



King Saud University
College of Medicine
Department of Medical Education

**“ ... ALL
HAPPENED IN
THE KITCHEN”
Tutorial TWO**

Year Two, Nervous System Block

Curriculum Development Unit

Student's Case

Case 4; 2013

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

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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:

- How would you explain the clinical findings found on Muneera's right side? Use your knowledge from basic sciences to explain your views.
- Discuss the risk factors that might have contributed to her current illness.
- What investigations would you like to order for her at this stage?

The doctor arranges for urgent investigations including brain CT-scan and some blood test. The results of these investigations are shown below:

Brain CT-Scan (2-3 hours after her current illness):

The brain CT-scan shows minimal changes in the left frontal lobe. Recommended for an urgent MRI scan of the brain.

Brain MRI Scan (about 4 hours after her current illness):

Report: Extensive changes in the left middle cerebral artery territory. Another radiological study called Perfusion Weighted Images (PWI) confirms that Mrs Muneera has a reduced cerebral blood flow in the left middle cerebral territory.

Full Blood Examination

Blood test	Patient	Normal range
Haemoglobin	139	115-160 g/L
PCV	0.42	0.37-0.47
White blood cells	5.5	4.0-11.0 x 10 ⁹ /L
Platelet count	350	150-400 x 10 ⁹ /L

Blood Biochemistry:

Serum levels of sodium, potassium, calcium, blood urea and creatinine levels are all within the normal range.

Fasting blood glucose: 7.9 mmol/L (Normal Range 3.6-5.3 mmol/L).

Electrocardiogram (ECG):

Normal sinus rhythm. Evidence of left ventricular hypertrophy (most likely due to the longstanding high blood pressure)..

Discussion Questions:

- Are there words that you do not understand?
- Summarize key information that you have obtained from this progress.
- On the basis of the new information, what is your final hypothesis?
- Summarise your management goals and your management options.

The neurologist responsible for treating Mrs Muneera reviews her investigations and re-examines her. He explains to her sons the nature of Mrs Muneera's illness. He says, " the clinical examination, the radiological images and the blood tests show that Mrs Muneera has ongoing problems including her uncontrolled high blood glucose (diabetes), high blood pressure and obesity. She also has high blood lipids which we will assess when her condition settles. These ongoing problems are called risk factors because they cause significant changes in the inner wall of blood vessels causing their hardening. As a result of these changes, a blood thrombus (clot) blocked one of the vessels supplying her brain; causing a brain damage. Because the damage has affected areas of the brain responsible for movement, sensations, and language, Muneera has lost her ability to move her right limbs, to feel the pain and temperature on her right side, and her ability to speak. When we further examined Mrs Muneera we found a bruit (noises) over her left carotid artery in the neck. This indicates narrowing and hardening of the carotid artery and it is possible the source of the clot (thrombus). The doctor arranges for a Carotid Duplex Doppler which reveals high grade internal carotid stenosis on the left side.

Further blood test results for her blood lipids are show below:

Blood Cholesterol: 7.9 (Normal Range 0.0-5.5 mmol/L)

Blood triglycerides: 3.3 (normal range 0.5-2.0 mmol/L),

About 5 days after her stroke, Mrs Muneera is commenced on a calcium channel antagonist (amlodipine) for her high blood pressure, a cholesterol lowering agent (simvastatin) and an oral hypoglycaemic agent (glibenclamide), and continued on a low dose aspirin.

She is also commenced on a rehabilitation program in which a team from physiotherapy , speech pathology, and occupational therapy departments has shared in her management.

Discussion Questions

- Are there words that you do not understand?
- Summarize key information that you have obtained from this progress.
- Construct a mechanism summarizing your final hypothesis with regard to the site of the lesion, the mechanisms underlying Muneera's weakness. Provide supportive evidence from history, clinical examination and investigation results.

Case closure:

(10 Minutes)

Over the next 6-7 weeks Mrs Muneera showed some improvement. She is able to move her right arm, speak a few words, and able to walk with assistance from one person. She undergoes left carotid endarterectomy about 6 weeks after her stroke. She continues taking her medications and her serum blood sugar, blood lipids are within the normal range. Her blood pressure is in the range of 110/70 to 120/80 mmHg and she has lost about 7 kg in body weight. The physiotherapy team plan to reduce her body weight further and she has improved significantly in regard to her ability to walk with little assistance and her ability to say a few short phrases. Her family supports her a lot and this has contributed to her recovery.

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.

- What are the main differences between upper and lower motor neuron lesions?
- Discuss the blood supply of the brain.
- Which areas of the cerebral hemisphere are affected as a result of occlusion of the middle cerebral artery? Discuss each area and the consequences of its malfunction.
- Discuss the role of Broca's area and Wernicke's area in language functions and the consequences of their malfunction.

Learning Objectives:

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

- Understand the anatomy and physiology of the cerebral hemisphere and the cerebral blood circulation.
- Identify the risk factors that could contribute to the development of cerebral infarction.
- Use basic sciences to interpret the symptoms and signs of a patient presenting with hemiplegia.
- Understand the pathology and pathogenesis of cerebral infarction and the sequence of biochemical changes that might occur in the nerve cells as a result of ischemia.
- Discuss the physiology of *Broca's and Wernicke's* areas of the language and the consequences of their malfunction in a patient with middle cerebral artery occlusion.
- Discuss the main differences between upper and lower motor neuron lesions .