

CLINICAL AND LABORATORY PROFILE OF TYPE 2 DIABETES PATIENTS WITH SKIN AND SOFT TISSUE INFECTIONS (SSTI) & CORRELATION WITH BACTERIOLOGICAL CULTURE & ANTIBIOTIC SENSITIVITY PATTERN

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Abstract

Background: This is the most common secondary complications in diabetes. Incidence of SSTI ranges from 20-50%, often associated with poor glycemic control. Appropriate antibiotic therapy involves decisions about the mode of administration, organism that need to be covered, the drug to be used and its duration. Study aims to assess the clinical and laboratory profile of Type 2 Diabetes patients with SSTI & correlate with bacteriological culture & antibiotic sensitivity which would help in preparing an antibiotic policy and would help in minimizing irrational antibiotic use. **Materials and Methods:** From 106 patients with Type 2 DM, evaluated and treated for SSTI at MGM Muthoot Medical Centre, Pathanamthitta during the period of July 2012 to June 2014 were analysed. **Result & Conclusion:** Of the 106 samples, Staphylococcus aureus was the predominant organism grown (68.87%). And was highly sensitive to carbapenems (95.38%), Among the gram-negative organism's highest sensitivity were obtained for carbapenems (93.10%), High resistance rate was observed for 3rd and 2nd generation cephalosporin (36.36% and 60.71%), 20.90% of the Staphylococcus aureus were MRSA. Foot was the site of infection in 62.26%. Evidence of neuropathy was seen in 74.24% of patients with foot infection. Those with more complications were also found to be more resistant to amoxicillin-clavulanic acid ($p < 0.05$). 29.25% of patients had history of recurrent SSTI. Presence of complications and history of previous SSTI made the hospital stay longer and predisposed for higher resistance to drugs.

INTRODUCTION

Skin and Soft Tissue Infections (SSTI) are the most common secondary complications in diabetes. Incidence of SSTI ranges from 20-50%, mostly in type 2 diabetes mellitus & often associated with poor glycemic control. The prevalence, severity and management aspects of SSTI are related to the clinical profile and glycemic status of patients. There is considerable variation in the type of isolates based on geographical distribution. Appropriate antibiotic therapy involves decisions about the mode of administration, organism that need to be covered, the drug to be used and its duration. Initial antibiotic therapy is empirical and one should base this on the severity of infection and the most likely organisms involved. A diabetes epidemiological survey conducted in 2007 in the rural area of the state showed a prevalence rate of

14.6%. Pathanamthitta district of Kerala has the highest prevalence of diabetics (16%) based on the union health ministry nation-wide campaign for screening diabetes in rural areas. Clinical and microbiological data from Pathanamthitta are lacking and there is a growing tendency to use irrational antibiotic therapy at the primary care level. This study aims to assess the clinical and laboratory profile of Type 2 Diabetes patients with skin and soft tissue infections (SSTI) & correlate them with bacteriological culture & antibiotic sensitivity pattern which would help in preparing an antibiotic policy for this geographical area and would help in minimizing irrational antibiotic use.

Aim/Objective

1. To study the bacteriological profile of SSTI in type 2 diabetes patients.

2. To evaluate the antibiotic sensitivity pattern in these patients.
3. To correlate the microbiological results with various clinical parameters of patients

MATERIALS AND METHODS

Data from 106 patients with Type 2 DM, evaluated and treated for SSTI at MGM Muthoot Medical Centre, Pathanamthitta during the period of July 2012 to June 2014 were analyzed. Clinical details were obtained from the Hospital Electronic Medical Records and Microbiological results maintained by the Microbiology department of the hospital. Missing clinical data was obtained by telephonic interview of the patients. All data were collected based on a well-structured questionnaire. Data was analyzed using the IBM SPSS Statistics v21 software. Hospital Ethical Committee approval was obtained prior to commencement of the study.

RESULTS

Of the 106 samples analysed, *Staphylococcus aureus* was the predominant organism grown (68.87%) and the remaining 31.13% grew gram negative aerobic bacteria.^[1] *Staphylococcus aureus* was highly sensitive to carbapenems (95.38%), 3rd and 2nd generation Cephalosporins (91.78% and 86.67%), Aminoglycoside (90.41%), Linezolid (93.62%).^[12] Moderate sensitivity was obtained for Piperacillin–Tazobactam (81.82%), Levofloxacin (83.33%), and Tetracycline (86.67%). High resistance rates were obtained to quinolones except Levofloxacin (31.51%), amoxicillin-clavulanic acid (55.22%), amoxicillin/ampicillin (77.78%), co-trimoxazole (45%), cloxacillin (37.50%).

DISCUSSION

This was an observational study with the main objectives are bacteriological profile of SSTI in type 2 diabetes patients. And to evaluate the antibiotic sensitivity pattern in these patients. To correlate the microbiological results with various clinical parameters of patients.

Over a period of July 2012 to June 2014 were analysed and total 106 sample met the inclusion criteria. Assessment of these all selected sample was done in IPD and OPD basis. Clinical details were obtained from the Hospital Electronic Medical Records and Microbiological results maintained by the Microbiology. Skin and Soft Tissue Infections (SSTI) are the most common secondary complications in diabetes often associated with poor glycemic control. Initial antibiotic therapy is empirical and one should base this on the severity of infection and the most likely organisms involved.

Of the 106 samples analysed, *Staphylococcus aureus* was the predominant organism grown (68.87%).

Among the gram negative organisms highest sensitivity were obtained for carbapenems (93.10%), Levofloxacin (87.10%), aminoglycoside (78.79%), Piperacillin–Tazobactam (75.76%). High resistance rate was observed for 3rd and 2nd generation cephalosporin (36.36% and 60.71%), quinolones except Levofloxacin (39.39%), amoxicillin-clavulanic acid (68.75%), co-trimoxazole (58.62%). 20.90% of the *Staphylococcus aureus* were methicillin resistant (MRSA).^{[1][2]}

61.32% of the patients were in the age group of 50-65 years. 63.21% of the patients had duration of diabetes more than ten years. Males predominated over females (55.66% v/s 44.34%). 62.26% of patients had an RBS of more than 200mg/dl at time of admission. HbA1c more than 8% was observed in 66.98% of subjects. Foot was the site of infection in 62.26% of patients. Evidence of neuropathy was seen in 74.24% of patients with foot infection. 60.38% of the patients were on either insulin or insulin + OHA at the time of admission. Half of the patients needed a hospital stay of 4-7 days, while 35.85% needed a stay of more than 7 days.

41.5% of patients had 3 or more micro/macro vascular complication of diabetes and these patients needed prolonged hospital stay compared to those with less than 3 complications ($p < 0.05$). Those with more complications were also found to be more resistant to amoxicillin-clavulanic acid ($p < 0.05$). 29.25% of patients had history of recurrent SSTI and these patients required prolonged hospital stay ($p \sim 0.01$). Those with more complications were also found to be prone to recurrent SSTI ($p < 0.01$). Patients with foot infection had longer hospital stay compared to infections occurring in other body parts.

Staphylococcus aureus was highly sensitive to carbapenems (95.38%), 3rd and 2nd generation Cephalosporins (91.78% and 86.67%), Aminoglycoside (90.41%), Linezolid (93.62%). High resistance rates were obtained to quinolones. Out of 106 sample 20.90% of the *Staphylococcus aureus* were methicillin resistant (MRSA).^[1]

Among the gram negative organisms highest sensitivity were obtained for carbapenems (93.10%), High resistance rate was observed for 3rd and 2nd generation cephalosporin (36.36% and 60.71%), Out of 106 patients, 61.32% of the patients were in the age group of 50-65 years. In these 63.21% of the patients had duration of diabetes more than ten years.

Males predominated over females (55.66% v/s 44.34%). In total HbA1c more than 8% was observed in 66.98% of subjects. Most commonly Foot was the site of infection in 62.26% of patients. Evidence of neuropathy was seen in 74.24% of patients with foot infection.

41.5% of patients had 3 or more micro/macro vascular complication of diabetes and these patients

needed prolonged hospital stay compared to those with less than 3 complications ($p < 0.05$).

Those with more complications were also found to be more resistant to amoxicillin-clavulanic acid ($p < 0.05$).

Out of 106 subject 29.25% of patients had history of recurrent SSTI and these patients required prolonged hospital stay ($p \sim 0.01$).

Pathanamthitta district of Kerala has the highest prevalence of diabetics (16%) based on the union health ministry nation-wide campaign for screening diabetes in rural areas. Clinical and microbiological data from Pathanamthitta are lacking and there is a growing tendency to use irrational antibiotic therapy at the primary care level. Most commonest causes of antibiotic resistant due to poorly controlled blood sugar level and neuropathy due to improper care of foot.^[5] And potential risk factor high carbohydrate rich diet in this area.

CONCLUSION

Staphylococcus aureus is still the major pathogen in SSTI in diabetic patients in this geographical area and is highly sensitive to carbapenems, 3rd generation cephalosporin, Aminoglycoside and Levofloxacin. Gram negative organisms showed better sensitivity to Aminoglycoside, carbapenems and Levofloxacin.^[12] High resistance rates were observed for amoxicillin clavulanic acid, cotrimoxazole, ciprofloxacin.^[10] Male sex, longer duration of diabetes, advancing age, poor glycemic control and presence of micro and macrovascular complications predisposed patients to SSTI. Presence of complications and history of previous SSTI made the hospital stay longer and predisposed for higher resistance to drugs. This study therefore provides a platform for formulating an antibiotic policy rational antibiotic use.^[6] and identifying diabetic patients at higher risk for SSTI in this geographical area.

Recommendations

- Proper glycemic control
- Avoid carbohydrate rich diet
- Avoid irrational use of antibiotics
- Strict diabetic diet and daily exercise

- Reduce overweight and control weight management
- Proper use of OHA and INSULIN as per prescribed

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