

Prednisolone-Induced Cushing's syndrome: A case report

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Abstract

Objective: Prednisolone, a frequently prescribed corticosteroid, is linked to diverse adverse effects, including Cushing's syndrome.

Material and Methods: This report details a case of prednisolone-induced Cushing's syndrome in a 6-year-old girl diagnosed with Acute Disseminated Encephalomyelitis (ADEM). Prednisolone was administered to manage inflammation associated with ADEM. Subsequent to the tapering of prednisolone, the patient exhibited progressive weight gain, facial rounding, fatigue, and muscle weakness. Clinical examination revealed classic manifestations of Cushing's syndrome, including central obesity, moon facies, and proximal muscle weakness. Laboratory analysis confirmed elevated serum cortisol levels and suppressed adrenocorticotrophic hormone (ACTH), confirming exogenous Cushing's syndrome induced by prednisolone. The patient's prednisolone dosage was gradually reduced under careful medical supervision. Regular follow-ups were conducted to monitor symptoms, weight fluctuations, and hormonal levels. With the decrease in prednisolone dosage, the patient's symptoms showed gradual improvement.

Results and conclusion: Prednisolone-induced Cushing's syndrome arises as a recognized complication of corticosteroid therapy, primarily characterized by the suppression of the hypothalamic-pituitary-adrenal axis. Early awareness of this adverse effect is pivotal for prompt identification and management. This case emphasizes the significance of vigilant monitoring and judicious use of prednisolone to mitigate adverse effects like Cushing's syndrome. Swift recognition, dose adjustments, and a gradual tapering of corticosteroids play a crucial role in effectively managing this condition for optimal patient outcomes.

Keywords: Prednisolone; Cushing's syndrome; Acute Disseminated Encephalomyelitis

1. Introduction

Prednisolone, a synthetic corticosteroid falling under the glucocorticoid category, effectively manages various conditions by reducing inflammation and altering the body's immune reactions. It's widely used to alleviate inflammation related to arthritis, allergic conditions, skin problems like eczema, and inflammatory bowel disease (IBD). Additionally, it's role in addressing immune system disorders such as lupus, multiple sclerosis, and certain types of vasculitis. Short-term usage is common during asthma or chronic obstructive pulmonary disease (COPD) exacerbations and as part of post-transplant immunosuppressive therapy. Its mechanism of action involves inhibiting specific bodily chemicals responsible for inflammation and immune responses. However, discontinuing prednisolone abruptly after extended use can trigger withdrawal symptoms. Hence, gradual tapering as per medical guidance is crucial to minimize these effects ^{[1],[2]}.

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Cushing's syndrome arises from prolonged exposure to excessive cortisol levels produced by the adrenal glands. Its symptoms encompass weight gain with increased fat in the upper body, face, and abdomen despite efforts to manage weight. Skin changes involve thinness, easy bruising, and pink or purple stretch marks, while muscle weakness, a rounded face, and hypertension is common. Glucose intolerance, mood swings, menstrual irregularities in women, osteoporosis, and persistent fatigue also characterize this condition. These symptoms collectively signal the need for medical assessment and tailored management strategies [3],[4].

Acute Disseminated Encephalomyelitis (ADEM) is a rare inflammatory disorder impacting the central nervous system, commonly arising post-infection or vaccination. It induces extensive inflammation in the brain and spinal cord, prompting rapid onset of neurological symptoms like fever, headache, confusion, seizures, and potentially coma. While both children and adults can be affected, it's more prevalent in children. The precise cause of ADEM isn't fully comprehended but is thought to involve an abnormal immune response triggered by infections or vaccinations. Symptoms encompass neurological issues such as confusion, drowsiness, seizures, and focal neurological deficits. Visual changes like blurred or double vision, along with motor and sensory changes such as limb weakness, paralysis, numbness, or tingling sensations, may present. Treatment typically involves high-dose corticosteroids like prednisolone as the initial approach to reduce inflammation. Intravenous Immunoglobulin (IVIG) is administered to modulate the immune response. In instances where corticosteroids and IVIG prove ineffective, plasma exchange (plasmapheresis) [5],[6].

2. Case history

6-year-old female patient was admitted in the pediatric department with chief complaints of fever, headache, unable to walk, cushingoid features +.she is a known case of Acute Disseminated Encephalomyelitis (ADEM) and was on prednisolone therapy and 3 months back discontinued dose of prednisolone for 4 days and experienced loss of vision and undergone 2 doses of IVIG treatment and discharged with prednisolone therapy after 3 months now again upon tampering the dose of prednisolone patient came with chief complaints of fever, headache, unable to walk and The patient was conscious and well oriented to time and place but on physical appearance was looking weak, pale upon examination physician noticed Cushing's syndrome features such as muscle weakness, pink stretch marks, fatigue, weakness, moon face , abdominal distension, On examination, her vitals are PR- 84bpm, Respiratory cycles- 26 cpm, CVS-S1, S2 positive, RS-BAE positive, blood pressure- 100/60mmhg.

Laboratory investigations shows that patient had elevated blood glucose levels of 160mg/dl and CSF analysis showed glucose- 52mg/dl, cell count- 3cells/ cumm, lymphocytes- 100% and her cortisol levels were elevated to 33mcg/dl. MRI SACN- showed multiple T. hypointense and T2 hyperintense and flair, intensities noted in subcortical white matter of B/L frontal and parietal lobes.

Based on subjective and objective data patient was diagnosed with Cushing's syndrome due to long-term use of prednisolone and the patient was treated with PCM infusion 15 mg IV/TID, syrup chlorpheniramine 5ml/PO/OD, syrup multivitamin 5ml/PO/OD, tablet ca+2 500mg, and tapered the dose of prednisolone to 5mg/BD and after 2 weeks to 5mg-2.5mg and after 2 weeks to 5mg/OD, and after 2 weeks to 2.5mg/OD.

3. Discussion

Cushing's syndrome, characterized by an excess of cortisol in the body, has varied origins. Exogenous Cushing's syndrome develops from extended therapeutic use of corticosteroids, while endogenous forms have internal sources. Internally, pituitary tumors, referred to as Cushing's disease, stimulate excessive ACTH production, leading to increased cortisol levels. Adrenal tumors, like adenomas or carcinomas, independently produce cortisol. Moreover, ectopic ACTH syndrome emerges from tumors outside the pituitary or adrenal glands, triggering heightened ACTH levels and subsequent cortisol elevation [7].

Symptoms of exogenous Cushing's syndrome, which occurs due to prolonged corticosteroid use, mirror those found in the endogenous form. These include weight gain, especially in the abdomen, face, and upper back, thinning and delicate skin, susceptibility to bruising, muscle weakness, elevated blood pressure, glucose intolerance, mood fluctuations, menstrual irregularities in women, and a heightened vulnerability to infections. These symptoms arise because of excessive cortisol introduced into the body through external corticosteroid administration [8].

Diagnosis of exogenous Cushing's syndrome entails a thorough assessment involving medical history, a physical exam, and targeted tests. The common laboratory findings in Cushing syndrome includes lack of response to an ACTH

stimulation test, low ACTH level, elevated fasting blood sugar level, 24-hour urinary free cortisol measurement, late-night salivary cortisol tests, and low-dose dexamethasone suppression tests, are utilized to evaluate cortisol levels and the body's reaction to corticosteroids.

Prolonged use of prednisolone can lead to Cushing's syndrome symptoms such as increased weight in the face and abdominal regions, alterations in the skin, weakened muscles, elevated blood pressure, glucose intolerance, changes in mood, and a heightened risk of osteoporosis. Treatment can be done by tapering the dose of corticosteroid and by using steroid sparing agents such as methotrexate and cyclophosphamide.

4. Conclusion

Patients considering steroid therapy should receive comprehensive information regarding potential side effects to ensure informed decision-making. Lack of awareness about these effects may result in severe systemic complications, including Cushing's syndrome, hypertension, dyslipidemia, suppression of the hypothalamic-pituitary-adrenal axis, development of striae, glaucoma, skin atrophy, cataracts, and increased susceptibility to life-threatening infections.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study

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