

COLLAGEN DISORDERS AMONG THE DIABETICS AND THE NON- DIABETICS OF NORTH INDIA: A COMPARATIVE STUDY

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ABSTRACT: Diabetes mellitus is a common condition which frequently has skin manifestations. The attachment of glucose to protein may result in a profound effect on structure and function of that protein, and account for clinical manifestations of the disease. The present study was undertaken to assess the incidence and to compare the incidence of waxy skin and scleroderma in diabetics and non diabetics. The study was done on 250 patients who attended the Skin OPD of Guru Nanak Dev Hospital, Amritsar. Thorough general physical examination and the dermatological examination were done in each case. All the cases of collagen disorders necrobiosis lipoidica diabetorum, granuloma annulare, scleroedema diabetorum, waxy skin and limited joint mobility were noted and compared between diabetics and non diabetic patients.

Keywords: Necrobiosis Lipoidica Diabeticorum, Granuloma Annulare, Scleroedema Diabeticorum, Waxy Skin, collagen disorders.

INTRODUCTION

Nearly one third of diabetic patients have cutaneous manifestations. A broad spectrum of cutaneous disorders may be encountered in patients with diabetes mellitus. On occasion, these dermatologic findings may precede any clinical or biochemical evidence for diabetes. Nearly one third of diabetic patients have cutaneous manifestations. [1] An estimated 30% of patients with diabetes develop skin manifestations during the course of their chronic illness. Although the mechanism for much diabetes associated skin conditions remains unknown, the pathogenesis of others is linked to abnormal carbohydrate metabolism. [2] Several skin conditions are specific to diabetes, but most of them also occur in the non-diabetic population. [3] Biopsy specimens of involved skin show pronounced thickening of periarticular rather than articular collagen, which may be due to non-enzymatic glycosylation of collagen. [4]

Collagen disorders

- Necrobiosis Lipoidica Diabeticorum
- Granuloma Annulare
- Scleroedema Diabeticorum
- Waxy Skin and Limited Joint Mobility

MATERIAL AND METHODS

In this study 250 patients were evaluated in the Department of Skin and STD OPD, Govt. Medical College, Guru Nanak Dev Hospital, Amritsar. The patients were equally divided into two groups of 125 patients each (Group A and Group B).

Group A: consisted of 125 diabetics in the age group of 30-60 years taken from Skin and STD OPD. Group B: consisted of 125 non-diabetic control patients taken randomly from Skin and STD OPD in the age group of 30-60 years.

The diabetics were diagnosed as per the revised criteria of glucose tolerance given by Alvin [5] Obese patients were taken according to the body mass index given by Truswell. [6]

A detailed history with special reference to age, sex, rural/urban background, socioeconomic status, obesity, hypertension, duration of diabetes, type of treatment taken, history of complications and family history of diabetes mellitus was taken from each patient in both the groups and were recorded.

Routine investigations like Hb, TLC, DLC, overnight fasting blood sugar, complete urine examination were done in each case in both the groups. Certain special investigations to confirm the diagnosis were carried out where required such as, glucose tolerance test, serum cholesterol, 24 hour urine for proteins were done in clinical pathology and clinical biochemistry laboratory of Guru Nanak Dev Hospital/Govt. Medical College, Amritsar. Fundoscopic examination was done in the eye department, Govt. Medical College, Amritsar. The incidence of collagen disorders in diabetic group, non- diabetic control group were assessed separately and then their incidence were compared in the two groups to know whether diabetes mellitus had any association with diseases of skin.

RESULTS

Amongst the group A, the most common disorder was waxy skin as observed in 41 (32.80%) cases followed by necrobiosis lipoidica diabetorum, granuloma annulare and scleroedema diabetorum in 1 (0.8%) case each. (Table I)

Amongst the group B, the only disorder seen was waxy skin as observed in 25 (20.0%) cases. (TableI)

TABLE I : SHOWING COMPARATIVE PATTERN OF SCLERODERMA DIABETICORUM AND WAXY SKIN GROUP A AND GROUP B

Manifestation	Group A(Diabetic) n=125		Group B(Non-Diabetic) n=125		X ²	P valve
	No	%	No	%		
WAXY SKIN	41	32.8	25	20.0	4.24	<0.05
SCLERODERMA DIABETICORUM	1	0.8	0	0	0.80	>0.05
NECROBIOSIS LIPOIDICA	1	0.8	0	0	0.80	>0.05
GRANULOMA ANNULARE	1	0.8	0	0	0.80	>0.05

The incidence of waxy skin observed in 32.8% of cases which was statistically significant when compared with 25% in non diabetic group.

We even had one case each of necrobiosis lipoidica diabetorum, granuloma annulare and scleroedema diabetorum in group A but these cases were absent 0% in group B which was statistically significant when compared.

DISCUSSION

Persons with diabetes tend to have thicker skin than their non diabetic counterparts. There are three aspects to this observation. The earliest description of this phenomenon was apparently the observation that insulin dependent diabetes was occasionally complicated by painful stiff hands [7]

Firstly, diabetics in general have a clinically inapparent but measurable increase in skin thickness unassociated with symptoms which go unnoticed by patients and physicians. Using pulsed ultrasound, it can be demonstrated that diabetics have thicker forearm skin than their age and sex matched non diabetic counterparts. [8]

Second is clinically apparent thickening of skin involving the fingers and hands ranging from pebbled skin of knuckles to diabetic hand syndrome. The diabetic hand syndrome (Waxy skin) consists of thickened skin over the dorsum of digits and limited joint mobility, especially of the interphalangeal joints. [9]

Third is an infrequent syndrome of diabetic scleroedema in which the patient develops markedly thickened dermis on the upper back. Thickening of the skin on the backs of the hands may occur in as many as 20% to 30% of persons with diabetes. [10] The incidence of limited joint mobility ranged from 8-50%. The variations of incidence are probably explainable by differences in age groups, duration of diabetes in the studies and lack of standardized testing. [10]

According to Sattar, at least 30% of diabetic patients have hand skin thickening, and some have demonstrable involvement of the dorsum of the feet. [4] Clinical clues which suggest such a thickening include difficulty in tenting the skin, pebbled or rough skin on the knuckles or periungual region. [4] They had studied 100 hospital based patients with diabetes mellitus. According to that study 14% had Scleroedema Diabetorum. He also concluded that the duration of Scleroedema also correlated with the duration of diabetes. These findings highlight the relatively common occurrence of this skin condition which goes often unrecognised in people with diabetes. Thickening of skin of the hands is a common occurrence, with a range of manifestations from simple pebbling of the knuckles to the diabetic hand syndrome. The diabetic hand syndrome consists of thickened skin over the dorsum of the digits and limited joint mobility, especially of interphalangeal joints. More common is simple thickening of the skin on the dorsum of the hands. At least 30% of diabetic patients have hand skin thickening, and some have demonstrable involvement of the dorsum of the feet.

According to Huntley, the diabetic hand syndrome consists of thickened skin over the dorsum of the digits and limited joint mobility, especially of interphalangeal joints. Clinical clues which suggest such a thickening include difficulty in tenting the skin, pebbled or rough skin on the knuckles or periungual region. [11]

Scleroedema adutorum of diabetes is a syndrome characterized by a marked increase in dermal thickness posteriorly on back and upper neck in middle aged, overweight, poorly controlled type II diabetic subjects. It is not recognised as being related to digital sclerosis and we found no correlation by ultrasound measurements of back skin and hand skin thickness. It has a reported prevalence of 2.5% in patients with type II diabetes. [12] Histologically one finds a thickened dermis with large collagen bundles that are separated by wide, clear spaces. There may be increased number of mast cells. [13].

Scleroedema adutorum a well-defined entity has been recognized a cutaneous manifestation of diabetes. In contrast to the identical changes occurring after infection scleroedema associated with diabetes may not remit even after long periods of time. Diabetic scleroedema occurs mainly in obese diabetic individuals with evidence of vascular complications. [14] In an excellent review of literature Krishna & Kavita also concluded that Scleroedema Diabeticorum is a diffuse, nonpitting induration of the skin characteristically occurring on the upper back, neck and shoulders in 2.5% of diabetics resulting in the limitation of movement. [15]

Mackool and Binkley suggested:

A) Scleroedema of Buschke, which occurs at any age and undergoes spontaneous resolution in 8-18 months. [16] [17]

B) Scleroedema diutinum, which does not follow acute infection, tends to chronicity and is often associated with diabetes mellitus. [13] Male diabetics are more affected than female (ratio 4: 1). Generally the diabetes is long standing and patients are obese, exhibiting high frequency of Diabetic Retinopathy, neuropathy, hypertension and Ischaemic heart disease. [16]

In our study the incidence of waxy skin was 41 (32.8%) cases in diabetic group and 25 (20%) cases in non diabetic group. The difference was statistically significant. In the diabetic group out of 41 cases there were 17 cases with skin thick over dorsum of hands especially fingers, 13 cases with pebbling of skin over knuckles, 10 cases with waxy skin and 1 case with skin thick over both dorsum of hands and feet. Except for one case all the above cases had age more than 40 years with family history of diabetes positive in most of the cases and duration of diabetes ranged from first time detected diabetics to more than 10 years. In non diabetic group out of 25 cases, 15 cases had skin thick over dorsum of hands especially over fingers. 7 cases had pebbling of skin over knuckles and 3 cases had waxy skin. Majority of the above cases had family history of diabetes positive and age more than 40 years.

We had recorded one case of scleroedema diabeticorum in diabetic group only, the incidence being 1 (0.8%). This finding was in variance with the study of Cole *et al* where the prevalence of scleroedema was 3% in patients with NIDDM. [12] The above patient was 60 years old male with the complain of limitation of motion of his upper extremities for the last 1 month along with single ulcer over right foot with gangrene of toe. He was a known diabetic for the last 2 years with uncontrolled diabetes and on irregular treatment. Patient also had waxy skin, polyneuropathy and peripheral vascular disease. Histopathology was consistent with the clinical diagnosis.

We had recorded one case of necrobiosis lipoidica diabeticorum in the diabetic group only, the incidence being 0.8%. This was in accordance with the findings of Muller who recorded 0.3% incidence in his study. [18] In another study, Yefimov *et al.* recorded the incidence to be 0.7% in diabetics. [19]

Our case was 55 years female with strongly positive family history of diabetes mellitus. She had already taken medicine for diabetic control some 2 years back but now her FBS was towards the higher side of normal at the time of presentation, but within 15 days she again developed frank diabetes. She came with the complaint of multiple swellings over left lower leg for the last one year and similar lesion on right lower leg for the last three months. On examination she had multiple swellings of variable sizes and an erythematous plaque with yellowish center 10x10 cm. On histopathology the features were consistent with clinical diagnosis.

We had recorded one case of granuloma annulare in diabetic group only the incidence being (0.8%). In a study, Jelinek reported an incidence of 10.9% which was much higher than that recorded in our study. [20].

The above case was 50 years female, a known diabetic for the last 5 years with positive family history of diabetes mellitus had annular erythematous plaques of varying sizes with beaded appearance over the margins were seen on dorsum of hands progressing on to the forearms for the last 3 months. At the time of presentation she had uncontrolled diabetes mellitus. On histopathology the features were consistent with the clinical diagnosis.

SUMMARY AND CONCLUSION

GROUP A

Among the disorders of collagen most common was waxy skin observed in 32.8% of cases which was statistically significant when compared with non diabetic group. We even had one case each of necrobiosis lipidica diabetorum, granuloma annulare and scleroedema diabetorum.

GROUP B

Among the disorders of collagen only waxy skin with its different presentations was observed in 20% of cases.

CONCLUSION

From the foregoing account it became clear that the skin is involved in diabetics quite often. So whenever patients present with multiple manifestations their diabetic status should be checked and controlled, or if they are obese and have positive family history of diabetes mellitus, a high index of suspicion should be kept regarding their diabetic status. In this way diabetes can be detected quite early and early intervention can prevent morbidity from this deadly disease.

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