



Cutaneous manifestations among Egyptian children and adolescents with type 1 diabetes[☆]



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Abstract *Background:* Although almost all patients with T1DM eventually develop one or more skin manifestations, data on cutaneous manifestations of type 1 diabetes mellitus (T1DM) are scarce. They can be the first presenting sign, or even precede the diagnosis or develop from the long-term effects of diabetes. *Objective:* To detect the prevalence and spectrum of skin manifestations in children and adolescents with T1DM attending the DEMPU clinic, Cairo University and to investigate the effect of the disease duration on these dermatoses. *Subjects and methods:* Two hundred twenty-five children and adolescents with T1DM were examined for dermatological problems. Of them, 152 patients who had cutaneous manifestations with T1DM were included in this case-control study, 152 age and sex matched non diabetic patients were included as control group. A detailed dermatological examination was carried out by the dermatology team. *Results:* The overall prevalence of dermatologic manifestations was 67.56% (152 T1DM patients; 74 males and 78 females). The mean age of the patients was 8.38 ± 3.79 years and the mean diabetes duration was 2.80 ± 2.86 years. Cutaneous adverse effects related to insulin injections were the most common manifestation representing 28.9%, followed by cutaneous infections (bacterial, fungal and viral infections) in 25%, allergic skin diseases in 19.1% and pruritus in 15.1% of patients with T1DM. *Conclusion:* Broad spectrums of dermatoses are common (67.56%) in Egyptian patients with T1DM. Early referral to the dermatologist helps to detect skin complications of diabetes in these children and is essential for both prevention and management of these conditions.

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Introduction

Although the mechanism for many diabetes-associated skin problems remains unknown, the pathogenesis of others is linked to abnormal carbohydrate metabolism, other altered metabolic pathways, atherosclerosis, microangiopathy, neuron degeneration, and impaired host mechanisms.¹ It seems that

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diabetes, similar to other endocrine disorders, may cause some alterations that could be derived from impaired skin homeostasis.² Cutaneous manifestations generally appear subsequent to the development of diabetes but may be the first presenting sign or even precede the diagnosis by many years. The cutaneous findings can be classified into four major groups: (1) skin diseases associated with diabetes, such as scleroderma-like changes of the hand, necrobiosis lipoidica, and diabetic dermopathy; (2) cutaneous infections; (3) cutaneous manifestations of diabetes complications such as neuropathic foot ulcers; and (4) skin reactions to diabetes treatment.³

Objective

The objective of this study was to evaluate the prevalence and the spectrum of skin manifestations in children with type 1 diabetes mellitus (T1DM) attending the Diabetes Endocrine & Metabolism Pediatric Unit (DEMPU) clinic, Cairo University, and to assess its relation to disease duration, metabolic control in children and adolescents with type 1 diabetes.

Material and methods

Study population

To assess the prevalence of the cutaneous manifestations in children with T1DM, two hundred twenty-five children and adolescents with T1DM attending the Diabetes Endocrine and Metabolism Pediatric Unit (DEMPU) clinic were examined for dermatological problems between December 2010 and September 2011. Patients were included if they have T1DM, aged less than 18 years. Children with associated other systemic diseases that may have cutaneous manifestations were excluded.

Only one hundred fifty-two patients were found to have cutaneous manifestations with T1DM and were included in this case-control study (group I). They were compared to the control group (group II).

The control group (group II) included one hundred fifty-two age and sex matched patients with cutaneous manifestations with no history of any systemic disease.

Procedure

- All children were subjected to full history taking including age, sex, onset, course, and duration of the present cutaneous lesions, associated diseases, and history of previous skin diseases and in children with T1DM; duration of diabetes, type of insulin therapy.
- A detailed dermatological examination was carried out by a dermatology team and the cutaneous findings were recorded.
- The charts of children with T1DM were reviewed for the previous results of HbA1c in the past year to assess the glycemic control, and thyroid profile, lipid profile and any other available labs to rule out any associated condition that may be associated with cutaneous manifestations.

Statistical analysis

Data were statistically described in terms of mean \pm standard deviation (\pm SD), median and range for quantitative data, or frequencies (number of cases) and percentages for qualitative data when appropriate. Comparison of numerical variables between the study groups was done using Student's *t* test for independent samples in comparing normally distributed data and Mann Whitney *U* test for independent samples in comparing non-normal data. For comparing categorical data, Chi square (χ^2) test was performed. Exact test was used instead when the expected frequency is less than 5. *p* values less than 0.05 was considered statistically significant. All statistical calculations were done using computer programs SPSS (Statistical Package for the Social Science; SPSS Inc., Chicago, IL, USA) version 15 for Microsoft Windows.

Results

The prevalence of cutaneous manifestations in children and adolescents with T1DM in the study group was 67.56% (out of the two hundred twenty-five children with T1DM, one hundred fifty-two patients had cutaneous manifestations).

Group (I) included 152 children with T1DM and cutaneous manifestations (74 males and 78 females) with a mean age of 8.38 ± 3.79 years (ranging from 1.5 to 15 years). The mean duration of diabetes was 2.80 ± 2.86 years and the mean HbA1c was $8.91 \pm 7.96\%$. Group II (control group) included 152 patients; 58 males (38.2%) and 94 females (61.8%), their mean age was 5.14 ± 2.02 years (ranging from 3 to 15 years). There was no statistical significant difference between the two groups as regards the age and sex ($p = 0.122$ and 0.091 , respectively).

Regarding the spectrum and the distribution of the skin manifestations in group I (children with T1DM), complications of insulin therapy were the most common cutaneous manifestation in patients with T1DM and diagnosed in 44 cases (28.9%), Fig. 1. The most common insulin complication was insulin lipohypertrophy (36/44 cases) followed by bruises at insulin injection sites (6/44 cases), brown pigmentation at insulin injection sites came in the third order (2/44 cases).

Cutaneous infections were the second common cutaneous disease in the study group (group I) diagnosed in 38 cases (25%); they included bacterial, fungal and viral infections (Fig. 1). Bacterial infections were diagnosed in 19 cases (12.5%), 6 males and 13 females. Boils, impetigo and acute paronychia were diagnosed in 16, 2, 1 case/s, respectively. Cutaneous fungal infections were diagnosed in 17 cases (11.2%), 3 males and 14 females. The most common cutaneous fungal infections were candidiasis (monilial vulvovaginitis) (11/17) cases followed by tinea versicolor, tinea corporis and tinea capitis in 3, 2 and 1 case/s, respectively.

The most common allergic skin disease in group (I) was papular urticaria (12/29) cases followed by pityriasis alba, urticarial and eczema in 11, 4, 2 cases, respectively.

There was no significant difference between children with T1DM and the control group as regards bacterial and fungal skin infections ($p = 0.737$, 0.565 , respectively), (Table 1).

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