

Year Two, System Block

Curriculum Development Unit

Student's Case

Case 1; 2014

Rakem
Al Mustair

**"Cannot Tolerate
 Hot Weather"**

Tutorial One

King Saud University
 College of Medicine
 Department of Medical Education



Copyright Statement

This material is protected by copyright laws. For any other purposes other than teaching and research in the King Saud University, no part may be reproduced or copied in any form or by any means without prior permission of the King Saud University.

© King Saud University, Kingdom of Saudi Arabia (2011).

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

The Student Case and Tutor Guide are written by:

- Prof Sammy Azer (Medical Education)
- Prof Riad Al-Sulimani (Medicine)
- Dr. Khalid Al Rogaiay (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?

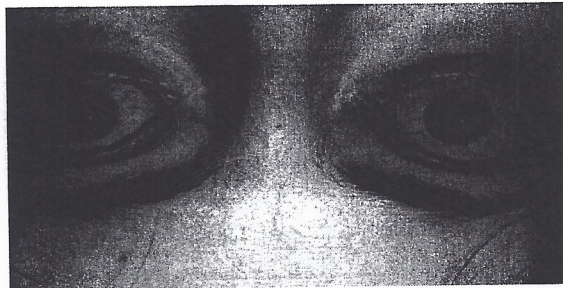
Clinical Examination (30 Minutes)

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

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.

<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.

Case I; 2014

Student's Case

Curriculum Development Unit

Year Two, Endocrine System Block

Tutorial TWO

**“Cannot Tolerate
Hot Weather”**

King Saud University
College of Medicine
Department of Medical Education



Rakan Al Mutairi

Copyright Statement

This material is protected by copyright laws. For any other purposes other than teaching and research in the King Saud University, no part may be reproduced or copied in any form or by any means without prior permission of the King Saud University.

© King Saud University, Kingdom of Saudi Arabia (2010).

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

The Student Case and Tutor Guide are written by:

- Prof Sammy Azer (Medical Education)
- Prof Riad Al-Sulimani (Medicine)
- Dr. Khalid Al Rogaiay (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:

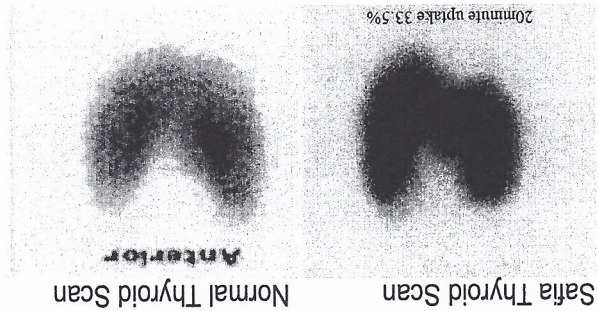
Blood Test	Safia	Normal Range
Free thyroxin (T ₄)	35	9-26 pmol/L
Tri-iodothyronin (T ₃)	3.7	0.9-2.6 nmol/L
Thyroid Stimulating Hormone (TSH)	0.05	0.5-5.0 mU/L

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.



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.