, Lipsky B. A. Corneyform bacteria in infectious diseases: Clinical and laboratory aspects. Clin. Microbiol. Rev., 1990; 3(3): 227-246.
9. Giridhara upadhyaya PM, Ravikumar KL, Umapathy BL. Review of virulence factor of Enterococcus: An Emerging nosocomial pathogen. Indian J Med Microbiol, 2009; 27:30.