

“Looking for Hope”

Endocrine Block, PBL; Case 2



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Color Guide:

- **Red:** Relatively important & mentioned in case tutorials.
- **Black:** Questions.
- **Blue:** Answers (mentioned in case tutorials).
- **Green:** Additional answers/notes.
- **Orange:** Explanation.

Learning Objectives

- Discuss anatomy, histology and physiology of the adrenal gland.
- Understand the hypothalamo-pituitary-adrenal axes and the physiology of the negative feedback mechanisms.
- Discuss the formation and physiological actions of glucocorticoids and adrenal androgen
- Use basic sciences to interpret symptoms, signs and investigations of a patient with Cushing syndrome.
- Discuss the pathology and pathogenesis of Cushing syndrome resulting from an adrenal adenoma.
- Discuss the impact of diseases such as Cushing syndrome on patient's psychological health.
- Identify management goals and management options for a patient with an adrenal adenoma

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Case Scenario

Key information: 27-year-old female.

Presenting problems:

1. Moonlike face.
2. Gained 10 kg (last 12 months).
3. Facial hair on her chin and upper lip (6-8 m ago).
4. Acne (6-8 m ago).
5. Fragile skin (skin bruising after minor trauma).
6. Difficulty climbing stairs.
7. Severe back pain.
8. Buffalo hump (collection of subcutaneous fat at the base of her neck).
9. Irregular menstrual period (last 4-5 m).
10. Depressed and unhappy.

History:

Past Medical History: no acne or facial hair **during teenage**.

Family History: no one from her family is **obese**, have **acne or facial hair** or feeling **depressed**.

Medication and Allergy: nil

Alcohol and Smoking: nil

Clinical Examination:

Vital signs: all normal except BP ↑.

Abdominal Examination:

- truncal obesity.
- purpural abdominal striae .

Lower limb: thin weak thigh muscles.

Back: tenderness over L4+5.

Dipstick urinalysis: presence of **glucose**.

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Investigations:

Full blood count: all normal except WBC ↑

Blood chemistry: all normal except

↑ **Glucose.**

↑ Cholesterol.

↑ Triglycerides.

Hormonal assays:

↑ **Cortisol**

↑ DHEA (dehydroepinandrosterone)

↑ Testosterone.

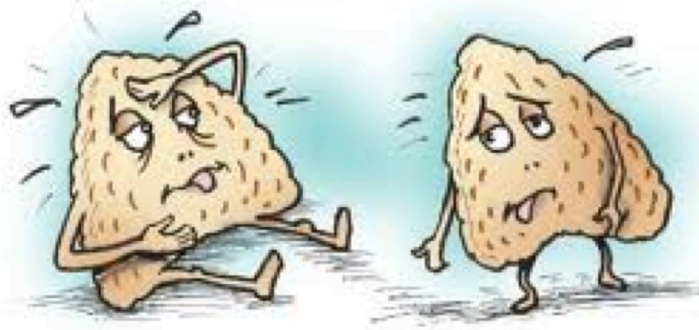
↑ ACTH (adrenocorticotrophic hormone)

X-ray spine:

1. compression fracture between L4-L5
2. osteoporosis
3. bone density recommended

CT scan of abdomen: a **mass** seen in the left adrenal gland.

Pelvic ultrasound: normal



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Questions

Before answering the questions below, please read tutorials 1 and 2.

Q1: What's the most likely diagnosis of this case?

Cushing's syndrome.

Q2: What is the cause of her signs & symptoms?

A mass in her adrenal gland causing increased secretion of cortisol. (endogenous)

Q3: What are the characteristics of the mass?

1. Located in the region of left adrenal gland.
2. Lies anterior and posterior to the left kidney.

Q4: Why does she have high blood pressure?

Because of the abnormal cortisol secretion.

Q5: What is the cause of truncal obesity, moon like face & Buffalo hump appearance?

Fat redistribution by cortisol.

Q6: Why do most patients of Cushing's have osteoporosis?

1. Anti-vitamin D effect of cortisol.
2. Cortisol reduces calcium absorption in the intestine.
3. Cortisol reduces bone formation.

Q7: Why do glucose levels in patients with Cushing's syndrome increase?

1. Increased gluconeogenesis in the liver.
2. Decreased utilization of glucose by the cells.



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Q8: Why does this patient have high WBC level?

Because she's more prone to develop infections due to her low immunity. (recall that cortisol has an anti-inflammatory effect)

Q9: What's the cause of her abdominal striae?

Low collagen because of high protein catabolism.

Q10: Why does she present with facial hair and irregular menstrual period?

Due to high androgen levels.

Q11: What test do we use to make a diagnosis of Cushing's syndrome?

Low-dose dexamethasone suppression test.

Q12: What test do we use to locate an ACTH-producing adenoma?

High-dose dexamethasone suppression test.

If cortisol level is suppressed = Pituitary adenoma

If not = Adrenocortical adenoma or ectopic origin.

Q13: What is the best treatment in this case?

Surgery. (remove the tumor)



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General Information

Definition	Cushing's syndrome describes the signs and symptoms associated with prolonged exposure to inappropriately high levels of the hormone cortisol.
Signs and symptoms	<ol style="list-style-type: none">1. Rapid weight gain2. Moodiness, irritability, or depression3. Muscle and bone weakness4. Memory and attention dysfunction5. Osteoporosis6. Diabetes mellitus7. Hypertension8. Immune suppression9. Sleep disturbances10. Menstrual disorders such as amenorrhea in women and decreased fertility in men11. Hirsutism12. Hypercholesterolemia
Causes	<ol style="list-style-type: none">1. Exogenous => administration of glucocorticoids2. Endogenous => pituitary Cushing's, adrenal Cushing's, ACTH-secreting tumors, CRH-secreting tumors3. Pseudo-Cushing's syndrome => (high Estrogen level)
Diagnosis	<ol style="list-style-type: none">1. dexamethasone suppression test2. Plasma CRH levels3. CT scanning of the adrenal gland and MRI of the pituitary gland4. ACTH levels5. Urine free cortisol excretion during 24 hours
Treatment	Treat the underlying cause