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Original Research Article

Dermatological manifestations in diabetes mellitus

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ABSTRACT

Introduction: Diabetes mellitus (DM) is the common endocrine disorder, which affects all ages and socioeconomic groups. The prolonged hyperglycemia may responsible for the diabetic complications. Multiple factors contribute to the onset of cutaneous manifestations in diabetes mellitus. The present study aimed to study the pattern of various cutaneous manifestations associated with diabetes mellitus.
Materials and Methods: The present study was conducted at Dermatology, Diabetic Clinic of a teaching tertiary care centre hospital. A total of 120 subjects were included in this study. Patients were selected on the basis of dermatological signs and/or symptoms. Detailed history and clinical examination with special emphasis on dermatological complaints and signs was done for all the study subjects. Under aseptic conditions, blood samples were collected and used for the estimation of blood glucose, bacterial infections- Gram stain and isolation of organism by culture, fungal infections- KOH (potassium hydroxide) mount, Gram stain (for Candida) and isolation of organism by culture. Skin biopsies were performed wherever necessary.
Results: In the present study, 120 subjects were included from both genders. Pruritus was the predominant symptom observed. Acrochordons, Candidial Balanoposthitis, Tinea Corporis were observed in highest number of patients. Infective dermatoses were observed in 72 (60%) patients. The non-infective dermatoses was reported in 56 (46.7%) patients. On bacterial culture, Pyogenic Ulcer was observed in 4. KOH test and culture were carried on 14 candidal infections and 17 dermatophyte infection and observed KOH mount positive were observed in 11 cases and culture positive was observed in 8 cases.
Conclusion: In the present study results indicates pruritus was the most common symptom in diabetic subjects. Infective dermatoses were more common than the non-infective dermatoses. Tinea corporis/cruris was most common clinical entity. 21.6% patients suffered from cutaneous bacterial infections, the most frequently encountered clinical entity being furunculosis. Staphylococcus aureus The commonest non-infective clinical entity was acrochordons (skin tags). Patients with diabetes may develop cutaneous manifestations of diabetic complications. Careful dermatological examination and follow-up of diabetes mellitus patients is required to provide them adequate skin management.

1. Introduction

Diabetes mellitus (DM) is the very common endocrine disorder, which affects all ages and socioeconomic groups.[1] In the year 2000, the prevalence of type 2 diabetes globally 171 million which is projected to be 366 million in the year 2030.[2] The incidence and prevalence of diabetes is rapidly increasing, especially so in recently urbanized and developing countries, including India. According to International Diabetes Federation (IDF), the number of diabetic subjects in India is around 61.3 million and this is further set to increase 101.2 million by the year 2030.[3]

It is characterized by hyperglycemia secondary to absolute or relative insulin deficiency. This hyperglycemia results in the generation of advanced glycation end products, which in turn responsible for the diabetic complications

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such as macrovascular and microvascular complications.[4] Globally, the prevalence of skin disorders in diabetes mellitus may veries from 51.1% to 97%.[5]

Multiple factors contributes to the onset of cutaneous manifestations in diabetes mellitus, which include abnormal carbohydrate metabolism, altered metabolic pathways, vascular abnormalities such as microangiopathy, atherosclerosis, neuronal degeneration, and impaired host mechanisms.[6] The dermatological manifestations in diabetes mellitus may vary from minor to lifethreatening.[7]

Dermatological manifestations of diabetes mellitus can be broadly categorized into four groups; skin lesions strongly associated with diabetes, skin lesions of infectious etiology, lesions secondary to complications of diabetes and lesions related to diabetic treatment.[1]

The most common cutaneous infections, staphylococcal infections, are more perilous and severe in patients with uncontrolled diabetes. Other types of infection include styes that cause tuberculosis of eyelid and also bacterial infection of the nails. A fungus called Candida albicans is involved in the numerous fungal infections in diabetic patients and these are common in vaginal area and lips corners (angular cheilitis).[8]

In addition, skin disorders commonly associated with diabetes, which as diabetic dermopathy, necrobiosis lipoidica, diabetic bullae, diabetic thick skin, yellow skin, acanthosis nigricans, eruptive xanthomas, disseminated granuloma annulare, scleredema, yellow nails, skin tags, diabetic rubeosis, vitiligo and lichen planus.[1] Commonly seen cutaneous bacterial infections in diabetes mellitus are folliculitis, furunculosis, carbuncle, ecthyma, cellulitis and erysipelas. Other associated disorders are calciphylaxis, xerosis, xanthelasma, lipodystrophy, macular amyloidosis and alopecia.[9] Commonly seen viral infections include herpes zoster and viral warts.[10]

Hence, the good knowledge about dermatological manifestations of diabetes mellitus may be helpful in the overall prognosis improvement of disease through the early diagnosis and treatment.[11] The present study aimed to study the pattern of various cutaneous manifestations associated with diabetes mellitus.

2. Material and Methods

The present study was conducted at Dermatology, Diabetic Clinic of a teaching tertiary care centre hospital. After approval from Institutional Ethics Committee and informed consent from study subjects, a total of 120 subjects were included in this study. Out of 120 subjects, 68 were males and 52 were females. Subjects below 12 years of age, those with impaired glucose tolerance, gestational diabetic subjects were excluded from the study. Patients were selected on the basis of dermatological signs and/orsymptoms. Detailed history and clinical examination with special emphasis on dermatological complaints and signs was done for all the study subjects. Under aseptic conditions, blood samples were collected and used for the estimation of blood glucose, bacterial infections- Gram stain and isolation of organism by culture, fungal infections- KOH (potassium hydroxide) mount, Gram stain (for Candida) and isolation of organism by culture. Generalized pruritus- CBC (complete blood count), LFTs (liver function tests), and RFTs (renal function tests) were done. Skin biopsies were performed wherever necessary, and formalin fixed paraffin embedded sections of the sampled tissues were stained with hematoxylin and eosin and observed under light microscope.

3. Results

In the present study, 120 subjects were included from both genders. Majority of the subjects were from 51-60 years of age group. Out of 120 patients, 116 were type 2 diabetcs and 4 were type 1 diabetics. Duration of diabetes, 87 (72.5%) patients were $\leq$5 years and 33 (27.5%) were $\geq$5 years. In the present study, pruritus was the predominant symptom observed followed by Cosmetic Concern as represented in Table 1. Acrochordons, Candidial Balanoposthitis, Tinea Corporis were observed in highest number of patients. The distribution of dermatoses in this study was represented in Table 2 and Figures 1, 2, 3, 4, 5, 6 and 7.

Table 1: Predominant sympoms in the diabetes mellitus subjects

Predominant Symptoms	No. of Patients
Asymptomatic	2(1.7%)
Cosmetic Concern	33(27.5%)
Pain	21(17.5%)
Pruritus	50(41.6%)
Soreness	21(17.5%)
Other	4(3.3%)
Total	131

*11(9.1%)Patients Had 2 Predominant Symptoms Each

In the present study, infective dermatoses was observed in 72 (60%) patients. In this, cutaneous fungal infections were observed in 46 (38.3%) and cutaneous bacterial infectious were observed in 26 (21.7%) patients. The non-infective dermatoses was reported in 56 (46.7%) patients as reported in Table 3. The distribution of cutaneous bacterial Infections and their microbiological aspects were represented in Table 4. On bacterial culture, Pyogenic Ulcer was observed in 4, Furunculosis in 3, Ecythema in 2, Pyogenic Abscess in 2, Folliculitis and Carbuncle 1 in each as represented in Table 5. In the present study, to study the cutaneous fungal infections, KOH test and culture were carried on 14 candidal infections and 17 dermatophyte infection. It was observed that KOH mount positive was observed in 11 cases and culture positive was observed in 8 cases as reported in Table 6. On culture, Trichophyton Rubrum observed in 7 cases and

Table 2: Distribution of dermatoses observed in the study subjects

Dermatoses	No. of Patients	No. Of Patients (In Percentage%)
Acanthosis Nigricans	4	3.3
Acrochordons	12	10
Candidial Balanoposthitis	12	10
Candidial Intertrigo	1	1.7
Candidial Paraonychyia	4	3.3
Candidial Vulvovaginitis	5	4.2
Carbuncle	1	1.7
Cellulitis	1	1.7
Diabetic Dermopathy	2	3.4
Diabetic Neuropathy	3	2.5
Necrobiosis lipoidica diabeticorum	1	1.7
Ecthyma	3	2.5
Erysipelas	2	3.4
Erythrasma	1	1.7
Folliculitis	3	2.5
Furunculosis	8	6.7
Bullosis diabeticorum	2	3.4
Generalized Pruritus	8	6.7
Lichen Planus	9	7.5
Onychomycosis	6	5
Perforating Dermatoses	3	2.5
Pyogenic Abscess	3	2.5
Pyogenic Ulcer	4	3.3
Tinea Corporis	12	10
Tines Manum	1	1.7
Tinea Pedis	5	4.2
Vitiligo	7	5.8
Xanthelasma	5	4.2
Total	128*	

* 8 (6.7%) Patients had two dermatoses each

Fig. 1: Acanthosis Nigricans

Fig. 2: Candidal Balanoposthitis

Fig. 3: DiabeticDermopathy

Fig. 4: Tinea Corporis

Fig. 5: LichenPlanus

Fig. 6: Xanthelasma

Fig. 7: Vitiligo

Trichophyton Mentagrophytes in 1 case as represented in Table 7. Out of 56 non-infective dermatoses, Acrochordons was observed in 12 cases, Lichen Planus in 9 cases, Generalized Pruritus in 8 cases and Vitiligo in 7 cases as presented in Table 8. 98 (81.7%) patients were on oral hypoglycemic agents, 7 (5.8%) were on insulin treatment and 6 (5%) were on both. 9 (7.5%) patients were not taking any treatment as depicted in Table 9.

Table 3: Distribution of Infective Vs Non Infective Dermatoses in the study population

Category	Sub-Catergory	No. of Patients
Infective	Cutaneous fungal infections	46 (38.3%)
	Cutaneous bacterial infectious	26 (21.7%)
	Total	72 (60%)
Non-Infective		56 (46.7%)
Total		128*

* 8 (6.7%) Patients had two dermatoses each

None of our patients presented with any known cutaneous adverse reaction to any of the above antidiabetic medications.

4. Discussion

Skin manifestations are commonly seen in diabetes mellitus patients as result of changes in the metabolism such as hyperglycemia, or damage to vascular, neurological or immune system.[12] Infections increases the possibility of developing neurovascular and other systemic complications which can give rise to various dermatological manifestations.[13]

In the present study, 116 (96.7%) were type 2 diabetes mellitus and 4 (3.3%) were type a diabetes. In a study by Nigam PK et al reported that 82.1% of subjects had type 2 diabetes.[14]**a**nd Mahajan S et al reported that 98% cases had type 2 diabetes mellitus.[15]

Patients in whom the diabetic status was detected within past five years are called 'early diabetics' as against 'chronic diabetics' in whom the diabetic status was detected more than 5 years back.[16] In our study, majority (72.5%) of patients (n= 87) were early diabetics.

The duration of diabetes varied widely among our study population. 9 (7.5%) of our patients presented with dermatological complains in the OPD, and on clinical suspicion were subjected to fasting and post-prandial blood sugar level estimation, and thereby their hitherto undetected diabetic status was revealed, The remaining 111 (92.5%) patients were already known sufferers of diabetes mellitus. The duration of diabetes in patients in the study by Nigam PK et al,[14] varied from 2 months to 27 years with a mean of 66.4 months. In the study by Rao GS et al., 71 (80.7%) patients were known diabetics, and 17 (19.3%) patients were diagnosed to have hitherto undiagnosed diabetes in the skin

Table 4: Distribution of cutaneous bacterial Infections and their microbiological aspects in the study subjects

Clinical Entity	No. of Patients	Sampled for microscopy and culture	Gram Stain + Organism	- Organism	No Results	No of cases with growth on culture
Furunculosis	8	5	3	-	2	3
Pyogenic Ulcer	4	4	3	-	1	4
Ecthyma	3	2	2	-	-	2
Folliculitis	3	2	2	-	-	1
Pyogenic Abscess	3	2	2	-	-	2
Erysipelas	2	-	-	-	-	-
Carbuncle	1	1	1	-	-	1
Cellulitis	1	-	-	-	-	-
Erythrasma	1	-	-	-	-	-
Total	26	16	13	-	3	13

Table 5: Bacteria isolated on culture

	Furunculosis	Pyogenic Ulcer	Ecythema	Folliculitis	Pyogenic Abscess	Carbuncle	Total
Staphylo-coccus Aureus	2	-	2	1	1	1	7
Strep. Pyogenes (GABHS)	-	1	-	-	1	-	2
Staph. Aureus & Strep. Pyogens (GABHS)	1	2	-	-	-	-	3
Citrobacter & Acinetobacter	-	1	-	-	-	-	1
Total	3	4	2	1	2	1	13

GABHS = Group A Beta Hemolytic Streptococci

Table 6: Distributionof cutaneous fungal infection in the study population and their Mycological Aspects

Clinical Entity	No. of Patients	Sample for microscopy and culture	KOH Mount Positive	Positive For Culture
Candidal Infections				
Balanoposthitits	12	8	5	3
Vulvovaginitis	5	2	1	1
Paronychia	4	3	-	1
Intertrigo	1	1	-	-
Total	22	14	6	5
Dermatophyte infection				
Tinea Corporis	12	8	6	4
Tinea Pedis	5	4	2	2
Tinea Manum	1	1	1	1
Tinea Unguium	6	4	2	1
Total	24	17	11	8

Table 7: Dermatophyte Species Isolated on culture

	Trichophyton Rubrum	Trichophyton Mentagrophytes
Tinea Corporis/Cruris	4	-
Tinea Pedis	1	1
Tinea Manum	1	-
Tinea Unguium	1	-
Total	7	1

Table 8: Distribution of Non Infective dermatoses in study subjects

Dermatoses	No. of Patients	Patients In%
Acrochordons	12	21.4
Lichen Planus	9	16.1
Generalized Pruritus	8	14.3
Vitiligo	7	12.5
Xanthelasma	5	8.9
Acanthosis Nigricans	4	7.1
Diabetic Neuropathy	3	5.4
Perforating Dermatoses	3	5.4
Diabetic Dermopathy	2	3.6
Bullosis diabeticorum	2	3.6
Necrobiosis lipoidica diabeticorum	1	1.8
Total	56	

Table 9: Distribution of Anti diabetic therapies in the study subjects

Therapeutic Agent	% of Patients	No.of Patients
OHA	81.70	98
None	7.50	9
Insulin	5.8	7
Both Insulin & OHA	5	6
Total		120

OPD after proper investigation.[16]

Pruritus causes excoriations on the skin which increases the risk of developing of infections. Generalized pruritus may be seen secondary to complications such as xerosis, chronic renal insufficiency, and diabetic polyneuropathy. Certain antidiabetic drugs and dry skin which is aggravated by age and reduced sweating secondary to diabetic autonomic neuropathy have also been implicated in the pathogenesis of diabetic pruritus.[17]

Pruritus was the most common symptom in our study with 50 (41.6%) of patients presenting with pruritus as the predominant complaint. 33 (27.5%) patients sought dermatological advice primarily for cosmetic concern of their skin lesions. Pain and soreness observed in 21 (17.5%) patients each were prominent symptoms in most of the remaining patients. In 11 (9.1%) of patients, soreness and pruritus were equally distressing to the patient. Rao GS et al., also found that pruritus was the main presenting symptom and was noted in 60.2% of their patients.[16] Al-Mutairi et al reported on the prevalence of cutaneous manifestations in 106 patients with diabetes mellitus: pruritus was shown to be the second most common cutaneous manifestation.[18]

In a single center epidemiologic study conducted in Iran, infection was also the most common lesion reported by patients in this study, the most common noninfectious manifestation was pruritus.[1] Similarly, Sasmaz et al. showed that most common skin conditions in DM patients are infections (31.7%), non-candidal intertrigo (20.5%), eczemas (15.2%), psoriasis (11.2%), diabetic dermopathy (11.2%), and prurigo (9.9%).[19]

Of the total 120 patients, 8 (6.7%) patients had 2 dermatological conditions each. Remaining 112 (93.3%) patients presented with only one dermatological condition each. Among 88 diabetic patients studied by Rao GS et al, 66 (75%) had only one cutaneous manifestation, 16 (18.18%) patients had two, 4 (4.55%) had three and 2 (2.27%) had four cutaneous manifestations each.[16]

Acrochordons (skin tags), candidal balanoposthitis, and tinea corporis /cruris with 12 (10%) patients each, were the leading dermatoses as a single clinical entity. There were 9 (7.5%) cases of lichen planus, 8 (6.7%) cases each of furunculosis and generalized pruritus without skin lesions, and 7 (5.8%) cases of vitiligo. There were 6 (5%) cases of onychomycosis; 5 (4.2%) cases each of candidal vulvovaginitis, and xanthelasmas; 4 (3.33%) cases each of acanthosis nigricans, candidal paronychia, and pyogenic ulcer. We observed 3 (2.5%) cases each of diabetic neuropathy, ecthyma, folliculitis, perforating disorders and pyogenic abscesses. There were 2 (1.7%) cases each of diabetic dermopathy (shin spots), erysipelas, and bullosis diabeticorum. We encountered only 1 (0.8%) case each of candidal intertrigo, carbuncle, cellulitis, necrobiosis lipoidica diabeticorum and erythrasma.

Galdeano et al. conducted a study on 125 diabetic patients in a single center in Argentina. Reported a high prevalence of skin disorders: 90.4%. Skin disorders occurring in more than 10% of the patients included xeroderma (69%), dermatophytosis (52%), onychomycosis. (49%), tineapedis (39%), peripheral hypotrichia (39%), diabetic dermopathy (35%) skin thickening syndrome (25%), diabetic foot (24%), candidiasis (17%), fibroids

pendulums (11%), intertrigo (10%), and inner eyebrow separation (10%).[20]

A study conducted by Foss NT in Brazil, demonstrated that 81% of patients had at least one dermatologic lesion, with a mean of 3.7 lesions/patient, being dermatophytosis the most common lesion. Of all dermatophytosis, 42.6% were onychomycoses (n = 172) and 29.2% were tinea pedis (n = 118). Skin lesions occurring in > 10% of the patients were actinic degeneration (62%), skin xerosis (20.8%), benign skin tumor (23.5%), candidiasis (12.9%) and scar (12.6%).[21]

In our study the infective dermatoses were more common than the non-infective dermatoses. Total of 72 (60%) patients suffered form either a cutaneous bacterial or fungal infection, of which 63.9% (n= 46) had cutaneous fungal infections. These 46 patients with cutaneous fungal infections contributed to more than one third (38.3%) of entire study population. Cutaneous bacterial infections were seen in about one fifth (n=26) of the study population. The ratio of cutaneous fungal infections to bacterial infections in our study was 1.77:1 56 (46.6%) of our patients presented with non-infective dermatoses.

Infections comprised the largest group affecting 35 of 64 (54.7%) cases in the study by Mahajan S et al[15] the ratio of cutaneous fungal to bacterial infections being 1.5:1. Gulati et al[22] reported cutaneous infections in 49% of their study population of diabetics. Similarly Rao GS et al[16] reported even higher rates of cutaneous infections in their diabetic patients (78.4%) with 59.4% of their total cases been suffered from cutaneous fungal infections. The ratio of cutaneous fungal to bacterial infection in their study was 1.64:1. In the study by Nigam PK et al,[14] the cutaneous bacterial and fungal infections formed the largest group with 32 (26.2%) cases and 21 (17.2%) cases respectively contributing to a total of 43.4% of all dermatoses observed. However, the ratio of cutaneous fungal to bacterial infection in their study was 0.65:1.

Among 26 patients with cutaneous bacterial infections in our study, the most frequently encountered clinical entity was furunculosis with 8 patients, contributing 30.8% of all bacterial infection cases, followed by pyogenic ulcers with 4 (15.4%) cases. In the study by Nigam PK et al,[14] there were 32 (26.2%) patients who suffered from cutaneous bacterial infections, the most common clinical entity been furunculosis (15 eases) followed by folliculitis (8 cases). In the study by Mahajan S et al[16], 12 (18.7%) patients had cutaneous bacterial infections, the commonest clinical entity been folliculitis (7 cases). In our study, there were 3 (11.5%) cases each of ecthyma, folliculitis, andpyogenic abscesses. We also encountered two (7.7%) cases of erysipelas, and one (3.8%) case each of carbuncle, cellulites, and erythrasma.

Of these 26 cases of bacterial infections, pus/exudate samples of 16 cases were sent for Gram stain and culture. On direct microscopy of the collected sample, on 13 (yield is 13/16 = 81.3%) occasions, Gram positive bacteria could be identified. On three occasions, neither Gram positive nor Gram negative bacteria could be seen. Of the 16 samples plated for culture, pathogenic bacteria could be isolated on 13 (yield is 13/16 = 81.3%) occasions. Staphylococcus aureus was the most frequently (61.5%) isolated bacterium (n=8), followed by 'Group A beta hemolytic strepotococci' (Streptococcus pyogenes) which was isolated on 4 occasions including once with Staphylococcus aureus (mixed infection). In the study by Nigam PK et al,[14] Staphylococcus aureus was the most frequently isolated bacterium (65.6%), and Streptococcus pyogenes was isolated on 12.5% occasions.

In our study, in one case of pyogenic ulcer on foot, the culture yielded two Gram negative bacteria- Citrobacter and Acenetobacter (Gram negative bacteria could not be demonstrated on direct microscopy).

Out of total 46 cases of cutaneous fungal infections observed in our study, there were 24 (52.2%) patients with dermatophyte infections of skin and /or nails and 22 (47.8%) patients with muco-cutaneous candidal infections. Nigam PK et al[14], observed 21 diabetics with cutaneous fungal infections-13 (61.9%) with dermatophyte skin/nail infections and 8 (38.1%) with mucocutaneous candidalinfections. Similarly, the dermatophyte infections (11 cases) were slightly more common than the mucocutaneous candidal infections (10 cases) in the study by Mahajan S et al.[15] Thus the ratios of dermatophyte to candidal infections in ours, Nigam's and Mahajan's study were 1.1:1,1.6:1, and 1.1:1 respectively.

In our study, among mucocutaneous candidal infections, balanoposthitis was the most common clinical entity with 12 (54.5%) cases, followed by 5 (22.7%) cases of vulvovaginitis. However, Mahajan S et al[15] observed that vulvovaginitis with 5 cases was most common entity among 10 of their cases with muco-cutaneous candidal infections. In our study, 4 (18.2%) patients had chronic paronychia and 1(4.5%) had intertrigo.

In our study, in only 6 (yield= 42.8%) of 14 cases sampled, the organism could be seen on KOH mount. On 5 (yield= 35.7%) occasions, positive growth of the organism was obtained, Candida albicans being the only species isolated in all these cases and 3 of these 5 cases were of balanoposthitis.

In our study, there were 24 (52.2%) patients with dermatophyte infections of skin and/or nails. Of these, 12 (50%) had either tinea corporis and /or cruris (tinea cruris and corporis= 7, only tinea cruris= 3, only tinea corporis= 2 including one with tinea incognito), 5 (20.8%) had tinea pedis and one (4.2%) had tinea manuum. 6 (25%) patients presented with dermatophyte infections of the nails (tinea unguium) of which 3 had only nail infection and remaining 3 had concomitant skin infection (tinea pedis= 2, tinea

manuum= 1). In their study, Nigam PK et al, found 10 (76.9%) patients with tinea corporis/cruris and 3 (23.1%) patients with tinea unguium of the total 13 patients with dermatophyte infections. Among dermatophyte infections observed by Mahajan S et al,[15] 6 (54.5%) cases were of cutaneous infection and 5 (45.5%) were of tinea unguium.

In our study, out of the 17 cases of dermatophyte infections which were sampled for microscopy and culture, on KOH mount, fungal hyphae could be seen in 11 (yield= 64.7%) cases and positive growth of dermatophyte species was observed on culture on 8 (yield= 47.1%) occasions. These included 4 cases of tinea corporis/cruris, 2 cases of tinea pedis, and one case each of tinea manuum and tinea unguium. The dermatophytic species identified in all cases was Trichophyton rubrum (87.5%), except for growth of Trichophyton mentagrophytes from one case of tinea pedis. Co-infection of two or more species was not observed in any of our cases. In the study by Nigam PK et al,[14] Trichophyton rubrum was the most commonly isolated species on culture, identified on 11 (84.6%) of 13 occasions. In our study, a total of 56 (46.7%) patients presented with non-infective dermatoses associated with diabetes mellitus. All patients had one cutaneous manifestations each except for 3 (2.5%) cases in which two unrelated cutaneous manifestations existed concomitantly in the same patient.

The commonest clinical entity was acrochordons (skin tags) with 12 cases contributing to 21.4% of cases of this group and 10% of total study population. This was closely followed by lichen planus (LP) with 9 (16.1%) cases-4 eruptive LP, 3 oral LP, 2 cases of lichen planopilaris (with co-existent eruptiveLP in one case and hypertrophic LP in the other). Vitiligo with 7 (12.5%) cases was the third most frequently observed non-infective dermatosis in our study. In the study by Mahajan S et al,[15] the most common non-infectious entity was neuropathy with 8 (12.5%) cases.

We observed 5 (8.9%) cases of xanthelasmas, 4 (7.1%) cases of acanthosis nigricans, 3 (5.4%) cases each of diabetic neuropathy and perforating dermatoses, and 2 (3.6%) cases of bullosis diabeticorum.

In patients with acrochordons, lichen planus, acanthosis nigricans, perforating disorders, and granuloma annulare, skin biopsies were performed, and the histopathological findings were consistent with the clinical diagnoses.

We came across 2 (1.7%) cases of diabetic dermopathy and one case (0.8%) of diabetic rubeosis (rubeosis facie). Both these entities are hypothesized to be manifestations of diabetic microangiopathy. Rao GS et al,[16] observed only one (1.14%) patient with diabetic dermopathy. The apparent low prevalence of these two conditions among Indian diabetics may be attributable to their dark complexion, making it difficult to recognize the subtle color changes associated with them.

In our study, there were 8(6.7%) patients who presented with generalized pruritus, however no skin lesions could be demonstrated, and relevant investigations performed (as mentioned in methodology) to detect underlying systemic cause if any for the unexplained pruritus were within normal limits. There were 9(7.37%) patients in the study by Nigam PK et al,[14] who had generalized pruritus with out any demonstrable skin lesion, and the authors attributed it to the hyperglycemic status of their patients.

The occurrence of cutaneous infections in early diabetics may be explained on the basis of decrease in the host defense mechanism and decreased phagocyte activity which is noticed immediately in uncontrolled diabetes and these changes do not require much longer time to develop unlike microangiopathy.[23] Skin manifestations due to diabetic microangiopathy areseen more commonly in chronic diabetes because the deposition of PAS-positive material (advanced glycosylation end products) within the lumina of theblood vessels occurs slowly in the disease process.[24]

Of the total 120 patients, 98 (81.7%) patients were only on oral hypoglycemic agents (OHAs). 7 (5.8%) patients (including 4 patients of type 1 DM) were only on insulin (daily subcutaneous injections), and 6 (5%) patients required both insulin and OHAs to control there blood sugar levels. 9(7.5%) patients who were diagnosed to have diabetes after presenting to dermatological OPD, were yet to be started on any anti-diabetic medication at the point ofinclusion in the study. We did not encounter any patient with cutaneous adverse reaction to either OHA or insulin in our study. These findings were supported by Nigam PK et al and Mahajan S et al.[14,15]

5. Conclusion

In the present study results indicates pruritus was the most common symptom. 27.5% of patients sought dermatological advice primarily for cosmetic concern of their skin lesions, Infective dermatoses were more common than the non-infective dermatoses. Dermatophyte infections were slightly more common than muco-cutaneous candidal infections in our study. Tinea corporis/cruris was most common clinical entity. 21.6% patients suffered from cutaneous bacterial infections in our study, the most frequently encountered clinical entity being furunculosis. Staphylococcus aureus The commonest non-infective clinical entity was acrochordons(skin tags). None of our patient presented with any known cutaneous adverse reaction to any of the anti-diabetic medication (OHA/lnsulin). Therefore, this results indictes high prevalence of skin disorders in DM patients. Careful dermatological examination and follow-up of diabetes mellitus patients is required to provide them adequate skin management, thus reducing morbidity and complications related to skin. Further studies with large sample size are required.

6. Source of Funding

None.

7. Conflict of Interest

None

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