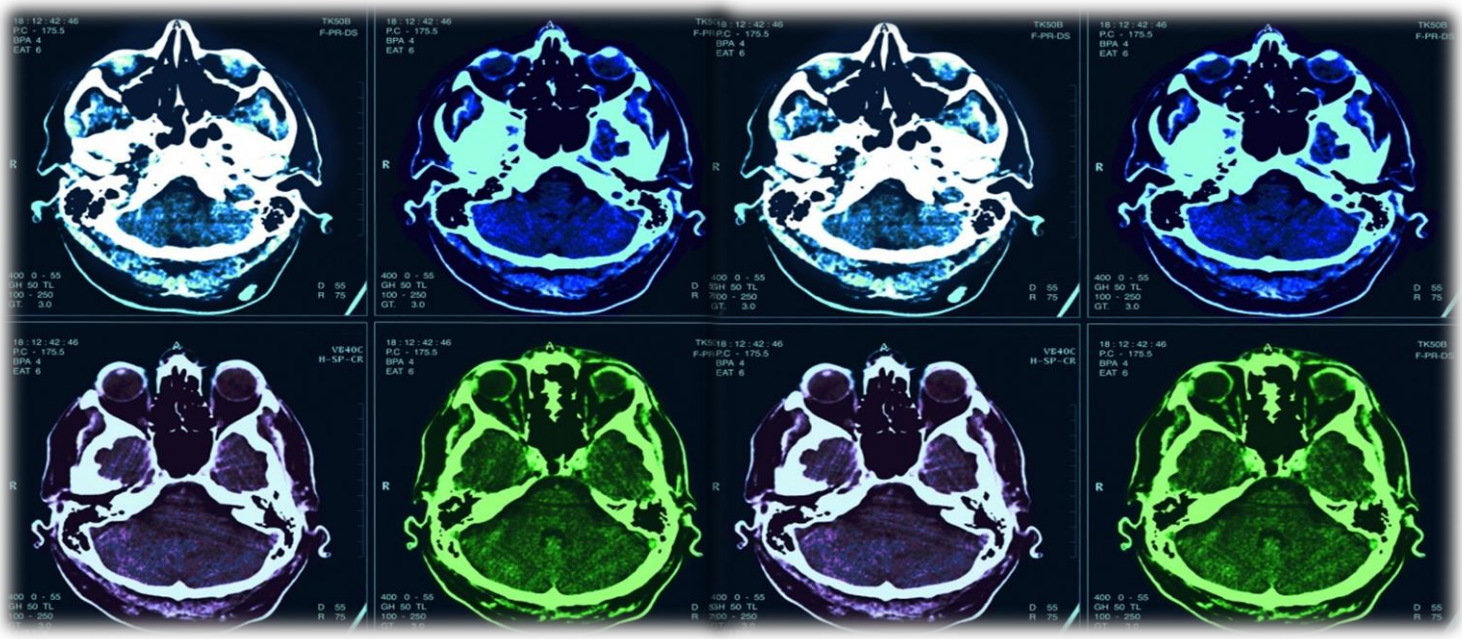
Radiology
Team 436

436
MEDICINE
KING SAUD UNIVERSITY

Neurosychatry Block



Brainstem and Cerebellum

Lecture two

تمت المراجعة
شوق الأحمري & عبدالعزيز العنقري

Objectives:

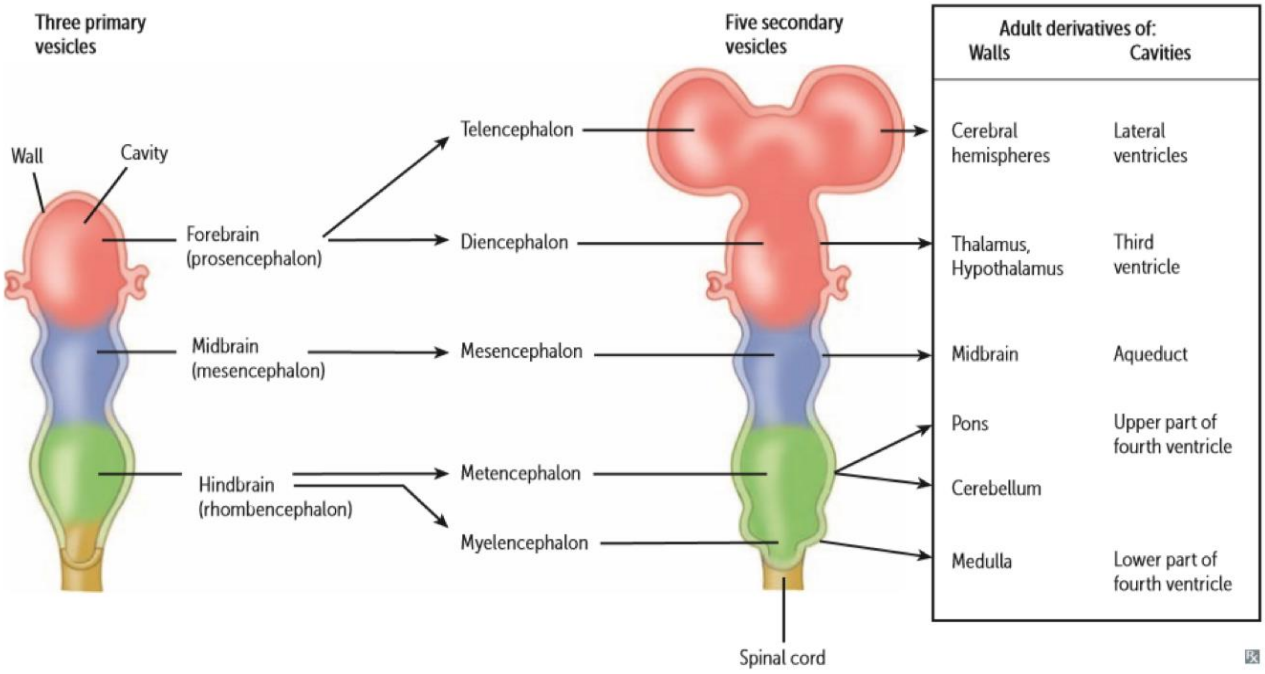
1. Identify radiological anatomy of brain stem and cerebellum.
2. Compares CT and MRI imaging of brain stem and cerebellum.
3. Recognize the imaging findings in common diseases involving brain stem and cerebellum.

Red: important

Green: Doctor's notes

Grey: Extra

Brain Divisions:



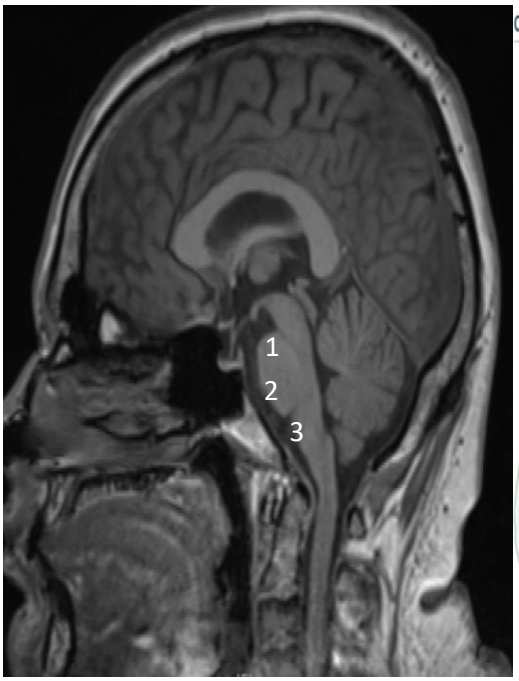
Brainstem:

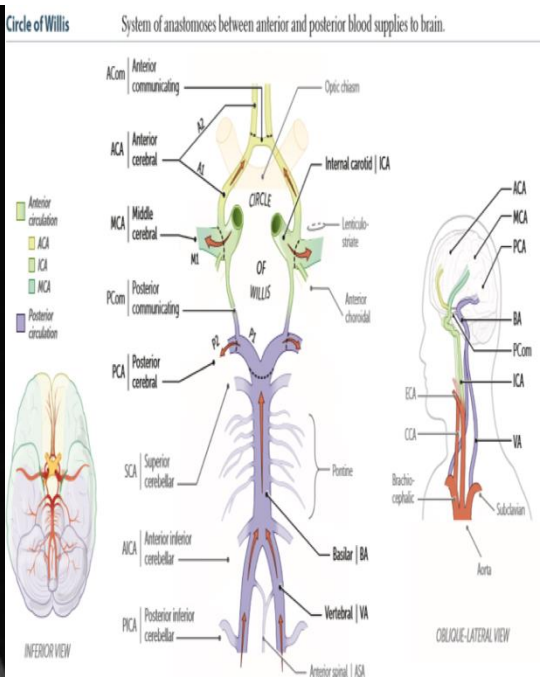
Three parts from superior to inferior:

1- Mid brain.

2- Pons (biggest part).

3- Medulla Oblongata.





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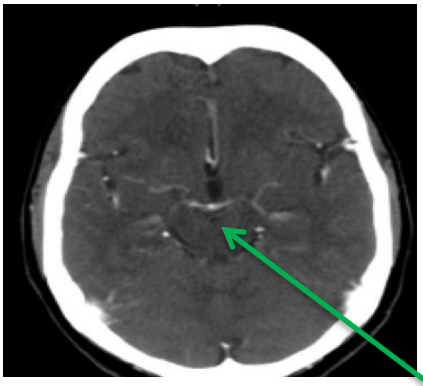
Midbrain:

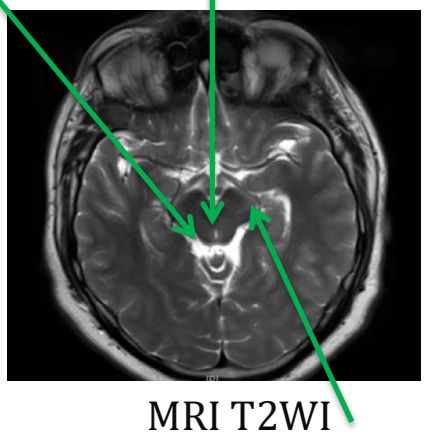
Radiological Features:

At the level of circle of willis (circle that feeds the brain) and every structure is important to recognize the level/location.

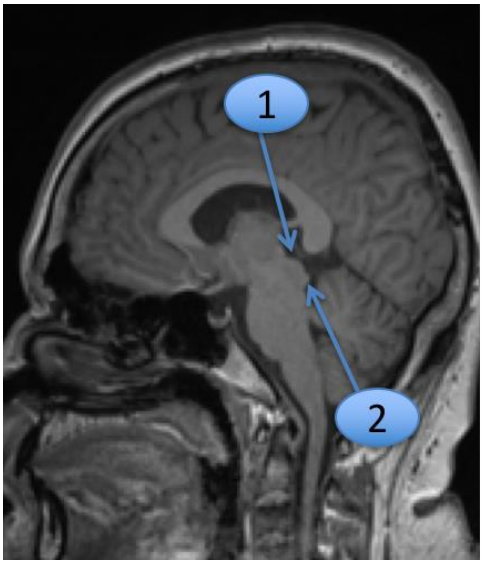
1- Anteriorly two cerebral peduncles separated by interpeduncular fossa.
2- Posteriorly four rounded prominences (superior and inferior colliculi).



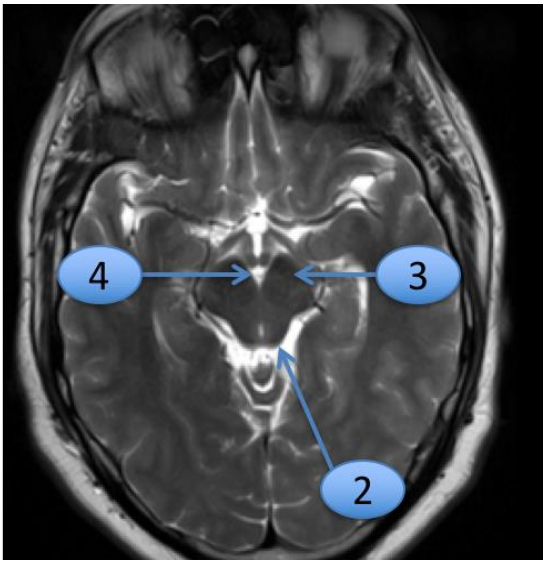
CT



MRI T2WI



Sagittal T1WI



Axial T2WI

1.Superior colliculus.

2.Inferior colliculus.

(both are more clear in sagittal radiographes)

3.Cerebral peduncle.

4.Interpeduncular cistern.

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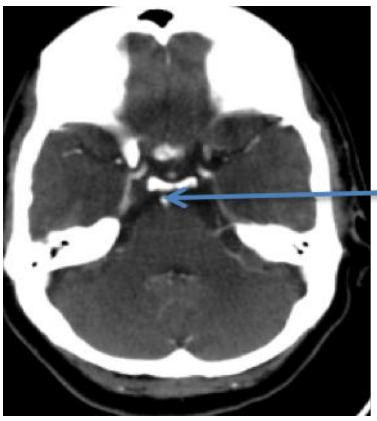
You have to know the differences between CT and MRI pictures.
MRI: shows the soft tissue clearly and bones appear with grey color.
CT: Bones appear white in color.
* The half circles. ** The small white spot.

Pons:

CT+



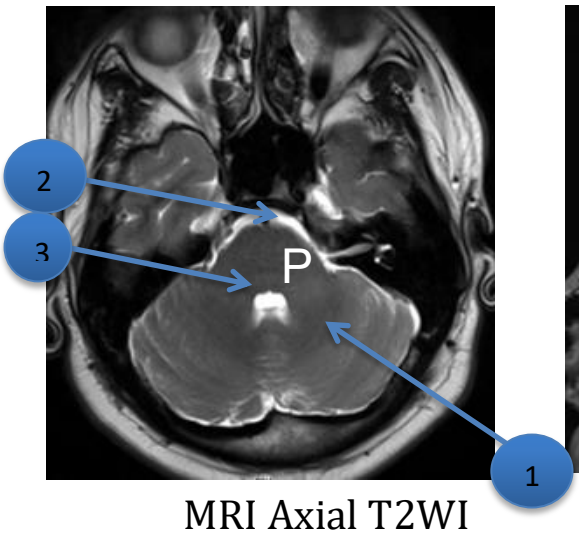
CT+

Radiological Features:

Basilar artery (comes from joining 2 vertebral arteries) lies in groove anteriorly.

Posterior surface of the pons forms the upper part of the floor of the 4th ventricle.

Bony anterior relation: clivus* bone centrally and petrous temporal bones laterally.



MRI Axial T2WI

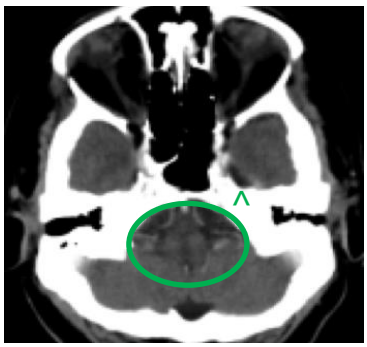
MRI Sagittal T1WI

P pons
1. 4th ventricle**.
2. basilar artery***.
3. middle cerebellar peduncle.

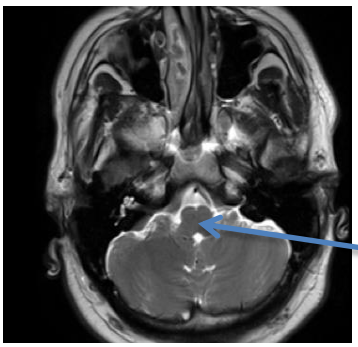
Medulla Oblongata:

Radiological Features:

1. The ventral median fissure is seen anteriorly with the pyramid laterally
2. The 4th ventricle is seen posteriorly



CT+



MRI Axial T2WI

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*Behind the puititary gland. ** The black triangle. ***Black spot.

^ To know how to diffrenciate this image of M.O. from the previous one in the pons, you can observe the butterfly-like or diamond like shape inside the circle, which represents the 2 arteries that will unite later to form the basilar artery in the pons.

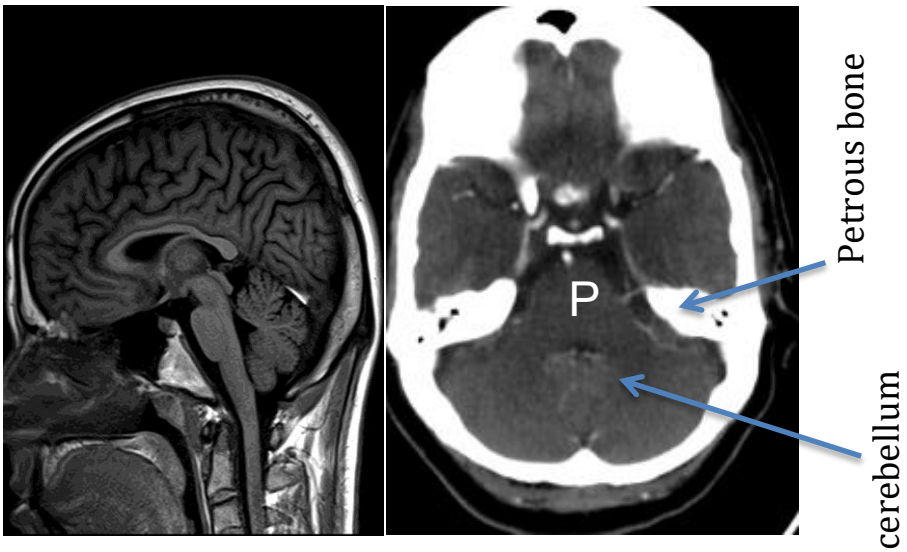
Cerebellum:

Radiological Features:

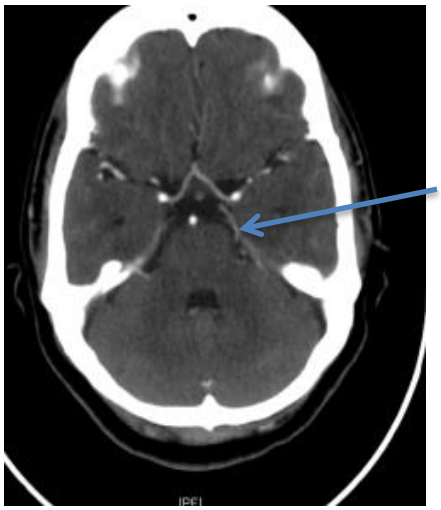
On axial Ct & MRI the cerebellum is separated from the pons by the 4th ventricle*.

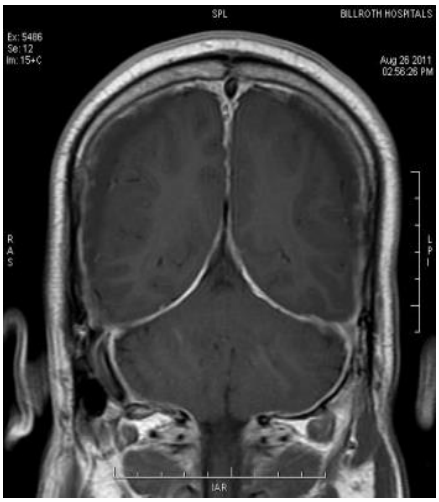
Connected to the pons on each side by middle cerebellar peduncle.

it is bounded anteriorly by petrous temporal bone.



CT+





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*The 4th ventricle is between the pons and cerebellum.

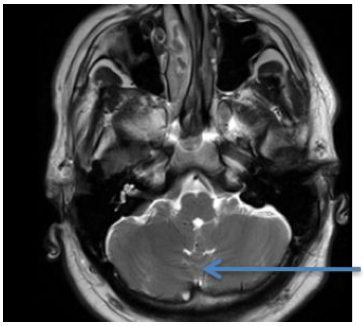
Radiological Features:

1. Cerebellum is connected to the brainstem by three pairs of cerebellum peduncles:
   - Superior: connected to the midbrain.
   - Middle: connected to the pons.
   - Inferior: connected to medulla oblongata.

MRI Sagittal T1WI

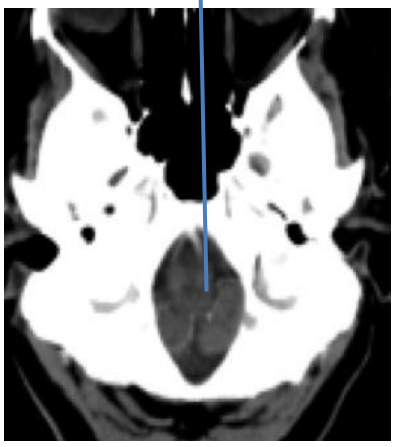
Cerebellar Tonsil

Two cerebellar hemisphere with midline vermis (Sulcus between 2 hemispheres)



MRI Axial T2WI

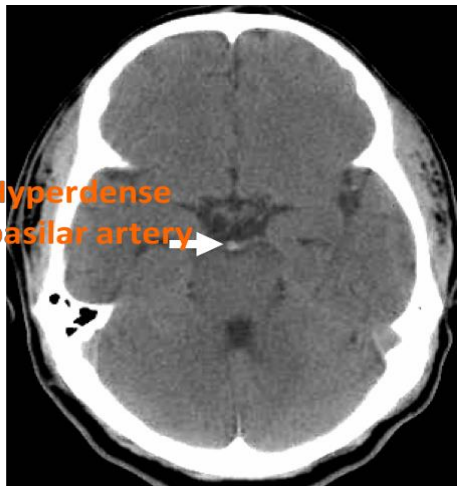
Vermis



Axial CT

Common Diseases of Brain and Cerebellum*

1. Acute infarction due to basilar artery thrombosis**



CT

MRI Axial FLAIR

MRI Axial T2WI

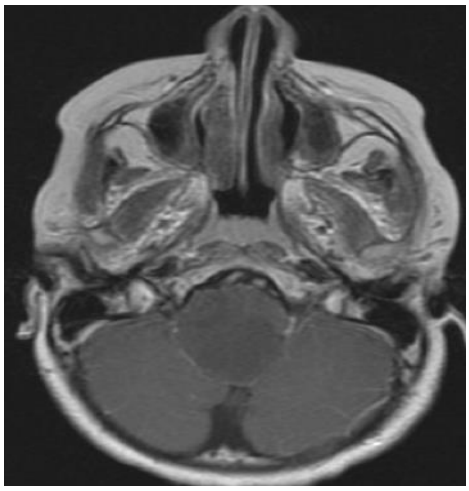
*Doctor note: Pathology is too advanced for you (focus on the anatomy more).

**Hyper-dense=lighter (white) e.g. Skull.

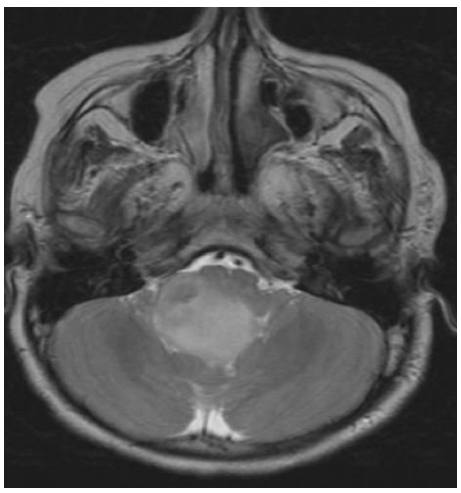
Hypo-dense=darker (black) Brain parenchyma.

2. Brainstem Glioma

Sagittal MRI



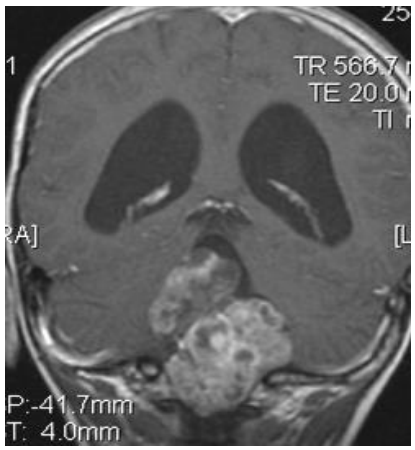
Axial MRI T2WI



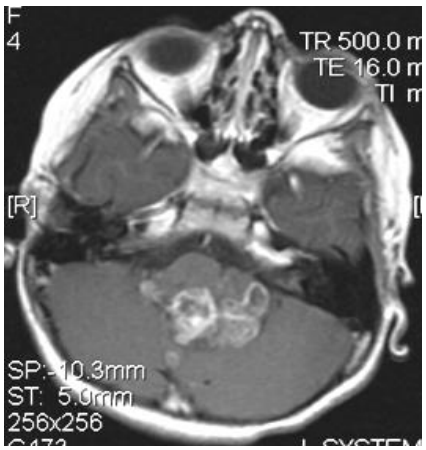
Axial MRI T2WI

3. Ependymoma intramedullary tumor

Sagittal MRI T1WI contrast



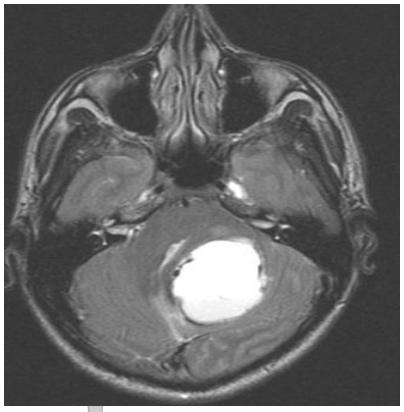
Coronal MRI T1WI contrast



Axial MRI T1WI contrast

4. Hemangioblastoma intramedullary tumor

Sagittal MRI T1WI contrast



Axial MRI T2W1

Coronal MRI T1WI contrast

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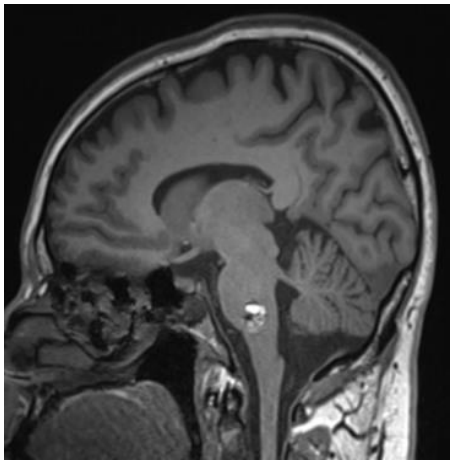
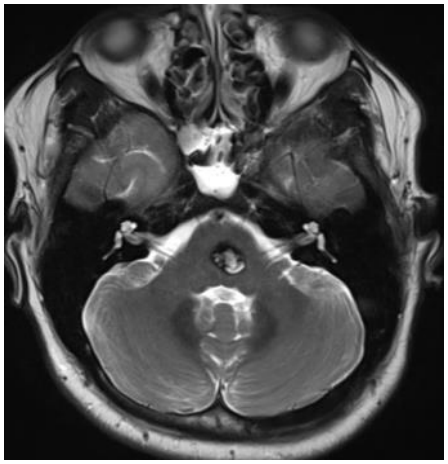
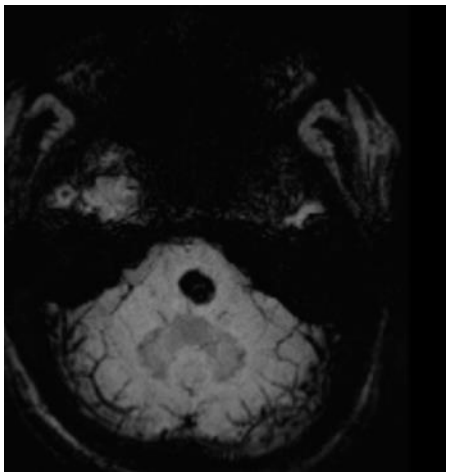
5. Cavernous Angioma



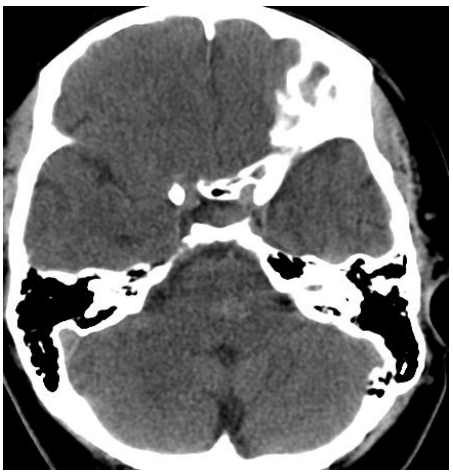
Sagittal MRI T1WI



Axial MRI T2WI



Axial MRI SWI



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How do we diagnose a patient?

We should do CT scan to see if is there any abnormal changes, and then we do MRI to specify if these changes are acute, subacute or chronic.

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Najd Altheeb

https://www.onlineexambuilder.com/2-brainstem-cerebellum/exam-180217

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- Jamie Weir, Peter Abraham, "**Imaging Atlas of Human Anatomy"** 3rd Edition, Pages 34-41
- Peter Armstrong, "**diagnostic imaging** ", 5th Edition, Pages (396-404)

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