ORIGINAL RESEARCH

To study the pattern of various cutaneous manifestations associated with diabetes mellitus

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Abstract

Background: Diabetes mellitus (DM) stands as a significant global health concern, impacting over half a billion individuals worldwide currently, and its prevalence continues to rise. To study and evaluate pattern of various cutaneous manifestations associated with diabetes mellitus.

Materials & Methods: The study population consisted of 200 consecutive patients diagnosed with diabetes mellitus and skin lesions who were either admitted to hospital wards or attended the diabetic clinic. All the results were recorded and analyzed using SPSS software.

Results: Mean age of the patients was 52.8 years. Out of 200 patients, 132 patients were males while the remaining were females. Overall, skin lesions were seen in 30 percent of the patients.

Conclusion: The skin is frequently affected by diabetes, leading to various manifestations. The increased prevalence of xerosis among people with diabetes may be attributed to the consistently cold and dry climatic conditions.

Keywords: Skin Manifestations, Diabetes, Dermopathy.

Introduction

Diabetes mellitus is one of the major global health problems, both because of its increasing prevalence and the complexity of its systemic and local manifestations. Diabetes affects more than half a billion of the world's population today and is present in more than 10.5% of the adult population. The manifestations of diabetes are very varied, among the most numerous being those at the cutaneous level, so the dermatologist has a very important role in detecting these associations. Conditions such as acanthosis nigricans, diabetic dermopathy, lipoid necrobiosis, bacterial and fungal infections, and skin xerosis are frequently associated with diabetes, often preceding its diagnosis. [1,2]The International Diabetes Federation (IDF) estimates the total number of diabetic subjects to be around 40.9 million in India and this is further set to raise to 69.9 million by the year 2025. [3] Estimates by WHO suggest that the number of diabetic subjects would increase to 80 million by the year 2030 in India. [4] Skin lesions are frequently observed in diabetic patients and about 30% of diabetics have cutaneous disorders. [5] The skin is affected by the acute metabolic derangements and the chronic degenerative complications of diabetes. Although the mechanism for many diabetes-associated skin conditions remains unknown, the pathogenesis of others is linked to abnormal carbohydrate metabolism, other altered metabolic pathways, atherosclerosis, microangiopathy, neuron degeneration, and impaired host mechanisms. [6] Only a few epidemiologic studies have been done on the prevalence of skin disorders in patients with diabetes mellitus. [5] The changes associated with diabetes mellitus can affect multiple organ systems. Between thirty and seventy percent of patients with diabetes mellitus, both type 1 and type 2, will present with a cutaneous complication of diabetes mellitus at some point during their lifetime.[7] Dermatologic manifestations of diabetes mellitus have various health implications ranging from those that are aesthetically concerning to those that may be life-threatening. Awareness of cutaneous manifestations of diabetes mellitus can provide insight into the present or

prior metabolic status of patients. The recognition of such findings may aid in the diagnosis of diabetes, or may be followed as a marker of glycemic control. The text that follows describes the relationship between diabetes mellitus and the skin, more specifically: skin manifestations strongly associated with diabetes, non-specific dermatologic signs and symptoms associated with diabetes, dermatologic diseases associated with diabetes, common skin infections in diabetes, and cutaneous changes associated with diabetes medications.[8-10]

Acanthosis nigricans (AN) is likely the most readily recognized skin manifestation of diabetes.[11] It is present in up to 74% of obese adult patients and can be predictive of the existence of hyperinsulinemia.[12] The presence of AN is a prognostic indicator for developing type 2 diabetes. There is also a possible genetic predisposition or increased sensitivity of the skin to hyperinsulinemia in different ethnic groups. At the same obesity rates, prevalence of AN is lowest in whites (0.5%), higher in Hispanics (5%), and even higher in African Americans (13%).[13]AN is a hyperpigmented velvety thickening of skin folds, presenting predominantly in the neck, axilla, and groin areas. Possible additional presentations could include skin tags and hyperkeratosis. Heredity, obesity, endocrine disorders, certain drugs, and malignancy are associated with AN. Benign AN type 2 is related to type 2 diabetes, and pseudo-AN type 3 is associated with the metabolic syndrome. Type 2 diabetes–related AN has an insidious onset and initially presents as hyperpigmentation. Both underlying conditions present with insulin resistance.[11] Children aged 8–14 years who had AN were found to have insulin resistance, and 25% had disturbed glucose metabolism at the time of the study. [14] Hence, this study was conducted to evaluate pattern of various cutaneous manifestations associated with diabetes mellitus.

Materials & Methods

The study population consisted of 200 consecutive patients diagnosed with diabetes mellitus and skin lesions who were either admitted to hospital wards or attended the diabetic clinic. Age, sex, length of diabetes mellitus, and treatment modalities were recorded in the clinical information. Every patient had a thorough dermatological examination. In order to verify the diagnosis, pertinent histological and microbiological tests were performed. All the results were recorded and analyzed using SPSS software.

Results

A total of 200 patients with diabetes mellitus were enrolled. Mean age of the patients was 52.8 years. Out of 200 patients, 132 patients were males while the remaining were females. Overall, skin lesions were seen in 30 percent of the patients. Xerosis, Dermopathy, Skin tags, Infections, Seborrheic keratosis, Nail changes, Xanthelasma and Vitiligo were seen in 25 percent, 23.33 percent, 20 percent, 13.33 percent, 3.33 percent, 3.33 percent, 1.67 percent, 1.67 and 8.33 percent of the patients respectively.

Table 1: Age-and Gender-wise distribution of patients

Variable		Number	Percentage
Age group (years)	Less than 40	88	44
	More than 40	112	56
Gender	Males	132	66
	Females	68	34

Table 2: Prevalence of skin lesions

Skin lesions	Number	Percentage
Present	60	30
Absent	140	70
Total	200	10

Table 3: Spectrum of skin lesions

Skin lesions	Number	Percentage
Xerosis	15	25
Dermopathy	14	23.33
Skin tags	12	20
Infections	8	13.33
Seborrheic keratosis	2	3.33
Nail changes	2	3.33
Xanthelasma	1	1.67

Vitiligo	1	1.67
Others	5	8.33

Discussion

Cutaneous signs of diabetes mellitus generally appear after the primary disease has developed but may appear coincidentally with its onset, or even precede diabetes by many years. Although the mechanism for many diabetes-associated skin conditions remains unknown, the pathogenesis of others is linked to abnormal carbohydrate metabolism, other altered metabolic pathways, atherosclerosis, microangiopathy, neuron degeneration, and impaired host mechanisms. [15] Association of at least 30% of patients with diabetes mellitus with some type of cutaneous involvement was observed during the course of their chronic disease. [16,17] Most documented studies have shown the incidence of cutaneous disorders associated with diabetes to be between 30% and 71%. [16-18] Hence, this study was conducted to evaluate pattern of various cutaneous manifestations associated with diabetes mellitus. In the present study,a total of 200 patients with diabetes mellitus were enrolled. Mean age of the patients was 52.8 years. Out of 200 patients, 132 patients were males while the remaining were females. Overall, skin lesions were seen in 30 percent of the patientsA study by Goyal A et al, One hundred consecutive patients with the diagnosis of diabetes mellitus and having skin lesions, either attending the diabetic clinic or admitted in medical wards were included in this study.The common skin disorders were: Xerosis (44%), diabetic dermopathy (36%), skin tags (32%), cutaneous infections (31%), and seborrheic keratosis (30%).Skin is involved in diabetes quite often and the manifestations are numerous. High prevalence of xerosis in our diabetic population is perhaps due to cold and dry climatic conditions in the region for most of the time in the year.[19] In the present study,Xerosis, Dermopathy, Skin tags, Infections, Seborrheic keratosis, Nail changes, Xanthelasma and Vitiligo were seen in 25 percent, 23.33 percent, 20 percent, 13.33 percent, 3.33 percent, 3.33 percent, 1.67 percent, 1.67 and 8.33 percent of the patients respectively. Another study by Chatterjee N et al, an observational study, conducted in the General Medicine and Endocrinology departments of a Medical College and Hospital in Eastern India. Six hundred and eighty (680) diabetic patients were examined, there were (64.8%) male and (35.1%) were female, of them 95.3% were Type 2 diabetics while 4.7% were Type 1. Five hundred and three patients (503) out of six hundred and eighty. i.e. 73.9% were found to have skin lesions. Thirteen (13) (41%) Type1 diabetics demonstrated skin lesions commonest being diabetic xerosis, infections and diabetic hand. Among Type2 diabetics 490(75.61%) showed skin lesions. Here infections, xerosis, hair loss beneath the knees, diabetic dermopathy were the most frequent. Majority of patients (67%) had combination of more than one type of skin lesion. There was statistically significant correlation of skin lesions with duration of diabetes, however similar correlation could not be demonstrated regarding metabolic control. Involvement of skin is inevitable and multifarious in diabetes mellitus. Higher prevalence is seen in Type 2 diabetic population. The duration of diabetes is positively correlated with lesions and infective dermatologic manifestations were associated with higher HbA1C values. [20] Vata D et al, conducted a retrospective study on a group of 103 patients hospitalized between January 2018 and December 2022, in a clinic of a county hospital, using as criteria the diagnosis of diabetes mellitus complicated by cutaneous manifestations frequently associated with diabetes. The aim was to observe which are the most common manifestations and whether they correlate with data in the research literature. Manifestations such as diabetic foot (20% of patients), bacterial (35%) and fungal infections, and cutaneous xerosis (45%) were predominant. Often, the integumentary involvement may precede the diagnosis of the underlying disease. It is therefore very important to recognize, investigate and treat these manifestations as soon as possible.[21] Diabetic foot includes vascular and neuropathic complications that develop in patients with DM, the manifestation being slightly more prevalent in patients with type 1 DM. Clinically, callosities, xerosis, evolving to chronic ulcers and foot malformations occur in the initial stage. Ulcerations (perforating foot ulceration) develop on pressure areas subject to frequent trauma. They heal poorly, are prone to bacterial or fungal superinfection, and if they do heal, recurrence is common. The factors leading to these changes are a combination of neuropathy, atherosclerosis and poor healing. Treatment includes rigorous hygiene, wearing appropriate footwear to minimize and redistribute plantar pressure. In case of superinfection, antibiotics should be administered and special hydrogel dressings, topical growth factors or grafts for epithelization. In ischemic ulcers, surgical revascularization should be used. [22,23]Necrobiosis lipoidica (NL) is rare, appearing in 0.3–1.6% of people with type 1 diabetes, more often in women than men. 24 Typical lesions of NL occur in young and middle-aged patients and present most commonly on the pretibial skin as irregular, painless ovoid plaques with a yellow atrophic center and a red to purple periphery. The lesions are usually multiple and bilateral. Lesions may ulcerate spontaneously or from trauma.[25,26] Of the patients with NL, 11–65% have type 1 diabetes at the time of cutaneous diagnosis.[26] Ninety

percent of people with NL who do not have diabetes eventually develop diabetes (mostly type 1 diabetes). Glycemic control has no effect on the course of NL. [27] Xerosis is another name for dry skin. It is the second most common skin manifestation in people with diabetes. In a study of 100 patients with diabetes and skin lesions, xerosis was present in 44% of the patients. 19 Patients with renal disease also frequently suffer from xerosis. Lichen planus is an uncommon disorder affecting <1% of the general population. Onset is common in middle age (30–60 years of age). However, the prevalence of lichen planus in people with type 1 or type 2 diabetes has been noted to be 2–4% .[28] Lichen planus may affect the skin (termed "cutaneous," with several variants), the oral cavity ("oral"), the genitalia ("vulvar" or "penile"), the scalp ("lichen planopilaris"), the nails, or the esophagus.[29]Lichen planus presents as grouped, symmetric, erythematous to violaceous, flat-topped, polygonal papules distributed mainly in flexural aspects of arms and legs and rarely can appear on the trunk ("Blaschkoid" or "zosteriform") and inverse ("intertriginous").[29] Variants may include ulcerative and perforating types. Koebner phenomenon is common, and pruritus associated with lichen planus is intense and heals with postinflammatory hyperpigmentation. Clinically, cutaneous lichen planus presents as flat-topped, violaceous papulosqamous eruptions on the skin. It is classically described as the "four Ps": pruritic, purple (violaceous), polygonal, and papules or plaques. Papules may be isolated and a few millimeters in diameter or may coalesce to form larger plaques.[29] Fine white lines may be visible on the surface of papules or plaques and are known as "Wickham's striae." Diagnosis can be made based on clinical findings. If clinical recognition is questionable, a biopsy is indicated. Etiology of the condition is unknown. It is suspected that CD8+ T cells and a Th1 immune response (cell-mediated mechanism against keratinocytes) is involved.[30]Most cases of lichen planus will be managed by a dermatologist. Treatment of cutaneous lichen planus is focused on pruritus control.[31] The potency of topical steroids used depends on the site involved. On the trunk and extremities, high-potency corticosteroids are indicated, whereas on the face and intertriginous areas, medium- to low-potency ointments are used. This is because of steroid-induced atrophy. Treatment efficacy should to be checked in 3 weeks. With generalized involvement, light therapy may be added to the treatment plan. Intralesional corticosteroids are applied to thicker lesions.[30] Systemic glucocorticoids, phototherapy with PUVA and ultraviolet B, and oral acitretin can be beneficial in people who are not candidates for topical steroid therapy. Few studies have been conducted on treatments because of the typical spontaneous remission of lichen planus. [28]

Conclusion

The skin is frequently affected by diabetes, leading to various manifestations. The increased prevalence of xerosis among people with diabetes may be attributed to the consistently cold and dry climatic conditions prevailing in the region for a significant portion of the year.

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