

A Rare Case of Methylprednisolone-Induced Exogenous Cushing's Syndrome

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ABSTRACT

Exogenous corticosteroid use is a well-recognized cause of iatrogenic Cushing syndrome. Among systemic glucocorticoids, methylprednisolone is widely prescribed for inflammatory and autoimmune conditions. Corticosteroids, naturally produced by the adrenal cortex or synthetically formulated, play a vital role in various medical treatments. Glucocorticoids, such as methylprednisolone and hydrocortisone, possess potent anti-inflammatory, immunosuppressive, anti-proliferative and vasoconstrictive properties, making them essential in controlling inflammatory diseases. This case report discusses 65-year-old male patient with history of Rheumatoid Arthritis managed with long term methylprednisolone use 4 mg BD for 2 years presenting with cough with expectoration, breathlessness, wheezing, lower limb swelling and abdominal pain. Clinical evaluation found to be normal. His treatment includes nebulized bronchodilators (levosalbutamol and ipratropium bromide), corticosteroids (budesonide), antibiotics (Piperacillin-tazobactam, clarithromycin) and supportive therapy with oxygen. This case underscores the importance of carefully monitoring corticosteroid therapy to prevent adverse effects. A balanced approach in steroid administration is crucial to minimizing complications while maximizing therapeutic benefits.

Keywords: Corticosteroids, Cushing's syndrome, Immunosuppressive, Methylprednisolone.

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INTRODUCTION

Cushing's syndrome is an endocrinological abnormality that results from excessive levels of glucocorticoids, which may be produced endogenously or administered exogenously. Chronic use of corticosteroids like methylprednisolone is recognized as one of the primary causes of iatrogenic Cushing's syndrome. Iatrogenic Cushing's syndrome, most commonly caused by the long-term use of corticosteroids, presents with features such as moon face, central obesity, and muscle weakness. While oral and intravenous corticosteroids are widely used for their anti-inflammatory effects, inappropriate or extended use can induce significant metabolic and physical alterations (Suresh *et al.*, 2025). Cushing's syndrome may occur due to the exogenous causes or endogenous causes. The exogenous causes for the occurrence of the Cushing's syndrome is due to the administration of the corticosteroids, hence it is called as steroid induced Cushing's syndrome or Iatrogenic Cushing's syndrome. This steroid induced Cushing's syndrome more commonly seen in females than males (Liu *et al.*, 2013). This is due to the differences in the biology and regulation

of the Hypothalamic-Pituitary-Adrenal Axis, corticosteroid metabolism and hormone interactions specific to sex. The iatrogenic (exogenous) is the most frequent Cushing's syndrome which is caused due to the prolonged administration of synthetic glucocorticoids such as prednisolone. The endogenous Cushing's syndrome is uncommon and is due to the overproduction of cortisol by adrenal glands because of an adrenal tumor, excessive production of ACTH by a pituitary tumor, or ectopic ACTH production by other tumors (Ralston *et al.*, 2018). Iatrogenic Cushing's syndrome is presented with weight gain usually central obesity with redistribution of fat to truncal areas and the appearance of dorsocervical and supraclavicular fat pads (buffalo hump) and the classic moon face, bruising, thin skin, abdominal striae, myopathy, and muscle weakness can also be seen (Hopkins and Leinung, 2005). In healthy individuals, the pituitary gland secretes the ACTH that stimulates the adrenal glands to secrete cortisol. When the steroids are administered, suppression of this hypothalamic-pituitary-adrenal axis occurs. The diagnosis of iatrogenic Cushing's syndrome can be made by measuring 24-hr urinary free cortisol or serum cortisol or administration of 1 mg dexamethasone or late-night salivary cortisol and also by checking the past medical history of the patient for administration of steroids in any form (Nieman, 2018). Sudden stoppage of the corticosteroids causes the adrenal crisis, hence the treatment is



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done by dose tapering of the corticosteroids by this adrenal gland atrophy can be reversed (Rice *et al.*, 2017).

CASE PRESENTATION

A 65-year-old male patient was admitted to the department of General Medicine on 14/4/2025 with complaints of cough and breathlessness on exertion, bilateral swelling of the lower limbs, facial swellings over the past 3 days. His past medical history was significant for rheumatoid arthritis, for which he has been receiving regular treatment for past two years. Had history of taking Tab. Methylprednisolone, 4 mg BD. On physical examination the patient was found to be conscious, oriented. His vital signs revealed a normal body temperature and was having positive signs of Pedel Edema and Lymphedenopathy. All the vitals were normal. Laboratory investigation shows elevated blood glucose levels. Renal function test indicated increased serum urea level. Liver function test revealed decreased serum albumin level. On diagnostic test of USG *Scrotum* and inguinal region revealed Right spermatocele and minimal hydrocoele.

Upon admission, the patient was initially managed with a nebulization Ipratropium bromide and Levosalbutamol to relieve Bronchospasm, nebulized budesonide to reduce airway inflammation. Further therapeutic management included the administration of Intravenous piperacillin and Tazobactam (4.5 g thrice daily) for infection control Inj.Pantoprazole, 40 mg IV, OD. Tab.Clarithromycin 500 mg, Cap.Acebrofylline and N-acetylcysteine, Inj.Insulin.

On second day of admission the patient having complaints of multiple hyperpigmented Itchy skin lesions, scaly plaques over buttocks and groin region and it was diagnosed as *Tinea corporis* and it was treated with Cap.Itraconazole 65 mg OD, Tab.HH Levo 5 mg OD and advised a topical application luliconazole cream. And the Pedal Edema was treated with Inj.Furosemide, 40 mg twice daily. Tab.Methylprednisolone restarted after 2 days to 4 mg OD. Because of abrupt withdrawal can cause secondary adrenal insufficiency.

DISCUSSION

Generally, 1% of the general population are long-term users of high doses of corticosteroids for the treatment of various diseases which may lead to the development of iatrogenic Cushing's syndrome (Nandyala and Prasad, 2017). In this case, the patient had clinical features such as buffalo hump (Figure 1), moon face (Figure 2), fat deposition in neck region, B/L upper limb (Figure 3) and lower limb swelling. The reason for the admission was cough and breathlessness on exertion. The patient also had underlying comorbid condition such as Hyperglycemia. The patient is K/C/O of Rheumatoid Arthritis. The serum cortisol level was found to be decreased but long-term use of corticosteroid has confirmed that the patient is having Exogenous Cushing's syndrome. To deal with this condition, steroid doses must be tapered slowly as



Figure 1: Buffalo hump.



Figure 2: Moon face.



Figure 3: Upper limb Edema.

sudden stoppage may lead to adrenal crisis. Similar management strategies were adopted in this case to treat hyperglycemia with Insulin. Cough and breathlessness symptoms were treated with corticosteroids, ipratropium bromide and levosalbutamol to relieve Bronchospasm, nebulized budesonide to reduce airway inflammation (Rafiq *et al.*, 2020).

The Primary cause of Cushing's syndrome is prolonged use of synthetic glucocorticoids. Now-a-days the usage of the steroids is increasing enormously without any prescriptions, even though it is not an OTC medication. All pharmacies and Registered Medical Practitioner's are prescribing steroids as pain killers. Meticulous monitoring of corticosteroid therapy is crucial to prevent serious adverse effects. Identification and diagnosis of this kind of clinical condition are not always clear and consistent. Hence awareness of this disorder should be encouraged. Clinical pharmacists have to be aware of these rare syndromes and support the clinicians in whatever ability is required.

CONCLUSION

This case highlights the significant risk of developing iatrogenic Cushing's syndrome following the long-term use of methylprednisolone for conditions like rheumatoid arthritis. The presentation of classic symptoms, including moon face and a buffalo hump, underscores the need for high clinical suspicion in patients on chronic steroid therapy. Management must prioritize a gradual tapering of the corticosteroid dose to avoid life-threatening adrenal crisis and to allow for the reversal of adrenal gland atrophy. Ultimately, a balanced therapeutic approach, combined with vigilant monitoring by clinicians and pharmacists, is essential to minimize metabolic complications while maintaining the benefits of treatment.

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ABBREVIATIONS

ACTH: Adrenocorticotrophic hormone; **BD:** Twice daily; **B/L:** Bilateral; **COPD:** Chronic obstructive pulmonary disease; **HPA axis:** Hypothalamic-Pituitary-Adrenal axis; **IV:** Intravenous; **K/C/O:** Known case of; **OD:** Once daily; **OTC:** Over the counter; **RA:** Rheumatoid arthritis; **RBS:** Random blood sugar; **SABA:** Short-acting beta-2 agonist; **Tab.:** Tablet; **Cap.:** Capsule; **Inj.:** Injection; **USG:** Ultrasonography.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ETHICAL STATEMENT

The author has obtained permission for this case study.

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