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Case Report

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Xerosis Cutis as a Presentation of Hypothyroidism in a Pediatric Patient: A Case Report

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Abstract

The skin is probably one of the main target organs of the thyroid hormone effects. We report a case of a 6-year-old girl with hypothyroidism in which marked xerosis was the most conspicuous and impressive clinical manifestation, probably a rare manifestation of thyroid disease. This case illustrates the role of subtle dermatological signs as a window to the presence of thyroid disease and an effective intervention in the form of levothyroxine replacement therapy to restore growth and reverse cutaneous findings in a child with hypothyroidism. Investigations for thyroid dysfunction in cases with unexplained cutaneous findings may be advantageous.

Keywords: Children; Growth; Hypothyroidism; Levothyroxine; Pediatric; Skin.

جفاف الجلد كعرض لقصور الغدة الدرقية لدى طفل مريض: تقرير حالة

الخلاصة

الجلد ربما يكون أحد الأعضاء المستهدفة الرئيسية لتأثيرات هرمون الغدة الدرقية. نبلغ عن حالة فتاة تبلغ من العمر 6 سنوات تعاني من قصور الغدة الدرقية، حيث كان جفاف الجلد الظاهر هو أكثر المظاهر السريرية وضوحاً، وربما كان مظهراً نادراً لمرض الغدة الدرقية. توضح هذه الحالة دور العلامات الجلدية الخفية كنافذة لوجود مرض الغدة الدرقية وتدخل فعال على شكل علاج بديل بالليفوثيروكسين لاستعادة النمو وعكس الاكتشافات الجلدية لدى طفل يعاني من قصور الغدة الدرقية. قد تكون التحقيقات في خلل الغدة الدرقية ذات أهمية في الحالات التي تظهر فيها نتائج جلدية غير مفسرة.

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INTRODUCTION

Since thyroid hormones act in a variety of organs and on a variety of cellular processes, the skin was also considered a very important target organ [1]. Thyroid hormones regulate sebaceous gland activity, hair follicle cycling, dermal metabolism, and epidermal proliferation and differentiation. For this reason, hypothyroidism is associated with various skin changes. The most common cutaneous finding in hypothyroidism is xerosis, or dry rough skin, due to decreased activity of eccrine glands and decreased turnover of the epidermis [1,2]. Generalized pruritus, with dry, hyperkeratotic skin and absence of sweating, may occur. Skin findings of hypothyroidism include pallor, coldness, non-pitting edema (myxedema) as a result of decreased cutaneous blood flow, deposition of mucopolysaccharides into the dermis, and changes of hair and nails [2]. Diffuse hair loss, coarse brittle hair, and thinning of hair on the scalp are common findings seen in patients with hypothyroidism with decreased keratinocyte proliferation and metabolism [3]. These skin changes are meaningful as they may represent the first detectable

changes in patients before a biochemical diagnosis, allowing earlier identification and treatment of hypothyroidism and systemic changes [4,5]. Consequently, failure to elicit and manage thyroid dysfunction in a timely fashion could have dire consequences, as even previously unrecognized subclinical hypothyroidism has been considerably associated with adverse cardiovascular events and higher short-term mortality [6]. This report describes the eventful diagnosis of hypothyroidism in a child resulting from severe xerosis cutis (dry skin).

Case Presentation

A 6-year-old child presented to the pediatric endocrinology outpatient clinic with complaints of generalized dry skin for approximately one year. The dryness progressively worsened and was associated with pruritus but no erythema or infection. There was no history of atopic dermatitis, allergies, or exposure to irritants. The child's mother reported that her daughter had been managed as a case of eczema and had received intermittent treatment with emollients and topical

corticosteroids, with only minimal improvement. Upon further inquiry, the mother also noted that the child had been experiencing poor concentration, easy fatigability, and occasional episodes of facial puffiness.

Physical examination

On physical examination, the patient had generalized xerosis with rough, scaly skin, most pronounced over the extremities and abdomen. The skin was coarse in texture and cold to touch. Mild periorbital puffiness and slight thinning of the hair were observed. No goiter. In addition, the abdomen was distended. Cardiovascular and respiratory examinations were unremarkable; sexual maturity was stage 1 for both breasts and pubic hairs, as shown in Figure 1A-C.

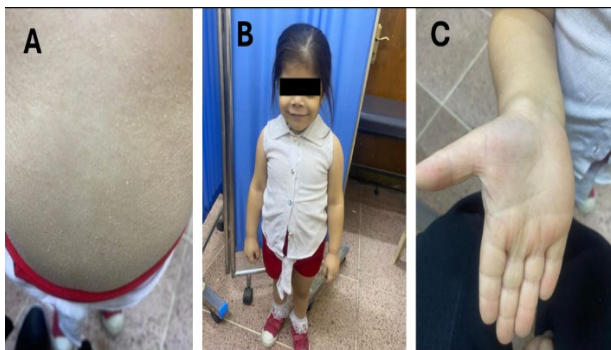


Figure 1: A and B) rough, dry, and scaly skin over palm and abdomen respectively; C) short patient with periorbital puffiness.

Anthropometric assessment revealed markedly short stature, disproportionate to weight. The patient's height was 98 cm (-3.6 SDS), corresponding to too far below the 3rd percentile for age, while her weight was 19.5 kg (-0.29 SDS), lying between the 25th and 50th percentiles. Mother's height: 161 cm, father's height: 176 cm, midparental height: 162 cm.

Investigations

Thyroid function tests revealed elevated thyroid-stimulating hormone (TSH) with reduced free thyroxine (FT4) levels, consistent with primary hypothyroidism, as shown in Table 1.

Table 1: Laboratory findings of the patient

Parameter	Result	Reference Range	Interpretation
TSH mIU/L	287	0.5–5.5	Very high
Free T4 ng/dL	0.2	0.8–2.2	Very low

Table 2: The dermatological manifestations of hypothyroidism [1,10,11].

Skin Manifestation	Description
Xerosis (dry skin)	Rough, scaly, dry skin; often generalized, more prominent on extremities
Pruritus	Itching due to dryness and reduced sweat/oil production
Pallor/Cool skin	Pale, cool, sometimes yellowish due to carotene accumulation
Nail changes	Brittle, slow-growing nails
Eczema/Atopic-like dermatitis	Chronic pruritic lesions, lichenification
Hair changes	Dry, brittle hair; hair loss
Facial puffiness/edema	Periorbital edema

Additional laboratory investigations, including complete blood count, liver and renal function tests, serum electrolytes, and celiac disease screening, revealed no abnormalities. Radiological evaluation for growth assessment, by the Tanner Whitehouse method (TW) [7], demonstrated a delayed bone age of 3 years compared with a chronological age of 6 years. Thyroid ultrasound showed agenesis.

Treatment

In the case of severe or long-standing hypothyroidism, particularly in children, it is usually recommended that replacement therapy with levothyroxine begin with a low dose and increase gradually. A start with one-third to one-half of the replacement dose and titration over 2 to 3 weeks lowers the risk of adverse effects compared to administration of the full replacement dose [8]. So, in our case we started with 37.5 micrograms/day ($2 \mu\text{g}/\text{kg}/\text{day}$) and increased to 75 micrograms/day ($4 \mu\text{g}/\text{kg}/\text{day}$) three weeks later. Rapid correction with the full dose of levothyroxine may lead to complications such as behavioral changes, irritability, headaches, or pseudotumor cerebri, particularly in children with severe or long-standing hypothyroidism. Gradual dose escalation allows the body to adapt to increasing thyroid hormone levels and improves treatment tolerability [9].

DISCUSSION

In pediatric patients, dermatological manifestations of hypothyroidism are often subtle and may be misinterpreted as primary dermatologic conditions [1]. In our case, the patient's primary complaints were skin dryness and pruritus. Careful and systematic history-taking, along with a high level of clinical suspicion, made it possible to make a diagnosis more quickly and accurately. Severe xerosis can predispose patients to eczematous dermatitis, although this presentation is relatively uncommon and infrequently reported as a primary manifestation of hypothyroidism. The dry skin increases susceptibility to inflammation, leading to pruritic and erythematous lesions that may clinically resemble eczema [1,10]. Dermatological manifestations ranging from chronic urticaria, vitiligo, and alopecia areata to less common conditions such as pretibial myxedema and thyroid acropachy can serve as valuable diagnostic clues for hypothyroidism [10]. Table 2 summarizing the dermatological manifestations of hypothyroidism.

A large observational study for a total of 460 consecutively diagnosed hypothyroid patients who were evaluated specifically for skin, hair, and nail manifestations. It highlighted the high prevalence of skin abnormalities in those patients—especially xerosis, hair loss, and edema. It emphasized that many skin manifestations, though nonspecific, can serve as clinical clues to underlying hypothyroidism and warrant further endocrine evaluation [12]. It is known that it is critical to diagnose thyroid dysfunction in children as early as possible because it will have a great impact on growth and mental development. Our patient had very short stature due to long-standing primary hypothyroidism. Cases such as congenital hypothyroidism and autoimmune thyroiditis can considerably affect growth and development, so the potential for early diagnosis and proper management relies on its dermatological features [13,14]. Ideally, appropriate thyroxin therapy will promote catch-up growth as it normalizes growth hormone secretion and skeletal age. Marked improvement in cutaneous manifestations is observed [15]. In our patient, we observed a good increase in height velocity and a clear improvement in cutaneous dryness; the current height after 1 year of treatment is 106 cm (Figure 2).



Figure 2: Noticeable improvement in cutaneous manifestation in addition to height gain after thyroxin treatment.

Conclusion

As skin manifestations might be the first sign of thyroid dysfunction, all patients who present with unexplained skin changes should be screened for thyropathies and undergo routine follow-up to facilitate early diagnosis and begin treatment to ultimately improve their metabolic profile and overall quality of life.

Conflict of interests

The authors declared no conflict of interest.

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Data sharing statement

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