



Case Report

Topical corticosteroid-induced iatrogenic cushing syndrome in an infant; a case report with literature review



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ABSTRACT

Introduction: Cushing syndrome (CS) is an endocrinological abnormality that results from a high level of glucocorticoids in the blood. Iatrogenic CS due to the overuse of topical corticosteroids is rarely reported. The current study aims to present a rare case of topical corticosteroid induced iatrogenic CS in an infant.

Case presentation: A 4-month-old female infant presented with an insidious onset of face puffiness that progressed over a 2-month period. The mother reported to have used a cream containing Betamethasone corticosteroid 5–8 times a day for a duration of 3 months to treat diaper dermatitis. Laboratory findings revealed low levels of adrenocorticotrophic hormone (ACTH) and serum. Abdominal ultrasound showed normal adrenal glands. The topical corticosteroid was halted and physiologic topical hydrocortisone doses were administered.

Clinical discussion: Infants are more likely to acquire topical corticosteroid induced iatrogenic CS due to their thin and absorptive skin, higher body surface area, and the high prevalence of conditions that necessitates the use of these medications. Most iatrogenic CS cases following topical steroid application have been reported in infants with diaper dermatitis that are most commonly treated with Clobetasol and Bethamethasone.

Conclusion: Infants are susceptible to develop CS due to topical corticosteroid overuse. Hence, physicians need to consider this in infantile CS cases, and take appropriate measures to avoid their occurrence.

1. Introduction

Cushing syndrome (CS) is a reversible endocrinological abnormality that results from high level of cortisol or other glucocorticoids in the blood [1]. It can be caused by either endogenous factors such as excess steroid production and secretion due to adrenal or pituitary tumors, or exogenously through prolonged use of corticosteroid medications resulting in iatrogenic CS [2]. Iatrogenic CS due to the overuse of oral or parenteral corticosteroids is common, however, while topical corticosteroids are one of the most widely prescribed medications by dermatologists, they are less frequently reported to cause iatrogenic CS [3,4]. Even though CS is very rare in the pediatric population with an annual incidence of only 5 cases per million, children of the pediatric age have a higher risk of developing iatrogenic CS, which is likely due to the high prevalence of conditions that necessitates the use of topical corticosteroids and the thinness of their skin that can more easily absorb the

steroid [5,6].

The aim of the current study is to present a rare case of topical corticosteroid induced iatrogenic CS in an infant. SCARE guidelines are considered in writing this report [7].

2. Case presentation

2.1. Patient information

A 4-month-old female infant presented with an insidious onset of puffiness of the face; the swelling progressed over a period of 2 months without any other associated symptoms. The infant's prenatal, developmental, and family history were insignificant, and she was born full term to consanguineous parents via caesarian delivery. After delivery she did not require neonatal intensive care unit (NICU) and was discharged in good health. She has been given both bottle and

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breastfeeding every one to two hrs, and she has received all the required vaccinations at their proper times.

The mother reported to have used a topical corticosteroid cream (Optizol-B cream; a combination of Clotrimazole and Betamethasone) for a period of 3 months with a dose of 5–8 times a day to treat diaper dermatitis of the infant.

2.2. Clinical findings

The infant's physical examination revealed facial puffiness (Moon face) with no body edema, and cutaneous examination showed the diaper rash without any other cutaneous manifestations. The infant was vitally stable with no dysmorphic features and no skeletal deformities. Her growth parameters were within normal limits, and her systemic examination was unremarkable.

2.3. Diagnostic approach

Laboratory findings revealed low adrenocorticotropic hormone (ACTH) level in the blood measuring 5.9 p.m./l, a serum cortisol level of 24 nmol/l, and normal serum sodium and potassium levels of 144 mEq/l and 4.8 mmol/l, respectively. Abdominal ultrasonography (US) showed normal adrenal glands.

2.4. Therapeutic intervention

The topical corticosteroid cream that contained Bethamethasone was halted and oral hydrocortisone was given (10 mg/m²) tapered over one month. The patient was given a card addressing Cushing syndrome to inform the health care providers in case of emergency situation or unexpected surgical intervention.

2.5. Follow-up and outcome

The infant's facial puffiness was significantly improved after 7-month follow-up of the patient.

3. Discussion

CS is an endocrinological disorder resulting from high glucocorticoid level in the blood, it is categorized into ACTH dependent (due to pituitary tumors or excess ACTH administration) or ACTH independent CS (due to adrenal neoplasms or excessive glucocorticoid intake) [8,9]. Under normal circumstances, ACTH is secreted by the pituitary gland which in turn stimulates the secretion of cortisol by the adrenal glands [10]. Prolonged exogenous corticosteroid administration can lead to a number of adverse effects based on potency and duration of the treatment, including the suppression of hypothalamic-pituitary-adrenal (HPA) axis and iatrogenic CS, severe infections, and failure to thrive [11]. While iatrogenic CS is frequent with prolonged administration of oral or parenteral corticosteroids, its occurrence due to topical corticosteroids have rarely been reported [12].

Multiple factors can increase the probability of acquiring the condition, such as corticosteroid potency, amount and frequency of application, age, skin quality, presence of occlusion, and duration of application [4]. In general, infants are more likely to develop topical corticosteroid induced iatrogenic CS, this is due to their thin and absorptive skin, higher body surface area, underdeveloped skin barrier, and the high prevalence of conditions that necessitates the use of these medications [5,6]. Most iatrogenic CS cases following topical steroid application have been reported in infants with diaper dermatitis [8]. This was also the case in this study. This is likely because the diaper area provides occlusion, the perineal skin has intrinsically absorptive properties, the steroid causes local skin atrophy, and percutaneous absorption is even more increased as the result of skin inflammation [13].

The most frequently used corticosteroid for the treatment of diaper

dermatitis is reported to be Clobetasol followed by Bethamethasone, with a mean application duration of 2.75 (1–17) months to induce cortisol and ACTH levels suppression [4]. Typical clinical manifestations of CS include facial puffiness (Moon face), generalized body edema and obesity, hirsutism, buffalo hump, hypertension, skin fragility, and purple striae [3,5]. The causative corticosteroid in the current case was Bethamethasone that only resulted in facial puffiness (Moon face) without generalized body edema.

A specific and definitive diagnostic approach for iatrogenic CS is currently lacking [5]. However, prolonged exogenously administered glucocorticoids can suppress ACTH secretion which results in dismissing the need for proper endogenous production of cortisol [14]. Hence, almost all iatrogenic CS cases are associated with low ACTH and cortisol levels which can aid in the diagnosis of the condition [8]. Same findings were observed in this case. According to multiple studies, exogenous corticosteroid administration can often lead to HPA axis suppression alongside CS [15,16]. However, topical corticosteroid induced iatrogenic CS has been reported without HPA axis suppression [8].

The management of these cases start with the cessation of the causative corticosteroid medication and administration of physiologic topical hydrocortisone [5]. The same approach was followed in this study. In order to prevent the development of this condition in the first-place; clinicians should avoid prescribing high potency corticosteroids in the treatment of infantile dermatological disorders and instead choose low potency topical steroids, and also parents should be advised not to overuse these medications and only apply a thin layer to the affected area [6].

In conclusion, even though iatrogenic CS in infants is rare, overuse of topical corticosteroids can lead to their occurrence. Hence, physicians need to consider extensive steroid use as a causative agent of infantile CS. Appropriate measures need to be taken to avoid their occurrence by prescribing less potent steroids, limiting the use of high potent steroids, and informing parents about adverse effects of steroid overuse in infants.

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Author statement

Soran Mohammed Ahmed: physician managing the case, follow up the patient, and final approval of the manuscript.

Shaho F. Ahmed, Snur Othman, Berwn A. Abdulla, Shvan M.Hussein, Abdulwahid M.Salih, and Fahmi H. Kakamad: literature review, writing the manuscript, final approval of the manuscript.

Patient consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Provenance and peer review

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Declaration of competing interest

None to be declared.

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