

## Case 1: Brainstem Glioma



## ❖ Learning issues:

1. **Anatomy and Functions of Brainstem**
2. **Anatomical structures needed for the production of voice**
3. **mechanisms responsible for initiating swallowing in the Oropharynx, Mechanisms responsible for taste sensation**
4. **Impact of serious diseases on patients and their families**
5. **Brain tumors**
6. **Anatomy of cranial nerves (5<sup>th</sup>, 7<sup>th</sup>, 9<sup>th</sup> and 10<sup>th</sup>)**
7. **Difference between cranial and peripheral nerves**
8. **The modalities of sensory sensations (pain and temperature) in regard to anatomical pathways and function**
9. **Physiology of motor system**



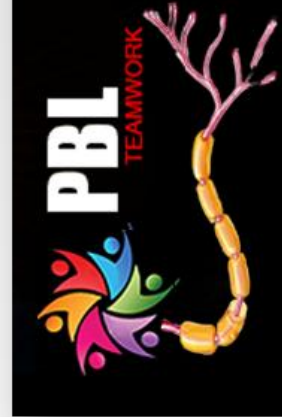
## ❖ Key information and Presenting problems:

- Male, 28 years old, construction engineer
- Loss of taste sensation
- changes in his voice
- Difficulty in swallowing, he choked 3 times



### History:

- Numbness and tingling sensation in the **right** side of his face
- Drooping in the **right** side of his face
- Unsteady gait
- Numbness in his **left** arm
- He has **no** double vision, headache, or changes in his hearing
- He has always been healthy and well
- He has **no** history of any medical problems in his family.
- **NO** Tobacco and Alcohol
- **NO** Medication and Allergy



NEW TERMS	
Tingling sensation	stinging (sharp spines) sensation in the skin or in any part of body
Numbness	loss of feeling or sensation
Unsteady gait	walking abnormalities which are unusual and un controllable walking patterns
Double vision (diplopia)	a disorder of vision in which a single object appears double
Drooping	to bend or hang downward

## CNS Examination

Cranial nerves 1 (**olfactory**), 2 (**optic**), 3 (**oculomotor**), 4 (trochlear), 6 (**abducens**), 8 (**vestibulocochlear**), 11 (**accessory**), 12 (**hypoglossal**)

NORMAL

Cranial nerve 5th (**trigeminal**)

- ✓ Loss of corneal sensation on the **right** side
- ✓ Loss of pain and temperature sensations on the **right** side of the face
- ✓ Normal on the **left** side

Cranial nerve 7th (**facial**)

Weakness on the lower **right** part of the face

Cranial nerve 9th (**glossopharyngeal**) and 10th (**vagus nerve**)

- ✓ **Right** palatal movement is poor
- ✓ Loss of sensation of the soft palate on the **right** side

All cranial nerves on the left side

NORMAL

## Motor Power

Gait

Unsteady

Upper and lower limb muscle tone

Increase in the **left** side

Knee, ankle and extensor plantar reflexes

Exaggerated in the **left**

Biceps, triceps and brachioradialis reflexes

Exaggerated in the **left**

## Sensory system examination

Loss of pain and temperature sensations on the entire **left** side of the body

## ■ Investigation:

### ○ *Brain MRI scan:*

- Showing a mass occupying the brainstem, most likely a **Brainstem glioma**

## ■ Management:

- Over the next 2 weeks Ahmed was referred to a specialized center for **focal radiotherapy**
- He recovered from the treatment and was discharged two weeks later on **Corticosteroids**
- **N.B:** the doctor refused to make a surgery for Ahmed's case due to the location of tumor mass

## ■ Explanation of the management:

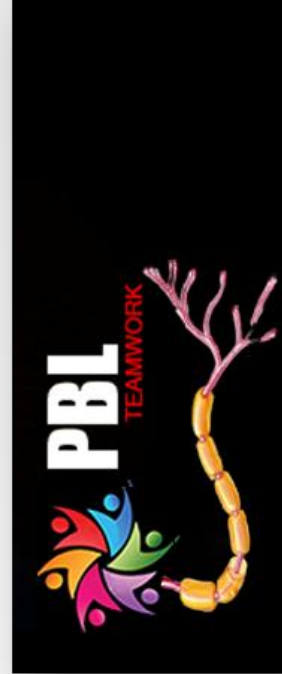
1. **Focal radiotherapy:** could help in reducing the tumor mass and hence its pressure on the surrounding brain structures
2. **Corticosteroids:** an immunosuppressant that help in reducing the local edema around the tumor mass.

## ■ Prognosis:

- ✓ Ahmed did not live long, he died 14 months later.

## ■ Diagnosis:

- ✓ **Brainstem glioma**



# Brain tumors

## 1- Glioma

- **Astrocytoma**
- **Oligodendroglioma**
- **Ependymoma**

## 2- Meningioma

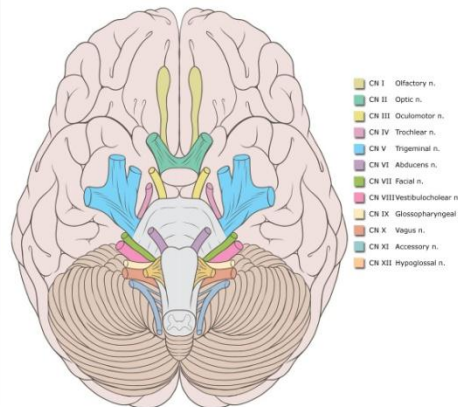
## 3- Medulloblastoma

## Difference between cranial nerves and peripheral nerves

	<b>Cranial nerve</b>	<b>Peripheral nerve</b>
<b>Origin</b>	Forebrain & Brain stem (except 11 <sup>th</sup> cranial nerve which has spinal origin too)*	Spinal cord
<b>Decussation (Crossing)</b>	Never (injury of the right side of the brain will cause problem in the right side of the body)	Yes (injury of the right side of the brain will cause problem in the left side of the body)
<b>Autonomic nervous system</b>	Parasympathric only	Sympathatic and parasympathtic systems.
<b>Fibers</b>	Nerves contain either sensory, motor, or mixed fibers.	Nerves contain <b>both</b> sensory & motor fibers.
<b>Number of pairs</b>	12 pairs	31 pairs

# Anatomy of the cranial nerves

	Functions	Origin
V trigeminal (mixed)	<u>Sensory</u> : Face, scalp, cornea, cranial dura & cornea <u>Motor</u> : mastication	PONS
VII facial (mixed)	<u>Sensory</u> : taste <u>Motor</u> : facial expression	PONS
IX Glossopharyngeal (mixed)	<u>Sensory</u> : pharynx, taste & middle ear <u>Motor</u> : Swallowing	MEDDULLA
X vagus (mixed)	<u>Sensory</u> : pharynx,, external ear & Abdominal and thoracic viscera. <u>Motor</u> : Speech & swallowing	MEDDULLA



# Questions



<p><b>Q1</b></p>	<p><b>What is the motor nerve supply of the face and what is the sensory supply to the face?</b></p>	<p><b>Q5</b></p> <p><b>What are the Impact of Serious Diseases on Patients &amp; Their Families?</b></p>
	<p>7<sup>th</sup> is the motor supply, 5<sup>th</sup> is the sensory supply</p>	<p><b>1- Distress: 2- Anxiety. 3- Fear of losing that person. 4- Depression.</b></p>
<p><b>Q2</b></p>	<p><b>State the cranial nerve which is related to the abnormality:</b></p>	<p><b>Q6</b></p> <p><b>In this case, the doctor Reject to do the Surgery for removing the tumor, why ?</b></p>
	<ul style="list-style-type: none"> <li>* Difficulty in swallowing: 9<sup>th</sup> cranial nerve</li> <li>* Loss of taste sensation over the posterior 1/3 of tongue: 9<sup>th</sup> cranial nerve</li> <li>* Loss of taste sensation over the anterior 2/3 of tongue: 7<sup>th</sup> cranial nerve</li> <li>* Changing of voice: 10<sup>th</sup> cranial nerve</li> </ul>	<p><b>Because it is difficult due to the location of the mass</b></p>
<p><b>Q3</b></p>	<p><b>What do we call nerves supplying structures of the head?</b></p>	<p><b>Q7</b></p> <p><b>(Loss of corneal sensation) is due to:</b></p>
	<p><b>Cranial nerves</b></p>	<p><b>5<sup>th</sup> cranial nerve lesion</b></p>
<p><b>Q4</b></p>	<p><b>which investigation is appropriate in Ahmad's case?</b></p>	<p><b>Q8</b></p> <p><b>what would the doctor recommend to start treatment and what he would he recommend after discharging?</b></p>
	<p><b>MRI</b></p>	<p><b>focal radiotherapy to start the treatment, Corticosteroids after discharging</b></p>



Q9	Which part of the brainstem does the trigeminal nerve originate ?	Q14	What is the medical term refers to (Double Vision)?
	From the Pons.		Diplopia
Q10	According to the case, why is the lesion: In head → on the RIGHT side In upper and lower limbs → on the LEFT	Q15	what is the difference between the cranial nerves and peripheral nerves regarding the area where they emerge?
	Due to decussation (cranial nerves don't decussate, and peripheral nerves decussate)		cranial nerves > from the brain. peripheral nerves > from the segments of the spinal cord.
Q11	What is the medical term referring to (feel a stinging)?	Q16	What is the type of 5th (trigeminal), 7th (facial), 9 <sup>th</sup> (glossopharyngeal) and 10 <sup>th</sup> (vagus) cranial nerves ?
	Tingling sensation		They are mixed (motor and sensory).
Q12	What is the technique that gives us to best Progress in this case ,and Mention Reason to use this technique ?	Q17	Mention the types of brainstem Glioma?
	Focal radiotherapy, it helps in reducing the tumor mass hence the pressure on the surrounding brain		1. Astrocytoma. 2. oligodendroglioma 3. Ependymoma
Q13	what is the indication of corticosteroids in Ahmad's case?	Q18	what are the most common brain tumor symptoms ?
	to reduce the local edema around the tumor		changes in voice, seizures, numbness in the arms or legs, tingling in the arms or legs.



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