Prednisolone Induced Exogenous Cushing Syndrome: A Case Report

Dr.Subhankar Das[1,*] | Dr.Jatin Kaushik[1] | Dr.Anushka Sharad Dube[1] | Dr.Pooja Biswas[1] | Dr.Faiqua Jamal[1] | Dr.Silky Kumari[1]

Department of Doctor of Pharmacy, Institute for Medical Sciences and Research Centre, Jaipur National University, Jaipur, 302017, Rajasthan, India.

***Corresponding Author**

ORCID ID: 0000-0003-3753-5810

Abstract:

Exogenous Cushing syndrome (ECF) develops when a patient uses synthetic (man-made) glucocorticoids to treat a condition. These drugs have cortisol-like effects on the body. ECS may be caused by oral corticosteroids such as cortisone or prednisone. In an adult, CS can appear as proximal muscular weakness, facial plethora, wasting of the extremities along with higher fat in the abdominal region and face, wide reddish striae, bruising without evident trauma, and supraclavicular fat deposits. In this case report, a 39-year-old woman was suspected of having Cushing syndrome because of his clinical symptoms and low cortisol levels due to taking oral corticosteroids for the last 2 years. She presented weakness, joint pain, buffalo hump, skin infection, diabetes mellitus type-2, along with suspicion of Central hypothyroidism. MRI scan of the brain showed demyelinating lesions. After a physical examination and laboratory data confirmed that the patient was diagnosed with corticosteroid-induced exogenous Cushing syndrome.

Keyword: Cushing syndrome, cortisol, corticosteroids, prednisolon

Introduction:

Cushing syndrome is a relatively uncommon endocrine disorder characterized by the excessive elevation of cortisol (also known as hydrocortisone) levels within the body [1]. The most prevalent etiological factor contributing to Exogenous Cushing's syndrome (ECS) is the type of Cushing syndrome (CS) affects persons who use glucocorticoids, often known as corticosteroids or steroids. ECS develops when a patient uses synthetic (man-made) glucocorticoids to treat a condition. These drugs have cortisol-like effects on the body. Low cortisol level due to low ACTH level (or high cortisol level) in the blood or urine, depending on the corticosteroid medication. [2-3]. The most common cause of CS is the corticotropin-secreting pituitary adenoma that results in Cushing's disease (CD) [4]. It is crucial to acknowledge that this surplus of cortisol within the body is associated with an elevated risk of mortality due to the emergence of severe complications. These complications encompass systemic arterial hypertension, insulin resistance with diabetes mellitus, obesity, and improper growth patterns in children. Furthermore, the elevated cortisol levels

are also implicated in decreased bone mineral density, proteolysis, and mental growth retardation [5]. Early diagnosis can prevent the illness from worsening; thus, the first step is to determine biochemically whether hypercortisolism is indeed present. In the second phase, it is decided if the hypercortisolism is pituitary dependent or pituitary independent. And final step to determine the exact cause by a range of examinations, including the Dexamethasone test, Metyrapone test, and radiological imaging modalities such as MRI (Magnetic Resonance Imaging) and CT scan (Computed Tomography) [6-7]. CS management hinges on the presence of a pituitary adenoma. Surgical removal of the adenoma stands as the primary treatment option, favored for its lower risk of adverse effects. Conversely, in cases devoid of an adenoma or when surgery is unsuitable due to the patient's condition, alternative strategies come into play. These alternatives encompass pituitary radiotherapy (XRT), anticortisolic drugs, and bilateral adrenalectomy (BLA)[8].

Case Report:

A 39 years old female patient was suffering from weakness, joint pain along with back pain, buffalo hump and skin infection at home, She visited the nearest RMP (Registered medical practitioner) in her village. She have been taking medicine with prednisolone in low to moderate doses since last 2 years for skin infection. After 2 years the patient was admitted to the female general medicine ward with chief complaints of muscle weakness in the lower limb, Pain in knee, back pain, skin infection, rashes and itching on both leg and hand, Puffy face since 4weeks, the patient was conscious and well. The patient had no past history of Diabetes mellitus, Hypertension, thyroid. The Patient could not show and tell previous medication she had taken. The physical appearance of the patient was looking weak and her vital were as follows BP-128/88, PR- 82bpm.

Laboratory test data shows HbA1c-8.2, the patient had elevated fasting blood glucose (FBG) level of 286mg/dl, Serum cortisol (AM) level of 0.07, Blood vitamin B12 level of 159 pg/ml, serum vitamin D 15.0 ng/mL along with stool occult blood-Positive. **USG impression is**- Fatty liver, Right renal simple cortical cyst, anterior wall Intramural fibroids uterus. **M.R.I scan of brain**- likely suggested demyelinating lesions. **Nerve conducting studies suggested** bilateral mild to moderate peroneal axonal neuropathy or affecting bilateral peroneal nerves. On the basis of laboratory investigation patient was diagnosed with prednisolone induce cushing syndrome.

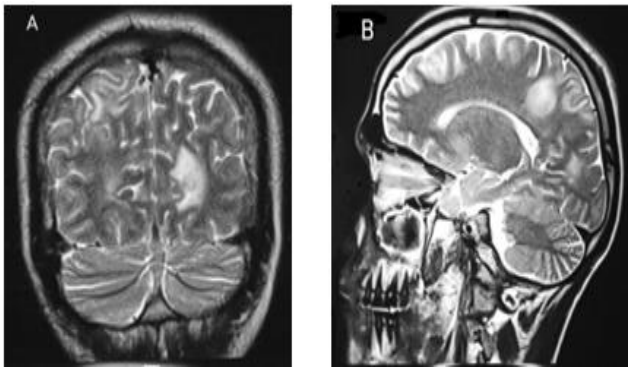

Fig. A and B a brain MRI, suggest demyelinating lesions

The patient took medication according to the prescribed manner, which includes Tab. Vitamin B complex once a day (OD), Huminsulin R 40IU/ml 10 unit TDS, tab. Metformin 500 mg BD, Tab. calcium vitamin D3 OD, cholecalciferol-60000 I.U once a week, tab. montelukast levocetirizine 10/5 mg OD, Cream.Luliconazole (1% w/w) BD. Lotion liquid paraffin BD, tab. Terbinafine 250 mg OD from admission time. 22 days later, the patient's FBG was 132 mg/dl, and the patient got relief symptomatically. The patient recovered slowly with the proper care of the healthcare team. After 3 months of treatment, a physical examination revealed that the Cushing syndrome had regressed.

Discussion:

The diagnosis of Cushing syndrome is difficult. The overlap of Cushing's with more widespread medical conditions like diabetes, high blood pressure, obesity, and polycystic ovarian syndrome may cause delayed diagnosis [9]. Corticosteroids have been known to produce Cushing syndrome, which has been shown to predominantly affect infants and young children [10]. The body surface to weight ratio may be higher (2.5–3 times higher) in this syndrome [11]. Although it happens infrequently, people may develop Cushing syndrome through prolonged usage of highly

strong oral and topical steroids. For short-term treatment, high-potency topical steroids should be used. Weekly doses shouldn't be more than 50 g, and the creams shouldn't be applied to the face, axillae, perianal region, or genitals to prevent side effects [12]. Itraconazole, a strong CYP3A inhibitor, has been shown in a number of Cushing syndrome patients to increase the risk of iatrogenic Cushing syndrome when taken with topical (inhaler) corticosteroids [13].

Recent research have revealed that high-risk patient populations, such as those with diabetes (especially if poorly managed), hypertension, and early-onset osteoporosis (especially if accompanied fractures), have a substantially greater prevalence [14-17]. A study of two hundred patients with poorly controlled diabetes mellitus (HbA1C >8%) found that 5.5% of patients had Cushing's disease, mainly of an adrenal origin [15]. According to a recent study the prevalence of hypertension associated with Cushing syndrome is up to 67% . As in this case, it resolved after treatment in approximately 65% of cases, and left untreated, it constitutes a risk factor for cardiovascular events associated with diabetes and dyslipidemia [18].

Conclusion:

Early recognition of steroid induced Cushing syndrome helps in reducing the morbidity and mortality. If not treated Cushing syndrome may leads to the more complications and leads to survive heavily. Finally, recipients who will be treated with steroids, notably topical steroids, should be informed about the dose, duration, and kind of treatment, as well as any a systemic impact. Patients with Cushing syndrome should be asked regarding every modalities of glucocorticoid administration.

Declarations:

Ethics approval and consent to participate

Informed consent was obtained from the patient for publication of this case report including the clinical information and accompanying images.

Consent for publication

The patient was assured that their name and initials will not be published.

Funding

Not applicable.

Conflict of interest

None declared.

References:

1. Brzozowska MM, Kepreotis S, Tsang F, Fuentes-Patarroyo SX. Improvement in cognitive impairment following the successful treatment of endogenous Cushing's syndrome-a case report and literature review. BMC Endocrine Disorders. 2019;19:1-9.
2. Wannachalee T, Jantanapornchai N, Suphadirekkul K, Sirinvaravong S, Owattanapanich W. Multiple myeloma concealed by adrenal Cushing syndrome: a case report and review of the literature. Journal of Medical Case Reports. 2018;12(1):1-5.
3. Nieman LK, Biller BM, Findling JW, Newell-Price J, Savage MO, Stewart PM, Montori VM. The diagnosis of Cushing's syndrome: an endocrine society clinical practice guideline. The Journal of Clinical Endocrinology & Metabolism. 2008;93(5):1526-40.
4. Zhang D, Jiang Y, Lu L, Lu Z, Xia W, Xing X, Fan H. Cushing's Syndrome With Nocardiosis: A Case Report and a Systematic Review of the Literature. Frontiers in Endocrinology. 2021;12:640998..
5. Laws Jr ER. Neurosurgery's man of the century: Harvey Cushing—the man and his legacy. Neurosurgery. 1999;45(5):977.
6. Prague JK, May S, Whitelaw BC. Cushing's syndrome. Bmj. 2013;346.
7. Nieman LK. Diagnosis of Cushing's syndrome in the modern era. Endocrinology

and Metabolism Clinics. 2018 Jun 1;47(2):259-73.

8. Eviz E, Mutlu GY, Akcay AA, Erbey F, Guran T, Hatun S. An Overlooked Manifestation of Hypercortisolism-Cerebral Cortical Atrophy and Challenges in Identifying the Etiology of Hypercortisolism: A Report of 2 Pediatric Cases. Hormone Research in Paediatrics. 2023:1-.
9. Shaver D. Case report: Patient presenting with Cushing's disease. Surgical Neurology International. 2015;6(Suppl 6):S268.
10. Sıklar Z, Bostanci I, Atli O, et al. An infantile Cushing syndrome due to misuse of topical steroid. Pediatr Dermatol 2004;21:561–3.
11. Hengge UR, Ruzicka T, Schwartz RA, et al. Adverse effects of topical glucocorticoids. J Am Acad Dermatol 2006; 54:1–15.
12. Robertson DB, Maibach HI. Adverse systemic effects of TCS. In Maibach HI, Surber C, editors. TCS. Basel: Karger; 1992:pp. 163–169.
13. De Wachter E, Vanbesien J, De Schutter I, et al. Rapidly developing Cushing's syndrome in a 4-year-old patient during combined treatment with itraconazole and inhaled budesonide. Eur J Pediatr 2003;162:488–9.
14. Anderson Jr GH, Blakeman N, Streeten DH. The effect of age on prevalence of secondary forms of hypertension in 4429 consecutively referred patients. Journal of hypertension. 1994;12(5):609.
15. Catargi B, Rigalleau V, Poussin A, Ronci-Chaix N, Bex V, Vergnot V, Gin H, Roger P, Tabarin A. Occult Cushing's syndrome in type-2 diabetes. The Journal of Clinical Endocrinology & Metabolism. 2003;88(12):5808-13.
16. Chiodini I, Torlontano M, Scillitani A, Arosio M, Bacci S, Di Lembo S, Epaminonda P, Augello G, Enrini R, Ambrosi B, Adda G. Association of subclinical hypercortisolism with type 2 diabetes mellitus: a case-control study in hospitalized patients. European journal of endocrinology. 2005;153(6):837-44.
17. Chiodini I, Mascia ML, Muscarella S, Battista C, Minisola S, Arosio M, Santini SA, Guglielmi G, Carnevale V, Scillitani A. Subclinical hypercortisolism among outpatients referred for osteoporosis. Annals of internal medicine. 2007;147(8):541-8.
18. Azzoug S, Rabehi L, Hannachi S, Medjdoubi H, Chentli F. Cushing [apos] s syndrome and hypertension. InEndocrine Abstracts 2015 May 1 (Vol. 37). Bioscientifica.