CUTANEOUS INFECTIONS IN TYPE II DIABETES MELLITUS

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ABSTRACT

BACKGROUND

Skin in the patients of Diabetes Mellitus has both infective & non-infective lesions. A bacterial, fungal & viral infection along with duration with diabetes were studied here.

MATERIALS AND METHODS

200 patients of type II DM, above 20 years of age, of both sexes, with clinically diagnosed infectious skin lesions were included in this prospective, cross-sectional & observational study.

RESULTS

Very high proportion of study subjects (92%) were of age up to 60 years while very few (8%) were with age above 60 years. Age wise distribution of male and female participants revealed, no significant gender wise difference (Chi-square = 1.060, p = 0.5887). Proportion of all above three types of infections, was high in individuals with duration of 6 to 15 years in diabetes (except 15-20 years duration). Overall, proportion of infection showed increasing trend as duration of diabetes increases, but it declined after period after 15 years. Considering duration of diabetes, though the proportion of these various infections was increased, but skin infections did not have any significant association with the duration of DM (Chi-square = 7.865, p = 0.2482).

CONCLUSION

Proportionately more subjects (92%) were up to 60 years, while very few (8%) were above 60 years, without any significant difference in gender. Though, proportion of infection showed increasing trend as duration of diabetes increases & declined after duration above 15 years. However, all three types of infections did not have any significant association with age-groups or duration of diabetes.

KEYWORDS

Diabetes Type II, Skin Manifestations, Duration.

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BACKGROUND

Diabetes is a disease of considerable morbidity & mortality. Global prevalence of DM is 8% in 2011, which may rise by 10% in 2030. About 80% of population of DM lives in low or middle income & developing countries including India in east-Asia.[1] As per reports of International Diabetic Federation(IDF), South-East Asia Region including India, 415 million people have diabetes in the world and 78 million people in the India by 2040 this will rise to 140 million. There were 69.1 million cases of diabetes in India in 2015.[2]

The prevalence of a Cutaneous infections appears to be similar between people affected with Type 1 DM and Type 2 DM, but Type 2 DM patients develop more frequent cutaneous infections, while Type 1 DM patients manifest more as autoimmune-type cutaneous lesions.[3] Common skin lesions are infectious in origin in about 72% patients.[4]

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The changes in skin are parallel to those occurring in the internal organs in DM. This mechanism occurs to a lesser extent at normal blood sugar level and the condition i.e. skin lesions possibly relate to underlying diabetogenic mechanisms.[5]

In most cases, the Cutaneous manifestations usually develop following the diagnosis of diabetes but in some, skin manifestations are the initial presenting signs, thereby helping in early diagnosis of diabetes mellitus.[6] This study was carried out to assess the clinical pattern of Cutaneous manifestations among 200 patients of type 2 i.e. II DM., i.e. adult onset as per American Diabetology Association i.e. ADA.[7] We also tried here to know the association of these diseases with the duration of DM.

Aims and Objectives

To study association of bacterial, fungal & viral cutaneous infections with the duration of type II Diabetes Mellitus in 200 patients.

MATERIALS AND METHODS

A total of 200 patients of type II (type-2) Diabetes Mellitus (above 20 years), of both sexes, attending OPD (Out Patient Department) or IPD (In-Patient Department) of a tertiary centre (attached to a medical college in Western Maharashtra state of, India) of Type 2 DM as per ADA criteria

were recruited for the study between August 2015 – July 2017.

Study Design
Cross sectional, prospective & observational study.

Inclusion Criteria
The patients included vide ADA criteria as below[7] (i.e. definition of a study subject)
A patient diagnosed to have Non-Insulin Dependent Diabetes Mellitus (NIDDM) & above 20 years (type-2) with at least one of the following criteria: 1) Known cases of diabetes mellitus already on treatment OR 2) Newly detected diabetic patients as per based on the ADA criteria,

- Symptoms of diabetes + Random plasma sugar >200 mg/dl OR
- Fasting plasma sugar: >126 mg/dl OR
- HbA1C >6.5% OR
- 2 hr post 75 gm oral glucose >200 mg/dl.

Exclusion Criteria
Patients with partially treated skin lesions with changed morphology. 2. Patients having Type 1 diabetes mellitus.

Some of following methods were observed

- Blood sugar levels were done from a venous sample of blood.
- Glycosylated haemoglobin (HbA1c) levels were estimated in required patients to assess the control of diabetes, if necessary.
- Histopathological examination of skin lesions and microbiological investigations were carried out wherever necessary to confirm the diagnosis.

Data Analysis
The collected data was compiled in Microsoft Excel 2010 and analysed using SPSS (Statistical Programme for Social Sciences) software version 20.

RESULTS

Age of Patients in Years	Frequency	Percentage
20-<40	85	42.5%
41 to 60	99	49.5%
61 & above	16	8%
Total	**200**	**100%**

Table 1. Age Distribution Among the Study Population (n=200)

Very high proportion of study subjects (92%) were of age up to 60 years while very few (8%) were with age more than 60 years.

Age of Patients in Years	Males = N (%)	Females = N (%)	Total = N (%)
20 - 40	55 (41.7)	30 (44.1)	85 (42.5)
41 - 60	68 (51.5)	31 (45.6)	99 (49.5)
61 & above	9 (6.8)	7 (10.3)	16 (8)
Total	132(66%)	68(34%)	200(100%)

Table 2. Gender & Age Group wise Patients (N) & Percentage (%)

Amongst 200 study subjects, 132 (66%) were males and 68 (34%) were females. Age wise distribution of male and female participants revealed there was no significant difference in the proportion (Chi-square = 1.060, p = 0.5887).

Duration of DM in years	Fungal N & (%)	Bacterial N & (%)	Viral N & (%)	Total N & (%)
<5 years	11 (9.8)	11 (16.2)	3 (15.0)	25 (12.5%)
6 to 10 years	45 (40.2)	25 (36.8)	5 (25.0)	75 (37.5%)
11 to 15 years	49 (43.8)	23 (33.8)	8 (40.0)	80 (40.0%)
16 to 20 years	7 (6.2)	9 (13.2)	4 (20.0)	20 (10.0%)
Total	**112**	**68**	**20**	**200**

Table 3. Duration of Diabetes and Type of Infection

Proportion of subjects having fungal, bacterial and viral infections, individually as well as in total, was high in individuals with diabetes period 6 to 15 years. Overall, proportion of infection showed increasing trend as duration of diabetes increased but it was declined after period of 16 years. However, in DM, duration wise proportion of these various infections was not significant (Chi-square = 7.865, p = 0.2482).

DISCUSSION

The skin is a temporary reservoir for excess blood glucose which accounts for tendency to develop pruritus and infections like bacterial, fungal etc.

Age wise Distribution
Jost B. et al in 2011, in the rural population of central India, found mean age in type 2 DM i.e. T2DM was aged 30+ ±.6 years.[8] This figure is lower than previously reported in urban Indian populations. Mayur Patel et al in India in 2011, found out of 622 T2DM cases with mean age was 47.7 ± 10.9 years with 384 (62%) male.[9]

As per table-1& 2, in our study, majority i.e. 49.5% of respondents were in the age group of 41 to 60 years, followed by 42.5% were in 20- 40 years and only 8% were more than 61 years. In our study, mean age was 44.5 + 12.2 years, which is less than above studies, may be because of hygienic conditions in India, due to their low socio-economic conditions leading to earlier age prevalence. The less numbers above 60 years of age is un-explainable, may be because of un-attendance to dermatologists because of on health ground.

Unjali Gujaral in India in 2015, while studying type 2 DM at Chennai in 2305 patients (Indian Asians) found that, age adjusted prevalence was higher in India (38%) than the United States 24%, along with associated risk factors.[10]

Our study co-incises with, study by Gale et al. having average age was 42.5 years.[11] In India, Diabetes has trend is the shift in age of onset of diabetes to a younger age.

Indians get diabetes earlier than Western counterparts because of central obesity in Indians.[12]

Gender Distribution

As per Table 2, male are predominating than female i.e. 66% Vs 34%. In a cross-sectional study, Ambrish Mithal et al out of 5400 patients with T2DM from 178 centers across India 56.75% (N = 3065) of them were males.[13] According to CDC guidelines, males were slightly higher than females in United States too.[14]

According to, Himanshu Madaan et al. out of total diabetic population, 64.03% were male and 35.97% were female.[15] Our study (66% males Vs. 34% female) coincides with above studies by more male because of treatment seeking behaviour of this gender.

Type of infections & their duration with the DM

Cutaneous manifestations due to infections (bacterial/fungal/viral) are always with "unwanted' or disturbing awareness symptoms, inflammation/ itching / irritations in contrast with non-infection skin lesions i.e. auto-immune related like vitiligo.

In DM infective lesions are numerous because of insulin resistance in Type 2 DM more impaired insulin secretion and increased glucose production.[16] Diabetic patients have an increased susceptibility to some bacterial and fungal skin infections, which account, in part, for poor healing. Out of 200 patients of types II above 20 years, we found fungal infections proportionally more than bacterial, & lest percentage of viral infections. We further studied frequency or occurrence of these infections with the duration of DM as per table -3 with "duration" with DM. Majority 37.5% were <6-10 years, 40%, in 11 to 15 years, while 20% in above 15 years duration of DM.

The increasing trends of skin manifestations as the longer duration (older) may be because of treatment seeking behaviour of the patients. There was a contradictory fall of percentage in duration above 20 years of DM, may be because of tendency towards neglecting of long lasting skin symptoms or inability of relatives to take these older patients to doctors as dependency on relatives, who may neglect to this geriatric population.

Skin complications of diabetes provide clues to current and past metabolic status. Recognition of Cutaneous markers may slow disease progression and ultimately improve the overall prognosis.[17]

Bacterial infections were next to fungal, but almost similar in numbers. Poorly controlled patients in poor metabolic control is the cause or the consequence of the concurrent infections like bacterial.[18]

In the DM viral infections are least comparatively to fungal & bacterial infection as observed in a Indian study by Abhishek Goyal et al, in north India in 2010.[19]

There was statistically significant correlation of skin lesions with duration of diabetes, as studied by Chatterjee N et al in 2014, among Type 2 diabetics 490(75.61%) showed skin lesions predominantly bacterial infections.[20]

In present study it was seen that there was not any significant association with the duration of DM. Our findings are consistent with the study of Abhishek Goyal in year 2010 in 100 DM type II, observed that, as the duration increases the number of patients with skin lesions decreases.[19]

CONCLUSION

Whenever patients present with multiple skin manifestations, their diabetic status should be checked. Infective lesions are common in type II diabetes. The duration of DM has no association with skin infections.

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