

**Case 2; 2014**

*Student's Case*

**Curriculum Development Unit**

**YEAR TWO, ENDOCRINE BLOCK**

**TUTORIAL ONE**

**"LOOKING FOR HOPE"**

King Saud University  
 College of Medicine  
 Department of Medical Education



*Al Mutairi*

*Fadwan*

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The Template of the PBL Cases is designed by Professor Sammy A. Azer.

The Student Case and Tutor Guide are written by

- Professor Sammy Azer
- Professor Riad Sulimani
- Dr. Usman Ghani
- Dr. Amer Shafie
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Amani Omar, a 27-year-old Lebanese is very excited as she plans with her parents to travel for Hajj. She also plans to meet an old friend, Aisha, who lives in Jeddah and has not seen for over 7 years. At the airport, Aisha and her family are waiting for Amani and her family. On greeting each other, Aisha is astonished because Amani's face is moonlike rounded and she has some acne and excessive facial hair. She also noticed that Amani has put on a lot of body weight.

**Discussion Questions:**

- Are there any difficult words you do not understand?
- List the key information about Amani.
- Identify Amani's presenting problems.
- For each problem, generate a list of possible causes (hypotheses).
- What further information would you like to know from history to refine your hypotheses?

On the second day of the family arrival, Aisha's family offered to take Amani to their local family doctor. On taking history and examining Amani, the doctor notices that Amani has acne and some hairs on her chin and upper lip. Amani says "I noticed the appearance of acne and the hair on my face about 6-8 months ago." She tried several ways to remove her facial hair but it usually appears again in a few days. She has gained over 10 kgs in body weight over the last 12 months. She has tried hard to lose weight by exercising and dieting but did not succeed. She easily develops skin bruising after minor trauma. She feels that her skin is fragile. Recently, she noticed some difficulty on climbing stairs. Her menstrual periods are irregular for the last 4-5 months. She also has back pains for about 3-4 months on and off. She tried some NSAIDs, at times the medications help but no significant relief.

Amani worries a lot about her body image, sometime she goes to her room and cries, she always feels depressed and unhappy.

**Past medical history**  
She has always been well and healthy. No history of acne or facial hair during teenage.

**Allergy and Medication X**

Nil

**Family history**  
Her mother and two sisters do not have facial hair or acne and they are not obese. No family history of depression.

**Alcohol & Smoking X**

Nil

**Social history**  
She completed a degree in Arts at a university in Lebanon. She worked part time for a year and she is currently looking for a job.

**Discussion Questions:**

- Are there words that you do not understand?
- Summarize key information that you have obtained from this progress.
- Identify patient's new problems. Provide hypotheses for each problem.
- What further information would you like to know through clinical examination?

**Clinical Examination (30 Minutes)**

Amani has a moonlike face, she looks depressed. She has a collection of subcutaneous fat at the base of her neck (a buffalo hump). There are several acne lesions and abnormal hair on her upper lip and chin. The skin of her arms and legs show a few bruises.

Vital signs	Amani	Normal range
Pulse rate	80 regular	60-100/min
Blood pressure	160/90 mmHg	100/60-120/80 mmHg
Temperature	37.1	36.6-37.2 °C
Respiratory rate	14	12-16/min

**Abdominal examination:** She has obesity mainly located in her trunk. The skin of the abdomen and upper thighs shows a number of purplish striae.

**Lower limbs:** Her thighs are thin. She has bilateral proximal muscle weakness.

**Back** Tenderness over L 4 and 5. No neurological deficit

**Dipstick urinalysis:** Glucose ++

**Discussion Questions:**

- Are there words that you do not understand?
- Summarize key information that you have obtained from this progress.
- Identify patient's new problems. Provide hypotheses for each problem.
- Do you know a Nobel prize laureate whose work has contributed to the advancement of our knowledge in physiology and/or pharmacology related to this case? What was exactly his/her work about?
- Summarize your "learning issues."

## Resources

*A note to students:* You are not required to read all these textbooks and resources to prepare for your learning issues. You could use one textbook or one resource for each discipline. For example, for this case you will need to use a resource covering issues related to the case from four disciplines: Physiology, Anatomy, Histology, and Medicine. Once you have identified your learning resources, research them for your learning issues and the questions raised in the group discussion. You might choose to use alternative resources other than those listed below:

### Textbooks:

- Rhoades R, and Pflanzer R. Human Physiology, 4<sup>th</sup> ed. London: Brooks/Cole, 2003.
- Drake RL, Vogl W, Mitchell AWM. Gray's anatomy for students. Philadelphia: Elsevier Churchhill Livingstone, 2005.
- Guyton AC and Hall JE. Textbook of Medical Physiology. 10<sup>th</sup> ed. Philadelphia: WB Saunders & Co, 2000.
- Gartner LP and Hiatt JL. Color Textbook of Histology. 2<sup>nd</sup> ed. Philadelphia: WB Saunders & Co, 2001.
- Kumar P and Clark M. Clinical Medicine. 5<sup>th</sup> ed. Edinburgh: WB Saunders, 2002.
- Fox SJ. Human Physiology, 9<sup>th</sup> Ed. McGraw Hill, 2005.

### Educational websites:

#### Cushing syndrome:

<http://emedicine.medscape.com/article/117365-overview>

This is an educational website from emedicine. It covers different aspect of this syndrome. You might need to focus at this stage on issues related to basic sciences such as pathology, pathophysiology, and how clinical symptoms and signs can be interpreted in light of basic sciences.

#### Adrenal adenoma:

<http://emedicine.medscape.com/article/116587-overview>

This chapter from emedicine covers adrenal adenoma, mainly radiological assessment, pathophysiology, etiology and patient education.

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*Rafkan  
Al Mutairi*

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**Tutorial 2: Discussion of Learning Issues (60 minutes)**

**Students:** You should start by discussing your "learning issues" that you have identified at the end of tutorial one. You might spend about **60 minutes** on this task. A scribe on the whiteboard is needed to help in this process.

Once you have completed the discussion of your "learning issues", you might progress to these questions. Spend about **10 minutes** on discussing them in your group. A scribe on the whiteboard will help in this process.

- Discussion Questions:**
- On the basis of the information provided, what is your final hypothesis? Justify your views.
  - What further investigation you might order to confirm your final hypothesis?



- Do you know a Nobel prize laureate whose work has contributed to the advancement of our knowledge in physiology and/or pharmacology related to this case? What was exactly his/her work about?

**Investigations (40 minutes)**

Because Amani's presenting problems and the clinical examination findings (acne, abnormal facial hair, moonlike face, buffalo hump, truncal obesity, purpural abdominal striae, thin week thigh muscles, and presence of glucose in urine), the doctor arranges for some investigations. The results of these investigations are shown below:

**Full Blood Count**

Blood test	Amani	Normal Range
Haemoglobin (Hb)	155	115-160 g/L
PCV	0.45	0.37-0.47
WBCs	12	4.0 - 11.0 x 10 <sup>9</sup> /L
Platelet count	380	150-400 x 10 <sup>9</sup> /L

**Blood Chemistry**

Blood test	Amani	Normal Range
Serum sodium	140	135-145 mmol/L
Serum potassium	3.3	3.5-5.0 mmol/L
Blood urea	4.8	2.5-8.3 mmol/L
Fasting blood glucose	7.8	3.6-5.3 mmol/L
Blood cholesterol	6.9	0.0-5.5 mmol/L
Serum triglycerides	2.5	0.5-2.0 mmol/L

**Hormonal Assays**

Blood test	Amani	Normal Range
Serum cortisol	8 am : 1200 4 PM: 1180	140-630 nmol/L
Serum dehydroepiandrosterone (DHEA) sulfate	12.1	1.3-6.7 micromol/L
Serum testosterone	5.5	< 3.5 nmol/L
Serum ACTH	< 1	> 18 pmol/L

**X-ray Spine:**

- Compression fractures between L4 and L5
- Osteoporosis of body vertebrae.
- Bone density recommended

#### CT scan of upper abdomen:

A mass of 3 x 4 x 5 cm is seen in the region of the left adrenal gland. The mass lies anterior and superior to the left kidney. No evidence of enlarged lymph nodes or any other masses.

#### Pelvic ultrasound

Normal ovaries, uterus and tubes. No masses shown.

#### Discussion Questions:

- Are there any difficult words you do not understand?
- Use your knowledge from physiology and biochemistry to interpret Aman's investigation results.
- Construct a diagram to show mechanisms underlying Aman's problems. Provide evidence from history, clinical examination and investigation results.
- Summarise your management goals and your management options.

The doctor explains to Amani and her family that her symptoms ( weight gain, acne, excessive facial hair, skin bruising, and back pain) and the clinical findings (high blood pressure, weak thigh muscles, vertebral compression fracture and depressed mood) are all related to one disease and suggest excessive secretions of a hormone known as cortisol. This hormone is normally secreted in small amounts from a gland located over the kidneys. In Amani's case the hormone is secreted in large amounts. The investigations conducted including blood test results and radiological images support this diagnosis. There is no medical treatment for this condition and I would recommend to Amani to see an endocrine surgeon for further opinion and management. The mass from the gland as shown by the radiological images need to be removed so that the excessive secretion of cortisol can be controlled.

The family decides to see a surgeon they know in Lebanon after the Hajj. Three weeks after their return home, Amani undergoes a surgery and she recovers well. The mass is sent for histopathological examination and the report shows that the mass is benign and it is an adrenocortical adenoma.

Over the next a few months Amani and her family notice an improvement in Amani's mood. Her menstrual periods are more regular and her muscle power gradually improves.

#### Discussion Questions:

- Discuss the aetiology and pathology of adrenocortical adenoma.
- Discuss the impact of such disease on Amani's psychological health.
- Discuss the mechanisms responsible for the improvement of Amani's symptoms after the removal of the adrenal adenoma.

Amani reviews her doctor in Lebanon, the doctor finds that Amani's blood pressure has gradually dropped to 130/80mmHg and her biochemical tests have returned to normal range. The cortisol levels and DHEAS are also back to normal.

**Case closure**

(10 minutes)

**Tutor's note:**  
 In the last 10 minutes of the tutorial, you might encourage your group to discuss how they could work better as a group. What are the things they need to change and what things they need to improve? This discussion is very useful and will help the group to function better as they work on the next PBL case.

**Challenging and Revision Questions**

**Tutors:** Students could think about these questions on their own as they review the case. They might discuss their answers with their friends.

- Discuss the anatomy and function of the adrenal glands.
- Explain the role of feedback mechanisms in the regulation of the glucocorticoid secretion.
- In light of your knowledge from physiology and biochemistry, explain Amani's symptoms, signs and investigation results.
- Discuss the impact of such disease on Amani's psychological health.

**Learning objectives:**

On completion of this PBL package the students should be able to

- 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 androgens.
- 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.