King Saud University
College of Medicine
Department of Medical Education

"...At the Airport"

Tutorial Two

Year Two, Nervous System Block

Curriculum Development Unit

Student's Case

Case 2; 2013

The Template of the PBL Cases and the Tutor Guide is designed (IP): by Professor Samy A. Azer.
The Student Case is created by

- Professor Samy A. Azer
- Dr. Ahmad AbuAlnaja
- Dr. Nahed Yousef

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:

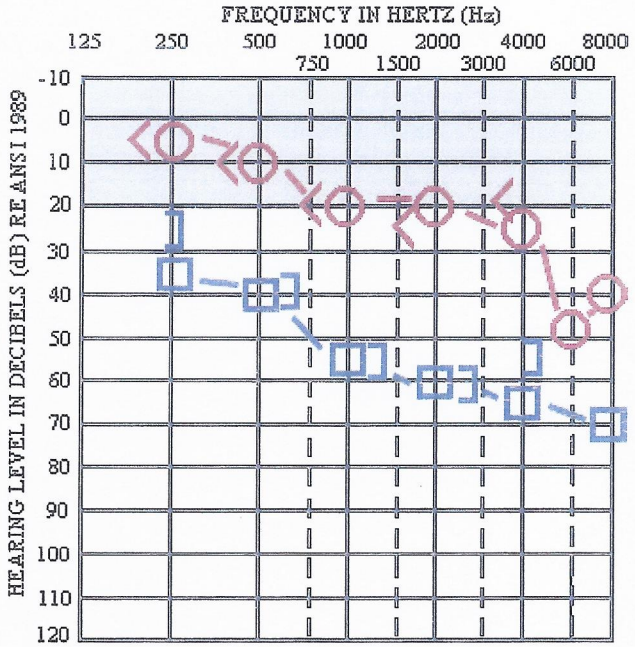
- How would you explain Mohammad's hearing loss, vertigo (spinning), unsteadiness, numbness and weakness of the right side of his face ?
- What investigations would you like to order to help in your diagnosis? Explain how each of the investigations you suggest could help.

Progress 1 (30 minutes)

Because Mohammad has unilateral hearing loss, vertigo (spinning, a sense that surroundings are moving), unsteadiness, numbness on the face, and facial weakness, it is most likely that these changes are due to a problem affecting the 8th cranial nerve as well as the 5th and 7th cranial nerves on the right side. Therefore the doctor arranges for an audiometry and MRI scan of the brain. The results of these investigations are shown below.

1. Audiometry of the right ear:

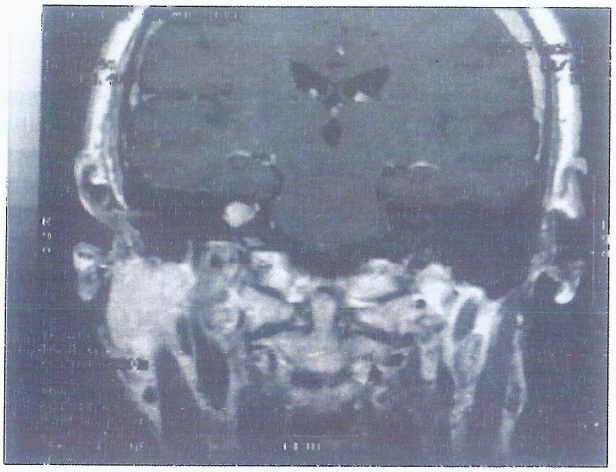
2.



Report: Right ear: There is evidence of high frequency of sensory neural hearing loss (lower curve). Bone conduction is relatively normal (upper curve). These changes are consistent with the possible diagnosis of acoustic neuroma on the right side.
Left ear: Normal.

Source: http://www.dizziness-and-balance.com/disorders/tumors/acoustic_neuroma.htm

3. MRI scan of the brain



Report: MRI scan with gadolinium of the brain (coronal) showing an acoustic neuroma on the right side of the brain (the white spot on the left side of the picture).
Source: http://www.dizziness-and-balance.com/disorders/tumors/acoustic_neuroma.htm

Discussion Questions:

- Are there words that you do not understand?
- Summarize key information that you have obtained from this progress.
- What is your final hypothesis?
- Summarise your management goals and your management options.

Progress 2 (20 minutes)

Mohammad is referred to a neurosurgeon for further assessment. The neurosurgeon examines Mohammad and reviews his audiometry report and the brain MRI scan. He discusses the diagnosis and management options with Mohammad and his wife. He says, "The clinical examination and investigations show that you have a small tumour on the 8th nerve on the right side. This nerve is responsible for hearing and help in maintaining body balance. Usually tumours such as yours are benign tumours and the symptoms you are experiencing are due to the pressure of the tumour on the nerves located close to the 8th cranial nerve on the right side such as the nerve that carries sensations from the face (the 5th cranial nerve) and the nerve that carries motor impulses to the muscles of the face (the 7th cranial nerve).

Our aim is to surgically remove the tumour or stop the tumour from further growth. I would recommend the second approach for your treatment. This is called "Stereotactic Radiation Therapy" where we use radiation delivered from a precise point to maximize the radiation delivered to the tumour mass and at the same time minimize the exposure of normal tissues of nerves from radiation.

Mohammad and his wife ask the neurosurgeon more questions about the Stereotactic Radiation Therapy and then finally Mohammad agrees to undergo this type of treatment.

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 Mohammad's presenting symptoms. Provide supportive evidence from history, clinical examination and investigation results.

Case closure: (10 Minutes)

Mohammad successfully undergoes Stereotactic Radiation Therapy and over the next a few days he feels much better. He has no ringing noises in his right ear and he does not feel unsteady as he used to, but his hearing on the right side did not improve. Another audiometry conducted two weeks after the radiation therapy did not show any significant improvement. Over the next couple of weeks, Mohammad returned to his work at King Khalid Airport.

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 mechanisms underlying hearing?
- Discuss the anatomy and functions of the 8^{th}, 5^{th}, and 7^{th} cranial nerves?
- What are the mechanisms by which we maintain our body balance during standing?
- What are the impacts of such problems on Mohammad? In what way could these problems affect his work and his family?

Learning Objectives:

By the end of this case, students should be able to:

1. Correlate the anatomical structures (inner ear, and vestibulocochlear nerve) with their functions in the hearing and body balance mechanisms.
2. Discuss the significance of the cerebellopentine angle area and anatomical structure related to it.
3. Understand the anatomy and function of the vestibulocochlear, trigeminal, and facial nerves.
4. Use basic sciences to interpret symptoms , signs and investigation results of a patient presenting with acoustic neuroma.
5. Briefly outline a management plan and manage options.
6. Discuss the impact of disease on patient, family and work.