Adrenal insufficiency and diabetes mellitus secondary to the use of topical corticosteroids for cosmetic purpose

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INTRODUCTION

Adrenal insufficiency and diabetes secondary to oral, injectable and inhaled corticosteroid treatment are well-characterised conditions [2]. The diagnosis of adrenal insufficiency in such context is based on the history of chronic administration of corticosteroids, and subsequent evidence of low plasma cortisol and low responsiveness to ACTH stimulation or inappropriate response to metyrapone or insulin hypoglycaemic testing [8]. Hypothalamo-Pituitary-Adrenal (HPA) function is thus systematically tested before withdrawal of long-term corticosteroid treatment. Although topical glucocorticosteroids are the most frequently used drugs in dermatologic practice [3], and extensive chronic use of corticosteroid-containing creams for cosmetic purpose is reported with high frequency in some populations of African descent [10], the association of topical corticosteroid with symptomatic acute HPA hypofunction and diabetes has not been previously reported.

We report a case of symptomatic topical corticosteroid-induced adrenal insufficiency and diabetes in a 46-yr old HIV 1 positive woman of African descent. Topical Betamethasone dipropionate 0.05%-containing creams were used for the purpose of bleaching over a 2 month period prior to the acute episode. She recovered from her acute onset diabetes with ketosis and adrenal insufficiency a few months after withdrawal of corticosteroids. Despite possible discussion about pathophysiology of diabetes because acute-onset remitting diabetes is not rare in patients of African descent, and diabetes may occur in patients taking anti-retroviral treatments, no other cause of an insuffisance surrénale transitoire n’a été mise en evidence. Ces données suggèrent la nécessité de rechercher des antécédents récents d’usage de dermocorticoïdes à forte dose chez les patients présentant une insuffisance corticotrope.

Mots-clés : dermocorticoïdes, dépigmentation, insuffisance surrénalienne, diabète, Afrique, VIH.

Key words: topical corticosteroids, depigmentation, adrenal insufficiency, diabetes, African, HIV.
A 46yr old lady originating from Sub Saharan Africa consulted in emergency with a 10-day history of fatigue, weight loss (-3kg) within 10 days, loss of appetite, polydipsia, dry cough, and no fever in May 2001.

She has HIV 1 infection diagnosed in 1990, initially started on AZT, then several antiretroviral combination and currently treated by Didanosine 400mg, Ritonavir 200mg, Indinavir 400mg, and Lamivudine 150mg. The patient had opportunistic Tuberculosis infection in 1991 successfully treated, and Kaposi in 1992. She is regularly followed-up at the Specialised STD consultation, and has a stable HIV infection under the current treatment with CD4 count at 442/mm3 and undetectable viral load. The anti-retroviral treatment is well tolerated excepts mild hypertriglyceridaemia at 2.6mmol/l with normal serum cholesterol and normal fasting blood glucose (4.0 mmol/l), and lower limb lipodystrophy at the review two months prior to this emergency consultation.

On examination, she weighted 71 kg for 176cm height, BP 105/60, pulse rate 90, normal chest examination, temperature 36° 8, lower limbs lipodystrophy (since several months). Surprisingly, she had extensive irregular skin depigmentation (the face, neck and limbs (since several months). She has HIV 1 infection diagnosed in 1990, initially started on AZT, then several antiretroviral combination and currently treated by Didanosine 400mg, Ritonavir 200mg, Indinavir 400mg, and Lamivudine 150mg. The patient had opportunistic Tuberculosis infection in 1991 successfully treated, and Kaposi in 1992. She is regularly followed-up at the Specialised STD consultation, and has a stable HIV infection under the current treatment with CD4 count at 442/mm3 and undetectable viral load. The anti-retroviral treatment is well tolerated excepts mild hypertriglyceridaemia at 2.6mmol/l with normal serum cholesterol and normal fasting blood glucose (4.0 mmol/l), and lower limb lipodystrophy at the review two months prior to this emergency consultation.

Careful history taking about the change in skin colour revealed the use of 10 x 30-g tubes of topical Be-tamethasone dipropionate 0.05% cream for the purpose of bleaching (cosmetic) over a 2-month period, discontinued few days before consultation.

Diabetes mellitus and adrenal insufficiency secondary to corticosteroid therapy were suspected and urgent admission at the Endocrinology department was decided. Initial laboratory investigation showed FBG 20.3mmol/l, ketosis without acidosis (bicarbonate 20.3mmol/l, anion gap = 12), absence of long term complication of diabetes, and plasma cortisol at 12ng/ml (normal: 70–230ng/ml), normal serum lipase and amylase, serum sodium 132mEq/l, and potassium 4.0mEq/l.

Diabetes and Adrenal insufficiency were thus confirmed and the patient was started immediately on initial Hydrocortisone 100 mg x 4 day IV continued by oral 30mg/day for adrenal insufficiency and a multi daily insulin injection protocol (approximately 1.6UI/day) in order to achieve blood glucose control. Insulin could secondarily be switched to oral metformin 850mg x 2/day after 8 days of insulin therapy due to repeated hypoglycaemic episodes despite reduction of insulin dosage. After appropriate education for diabetes care and adrenal insufficiency she was discharged and followed as out patient.

She was re-admitted 6 months later for re-evaluation. Skin pigmentation had returned to normal. After 4 days of withdrawal of hydrocortisone therapy, basal plasma cortisol was still low at 54ng/ml and inadequately responsive to ACTH stimulation (135ng/ml, normal > 200ng/ml). Oral Hydrocortisone replacement therapy was maintained. Oral hypoglycaemic agents were withdrawn and adequate blood glucose control could be achieved without pharmacological treatment (2h Post-prandial BG 5.6mmol/l and HbA1c 4.7% (normal < 6%)

Nine months after the first admission, basal plasma cortisol was found normal at 192ng/ml after 4 days of hydrocortisone withdrawal, and normally responsive at 315ng/ml 60 min after 250-microgramme ACTH stimulation suggesting recovery from the adrenal insufficiency. Thus, hydrocortisone replacement therapy could be withdrawn. Blood glucose control was still adequate on diet alone. The patient was given information about possible relapse of diabetes since she is still receiving anti-retro viral therapy and taking into consideration possible relapse of diabetes after prolonged remission often observed in African origin diabetic patients.

It is now 16 months since the initial episode and she is seen for out patient review on a regular basis and is still in remission of diabetes mellitus and maintains a clinically normal HHA function. At the most recent review, she weighted 78Kg, with BP 126/74, pulse rate 70/min, normal fasting blood glucose and plasma sodium and potassium.

**DISCUSSION**

The present case depicts reversible symptomatic adrenal insufficiency and severe diabetes in a patient who has been using heavy dose of topical corticosteroid-containing creams for cosmetic purposes.

The frequent use of corticosteroid containing creams for bleaching by women of African origin has previously been reported in some west-African countries with up to 28% of women reporting the use of depigmenting agents at least once in their life [10, 12]. Moreover, such creams are often sold in the market among other cosmetic preparation and delivered without medical prescription.

A previous study in 12 Senegalese women with a more than 10 years use of such bleaching agents have evidenced decreased responsiveness of HPA axis to ACTH stimulation but no case of overt acute adrenal insufficiency [9]. In a recent review, Levin and Maibach have identified the use of high potency corticosteroids, occlusive or prolonged treatment application, and use in thin-skinned areas as risk factors of adrenal insufficiency in individuals using topical corticosteroids [7]. Glucose tolerance abnormalities but not insulin-requiring diabe-
tes also have been reported in topical corticosteroid-containing creams users [4]. Altogether, these data suggest that percutaneous absorption of corticosteroid might be important enough to have an impact on HHA function. Percutaneous absorption is probably enhanced by the progressive reduction of skin thickness induced by prolonged application of corticosteroids, percutaneous absorption is known to be increased through altered skin [6].

In the present case, other causes of adrenal insufficiency such as HIV infection and opportunistic infection could have been suspected, but the acute presentation, the absence of other clinical signs of infection and the spontaneous short-term recovery without specific antinfectious treatment makes this hypothesis of very low probability.

By contrast, despite the remission of diabetes after withdrawal of corticosteroid administration, it is not possible to rule out type 1B diabetes in this patient. In fact it is well known that populations of African descent may develop acute onset diabetes with ketosis around the age of 40, with further long-term remission after short course of insulin treatment [1, 11]. Moreover, similar presentation of diabetes has been observed in AIDS patient in our clinical practice (unpublished data). In addition, the existence of lower limbs lipodystrophy is consistent with insulin resistance and might be associated with diabetes [13]. The high doses of insulin required initially are consistent with insulin resistance. However, diabetic ketosis has not been reported in insulin resistant lipodystrophic diabetic HIV patients [5, 13]. Thus, diabetes in the present case might by multifactorial with the association of some insulin resistance of lipodystrophic syndromes, possible predisposition to type 1B diabetes and systemic passage of topically administered corticosteroid creams.

This observation is unique in the sense that it puts in light [1] the use of potent topical corticosteroids for cosmetic purposes in SSA origin women, [2] a probable percutaneous absorption of corticosteroids important enough to cause symptomatic acute HPA suppression and possibly reveal diabetes mellitus. The use of topical highly potent corticosteroids for bleaching should therefore be considered as a new possible cause of secondary HPA hypofunction and diabetes.

REFERENCES


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