MEDICINE
KING SAUD UNIVERSITY

Radiology
Team 436

Endocrine Block

Practical

DOCTOR NOTES | IMPOTANT! | EXTRA

COLOR CODES

Normal pituitary gland

The gland is composed of two parts: (Not important)

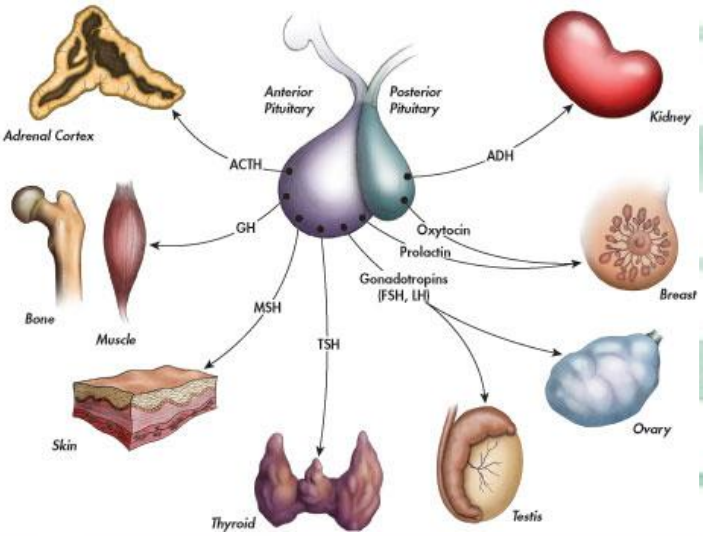
- Anterior lobe (adenohypophysis). All hormones are released from this lobe except for two hormones; ADH and Oxytocin.
- Posterior lobe (neurohypophysis).
  - Weight: 0.5 g.
  - Height: 4-16 mm.
  - Anterior posterior: 5-16 mm.

Indications for imaging the pituitary gland

- Hormonal dysfunction.
  I. Cushing syndrome (Increased Cortisol levels).
  II. Growth abnormalities e.g. Growth hormone deficiency, acromegaly (GHD and Acromegaly are the opposite of each other).
- Visual abnormalities (Related to Optic chiasma damage caused by pituitary adenoma mass effect).
- Headache (not always).

What is best modality to image the pituitary gland?*

A. X ray
B. CT scan
C. MRI
D. US
E. Nuclear medicine

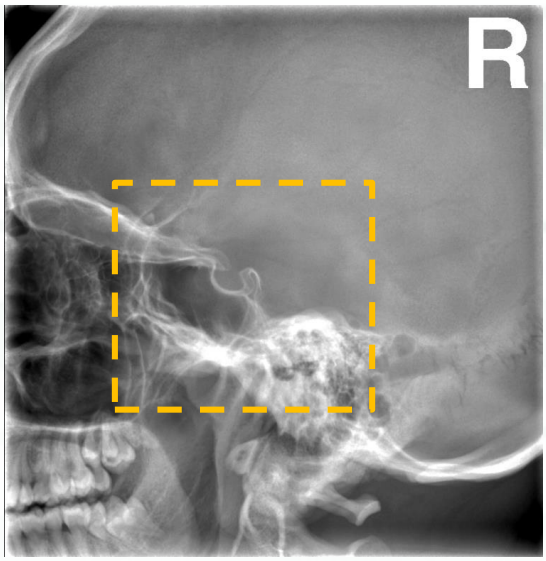


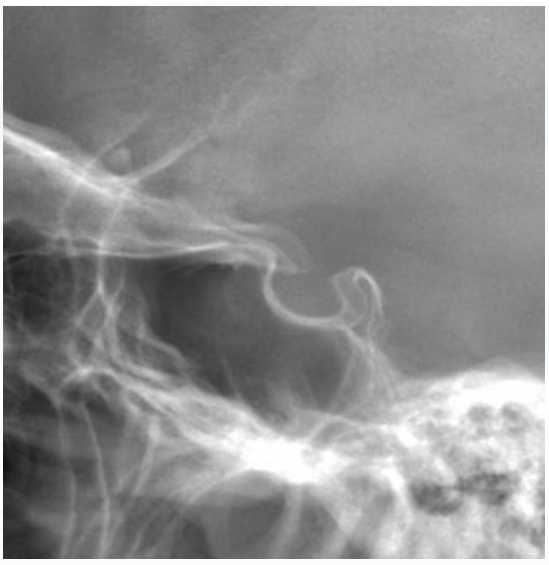
* The answer is C. (CT scan is not the best due to the: Beam Hardening Artifact, which occurs because of the position of the gland inside the sella turcica –bony structure-)

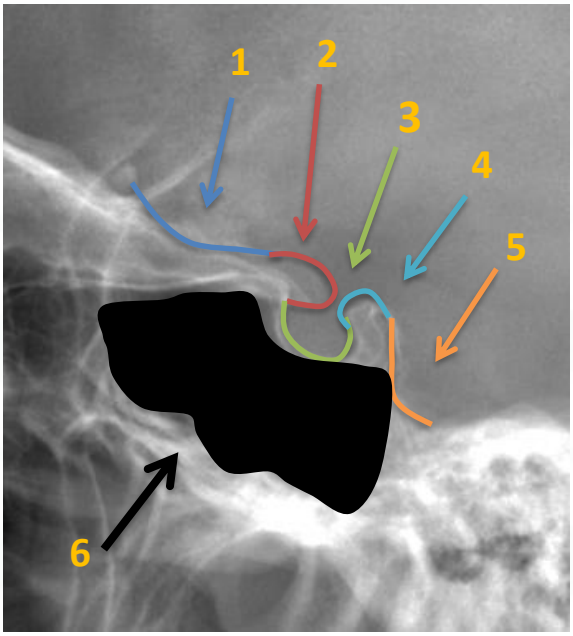
X-Ray (Sagittal view):

VERY IMPORTANT!!

- White: bone and calcification
- Grey: soft tissue
- Black: air



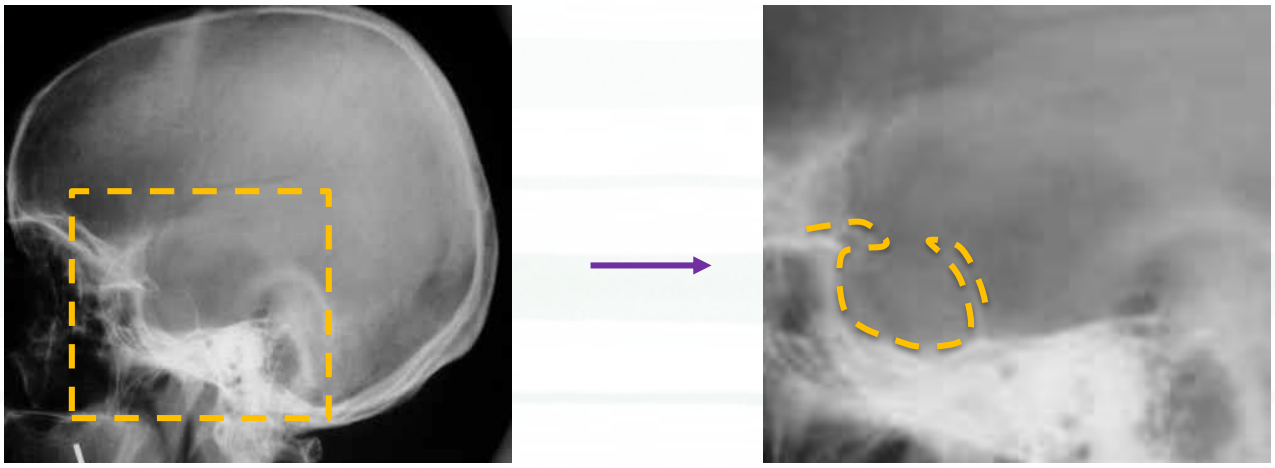




1- Optic sulcus.
2- Anterior clinoid process (part from the sphenoid bone).
3-Floor of sella turcica (Pituitary fossa) The gland lies here.
4- Posterior clinoid process.
5- Dorsum sella (Square shaped process of the sphenoid bone).
6- Sphenoid sinus (it is important to know that this sinus is next to Sella turcica. When there is a pituitary neoplasm the surgeon will operate through an opening in this area).

- X-ray modality is usually used for pediatric trauma cases.
- Surgeons reach the pituitary gland through trans sphenoidal process.

X-Ray (Cont.)



MRI

Normal

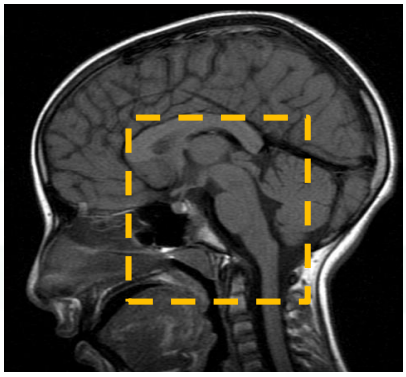
Pituitary Adenoma

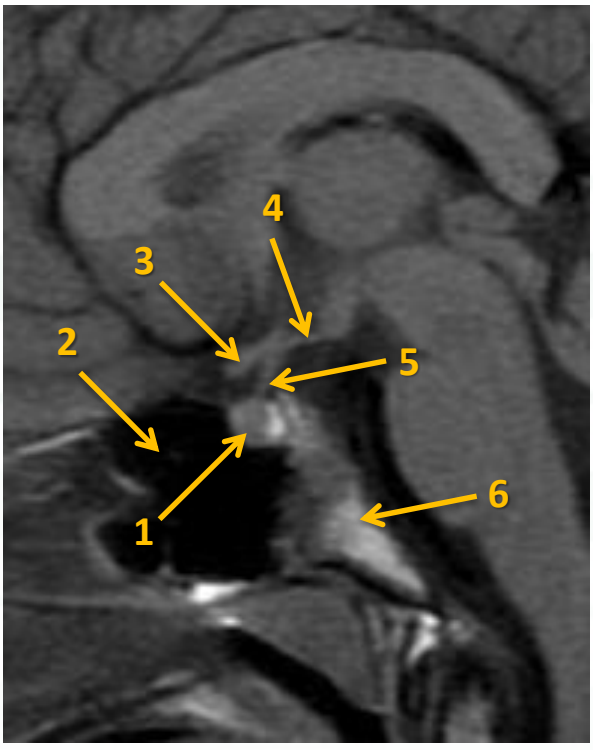
What is beam hardening artifact? To understand

Pituitary gland is located inside the sella turcica which is a bony structure. When we use X-ray or CT to examine the gland and due to its location the radio waves will hit the bone and reflect it without reaching the gland inside. Or in other words, the hyper density of the bony structure will mask the hypodense gland inside, and that's why we use MRI to assess the pituitary gland.

MRI (Sagittal view):

VERY IMPORTANT!!

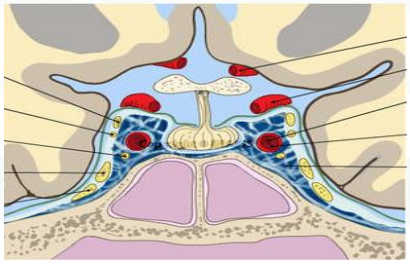


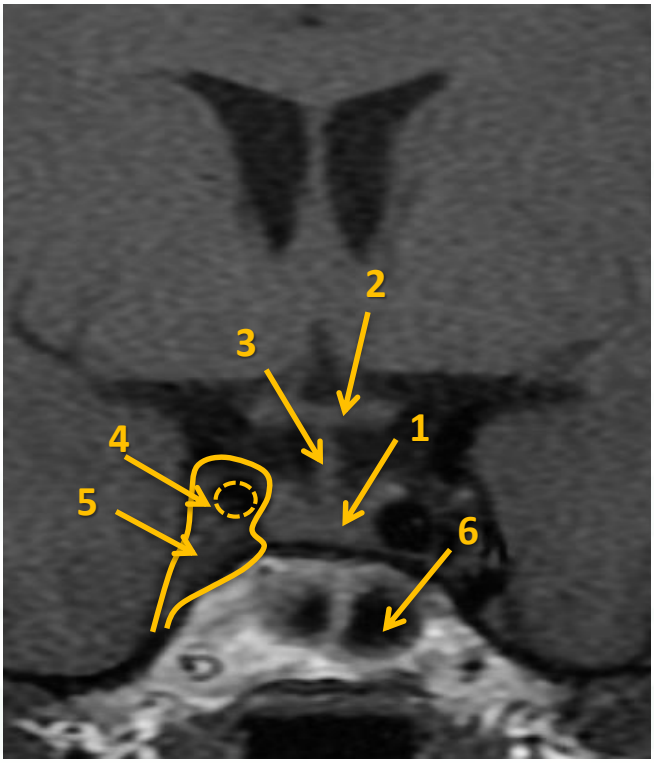


1- Pituitary gland.
2- Sphenoid sinus.
3- Optic chiasm.
4- Hypothalamus.
5- Pituitary stalk.
6- Clivus (A bony part of the cranium at the skull base).

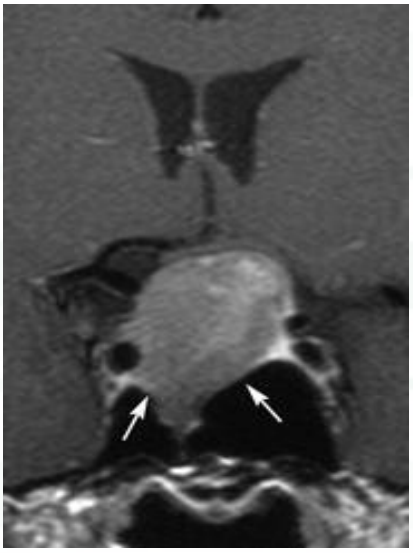
MRI (Coronal view):

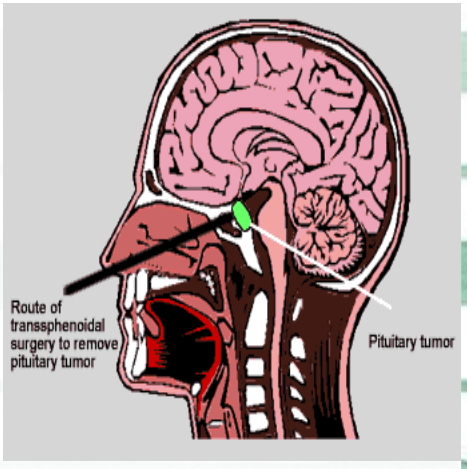
1. Pituitary gland.
2. Optic Chiasm.
3. Pituitary stalk.
4. Carotid artery (Hypodense -black- circle inside the cavernous sinus).
5. Cavernous sinus (It's full of blood, so it grey).
6. Sphenoid sinus (It's full of air, so it's black).

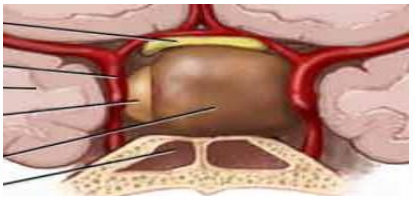


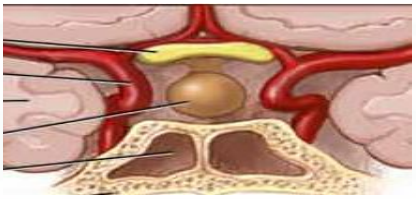


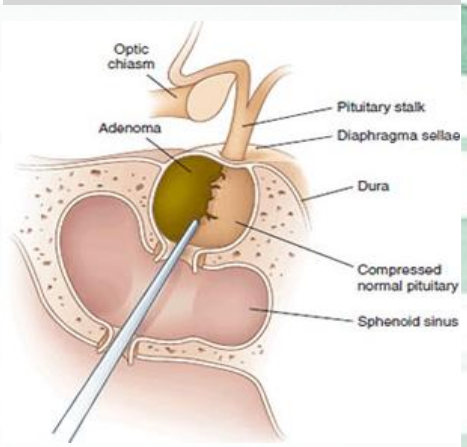
Pituitary gland pathology:









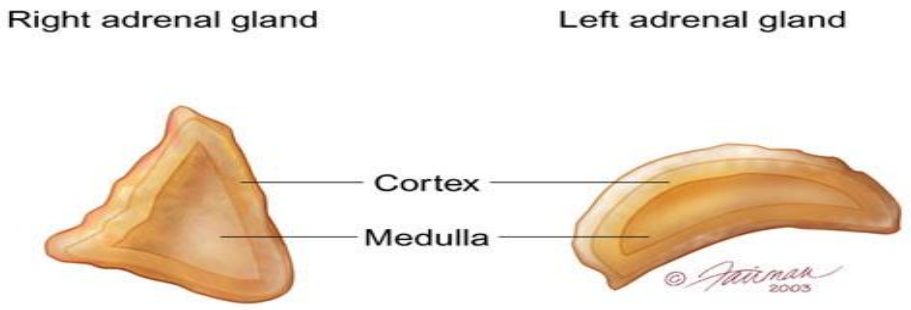


Trans sphenoidal approach*:

*The images are taken during the time of the operation.

Normal anatomy of the adrenal gland:

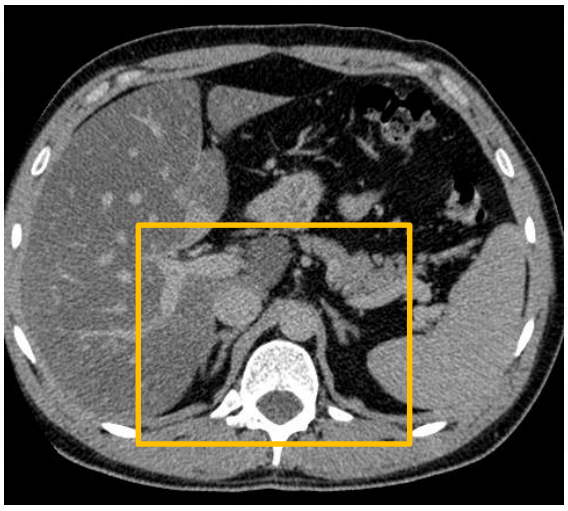
Only in females slides



- Modalities to image the adrenal gland : CT, MRI and US.
- Preferred modality: CT (because it is not surrounded by bone) and MRI.
- The sensitivity of MRI to small structures is high, thus we use it for the pituitary gland. and we don't use CT for pituitary gland because of the surrounding bone.

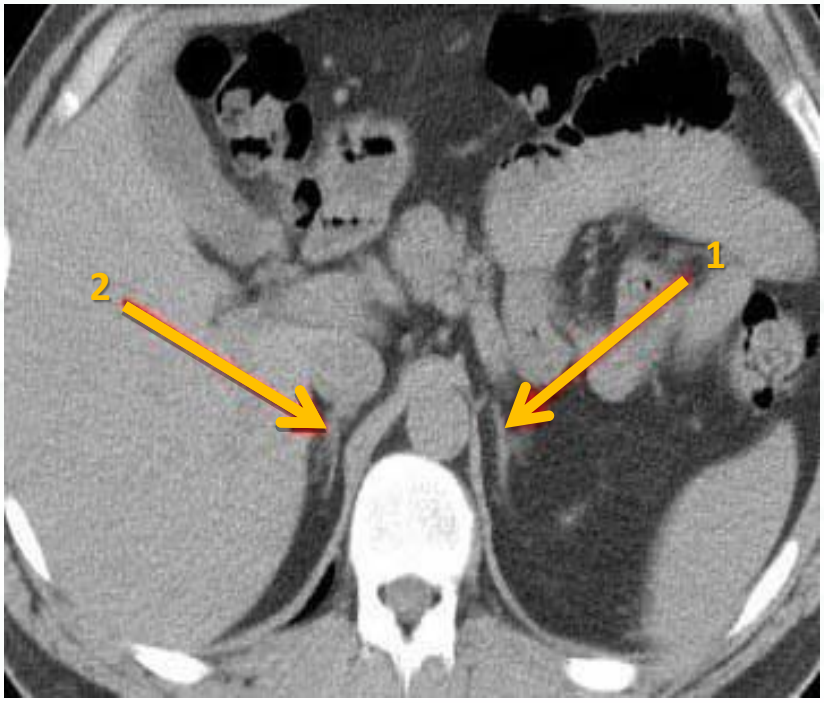
Normal adrenal gland on CT (Axial view):

Only in males slides



CT Scan of the abdomen (Axial view):

VERY IMPORTANT!!

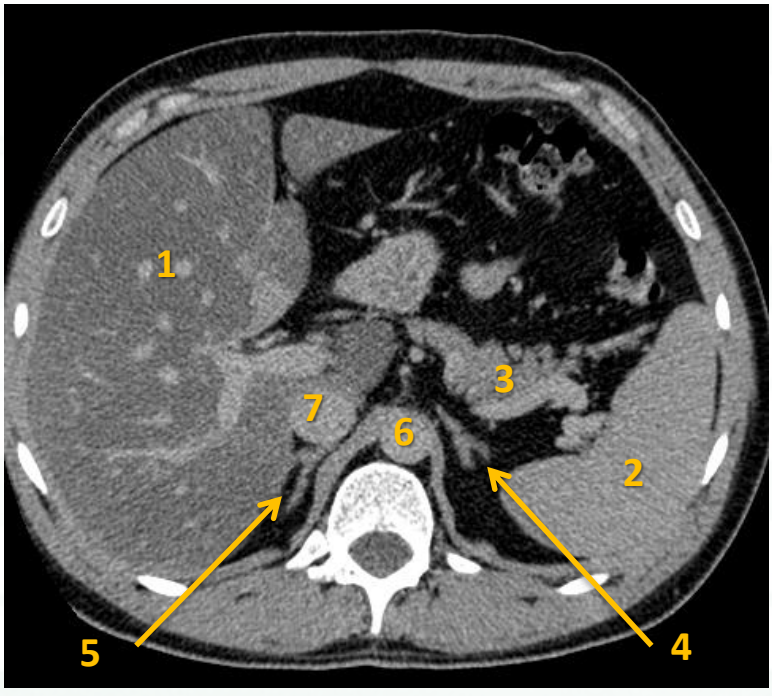


Only in females slides

1- Left adrenal gland.
2- Right adrenal gland.
It is very important to know the right from the left (shake hands with the image to know left from right).

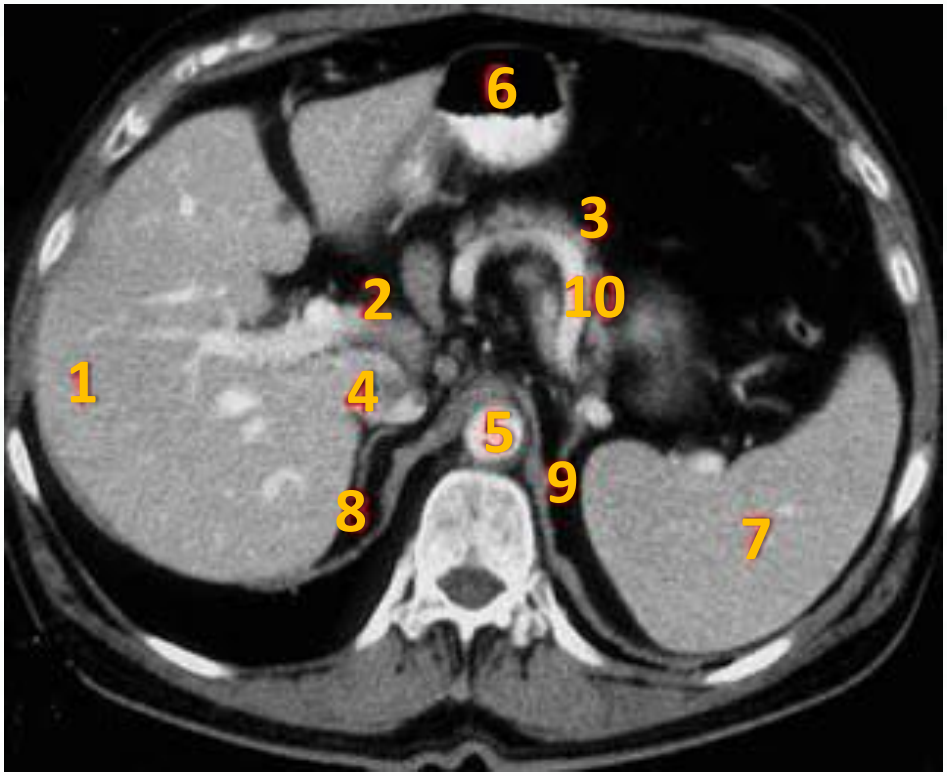
Only in males slides

1- Liver.
2-Spleen.
3- Pancreas.
4- Left adrenal gland.
5- Right adrenal gland.
6- Aorta.
7- IVC Inferior vena cava (notice that it is a circle lighter than the surroundings).



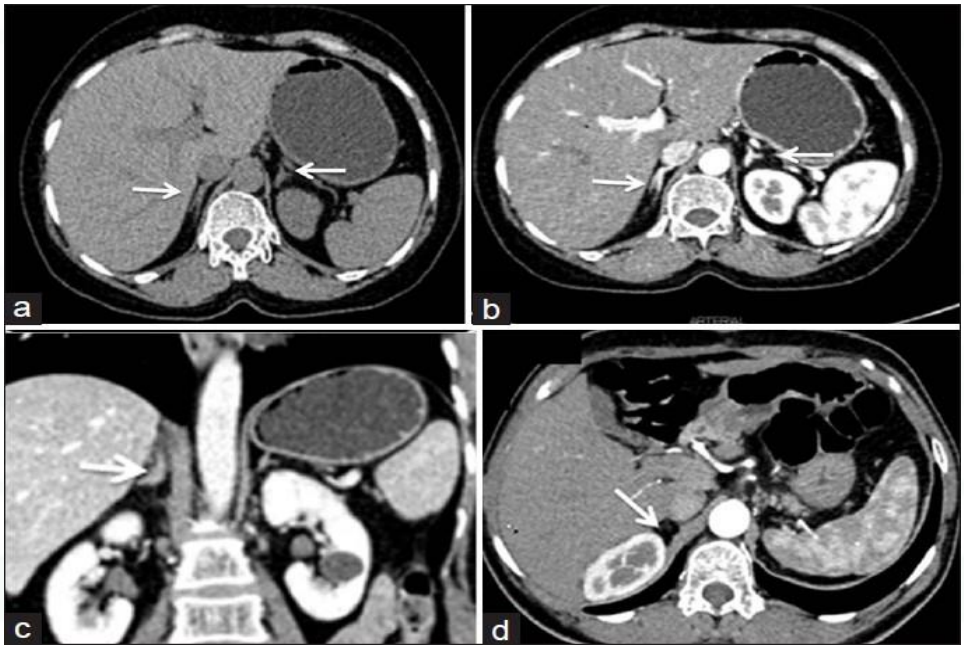
CT Scan of the abdomen (Axial view):

Only in females slides



1. Liver.
2. Portal vein.
3. Pancreas.
4. Inferior vena cava.
5. Abdominal aorta.
6. Stomach.
7. Spleen.
8. Right Adrenal.
9. Left Adrenal.
10. Splenic artery.

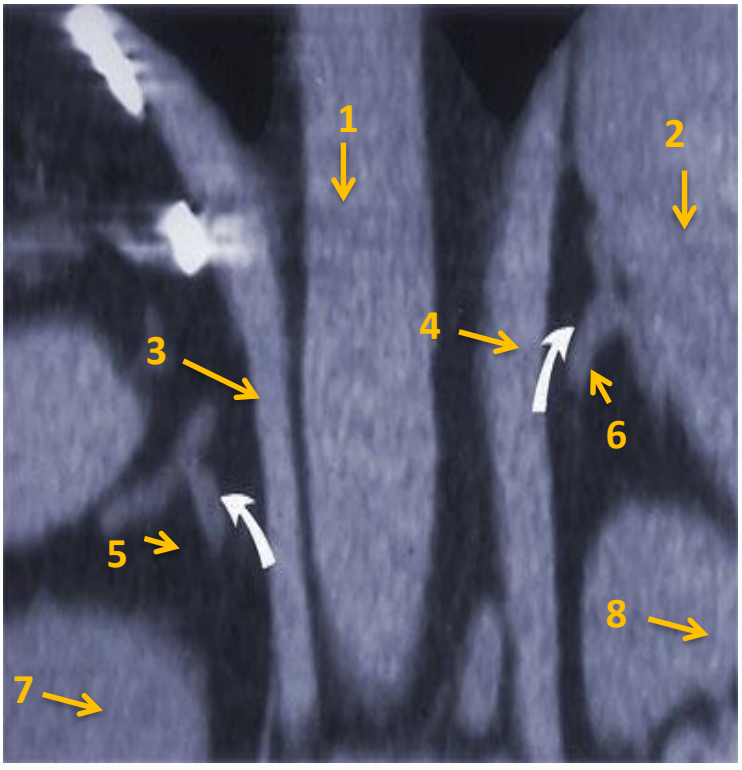
I really know this picture is confusing =(Please don't worry. Hopefully, we will not get it in the exam (Amen).



CT Scan of the abdomen (Coronal view):

VERY IMPORTANT!!

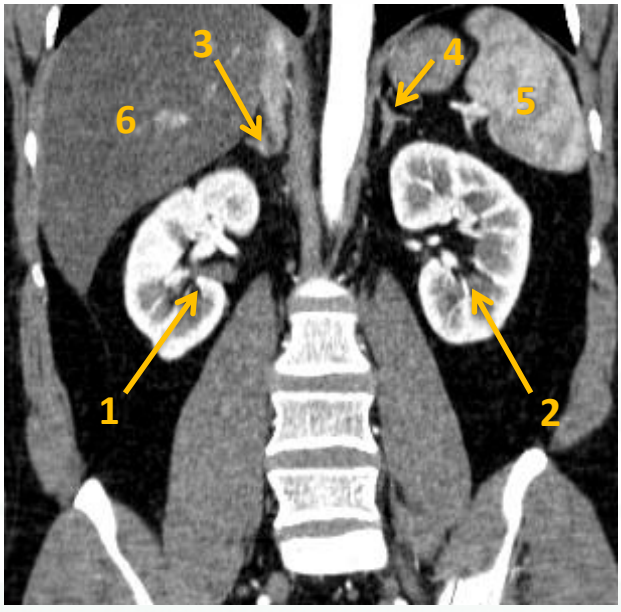
Only in females slides



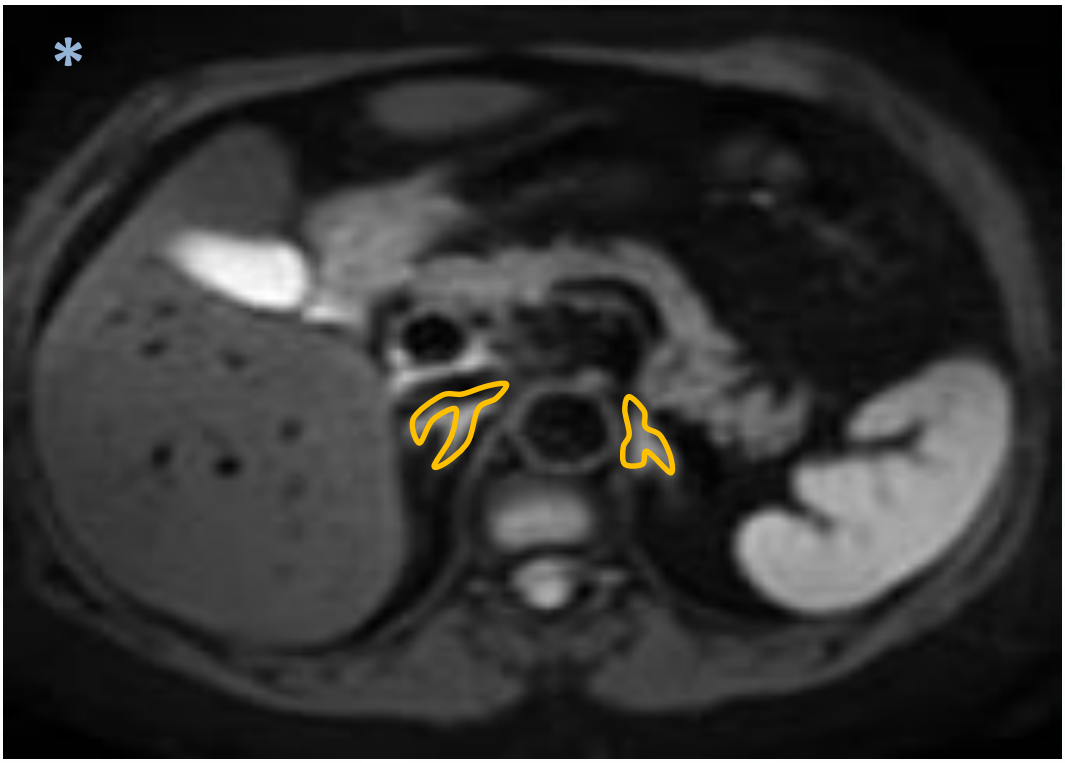
1-Aorta.
2-Spleen (is always on the left side but the right side of the image and the liver is always on the right side)
3-Right Diaphragmatic crus (beside it we have the R.Adrenal gland).
4-Left Diaphragmatic crus (beside it we have the L.Adrenal gland).
5-Right adrenal gland.
6-Left adrenal gland.
7-Right kidney.
8-Left kidney.

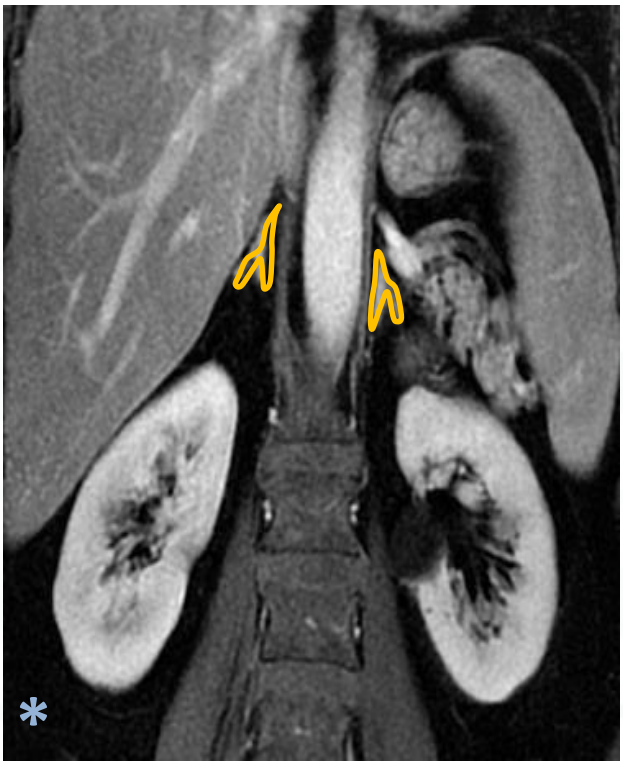
Only in males slides

1- Right kidney.
2- Left kidney.
3- Right adrenal gland.
4- Left adrenal.
5- Spleen.
6- Liver.



Normal adrenal gland on MRI:



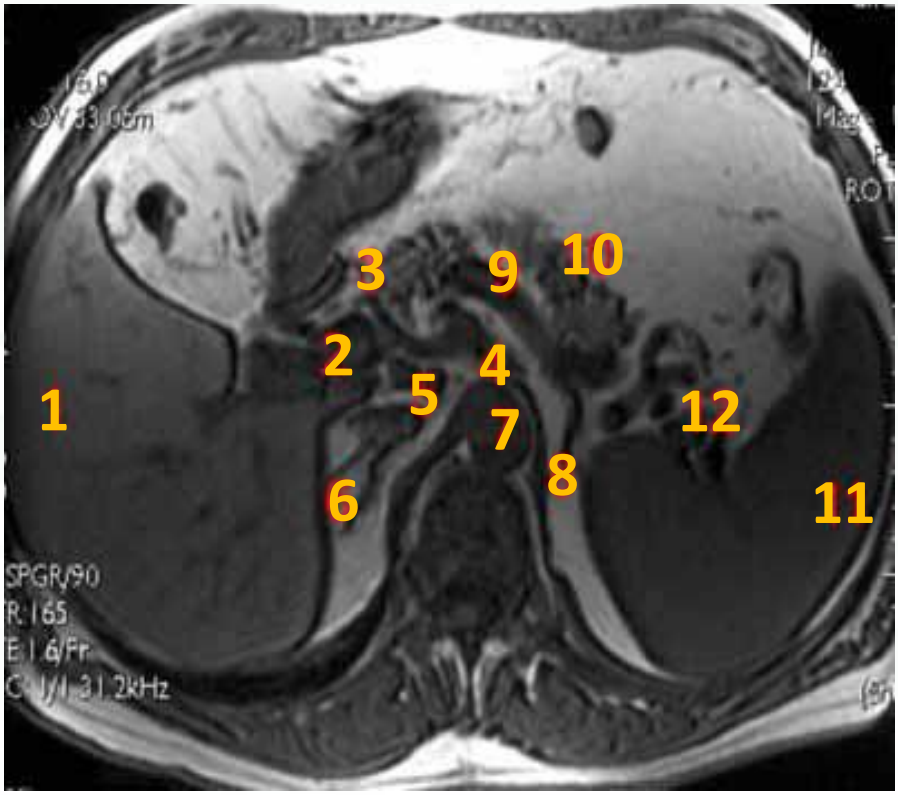


* Only in males slides

** Only in females slides

MRI of the abdomen (axial view):

Only in females slides

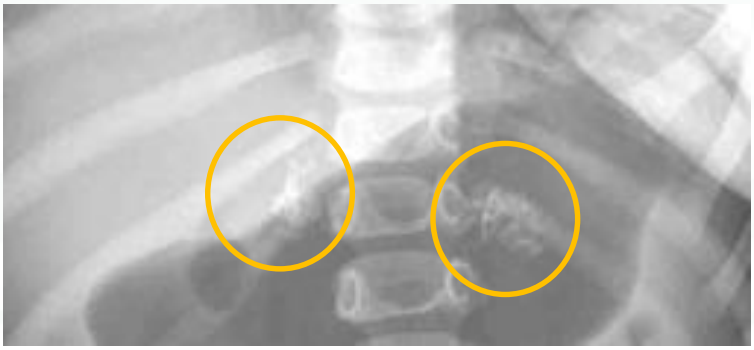


1- Liver
2- portal vein.
3- head of pancreas
4- celiac artery
5- Inferior Vena Cava
6- Right Adrenal
7- Abdominal Aorta
8- Left Adrenal
9- splenic artery
10- body of pancreas
11- Spleen
12- the entry for the splenic artery and vein to the spleen (hilum of the spleen).

And agaaain the image that we don't love =D,
but don't worry everything is going to be perfect.

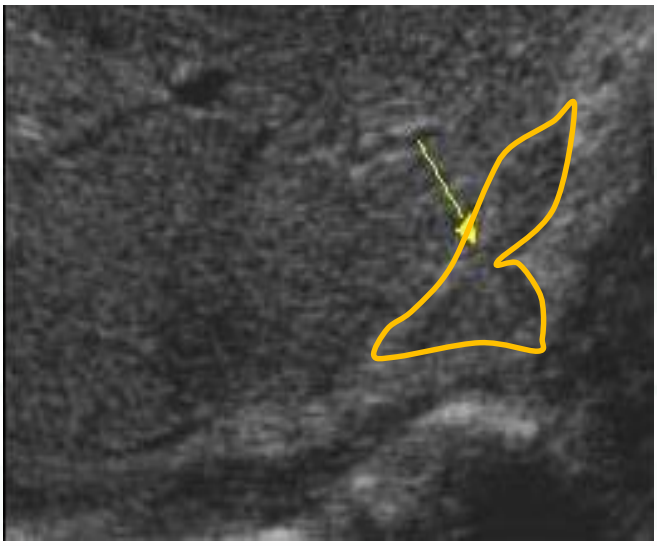
X-ray image shows adrenals calcifications:

Only in males slides



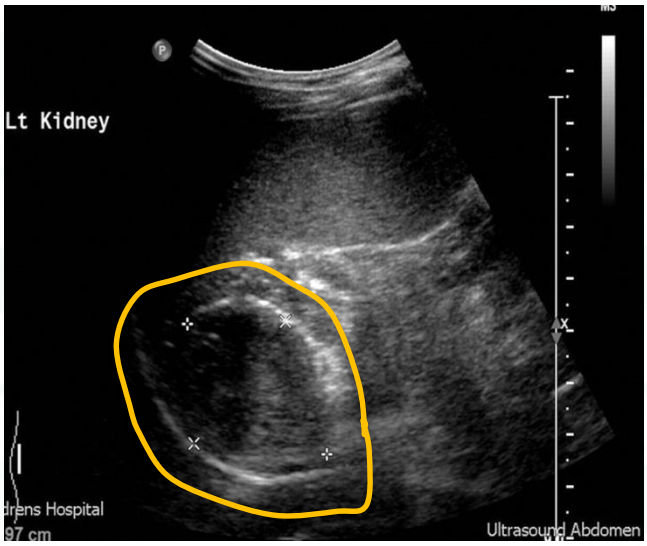
Only in males slides
EXTRA

Ultrasound:



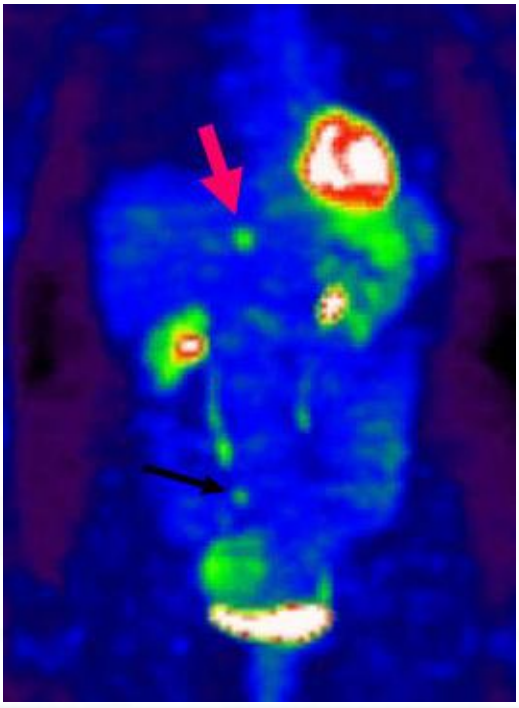
Normal

It's a little bit darker than the surrounding

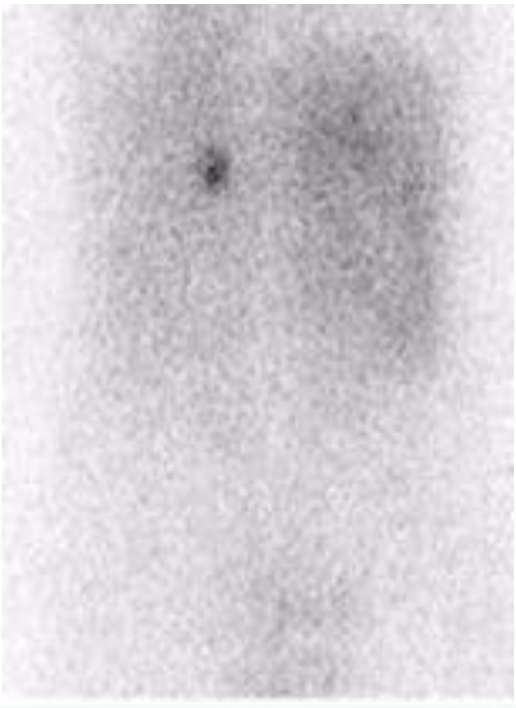


Abormal

Nuclear scan:



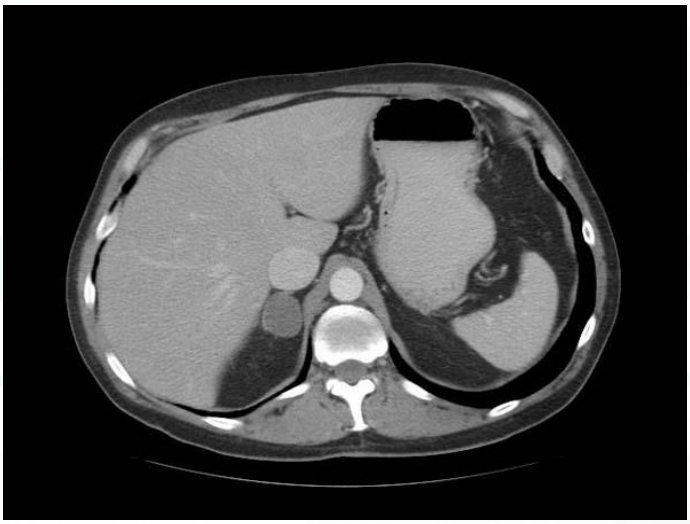
PET scan

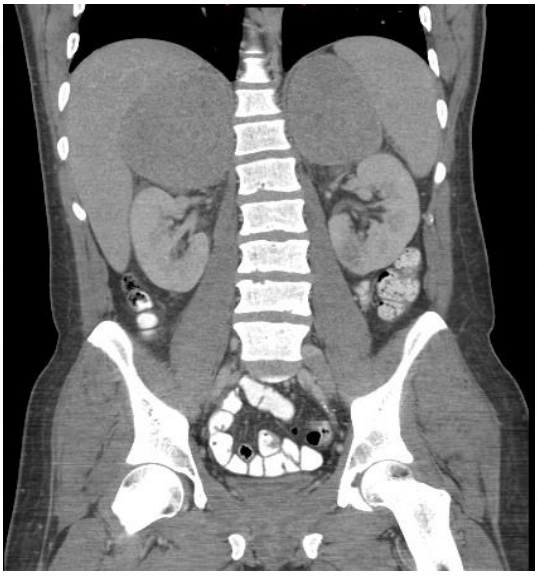


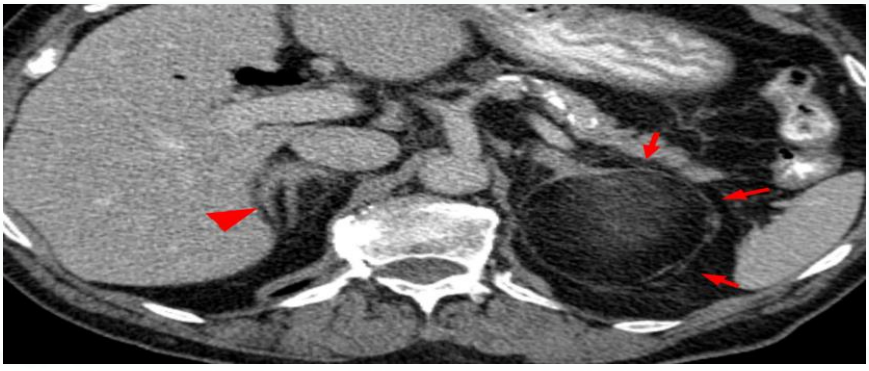
MIBG scan

Pathology of adrenal glands:

EXTRA







Lipoma* of the left adrenal gland

*Lipoma: benign tumor containing fat.
All pictures are CT scan images.

LEADERS:

Mohammed Alduayj
Hanin Bashaikh

MEMBERS:

Aseel Badukhon

Wejdan Alzeed

DESIGN:

Maram Alduayj

Radiology
Team 436

Contact us

@Radiology436

Radiology436@gmail.com

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