Original Article

Different cutaneous infections in diabetic patients presenting in an out patient department of a tertiary care hospital

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Objective: This study aimed to assess different skin infectious lesions in patients with diabetes mellitus (DM) presenting at a tertiary care hospital..

Methodology: A total of 200 patients with DM and cutaneous infections were recruited from Dermatology Outpatient of Dow University Hospital, Karachi from January to August 2018. History was taken with reference to cutaneous complaints and glycosylated hemoglobin (HbA1c) levels were estimated in all patients to assess the control of diabetes. Statistical analysis was done with SPSS version 22.

Results: A majority of the patients (43%) had fungal infection with Tinea corporis being the most common (23%). Bacterial infection (32%) was the second common infection among which folliculitis was observed in 28% of infections. Among the viral infections (25%), Shingles appeared in 40% patients of the viral infected patients.

Conclusion: Cutaneous infections are more commonly exhibited in DM patients among the Pakistani population. These were more common in females. Fungal cutaneous infections were the most common infection occurring among patients with poor glycemic control. (Rawal Med J 202;45:35-38).

Keywords: Diabetes Mellitus, cutaneous infection, Viral infections, Bacterial infections, Fungal infections.

INTRODUCTION

Cutaneous infections can be bacterial, viral or fungal depending upon the exposure of an individual. Genetic susceptibility plays a major role in the development of infectious diseases.[1] One of the most common disease consequent to immune dysregulation is diabetes. This being the most prevalent metabolic condition is one of the leading major health and socioeconomic problems worldwide.[2] The prevalence of DM has been rising worldwide, and in 2015, an estimated of 415 million people were diagnosed with it globally.[3,4] Pakistan appeared to be affected by this change significantly being number 6 in the list of top 10 countries with an estimation of 5.2 million diabetic people.[5,6]

In addition to a number of renal and cardiovascular complications, a variety of skin diseases are also associated with diabetes. Diabetes renders an individual susceptible to infections due to its association with processes of humoral immunity. Increased glycation in diabetic patients decreases immune activity namely, secretion of cytokines. Hyperglycemia leads to decreased mobilization of polymorphonuclear leukocytes, chemotaxis, and phagocytic activity and further reduces NADH levels decreasing the antioxidants of the body.[7] Diabetic patients are at a higher risk of skin and soft tissue infections such as, folliculitis, cellulitis and dermatophytic infections. These infections may be the first signs of diabetes or may break out during the course of the disease.[8] Insignificant amount of local data is available for this common occurrence and disorder. The objective of this study was to assess the different cutaneous infections a diabetic patient seen at our tertiary care hospital.

METHODOLOGY

This prospective cross-sectional study was carried out at Dow University Hospital, a teaching hospital in Karachi, from January to August, 2018. Informed consent was obtained. We enrolled 200 DM patients with cutaneous complaints from both genders. Patients with diabetic foot were excluded and existing co morbidities like hypertension, hypo/hyper thyroidism, chronic renal failure were excluded from the study.

A detailed history was elicited with particular reference to cutaneous complaints regarding

duration, progression and treatment modalities. Clinical examination included general physical examination followed by a meticulous examination of the lesion done to make a clinical diagnosis. Blood sugar and Glycosylated hemoglobin (HbA1c) levels were estimated in all patients to assess the control of diabetes.

RESULTS

A total of 200 diagnosed DM patients of both genders with cutaneous infections participated in the study. Majority (56%) were females. Mean age was 53.3±11.9 years (range 20-85). Less than 5% of participants were newly-diagnosed of less than 6 months, whereas a majority 25.5% of the individuals were known diabetics with the condition for over a year but under 5 years. Majority (39%) had DM for a duration of greater than 5 years but less than 10 years (Table).

Table. Gender distribution, duration of DM, FBS and RBS and HbA1C.

Gender	Male Frequency (%)	88 (44%)
	Female Frequency (%)	112 (56%)
Duration of Diabetes	Mean Years	7.06±6.58
	≤ 6 months	9(4.5%)
	7 months – 1 year	15(7.5%)
	>1 year – 5 years	51(25.5%)
	6-10 years	78(39%)
	11-15 years	35(17.5%)
	>15 years	12 (6%)
Treatment Used for DM	Oral Hypoglycemic Agents	126 (63%)
	Insulin	43 (22%)
	Both of the above	10 (5%)
	Diet only	20(10%)
Fasting Blood Glucose	mg/dl	139.68±45.27
Random Blood Glucose	mg/dl	223.03±58.62
HbA1c	mmol/mol	8.28±1.69
Number of Locations	1 location	128 (64 %)
	2 locations	46 (23%)
	3 or more locations	18 (9%)
Site of Infection	Throughout the body	32(16%)
	Head	21 (11%)
	Trunk	34 (17 %
	Inguinal	28(14%)
	Limbs & Extremities	80(40%)
	Back (Lumbar/ sacral)	5 (2.5%)

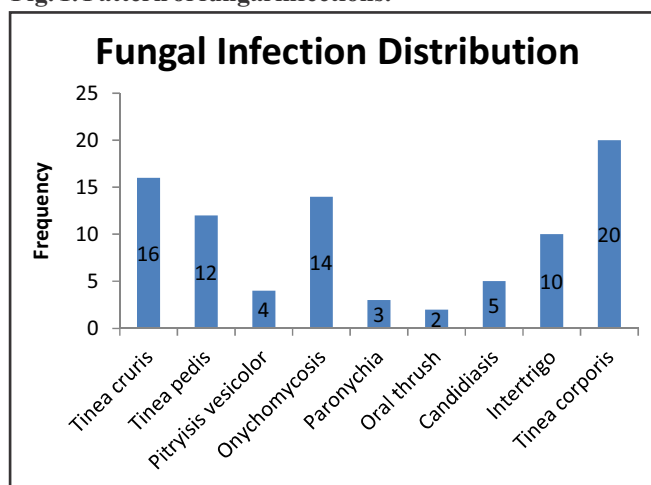Fig. 1. Pattern of fungal infections.
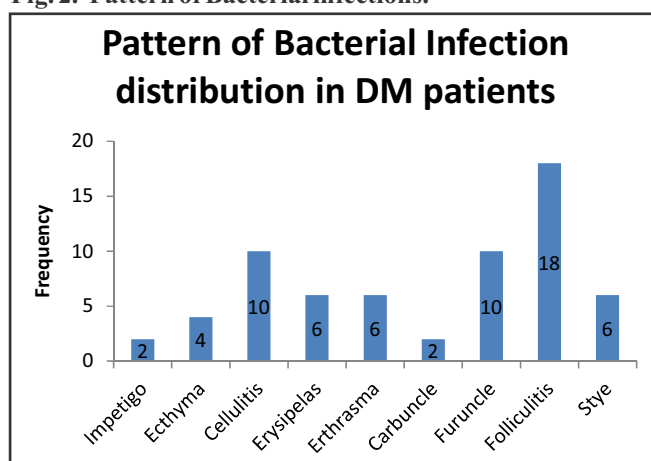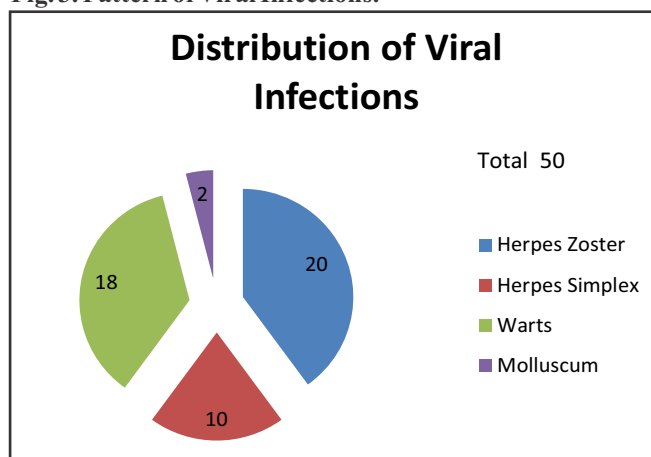

Fig. 2. Pattern of Bacterial infections.

Fig. 3. Pattern of Viral Infections.

A majority 126 patients (63%) stated using oral hypoglycemic agents while 43 participants (22%) were using insulin. Mean fasting blood sugar (FBS)

was 138.6± 43.4g/dl (range 85-298 g/dl) and random blood sugar (RBS) was 216.3±56.85 (range 130-366 g/dl). Mean HbA1c was 8.2±1.67 % (range 5.9-12.9).

Cutaneous manifestation in only one location of the body were found in 64% patients, while 23% had at two locations on the body, and 9% displayed it on 3 or more locations on their body. Fungal infections of skin were seen in 43% patients, while 32% displayed bacterial infection, and 25% exhibited a viral infection. Among fungal infections in 86 patients (43%), Tinea Corporis (n=20; 23.2%) was most common (Fig. 1) Among bacterial infections noted in 64 patients (32%), folliculitis was seen in 18 (28%), followed by cellulitis and furunculosis (Fig. 2). Infections caused by viruses were observed in 25% of patients which was dominated by shingles (n=20; 40%) and closely followed by viral warts, comprising mostly of genital and plantar warts (Fig. 3).

DISCUSSION

The skin is colonized by a diverse population of microorganisms that inhabit the skin either harming it or providing advantage to humans. Although the survival of the microbiota depends largely on the innate and adaptive immunological status, the microorganisms also function to educate the immune system usually to adapt to their existence on the skin surface. The contributing factors for the diversity of microorganisms populating the skin may be the density of hair follicles and sebaceous glands, age and gender, occupation, climate and hygiene.[9]

Fungal infection occurs with the highest frequency in affected diabetic patients (43%). Fungus thrives on cutaneous tissue feeding on the keratin. Diabetic patients provide sufficient glucose to the fungus for its sustenance. The compromised leukocyte function is the main cause of this infection. The most commonly occurring deep fungal infection in diabetes is mucormycosis followed by candidiasis.[10]

The findings of the present study highlight that Tinea Corporis was most common fungal infection, followed by onychomycosis and Tinea Cruris (Fig. 1). Tinea Corporis is the superficial fungal infection of the trunk, presented as an archetypal "ringworm"

eruption. It is suggested that non enzymatic glycation of proteins, including endothelial proteins and collagen renders the diabetic patients susceptible to infection.[11] Other factors that may be the cause of these infections may include impaired immune response characterized by reduced neutrophil chemotaxis and phagocytosis. An increased adhesion for pathogens is observed in the epithelia and mucousal cells of DM patients.[12]

After fungal infections, bacterial infections were observed. It has been identified that the host susceptibility factors increase the risk of infections in diabetic patients. The unique life cycles of various pathogens also play a key role in their survival and growth. The diabetic state, including hypergylcemia and oxidative stress modify the skin in a manner, encouraging bacterial pathogenesis.[13]

Although fungal infections are the most frequent, bacterial and viral infections are not as common. The reason suggested was the possible resistance of the fungal infective agents to the common antiseptic measures. Younger age and shorter duration of diabetes are factors for lesser prevalence of skin infections. Raised HbA1c levels amongst other factors relate directly with increased frequency of dermal infections.[14]

In the present study, around 50% of patients had more than one skin lesion. The prevalence of skin lesions in diabetic patients mentioned in other local studies is 68% and 96% reflecting a wide variation in the frequencies of skin manifestations, either infectious or non-infectious, in our population.[15,16]

This study indicated that female patients outnumbered their male counterparts, encompassing 56% of the study's population. This trend is similarly observed in other studies, which could be partly due to greater awareness of women regarding their health issues or may be due to under-representation of men in our setup. On the contrary, some studies have shown a preponderance of males.[17-20]

CONCLUSION

It can be concluded that fungal infections are the most frequent in diabetic patients, especially women suffering more with cutaneous infections. Diabetes not well managed increases the

vulnerability of diabetic patients to these infections. Anti infectious measures should be developed targeting the resistant microorganisms. The environmental factors conducive to the survival of these organisms should be controlled and proper hygiene should be maintained. However, a larger sample size and multi-centered studies are required to further assess the prevalence for cutaneous infection in diabetics.

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