



College of Medicine

King Saud University

Endocrine Block, PBL Small Group Learning

Dates of tutorials and Briefing Sessions

(Academic Year 2015 -2016)

(Year 2)

Academic weeks in the Block	Problem-based Learning Tutorials *		Briefing sessions	Venue
	First Tutorial (Monday)	Second Tutorial (Thursday)		
Week 2	Case 1		06 January 2016 12:30 pm – 2:30 pm	Room 3106 College of Medicine Level 3
	25 January 2016 (Case 1 Part 1)	28 January 2016 (Case 1 Part 2)		
Week 4	Case 2		07 January 2016 1:00 pm – 2:00 pm	Lecture Theatre D College of Medicine Level 3
	08 February 2016 (Case 2 Part 1)	11 February 2016 (Case 2 Part 2)		
Week 6	Case 3		18 February 2016 1:00 pm – 2:00 pm	Room 3004 College of Medicine Level 3
	22 February 2016 (Case 3 Part 1)	25 February 2016 (Case 3 Part 2)		

*Tutorial Time : Male A & B Groups (8am-10am) ; Female Group (8am-10am).

- Only 3 cases are in the Endocrine Block.



College of Medicine
Department of Medical Education

“... Cannot Tolerate Hot Weather”

Tutorial One

ENDOCRINE BLOCK- YEAR 2

Curriculum Development & Research Unit
Problem-Based Learning
STUDENT'S CASE
Case 1, 2015

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

The Student Case and Tutor Guide are written by:

- Prof Samy Azer (Medical Education)
- Prof Riad Al-Sulmani (Medicine)
- Dr. Khalid Al Rogaiey (Physiology)

Safia Ali, a 29-year-old accountant working in a bank in Riyadh comes in to see Dr. Mona Al Rajhi because she always feels hot. She sweats a lot and she has to keep wiping her hands all the time. She has noticed these changes over the last 7-8 months. Recently, she noticed tremors in her hands and she has lost 6 kg in bodyweight over the last two months.

Discussion Questions:

- Are there any difficult words you do not understand?
- List the key information about Safia.
- Identify Safia'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?

Safia says that she has been feeling hot all the time even when the air condition is on and at the maximum. She noticed that she has excessive sweating all over her body all the time and the palms of her hands are usually wet. She likes to take cold showers 2-3 times a day to feel better, but once out of shower she sweats again. Recently, she noticed shaking of her hand when she carry a cup of tea on a plate and tries to place it on a table or hand it to her guests. On several occasions things fall from her hands and she wonders why. Despite an increase in her appetite, she has lost 6 kg in body weight over the last two months. She is not on diet and not doing any exercises. At times she becomes aware of her heartbeats (palpitations) even during rest. She also has noticed that her bowels open 3 to 4 times daily while she used to pass stool once daily. Her husband noticed that she feels tired and under stress most of the time. At work, she is unable to accept comments from customers or colleagues and she lose her temper easily. Last week, her supervisor asked her to have two days rest because of her stress and several complaint from her colleagues, which was not her way.

Her menstrual periods are regular and her last menstrual period was 8 days ago.

Past medical history

Nothing significant

Allergy and Medication

Nil

Family history

Her mother is known to have a vitiligo for about 15 years. No family history of tremor

Social history

She has been married for about 5 years. She one child, 3 years old.

Discussion Questions:

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

Clinical Examination**(30 Minutes)**

Safia looks anxious and restless. Her height is 165 cm, her body weight 50 Kg, and her BMI is 18. Her vital signs are summarized in the table below:

Vital signs:

Vital signs	Safia	Normal range
Pulse rate	110 regular	60-100/min
Blood pressure	150/85 mmHg	100/60-120/80 mmHg
Temperature	37.0	36.6-37.2 °C
Respiratory rate	20	12-16/min

Eye examination:

- Exophthalmos.
- Lid lagging on looking down
- A white rim of sclera is seen above and below the cornea (see image below)

**Skin and hand examination:**

- Skin is soft and warm.
- Her outstretched hands show fine tremor
- Palms of her hands are warm and wet.

Neck examination:

- A swelling is noticed on the front of her neck which moves up on swallowing. The swelling is diffusely smooth to palpation.
- No palpable lymph nodes
- There is a bruit heard over the neck swelling

Upper and Lower limbs:

- Muscle of the shoulder and thighs are weak compared to distal muscles.
- Tendon reflexes: Biceps, triceps, brachioradialis, knee, and ankle are bilaterally symmetrical and brisk

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

Educational websites:

Graves Disease

<http://emedicine.medscape.com/article/120619-overview>

This website from eMedicine and covers Graves disease. Be selective and focus on area such as pathophysiology, pathology, and clinical picture of Graves disease. You might also study the pharmacology part about drugs used in management of Graves disease.

Graves Disease

<http://endocrine.niddk.nih.gov/pubs/graves/>

This website from National Endocrine & Metabolic Disease Information Service, USA. It covers a wide range of areas about Graves disease but in a simple language that the public can understand.



College of Medicine
Department of Medical Education

“... Cannot Tolerate Hot Weather”

Tutorial Two

ENDOCRINE BLOCK YEAR 2

Curriculum Development & Research Unit
Problem-Based Learning

STUDENT'S CASE Case 1, 2015

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- Dr. Khalid Al Rogaley (Physiology)

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 investigations would you like to order for Safia? State how each of these investigations can help you.



- 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

(30 Minutes)

Dr Mona discuss with Safia the need to arrange some investigations (blood tests and a thyroid scan). The results of these investigations are summarized in the tables below:

Blood Test	Safia	Normal Range
Free thyroxin (T ₄)	35	9-26 pmol/L
Tri-iodothyronin (T ₃)	3.7	0.9-2.6 nmol/L
Thyroid Stimulating Hormone (TSH)	0.05	0.5-5.0 mU/L

Thyroid auto-antibodies:

Thyroid Antibodies	Safia	Normal Range
TSH receptor IgG antibodies (TRAb)	Raised +++	Negative

Thyroid scan

The scan shows homogenous increased uptake of the radioactive iodine.

Safia Thyroid Scan



20minute uptake 53.5%

Normal Thyroid Scan

Anterior



Source: imaging.birjournals.org

Discussion Questions:

- Are there any terms that you do not understand?
- Summarize the key information that you have obtained from this progress.
- Identify if there are any new problems. Use the new information obtained to refine and rank your hypotheses.
- What are your management goals, management plans, and management options?

Dr. Mona explains to Safia that her symptoms are related to increased secretion of a hormone known as thyroxin. This hormone is normally secreted from the thyroid gland, a small gland in front of the neck. Normally thyroxin is secreted in small amounts, while in your case there is excessive thyroid hormone secretion. This has also been confirmed from the results of the blood tests and the nuclear scanning of the thyroid gland.

In answering to questions from Safia regarding management options, Dr Mona, says "there are basically three options for controlling the excessive secretions of thyroxin. These options are medical treatment, surgical removal of the thyroid gland, and destroying the active cells of the thyroid by radioactive iodine. However in your case, I would recommend the medical treatment to start with. She also mentions the need to ameliorate her symptoms such as palpitations, tremor, and anxiety."

Dr. Mona commences Safia on propranolol (beta-blocker) 40mg/day to ameliorate symptoms that mimic over stimulation of the sympathetic nervous system, and carbimazole 10mg tid to block the formation and secretion of the thyroxin from the thyroid gland. Dr Mona explains to Safia that there are side effects for these medications and she should seek medical attention immediately if she develops skin rash, fever or sore throat. Otherwise she should review in four weeks.

Discussion Questions:

- Discuss the mechanisms of action of propranolol and carbimazole in Safia's condition.
- Discuss the advantages and disadvantages of each management option stated by Dr Mona.
- Construct a diagram showing mechanisms underlying Safia's problems. Provide evidence from history, clinical examination and investigation results in your diagram.

Case closure

(10 minutes)

Over the next 4-6 months, Safia feels much better. She has no palpitations, anxiety, or sweating. She gained her body weight back, and she does not feel anxious. Her hands are not shaking and she does not feel that stressed in her work place.

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.

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 thyroid gland.
- Explain the role of feedback mechanisms in the regulation of the thyroid function.
- Discuss the mechanisms by which thyroxin is formed by the thyroid gland.
- Discuss the pathology and pathogenesis of Graves disease.
- Discuss the pharmacology of drugs used in treatment of Graves disease.

Learning Objectives:

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

- Discuss the anatomy and physiology of the thyroid gland.
- Discuss the formation of the thyroid hormones and their physiological actions.
- Discuss the pathology and pathogenesis of Graves disease.
- Use basic sciences to interpret the symptoms, signs, and investigation results of a patient with Graves disease.
- Discuss the pharmacology of drugs used in Graves disease.
- Discuss management goals and construct a management plan for a patient with Graves disease.



College of Medicine
Department of Medical Education

“... Looking For Hope”

Tutorial One

ENDOCRINE BLOCK- YEAR 2

**Curriculum Development & Research Unit
Problem-Based Learning**

**STUDENT'S CASE
Case 2, 2015**

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The Student Case and Tutor Guide are written by

- Professor Samy Azer
- Professor Riad Sulimani
- Dr. Usman Ghani
- Dr. Amer Shafie
- Dr. Khalid Al Regaiey

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, Amani has severe backpain. 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

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

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?

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

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:

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- 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?
- Summaries your "learning issues."

Resources

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- Kumar P and Clark M. Clinical Medicine. 5th ed. Edinburgh: WB Saunders, 2002.
- Fox SI. Human Physiology, 9th 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.



College of Medicine
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“... Looking For Hope”

Tutorial Two

ENDOCRINE BLOCK- YEAR 2

Curriculum Development & Research Unit
Problem-Based Learning

STUDENT'S CASE
Case 2, 2015

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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?

Because Amani's presenting problems and the clinical examination findings (acne, abnormal facial hair, moonlike face, buffalo hump, truncal obesity, purpural abdominal striae, thin weak 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 ⁹ /L
Platelet count	380	150-400 x 10 ⁹ /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 adrenalcortical 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 DHES are also back to normal.

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.