A case of **Steroid induced Cushing's syndrome** presented to a tertiary care teaching hospital

Dr. Sirisha G
Sr. Resident
[D.M. Clinical Pharmacology and Therapeutics]
Nizam's Institute of Medical Sciences

CONTENTS

Corticosteroids- Life Saving

- Corticosteroids are life saving drugs due to
  - Immunosuppressive action
  - Anti inflammatory action
- But they cause a huge bundle of side effects.

Some of these ADRs can be prevented when appropriate caution is exercised by the physician.

Iatrogenic Cushing's syndrome

- Caused by glucocorticoids are given in large doses or for prolonged periods.
- **Incidence**- 2-3/million population/year.
- Under reported in India, in spite of heavy usage.
- Requires multidisciplinary intervention to diagnose and treat in a tertiary care centre.

A Case of steroid induced Cushing's syndrome

- A 16 year old male patient was admitted in AMC of NIMS with complaints of

1. Altered sensorium
2. Shortness of breath
3. Blurring of vision and
4. Increased frequency of urination.

History of steroid intake by the patient

- Past history revealed that the patient was diagnosed with Craniopharyngioma 2 years back in another hospital- was treated one year back with cyber knife radiotherapy and intensive parenteral steroids.
- Since, discharge from that hospital, he was on steroids which were gradually tapered.
- Subsequently, he was kept on maintenance dose of tablet methyl- prednisolone 8mg three months back, which he has been using since then.

- On **physical examination** in NIMS, the patient was found to be obese, with moon face and striae on abdomen.
- Patient had acanthosis nigricans and developed infections like left lower lobe pneumonia.

- **Investigations** revealed that the patient had

1. Hyperglycemia(FBS-350 mg/dl, HbA1c- 8.4).
2. Electrolyte abnormalities

- Hypokalemia (K^+ - 2.2 mg/dl)
- Hypernatremia (Na^+- 168 mg/dl)

3. Developed hypothyroidism(Free T4- 0.75 mg/dl)

- Cushing's syndrome was suspected, so plasma morning cortisol levels were estimated, and were found to be high (53.9 µg/dl)- confirmatory.
- Water deprivation test was done, urine osmolality was 174.8 mOsm/L – Diabetes insipidus confirmed

Diagnosis

- **Features suggestive of Cushing's syndrome**:
  - Obesity
  - Moon face, abdominal striae
  - Hyperglycemia
  - Hypokalemia
  - Infections
  - Acanthosis nigricans
  - Cognitive disturbances
  - Elevated morning plasma cortisol levels.

- As patient has history of steroid intake, patient was diagnosed to have developed -

  Iatrogenic Cushing's syndrome

Diagnosis cont…

- **Features suggestive of hypopituatarism:**
  - Diabetes insipidus
  - Hypernatremia
  - Hypogonadism
  - Hypothyroidism
- Radiotherapy given for Craniopharyngioma was suspected to be the most common cause, though there are rare reports of steroids causing hypopituatarism.

Treatment given

- V-P shunt surgery was done in NIMS(as CT Scan showed persisting lesion with dilatation of supratentorial ventricular system and lesion extending into the hypothalamus)
- Parenteral antibiotics (Piperacillin+Tazobactum)
- Oral desmopressin
- Injection human actrapid
- Patient gradually recovered and was discharged after 1 month of hospital stay.

Common side effects with steroids

- HPA suppression

  ↓

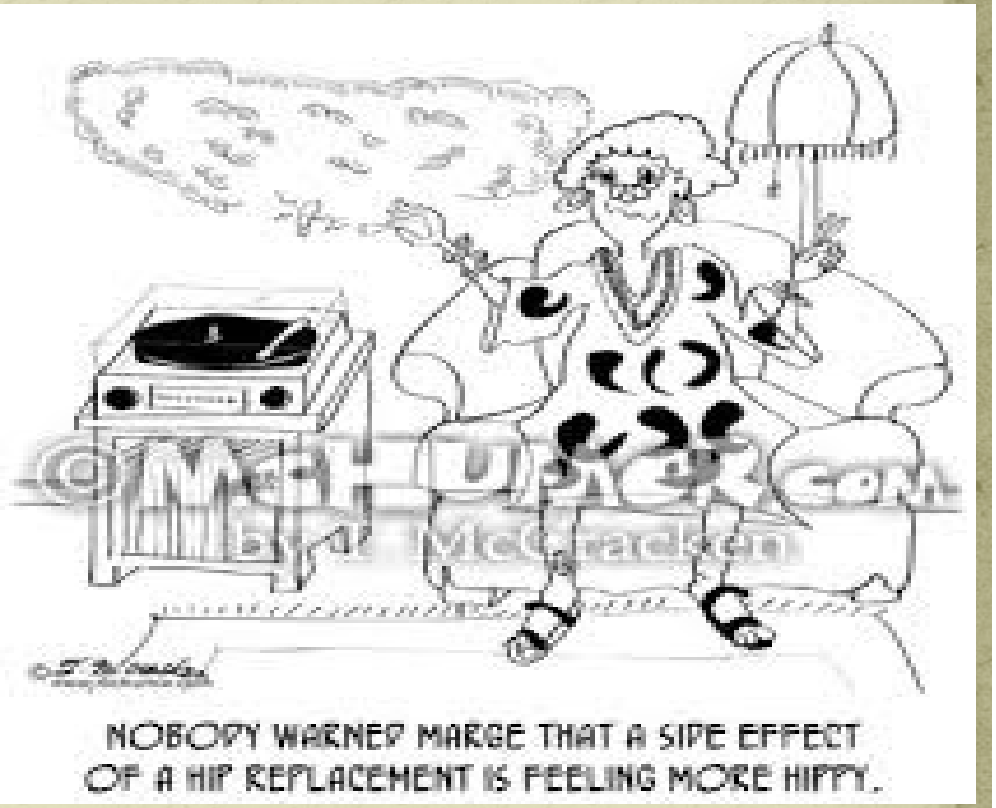
  causes adrenal insufficiency
- Abnormal fat distibution

  ↓

  moon face, buffalo hump, truncal obesity
- Electrolyte disturbances

  ↓

  hypernatremia, hypokalemia
- Hypertension



Common side effects with steroids cont…

- Steroid myopathy
- Osteoporosis
- Mood changes
- Growth retardation
- Peptic ulcer
- Posterior subcapsular cataracts

Minimizing side effects with steroids

1. Requires knowledge of physicians about the cautious use of steroids.
2. Careful monitoring for adverse effects and their management.
3. Avoiding medications which can cause possible drug interactions with steroids.
4. Gradual tapering of corticosteroids to prevent HPA axis suppression and its dangerous consequences.
5. Steroid sparing agents

Checklist for patients before steroids

- Full history including psychiatric, smoking, alcohol and drugs.
- Measure blood pressure and blood glucose.
- Varicella—history of chickenpox, check antibodies if necessary.
- Tuberculosis—history of TB, chest *x ray*.
- Osteoporosis—dual energy *x ray absorptiometry scan*
- Peptic ulcer disease—history of peptic ulcer disease, prophylaxis if in high risk group.

Advise to the patients on steroids

a) Take low calorie diet, poor in sodium and rich in potassium; regular physical exercise.
b) Report to the physician, if they suffer any side effect.
c) Avoid close contact with person suffering from chickenpox or shingles.
d) Wear steroid reminder bracelets (children).
e) Carry steroid treatment card.
f) Smoking cessation and alcohol moderation.
g) Not to discontinue steroids abruptly, against physician's advice.

Subsequent monitoring for adverse effects

- **Bone health :**

  BMD assessed 1 year post GC initiation

- If stable: assess every 2-3 yrs
- If decreased: assess annually
- Lateral spine x-ray in adults ≥ 65 yrs- vertebral ♯ risk.
- Use FRAX to estimate fracture risk.

Subsequent monitoring for adverse effects cont…

- **Growth (children and adolescents):**
  Monitor every 6 months and plot on growth curve.
- **Dyslipidemia and CV risk :**
  Assess lipids 1 month after starting GC, then every 6-12 m.
  Assess 10 yr CV risk with FRS.
- **Hyperglycemia/DM :**
  Measure RBS 24 hrs after GC initiation,
  then every 3-6 m for first yr; annually thereafter.
- **Ophthalmic examination**: annually; earlier if risk present

Prefer topical steroids

Entire dose in the morning

AVOID

HPA

SUPPRESSION

Alternate day therapy

Keep dose at the minimum

Tapering of steroids

Reduce prednisone dose by 2.5 to 5mg every 3-7days, until physiological dose (5-7.5mg/day) is reached

ALTERNATELY, Switch to hydrocortisone 20mg given in the morning

Gradually reduce hydrocortisone dose by 2.5mg over weeks to months

MEASURE morning cortisol levels

if < 275 nmol/L - continue hydrocortisone

275- 500 nmol/ L – discontinue hydrosotisone.

Use high dose steroids required at time of stress

Exercise caution during concomitant usage of

- Anticonvulsants
- Anti- infectives (rifampin, efavirenz)

} decrease GC levels

- Macrolides
- Antifungals (ketoconazole, itraconazole)

} increase GC levels

- Antidiabetic agents- glucose dysregulation
- Diuretics – increase kaliuretic effects of GC
- NSAIDS- increased risk of GI ulcers
- Warfarin – increased risk of bleeding

Importance of PV awareness in India

- Corticosteroids are more widely used by India, even by quacks, unaware of their potential adverse effects.
- There is under reporting of steroid induced ADRs in India
- This shows the need for more wider implementation of pharmacovigilance programme in India.
- The physicians should also bear a caution in mind, while prescribing steroids.

TAKE HOME MESSAGE

USE

STEROIDS

WITH

CAUTION

REFERENCES:

1) Liu et al, Allergy, asthma and clinical immunology 2013,9:30.
2) Goodman and Gilman- pharmacological basis of therapeutics.
3) Rosalyn MS, Elizabeth MG, Br J Ophthalmol 1998; 82: 704-08.

Than Q