

# **RADIOLOGY**

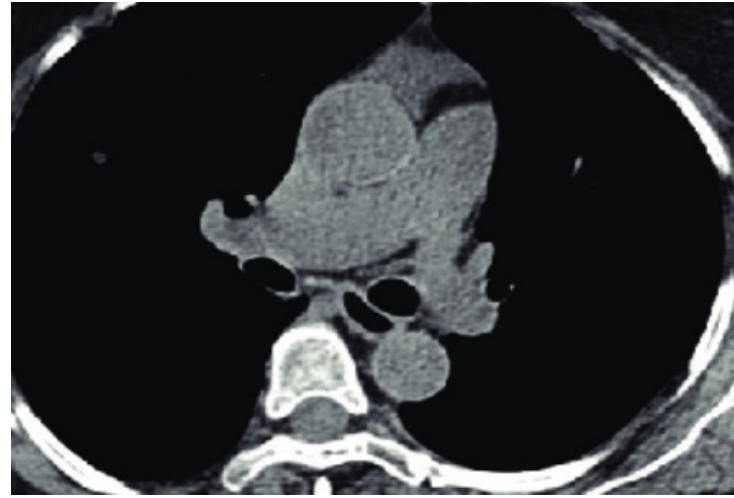
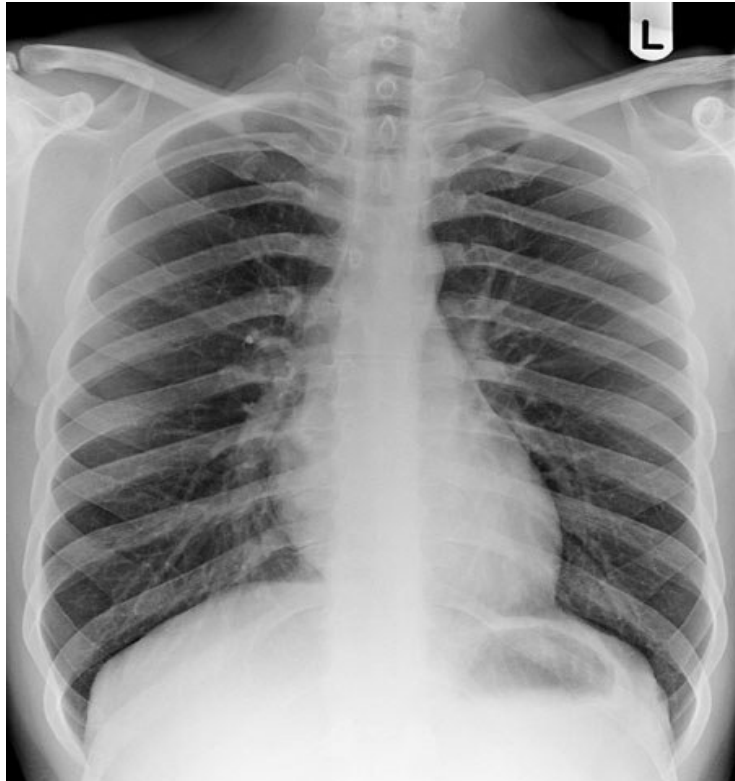
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# BASIC INVESTIGATIONS

	Concept	Ionizing Radiation	Black	White
X-ray				
CT				
MRI				
USG				
NUCLEAR MEDICINE				

<b>Modality</b>	<b>Dose</b>
<b>CXR</b>	<b>0.02 mSv</b>
<b>Skull Xray</b>	<b>0.07 mSv</b>
<b>Abdomen Xray</b>	<b>1 mSv</b>
<b>Mammography</b>	<b>0.5-0.7mSv</b>
<b>CT head</b>	<b>2 mSv</b>
<b>CT chest</b>	<b>5 mSv</b>
<b>CT abdomen</b>	<b>10 mSv</b>
<b>PET</b>	<b>10-12 mSv</b>
<b>Barium meal follow through/enema</b>	<b>7-8mSv</b>
<b>IVP</b>	<b>2-3mSv</b>

# X-RAY - CT



RIB COUNTING

# HOUNSEFIELD UNIT

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-1000

-10 to -100

0

20-30

60-90

100-300

1000

# NCCT-IOC

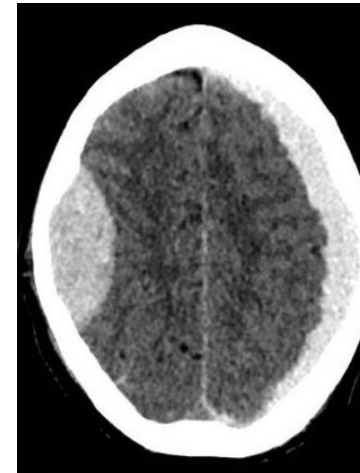
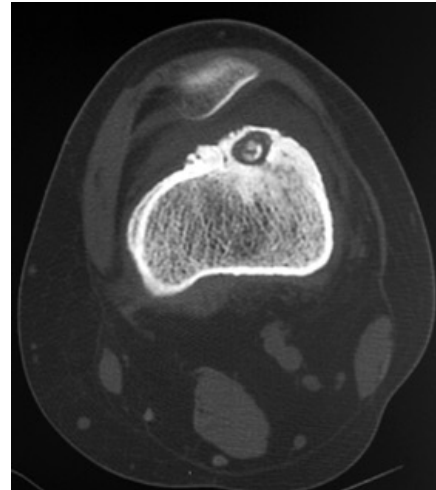
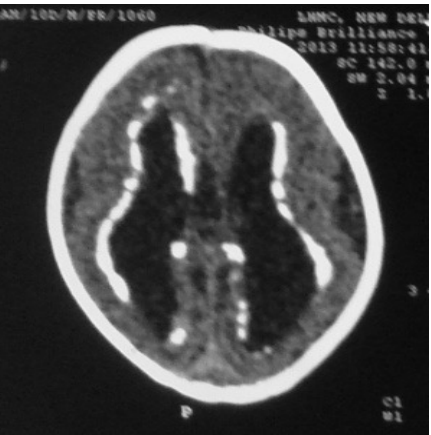
CALCIFICATION

CALCULI

BONE -CORTEX

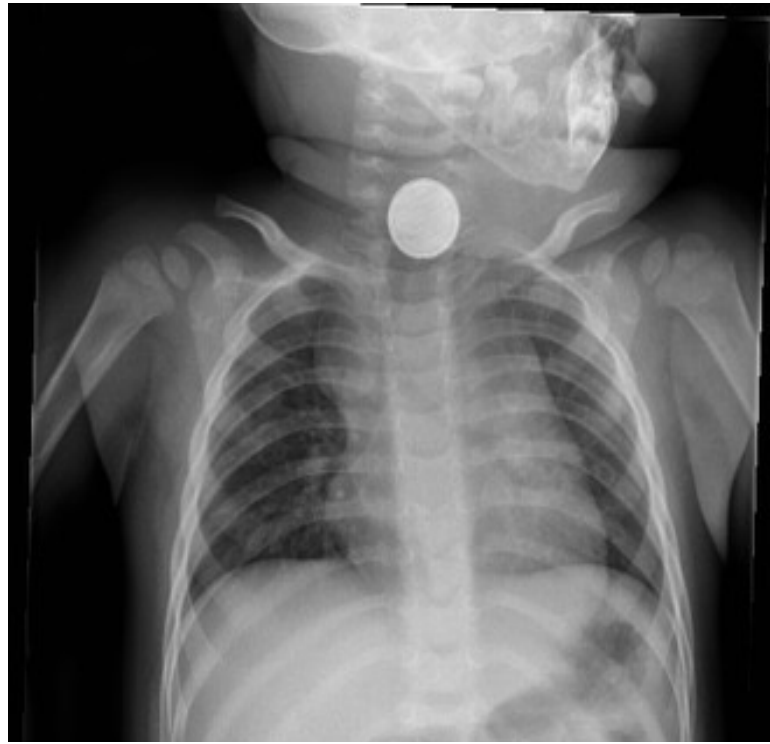
ACUTE  
HEMORRHAGE

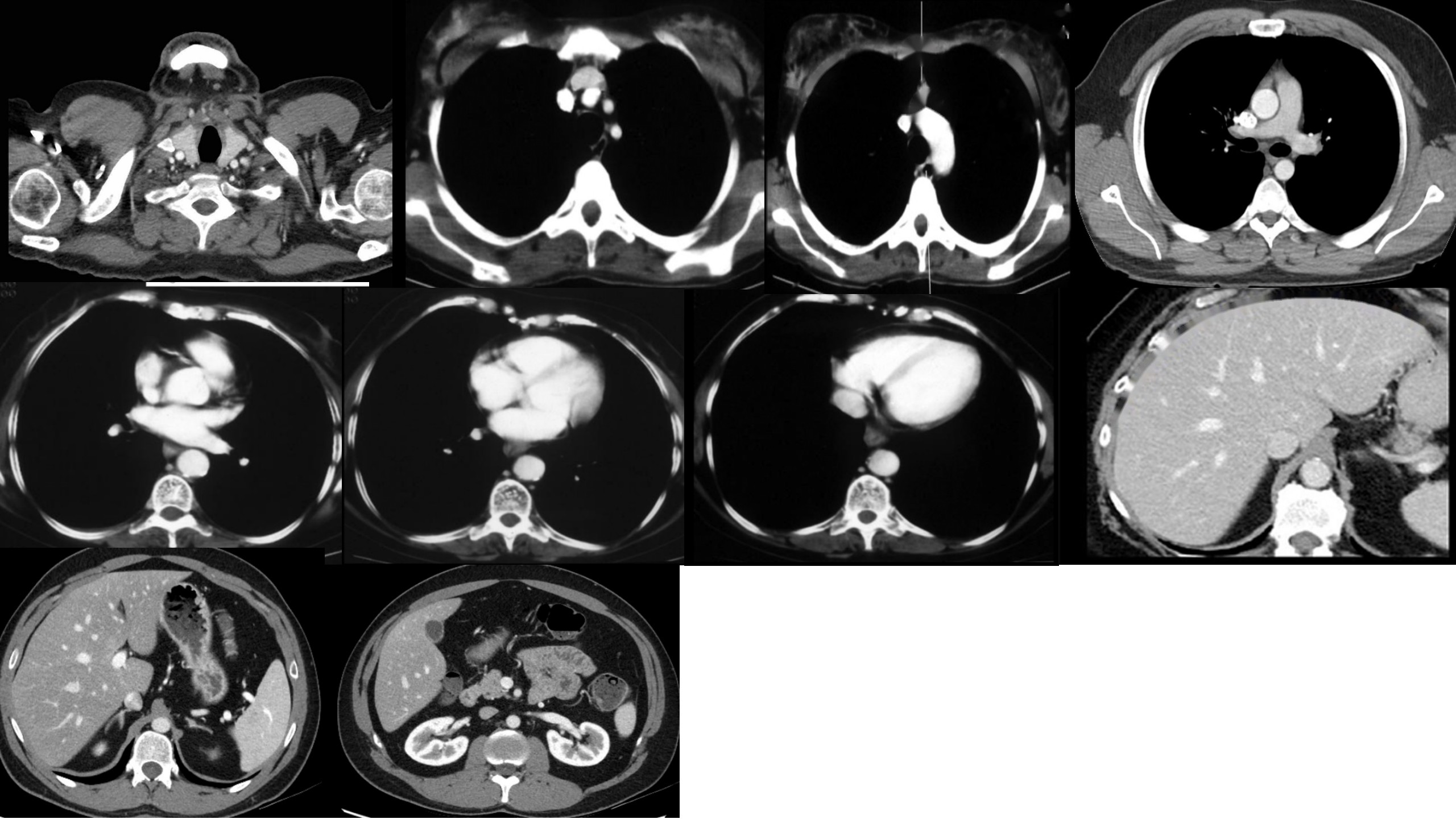
METALLIC FB



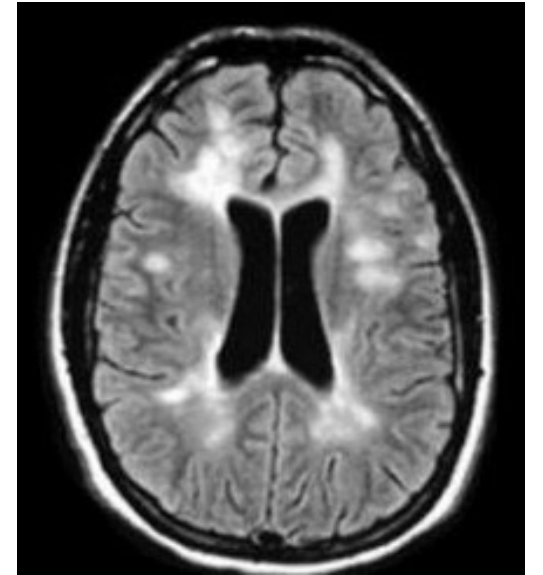
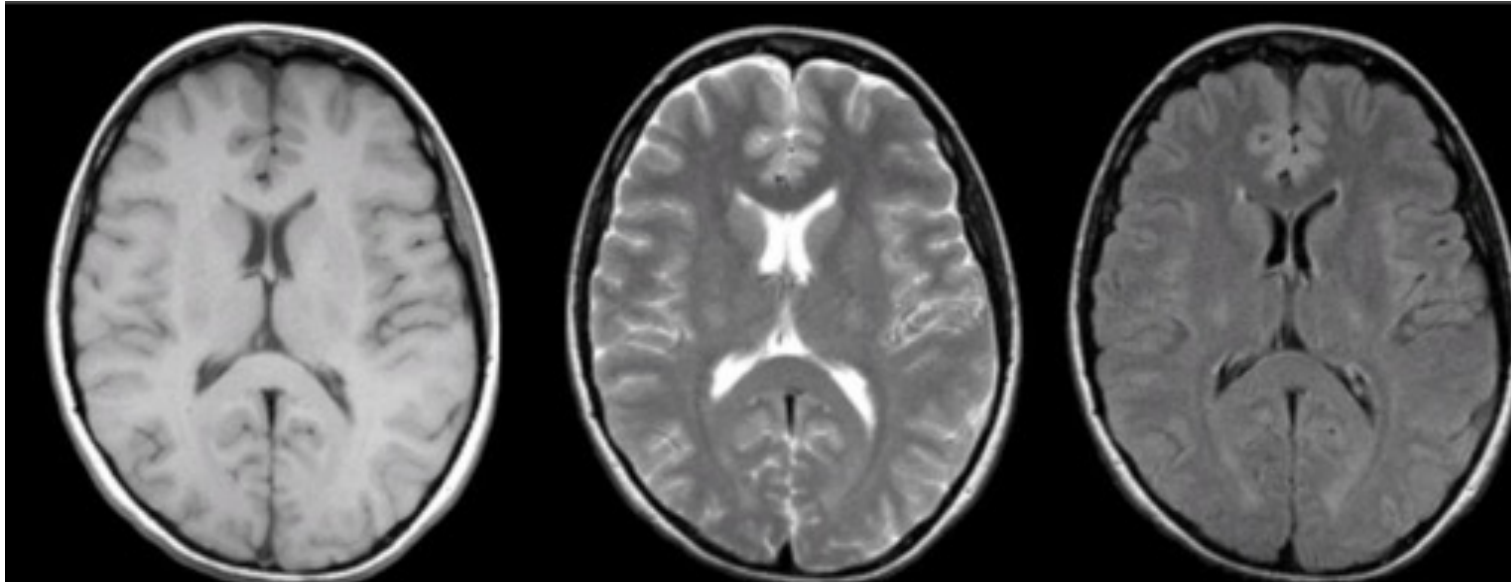
Periventricular:  
Parenchymal:

# APPROACH TO FOREIGN BODY



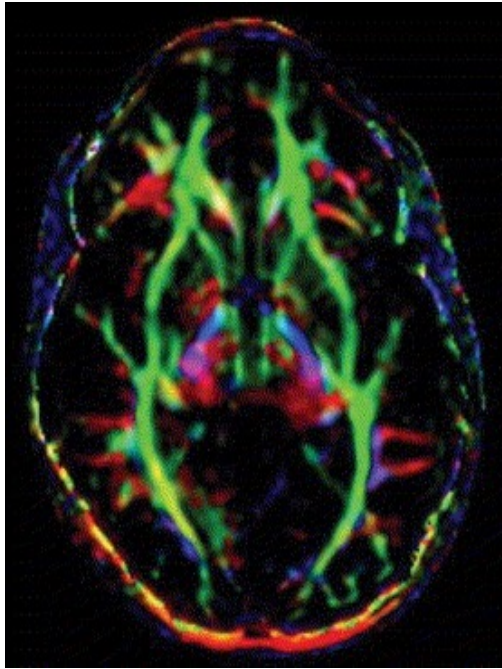
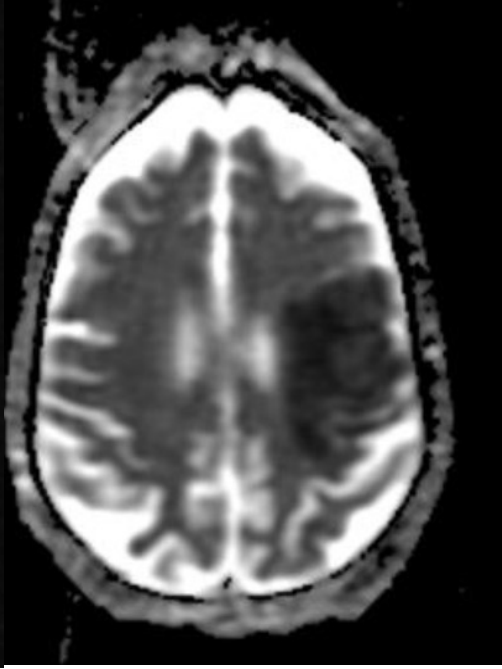
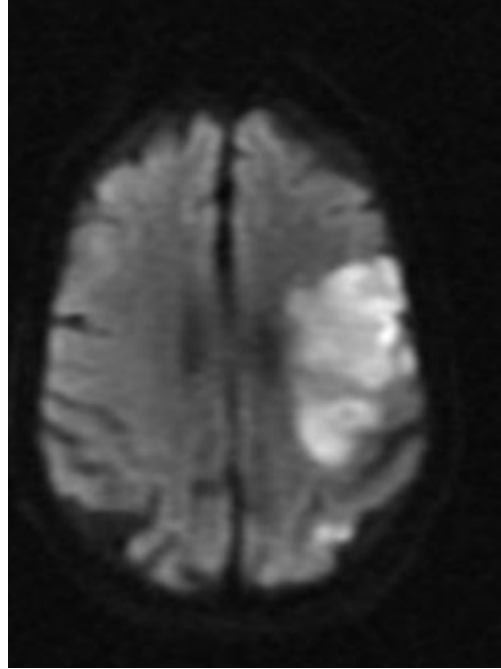
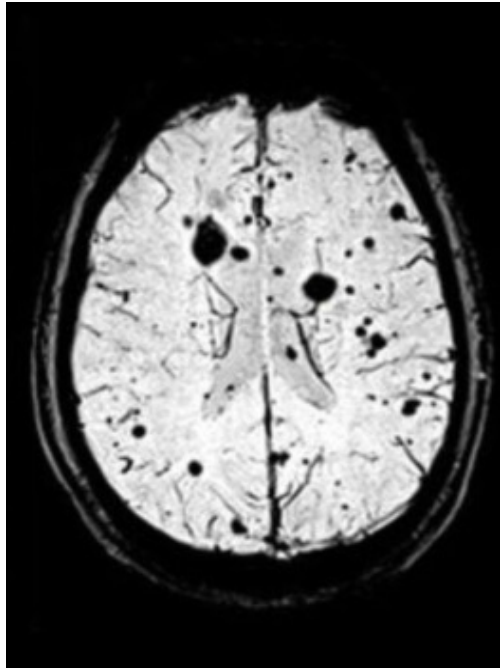


# MRI



SEQUENCE			
FLUID			
GRAY MATTER			
WHITE MATTER			
FAT			

# MRI SEQUENCES



# THUMB RULES-MRI

CNS

SPINE

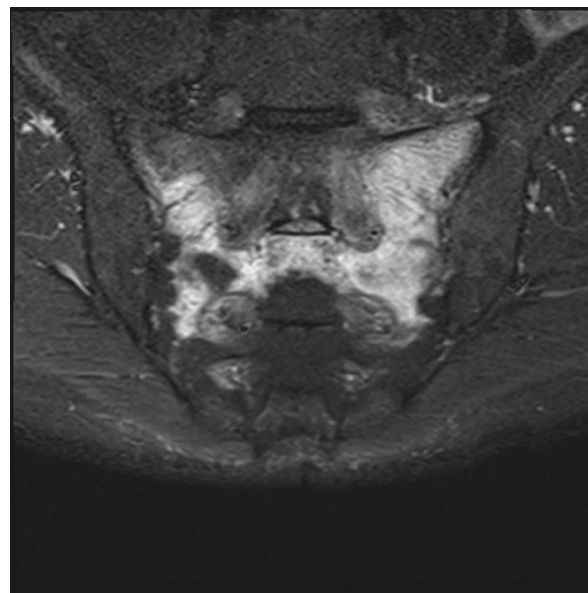
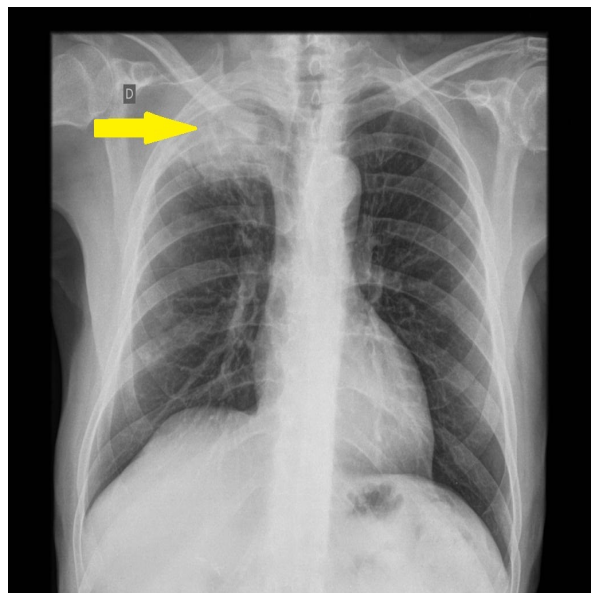
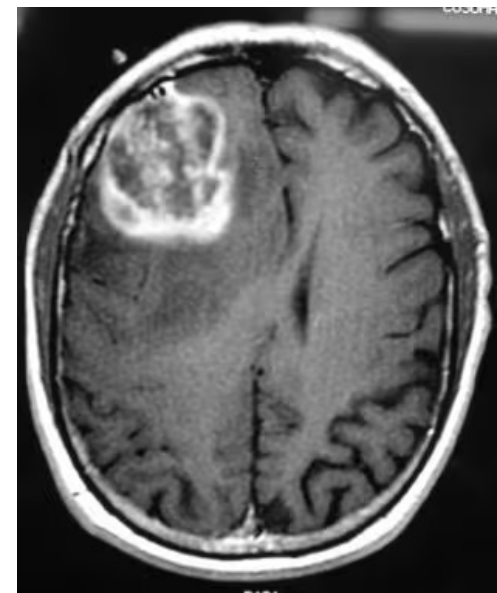
NERVES

BM EDEMA

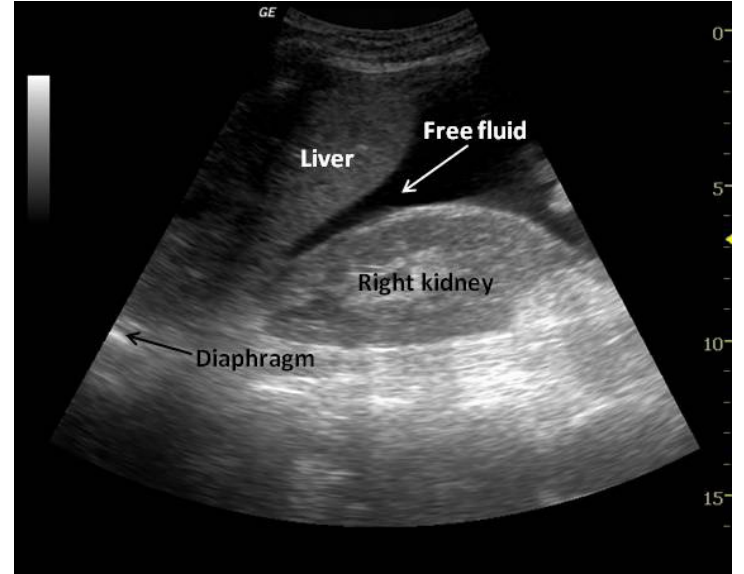
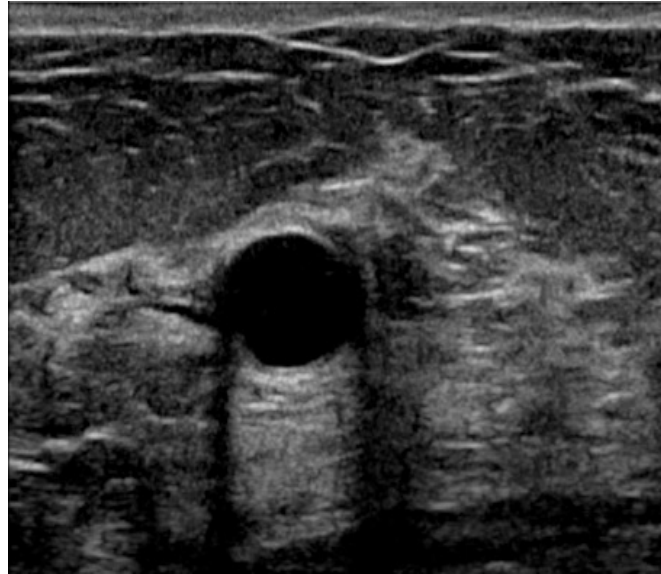
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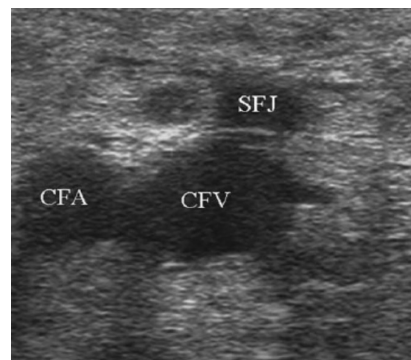
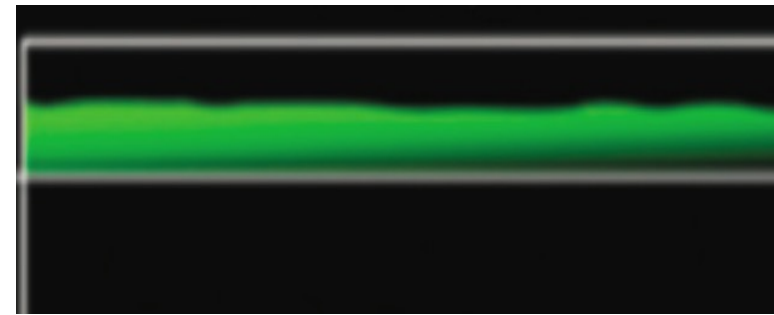
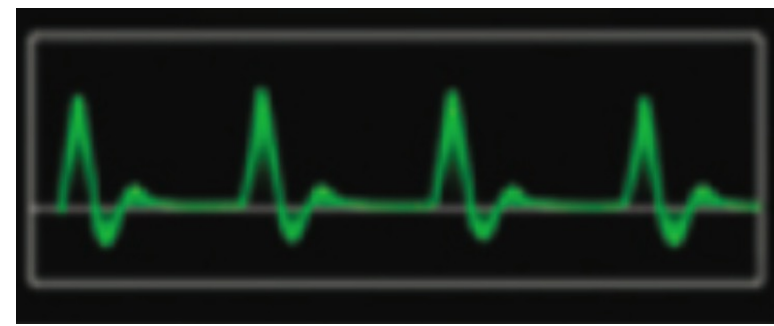
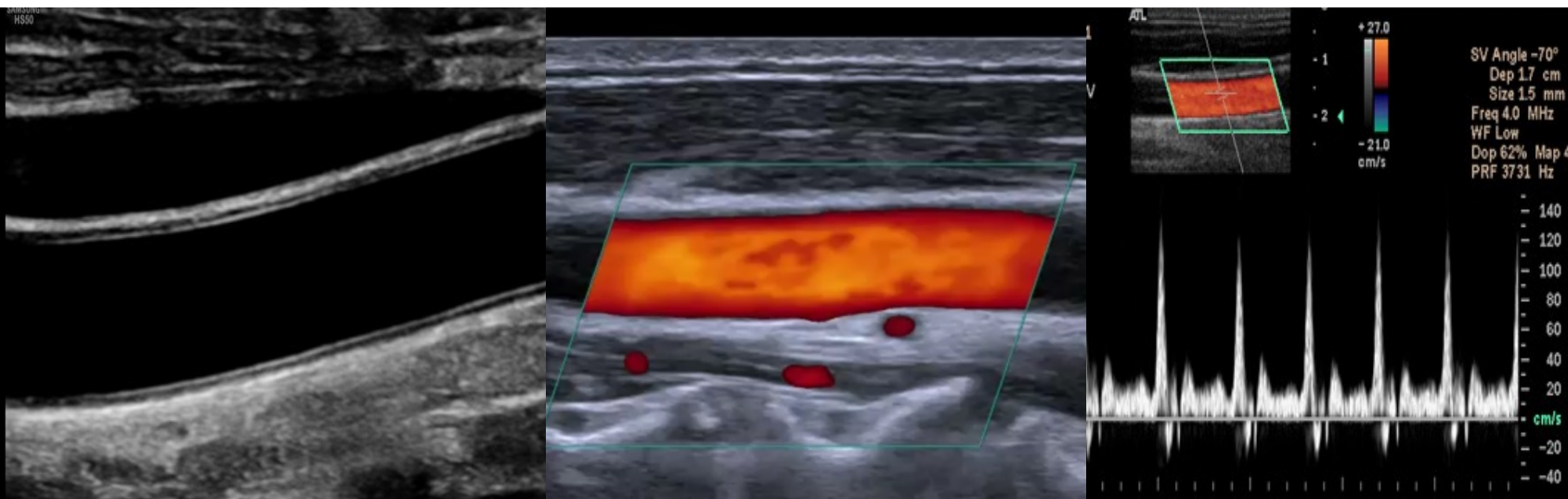
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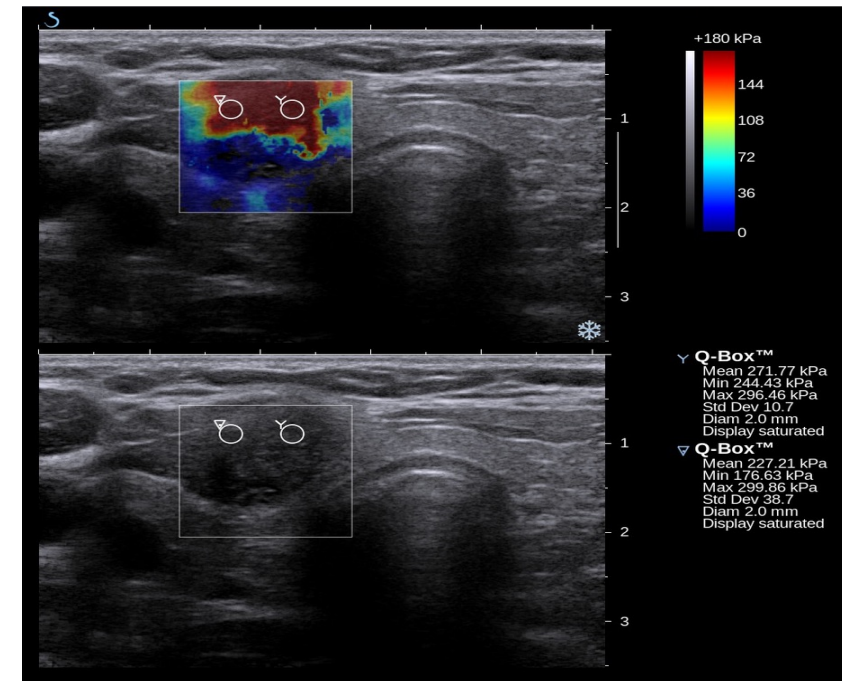
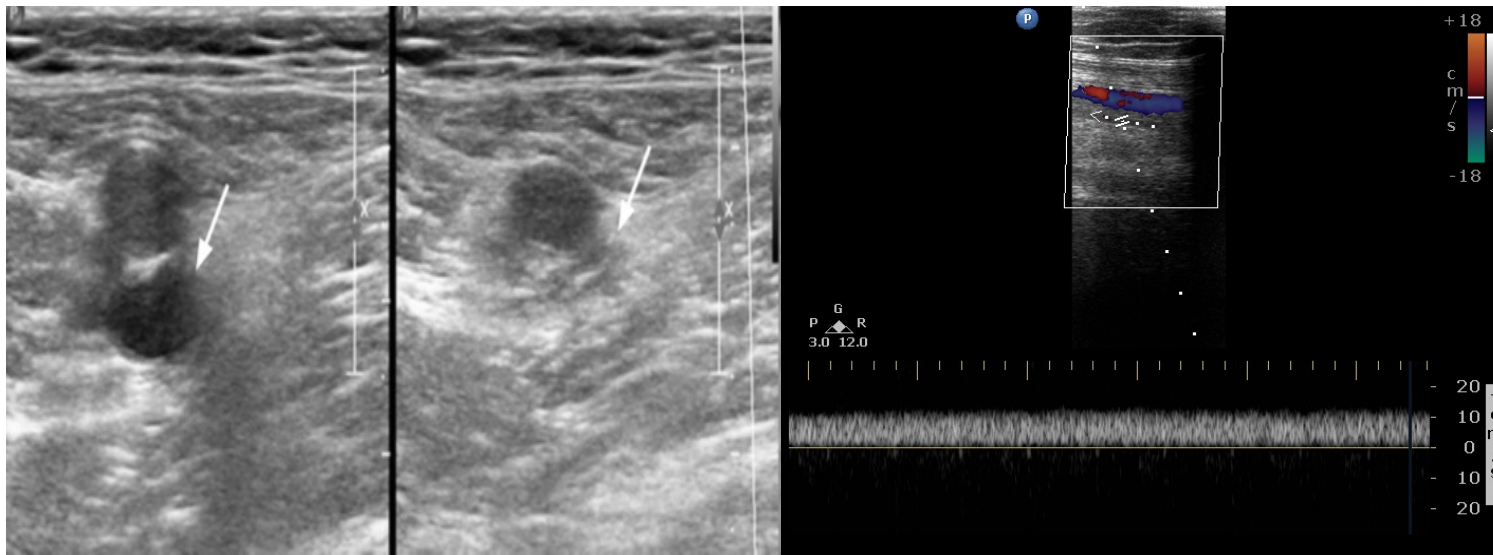
SOFT TISSUE



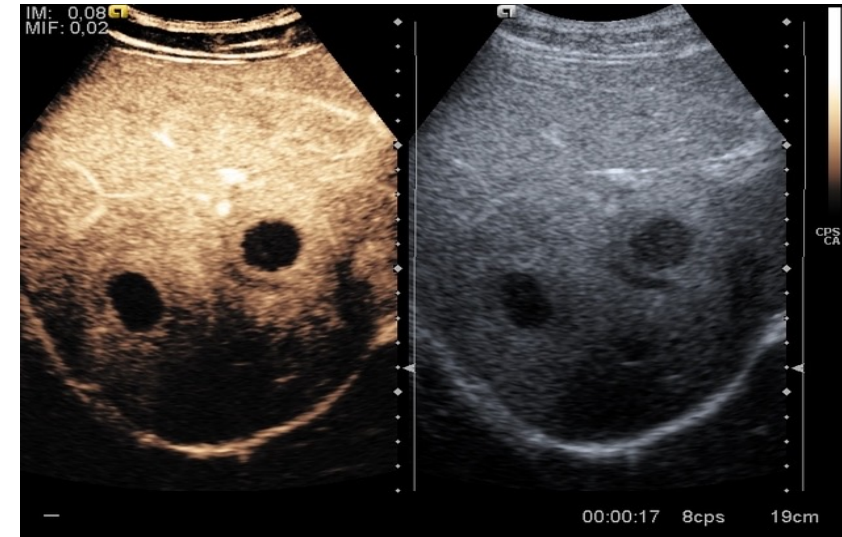
# USG







	NORMAL VEIN	DVT
COMPRESSIBILITY		
FLOW		



# THUMB RULES-USG

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**GALL BLADDER**

**FLUID**

**CYST**

**PREGNANCY**

**DVT**

**VARICOSE VEINS**

**ARTERIAL**

**DISEASES**

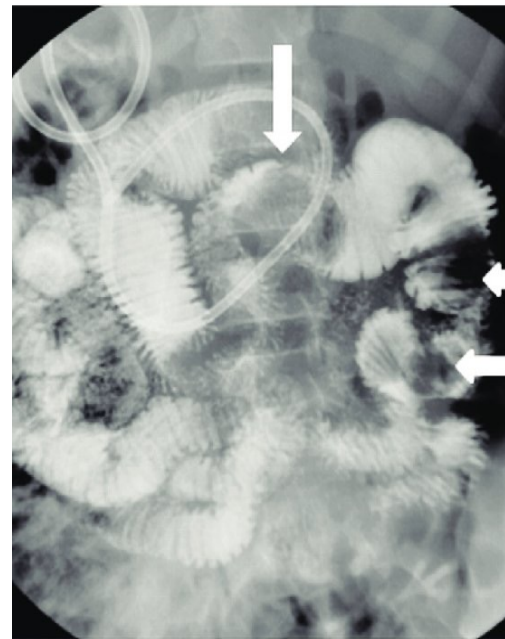
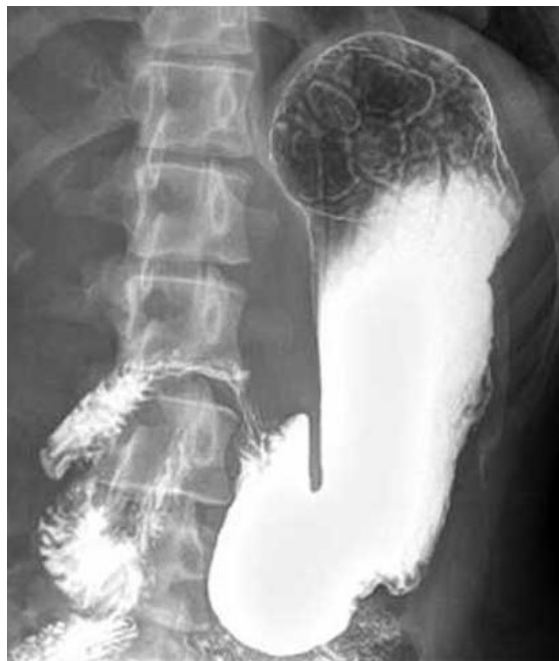
# CONTRAST MEDIA

Contrast media	Modality	Route	Pre-requisite	Complication
IODINATED CONTRAST				
GADOLINIUM				
SONOVUE				
BARIUM SULFATE				

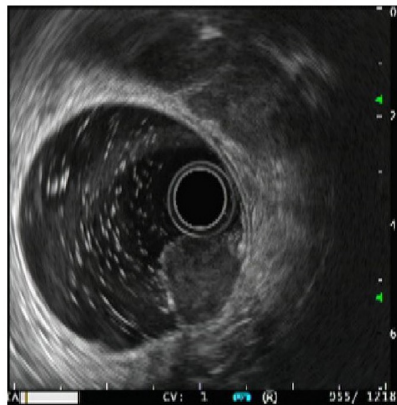
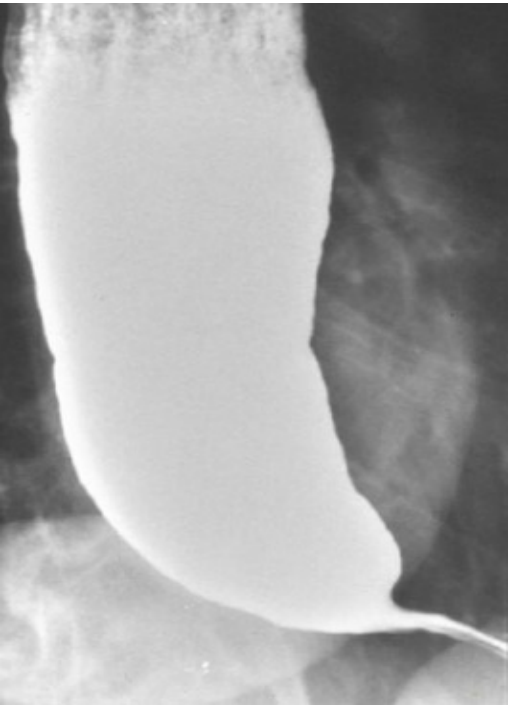
# **GI and HBP RADIOLOGY**

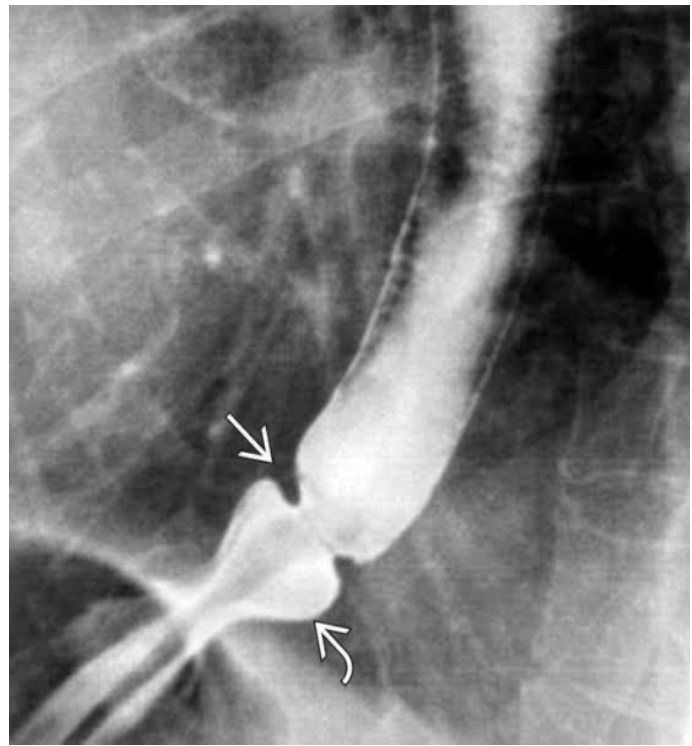
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# BARIUM PROCEDURES

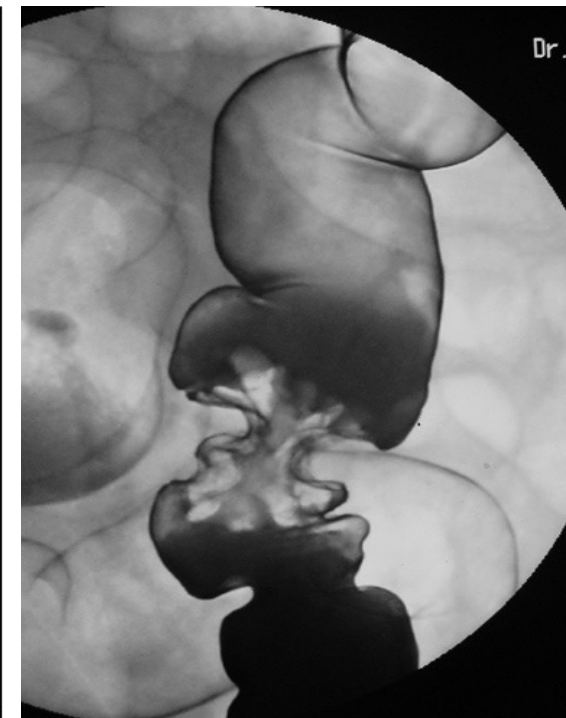
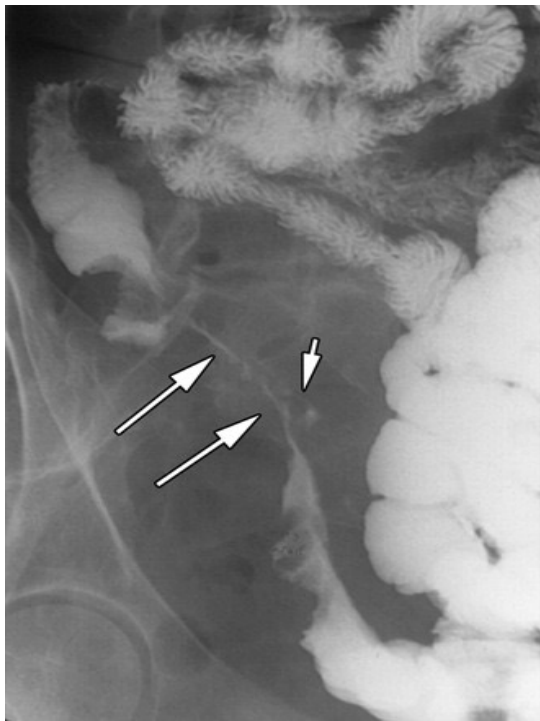


# ESOPHAGEAL PATHOLOGIES

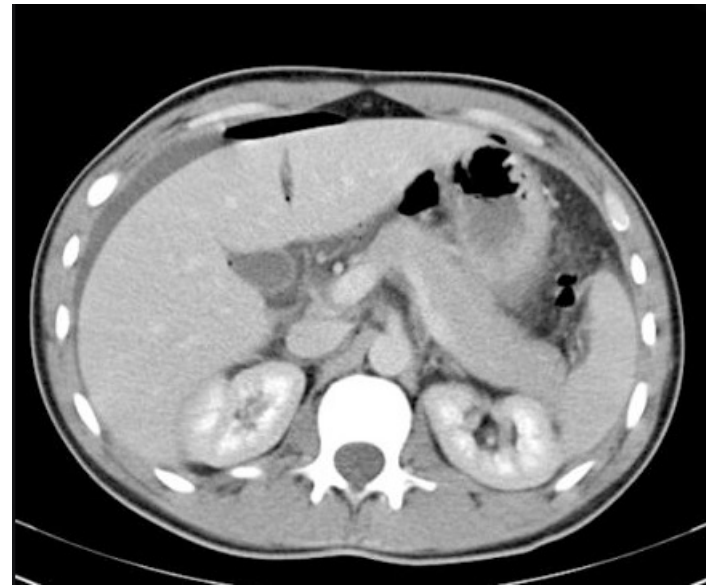




# IMPORTANT BARIUM SIGNS



# PNEUMOPERITONEUM



# APPROACH TO INTESTINAL OBSTRUCTION

Pain abdomen + Obstipation + Abdominal distension + Vomiting

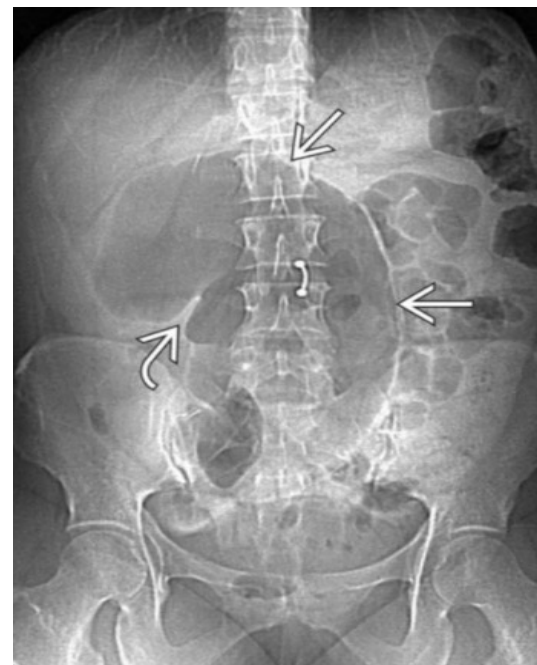


	SBO	LBO
MC Cause		
Distribution		
Diameter		
Valvulae conniventes		
Stepladder sign		
Haustra		
Mx		



Paralytic ileus:

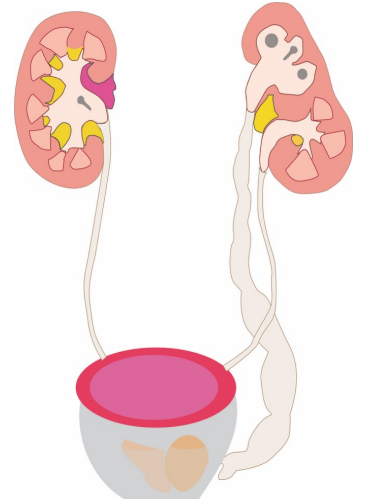
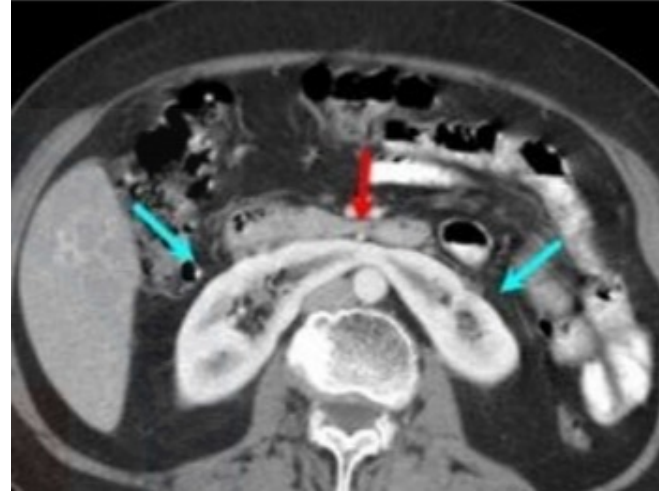
# SIGMOID VS CECAL VOLVULUS



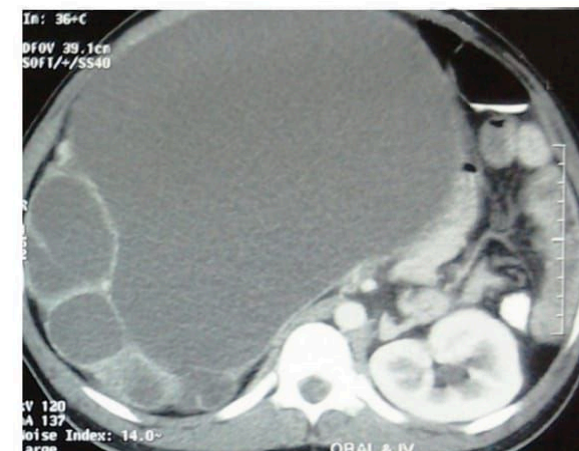
# GU RADIOLOGY

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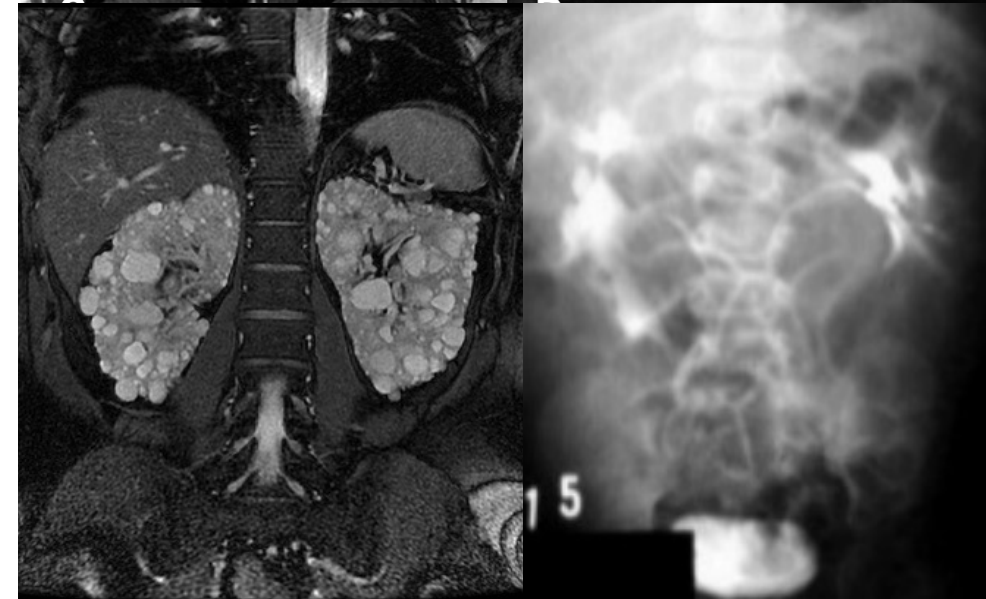
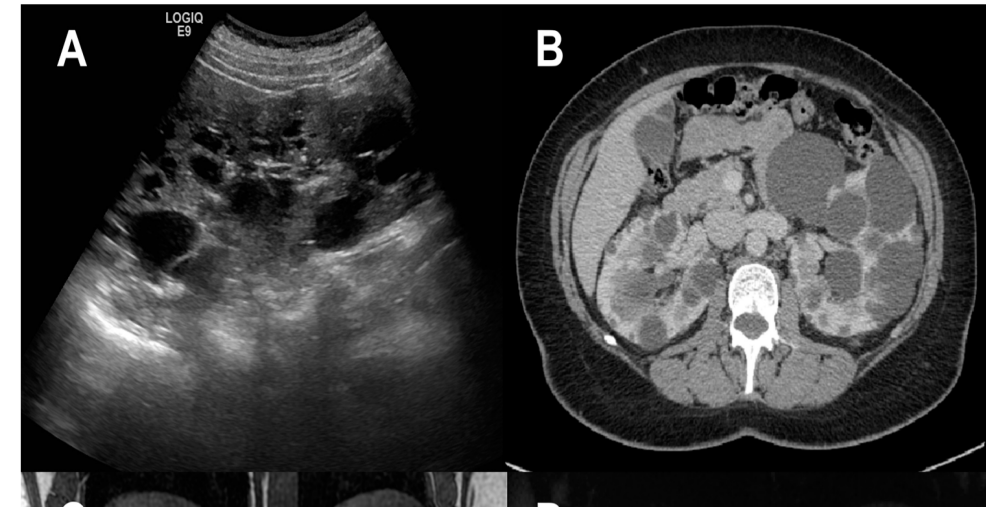
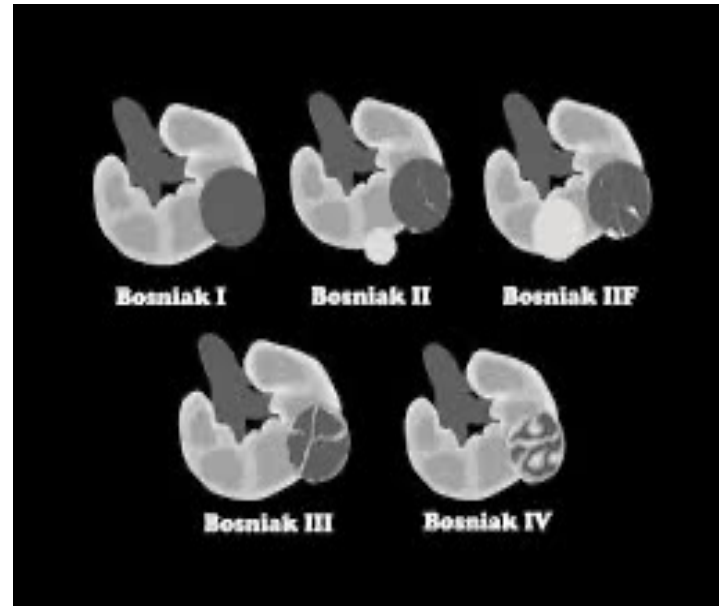
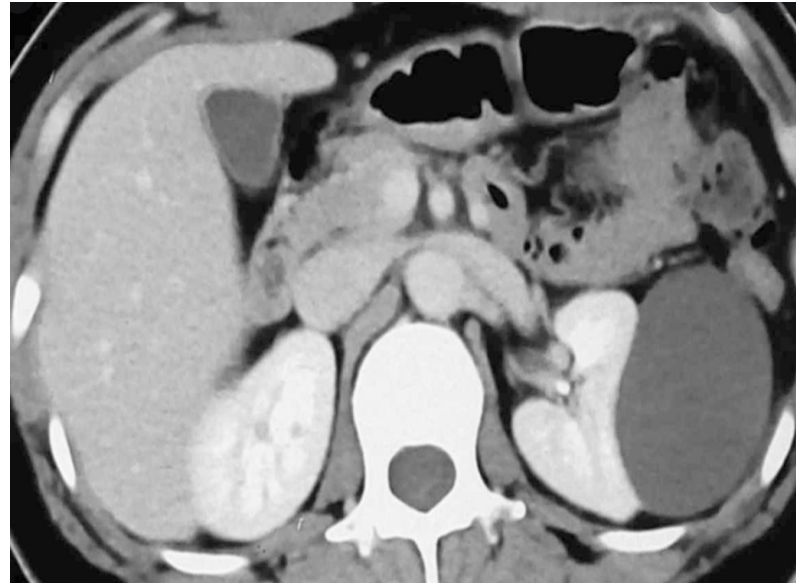
# IVP



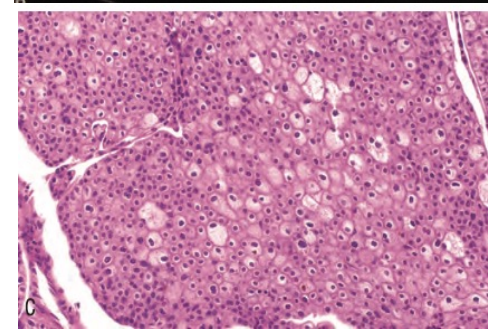
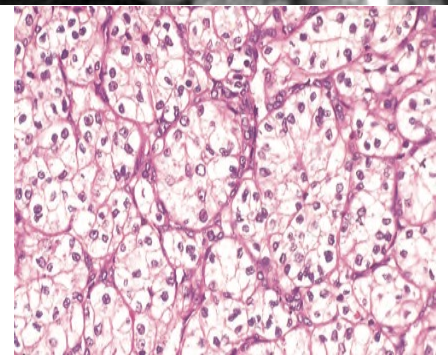
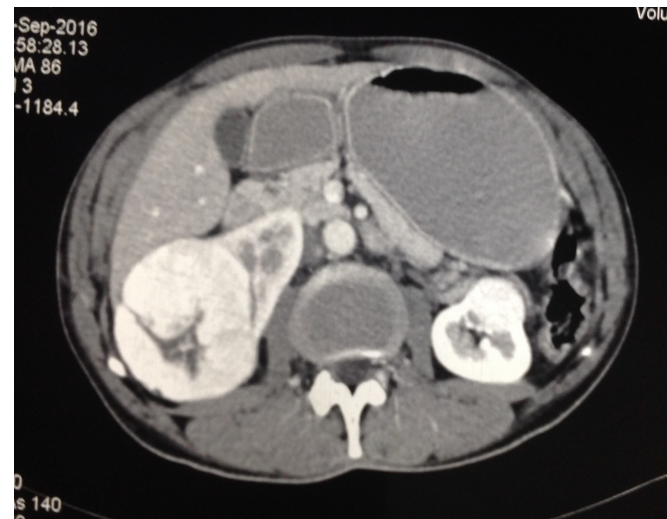
# 'WHITE KIDNEY'-PATTERN APPROACH



# RENAL CYSTS



# RENAL MASSES



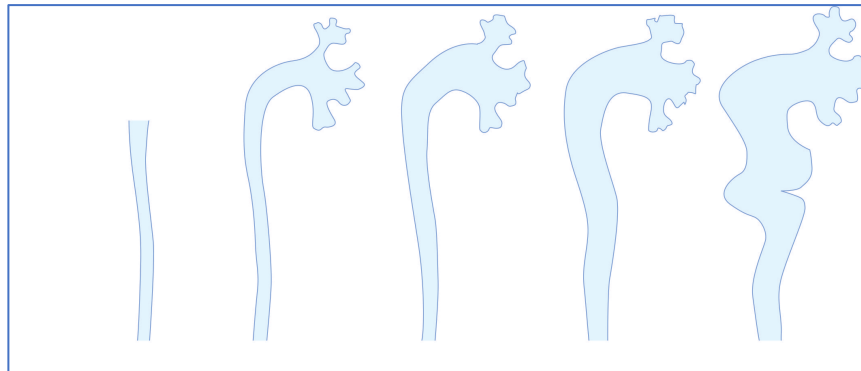
Cerebellar hemangioblastoma, Pheochromocytoma

Lung cysts, fibrofolliculomas

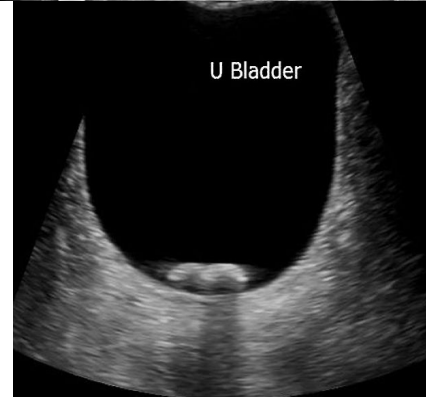
Seizures, adenoma sebaceum

RP hemorrhage:

# MCU



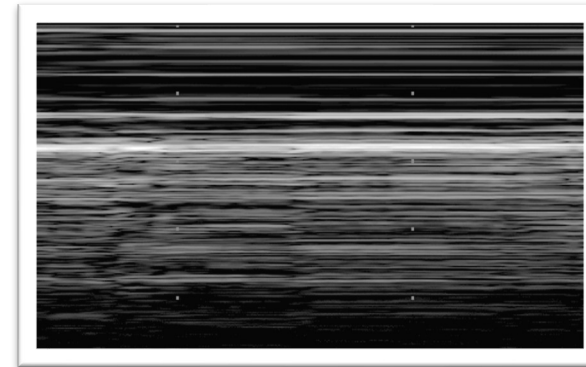
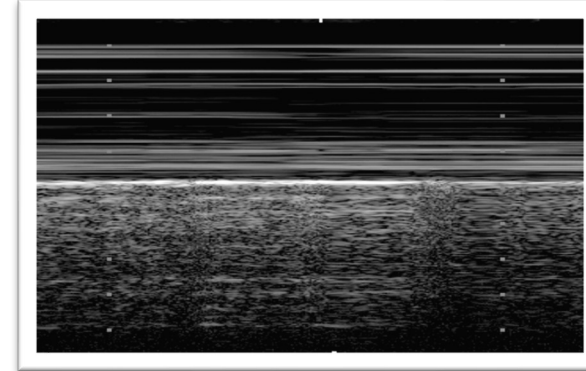
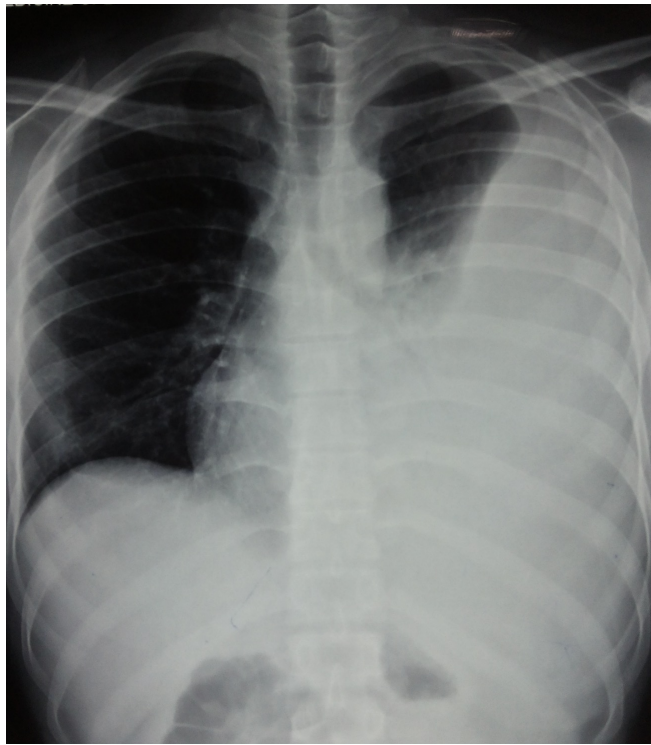
# UB PATHOLOGIES



# THORACIC RADIOLOGY

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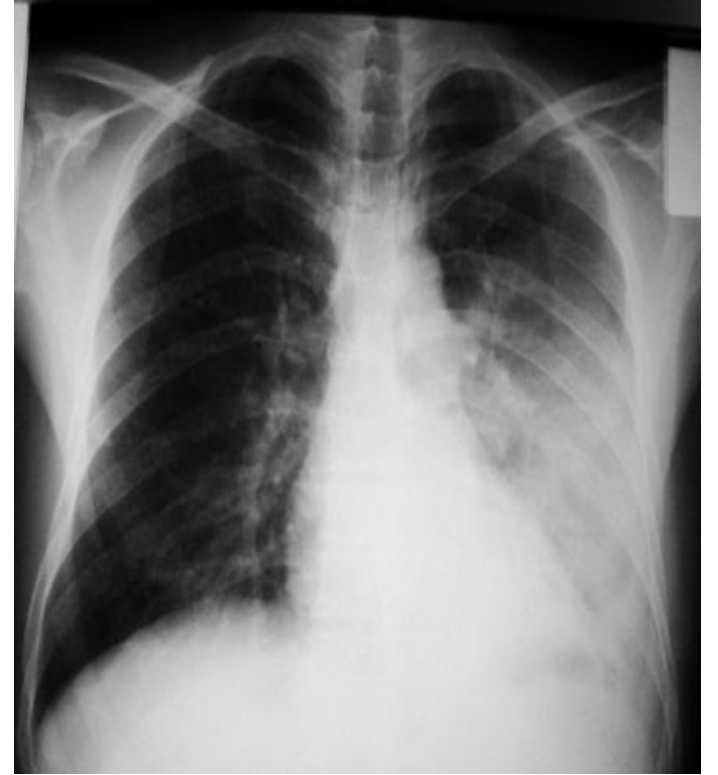
# PLEURAL EFFUSION



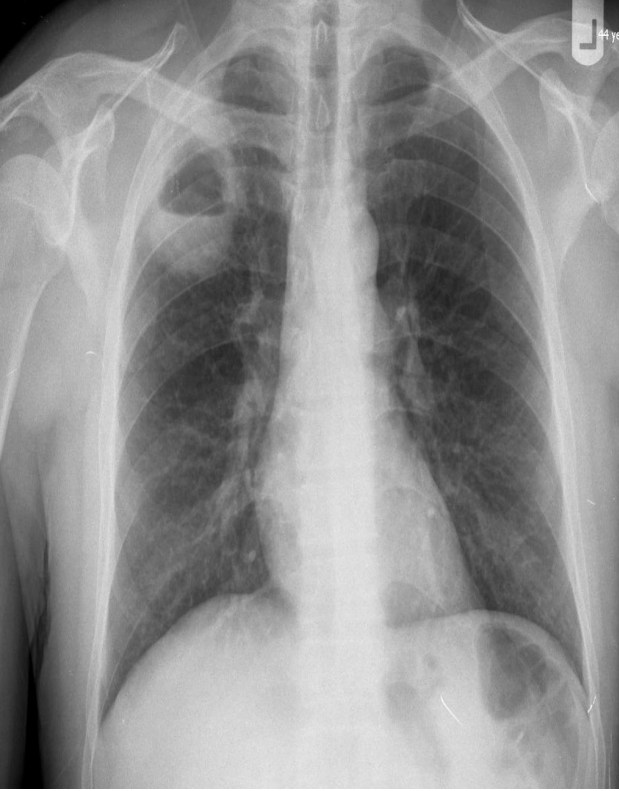
**SIGN:**  
**EARLIEST FINDING:**  
**MEDIASTINAL SHIFT:**  
**MOST SENSITIVE IX:**  
**MOST SENSITIVE XRAY:**

**MEDIASTINAL SHIFT:**  
**MOST SENSITIVE IX:**  
**MOST SENSITIVE XRAY:**

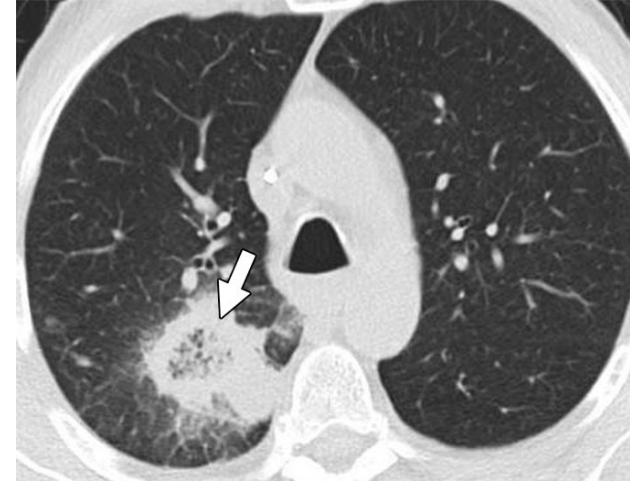
# APPROACH TO OPAQUE HEMITHORAX



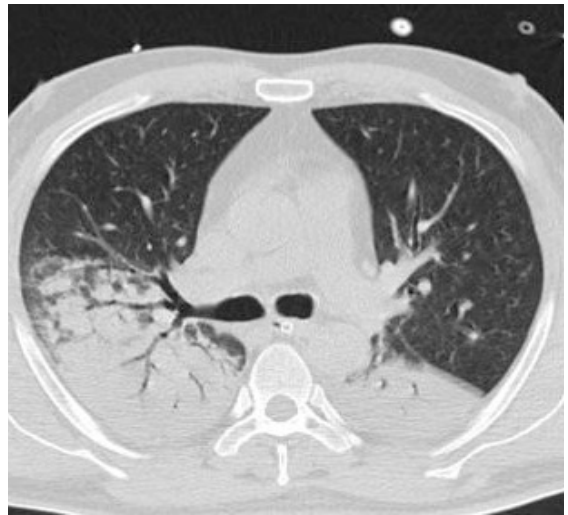
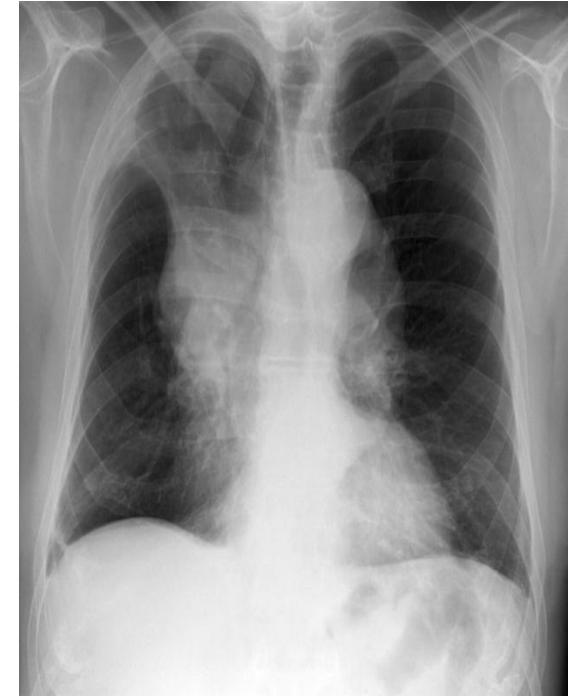
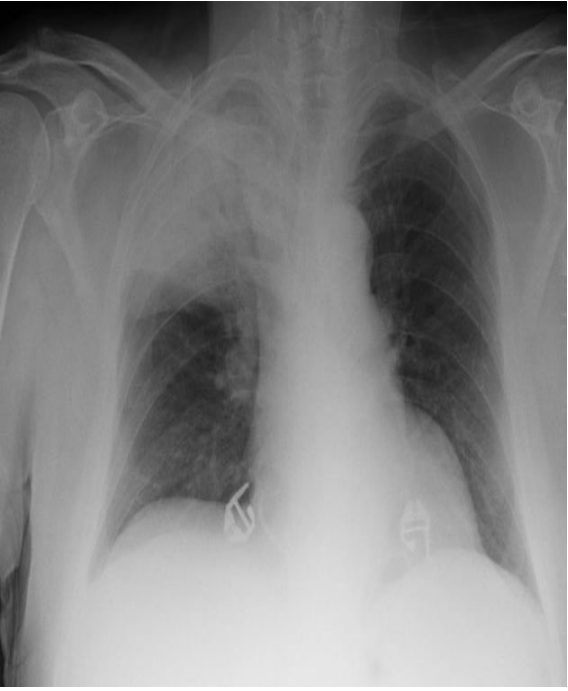
# AIR-FLUID LEVELS



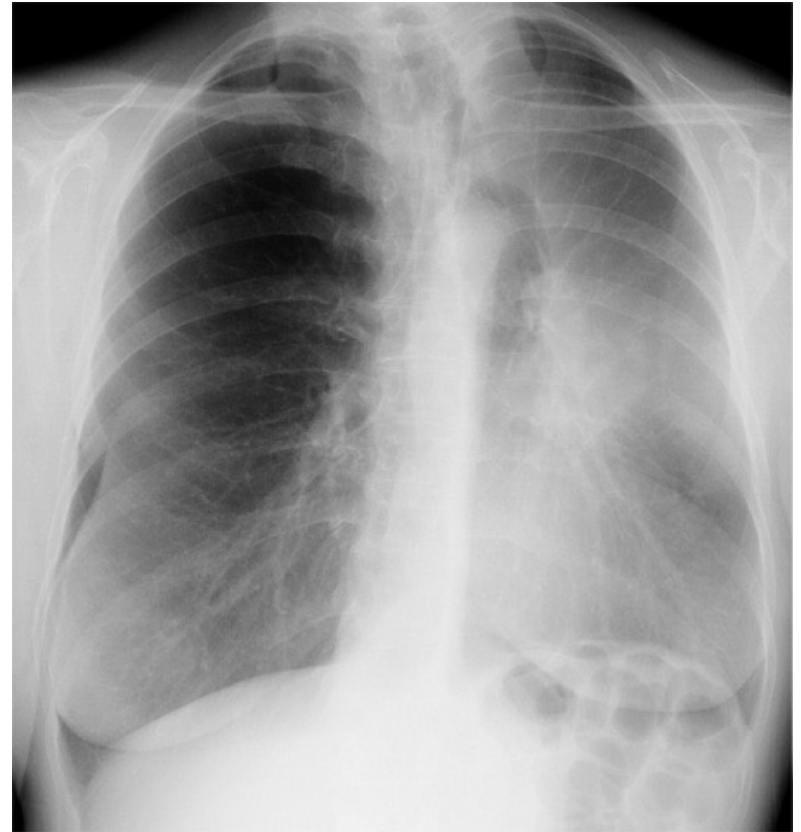
# ASPERGILLUS



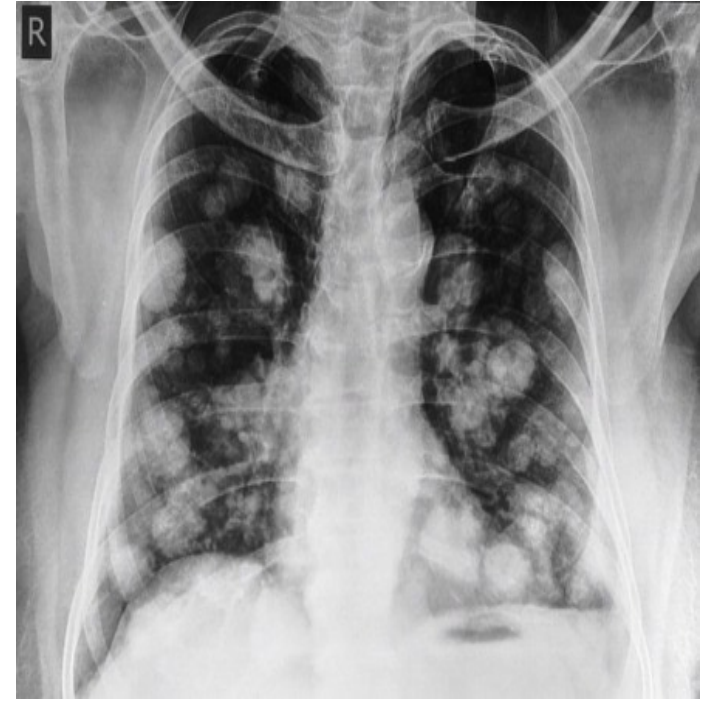
# CONSOLIDATION VS COLLAPSE



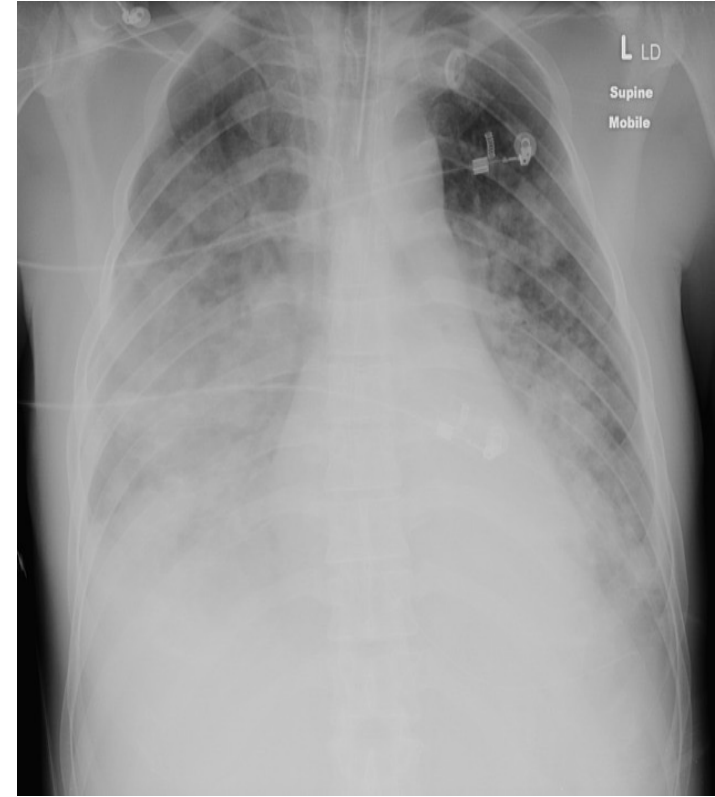
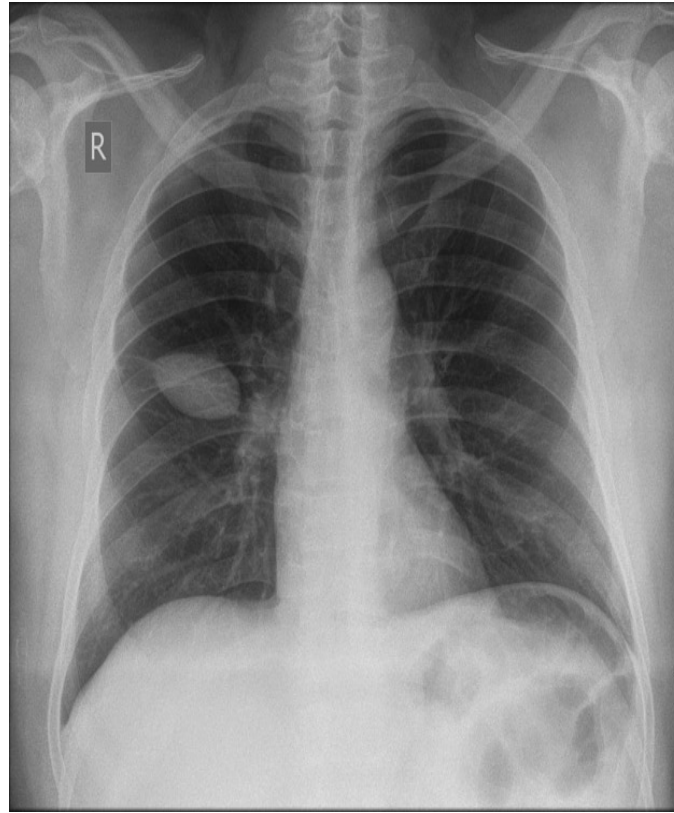
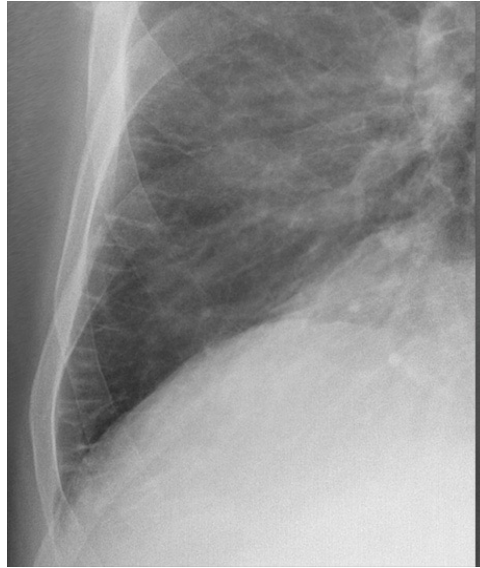
# SILHOUETTE SIGN



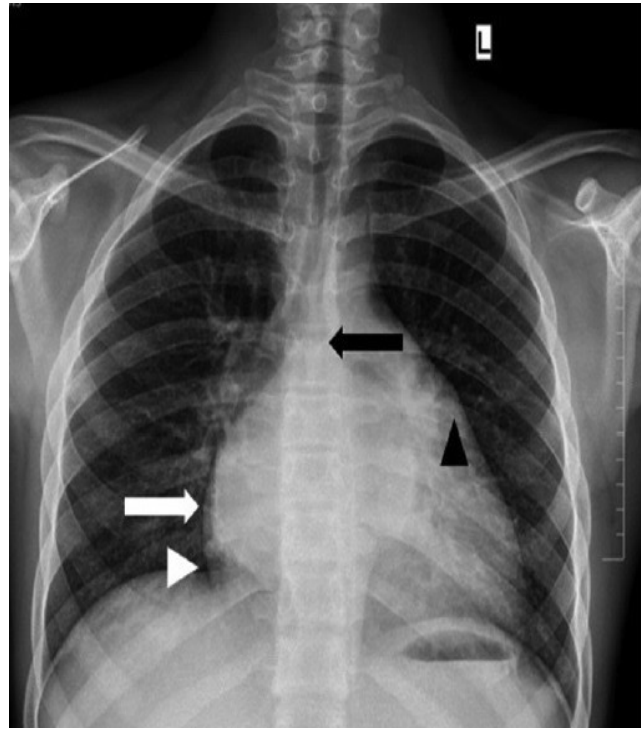
# MISCELLANEOUS



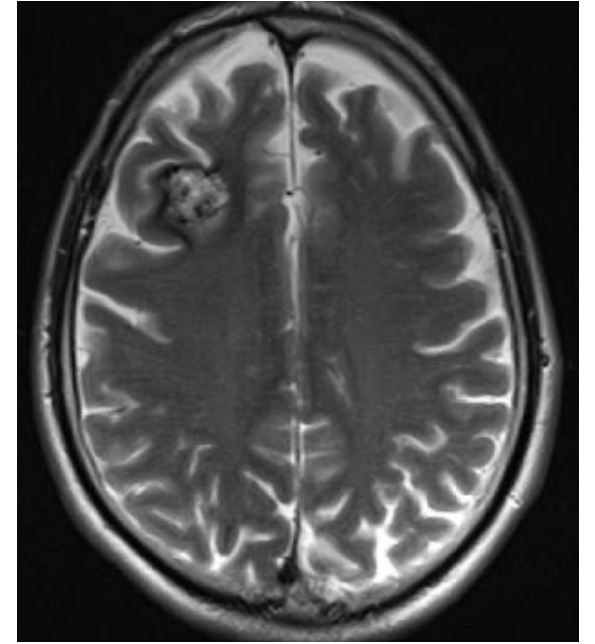
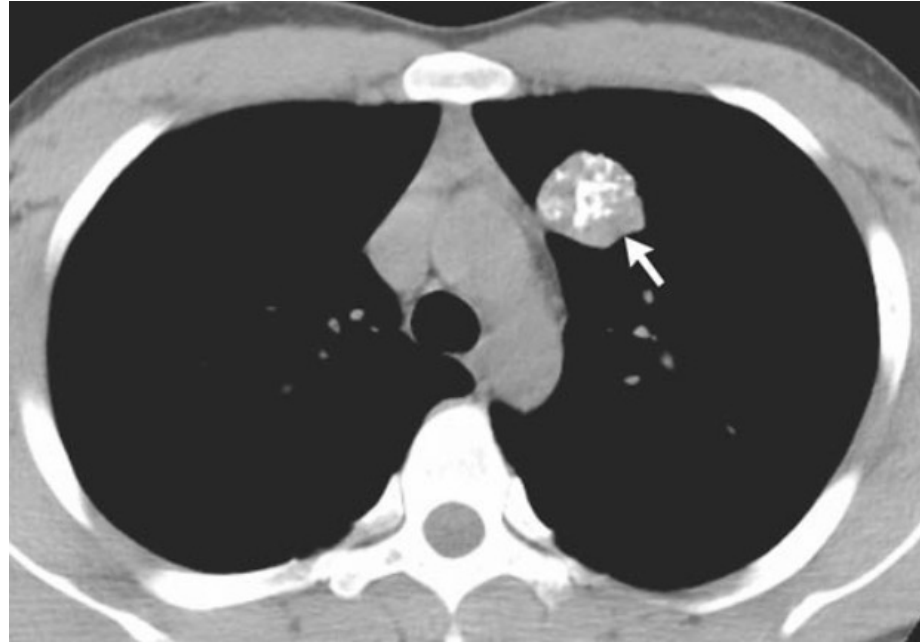
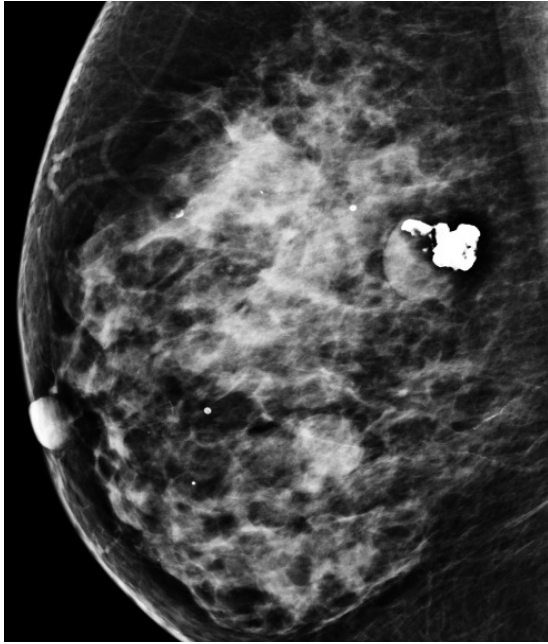
# PULMONARY EDEMA



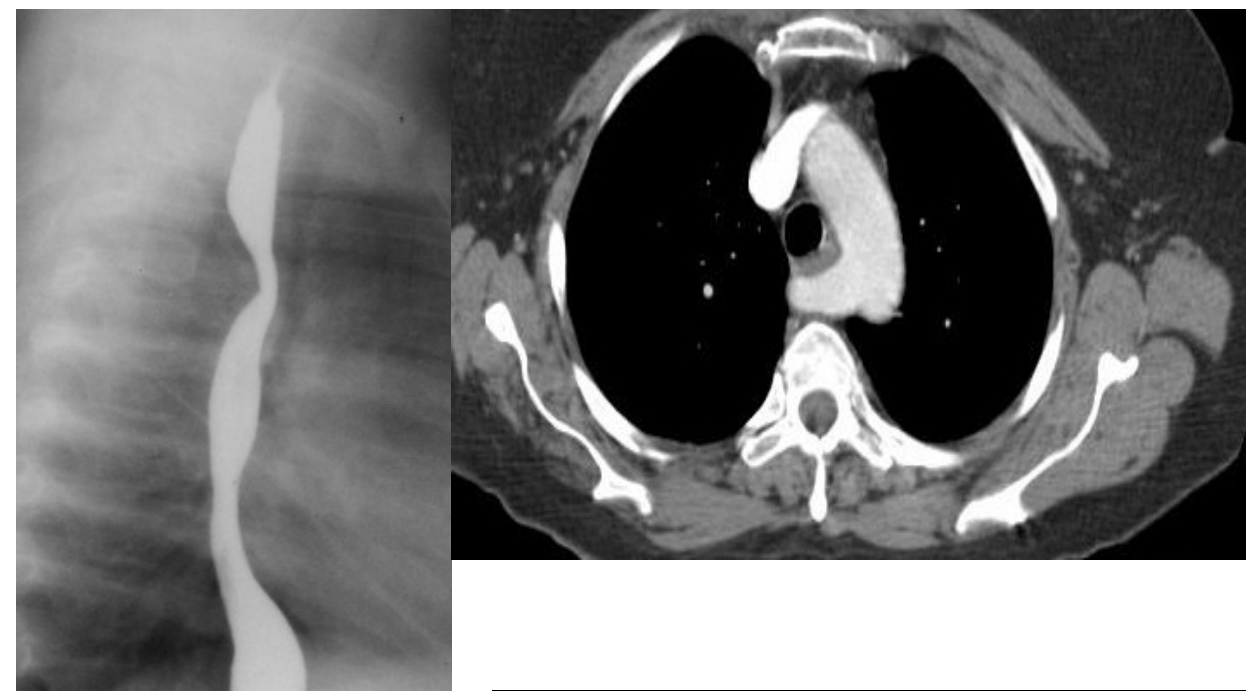
# CARDIAC SILHOUETTE



# POPRCORN SIGN



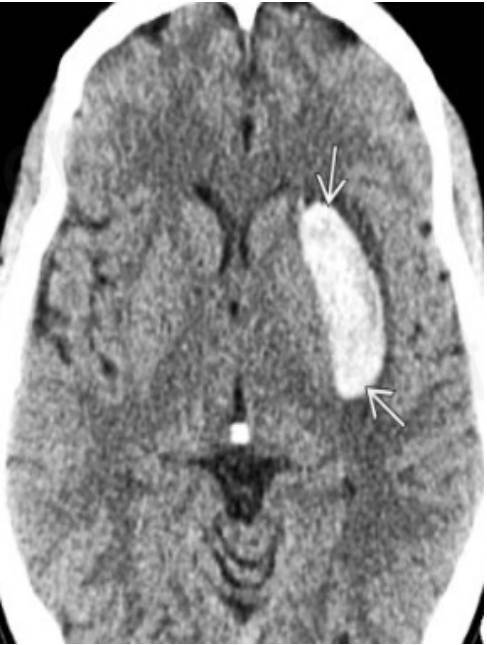
# SPOTTERS



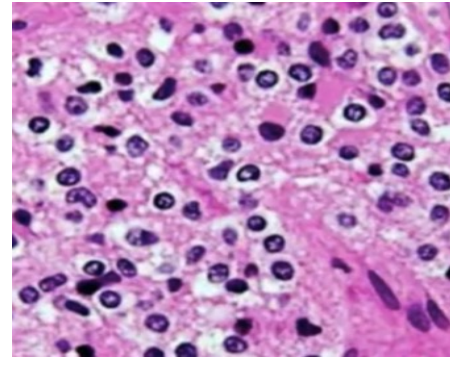
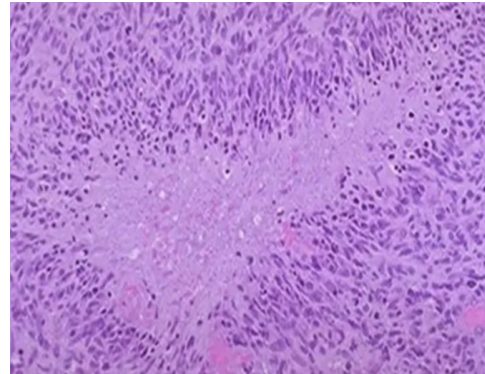
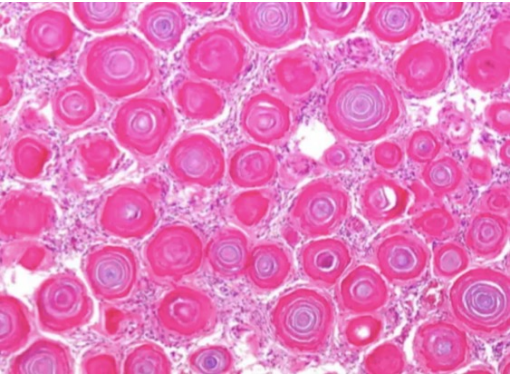
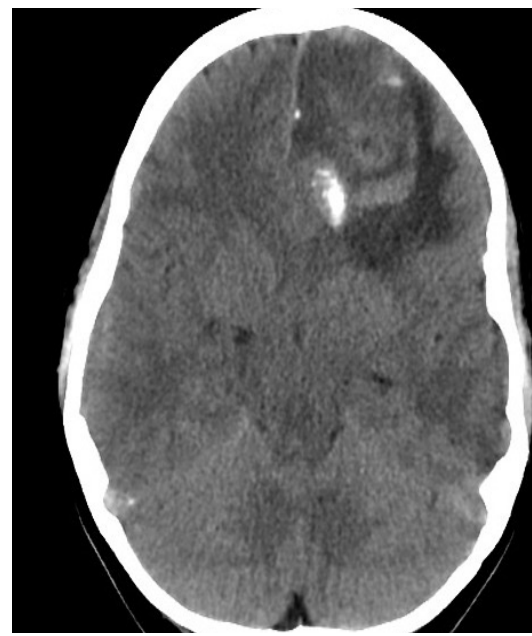
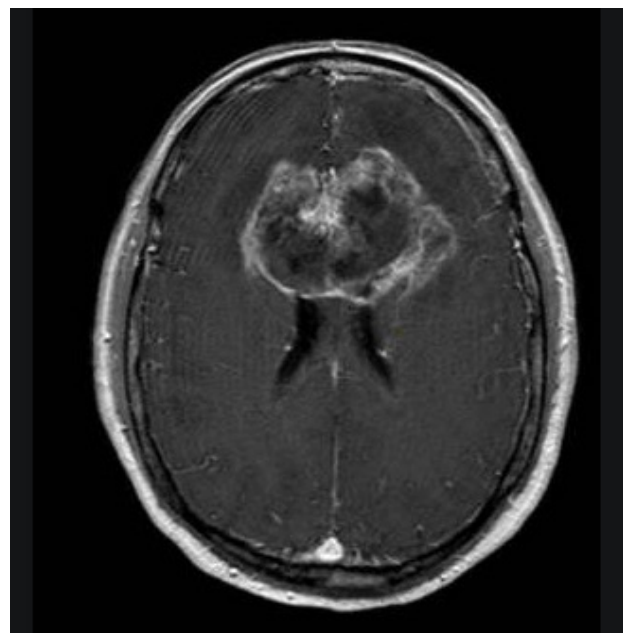
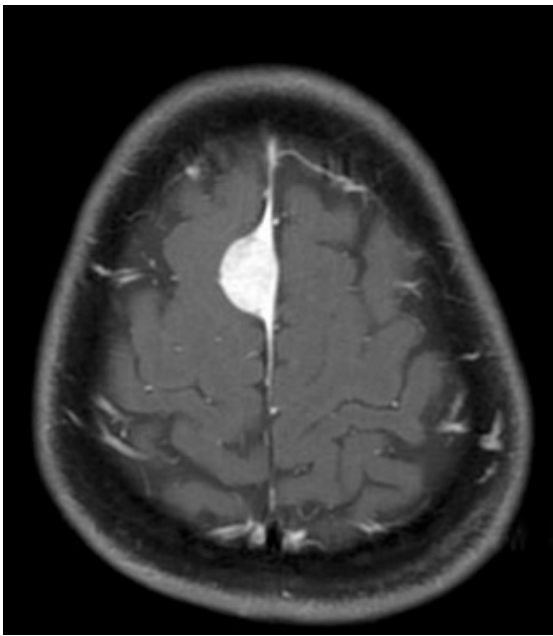
# NEURORADIOLOGY

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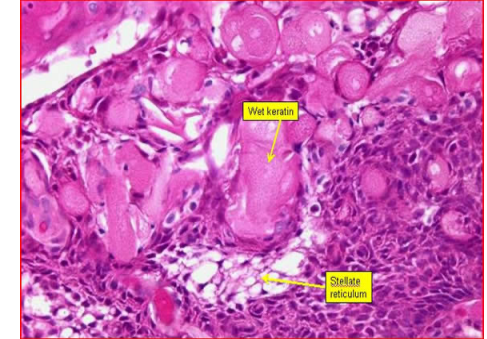
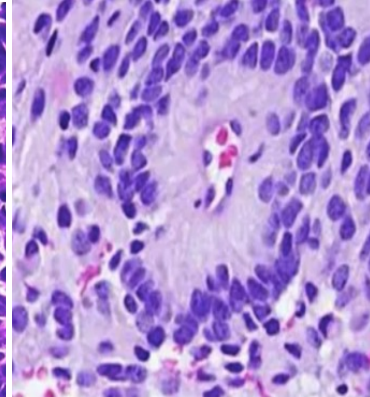
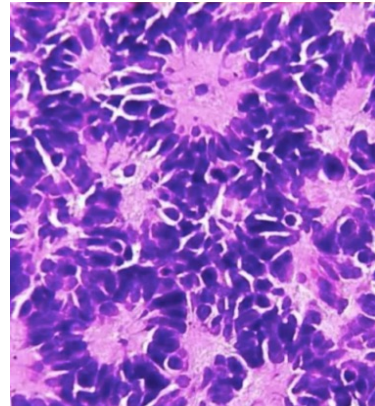
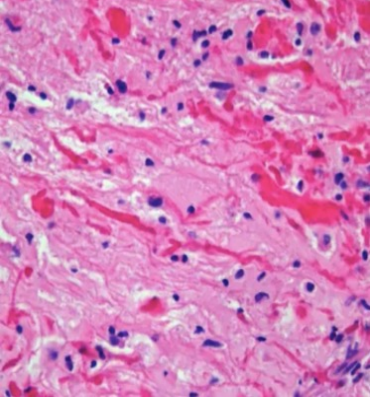
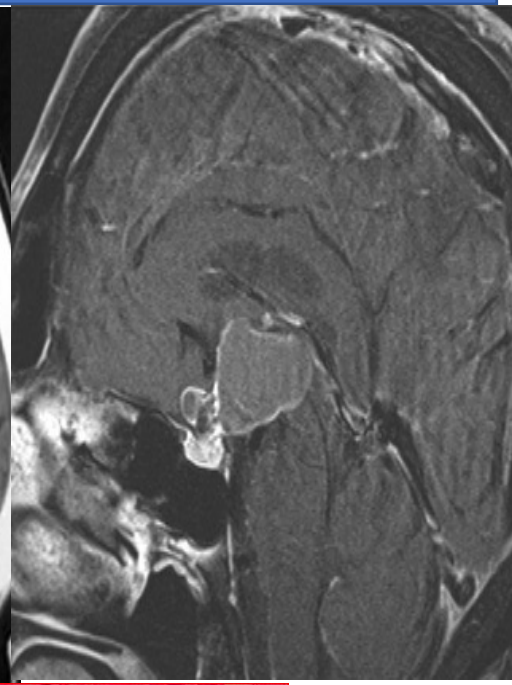
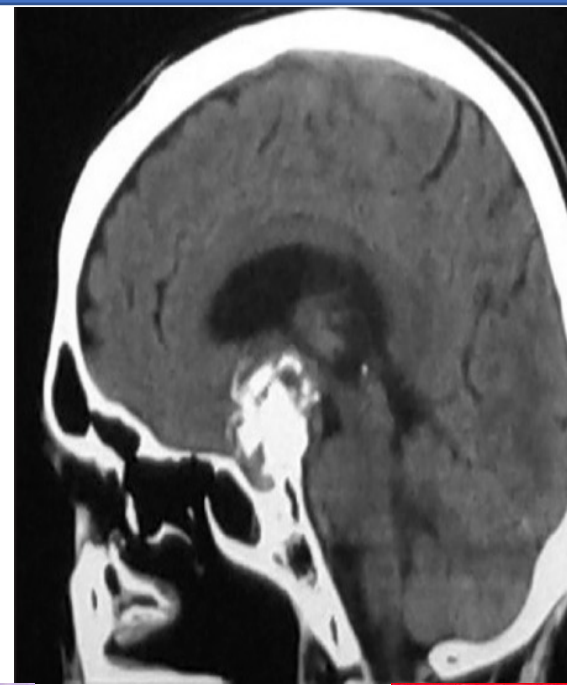
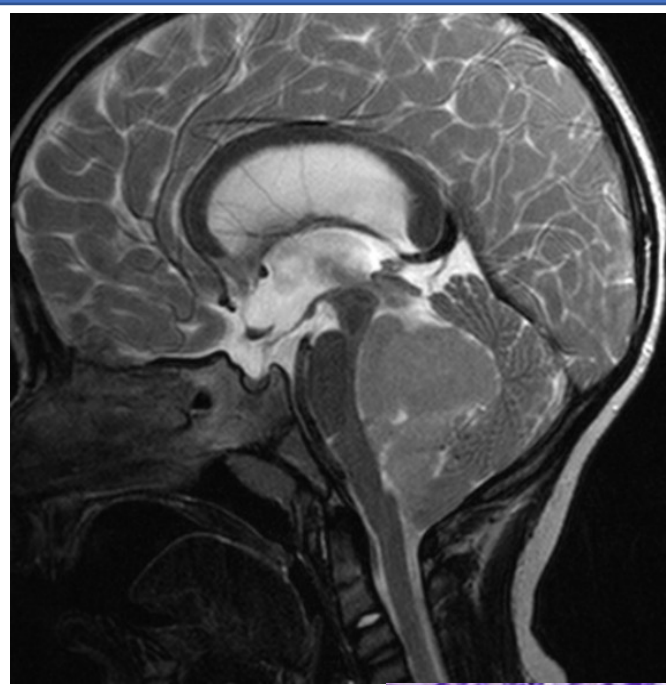
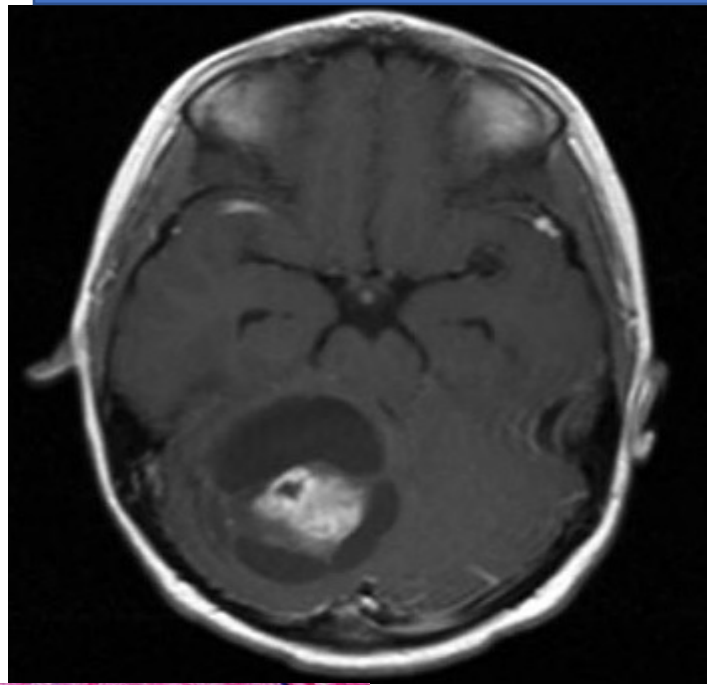
# STROKE



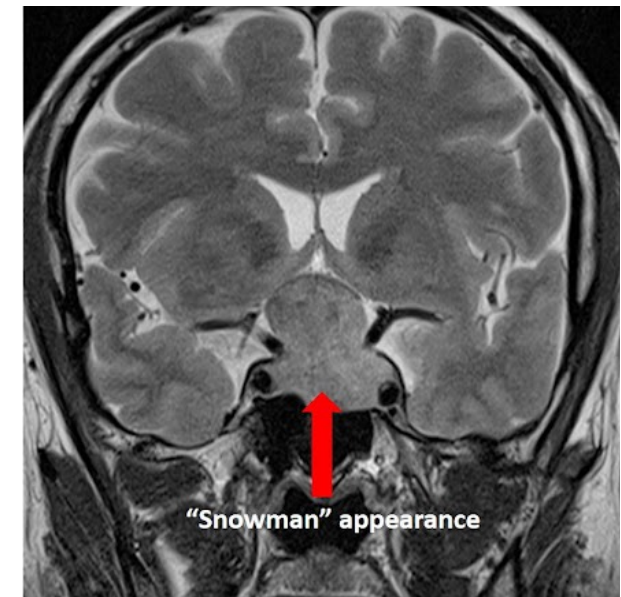
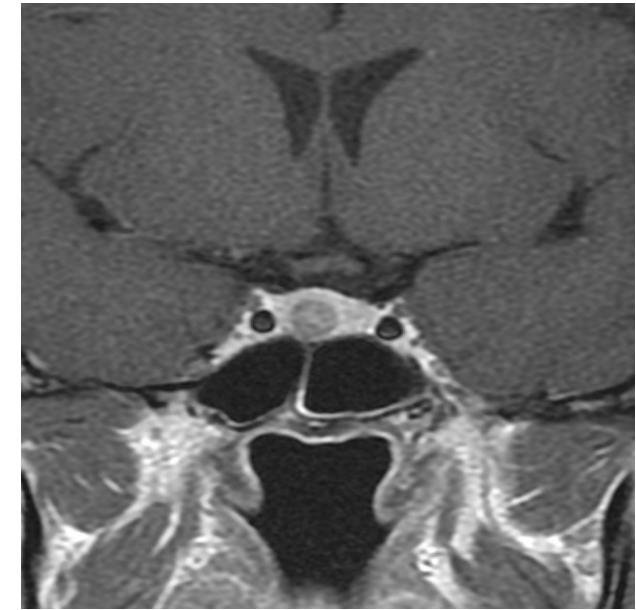
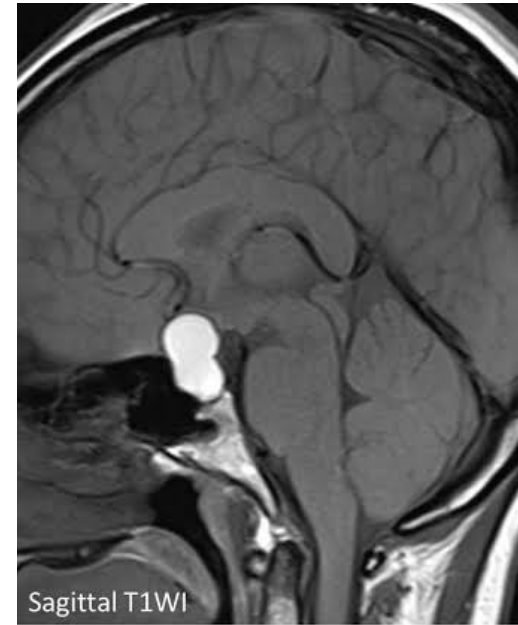
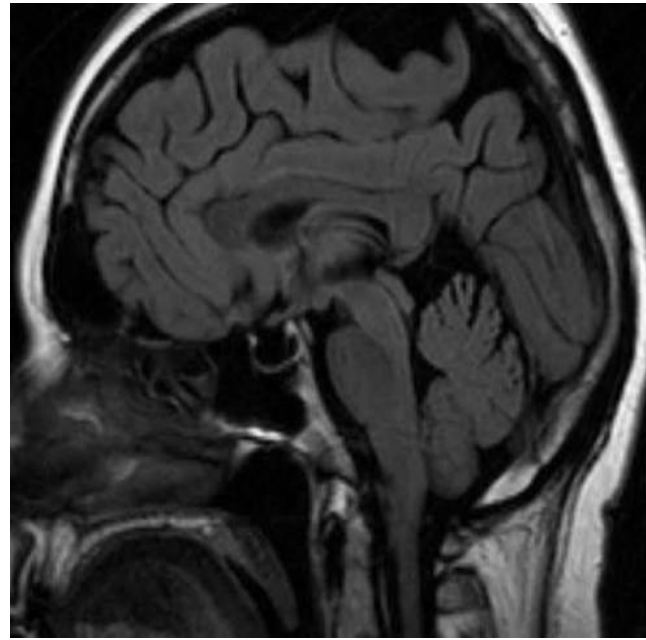
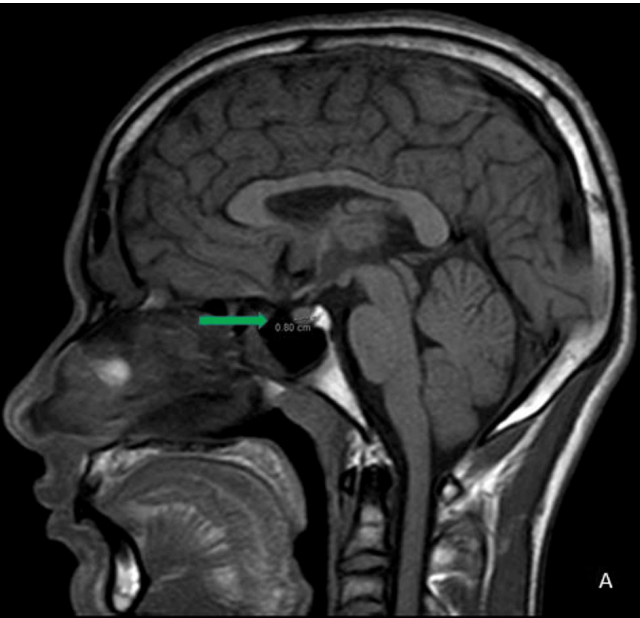
# BRAIN TUMORS IN ADULTS



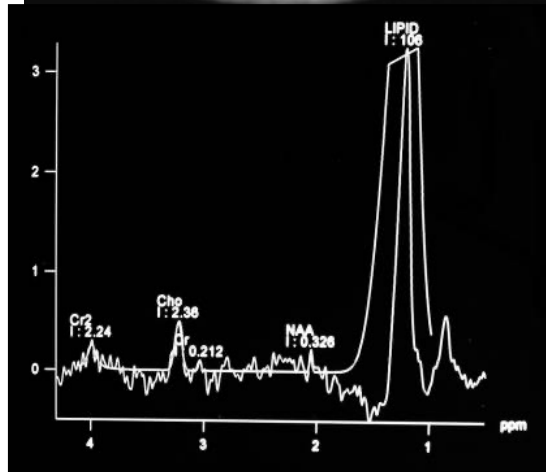
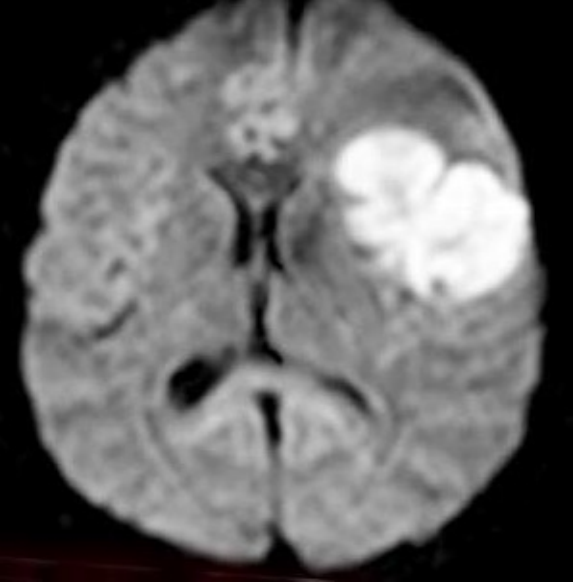
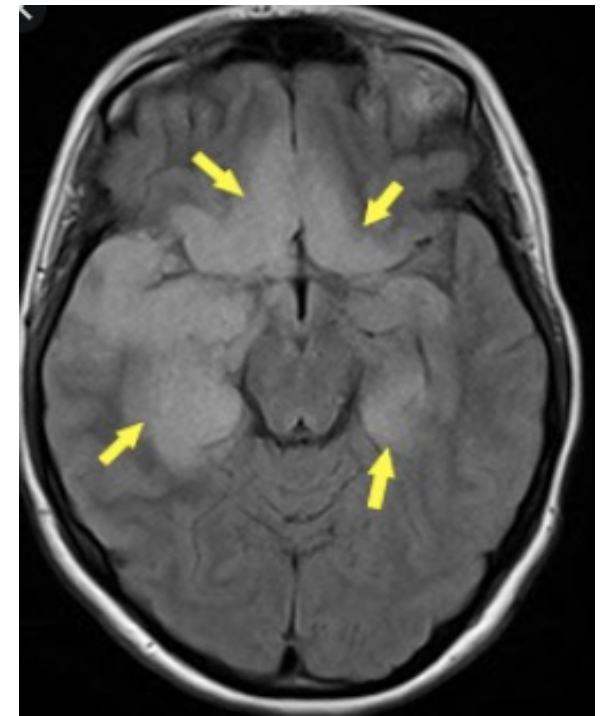
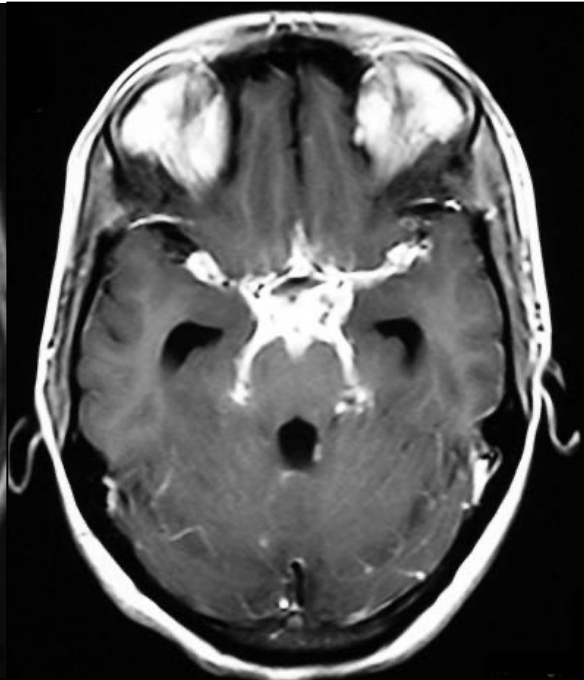
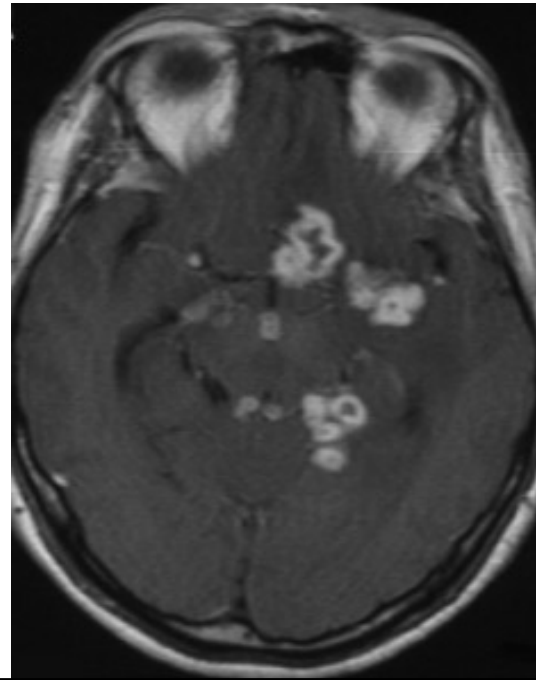
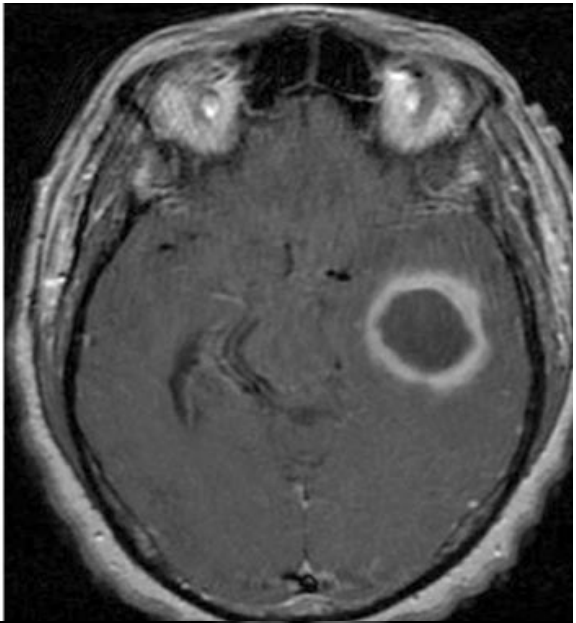
# BRAIN TUMORS IN CHILDREN



# SELLA LESIONS



# CNS INFECTIONS

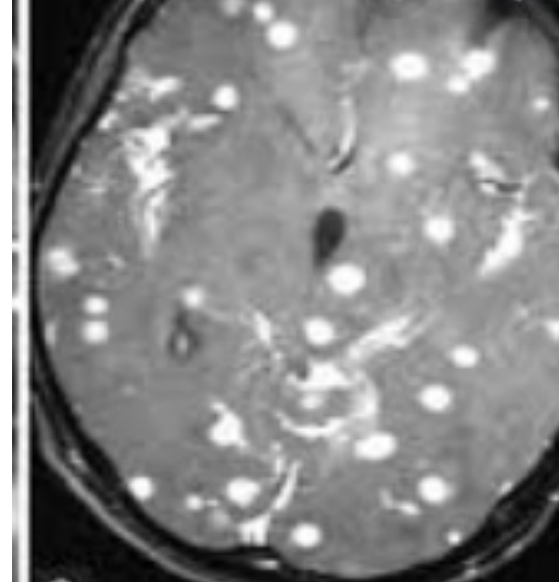
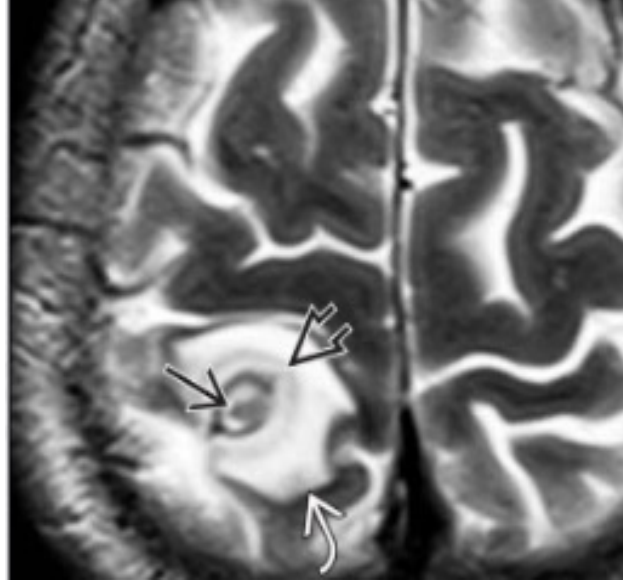


Vesicular

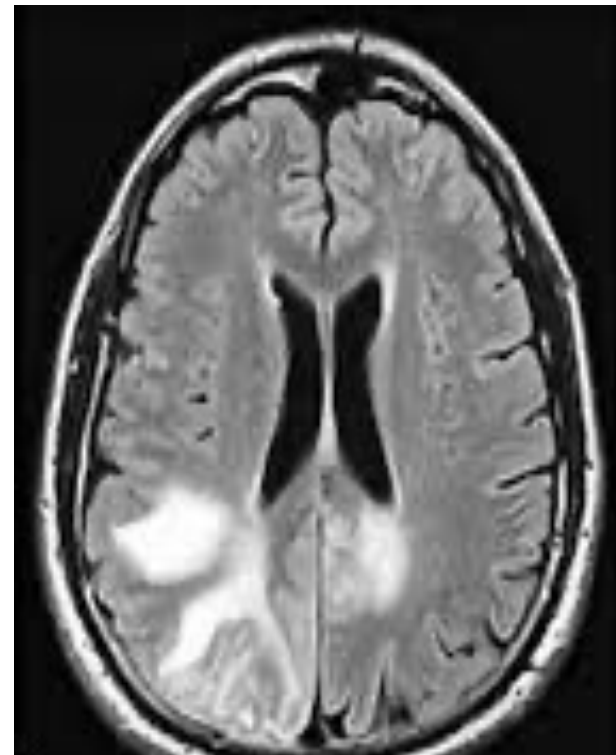
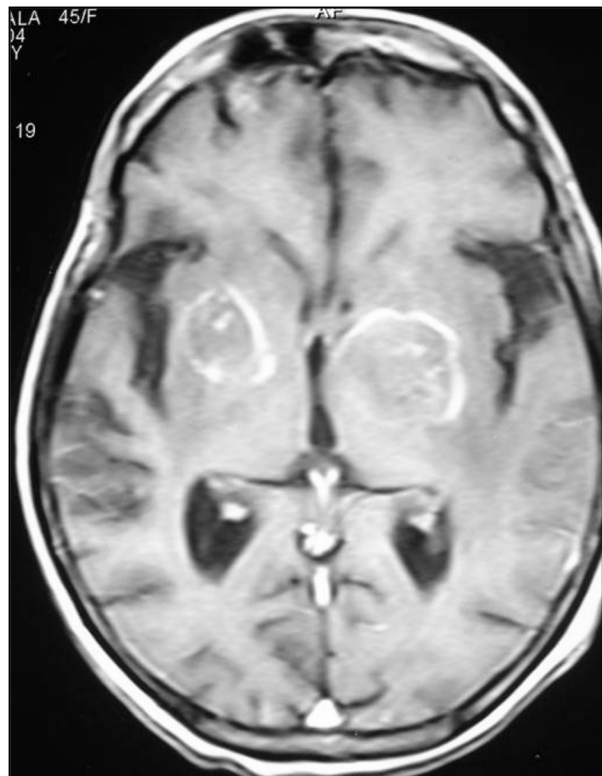
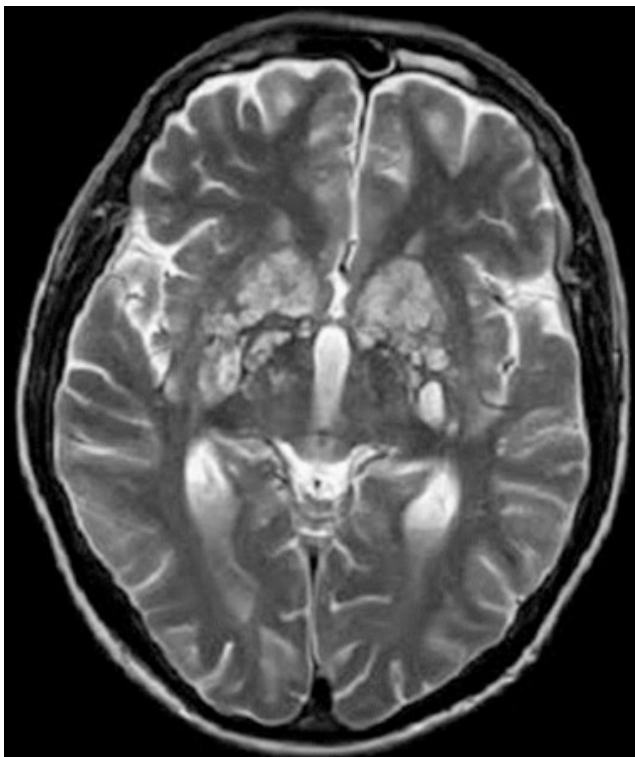
Colloid  
vesicular

Granular  
nodular

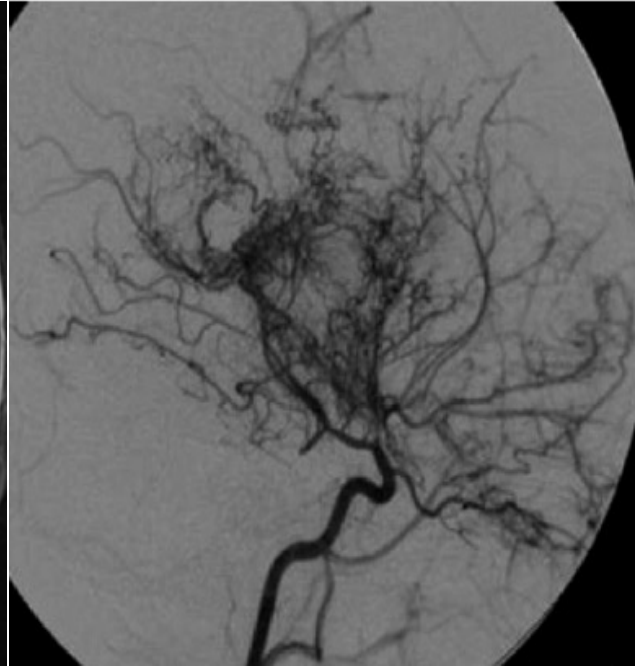
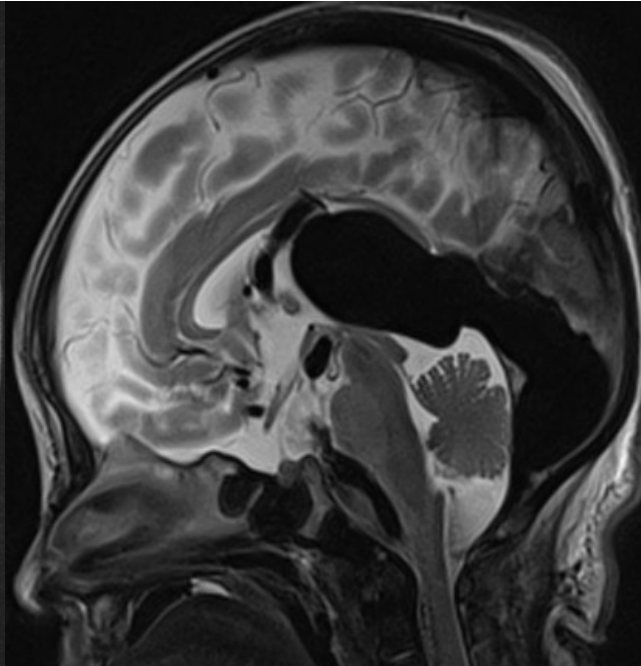
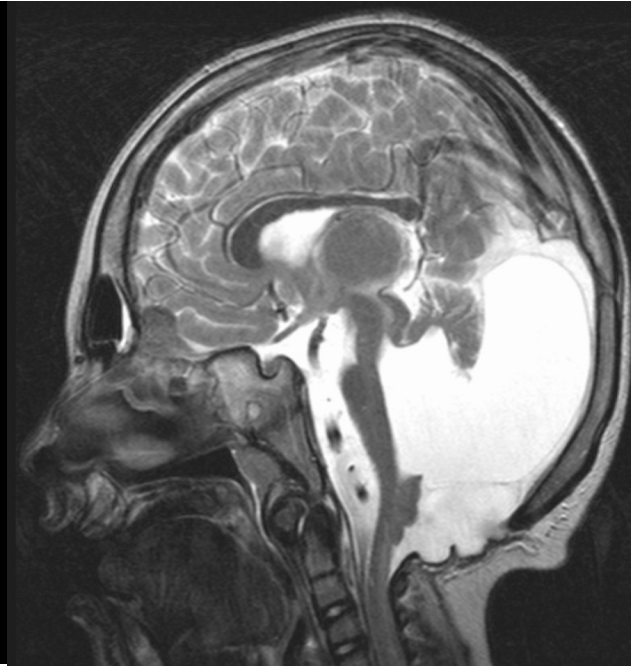
Nodular calcified

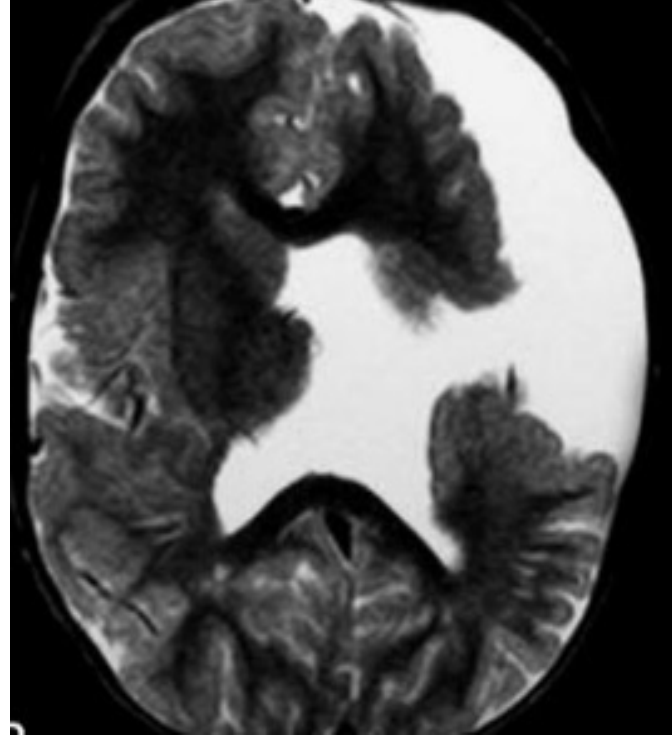
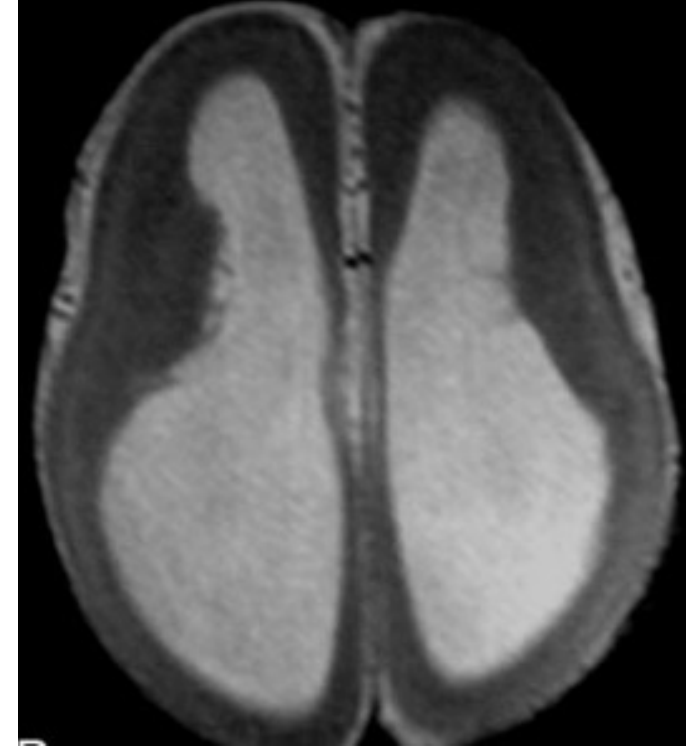


# HIV/AIDS



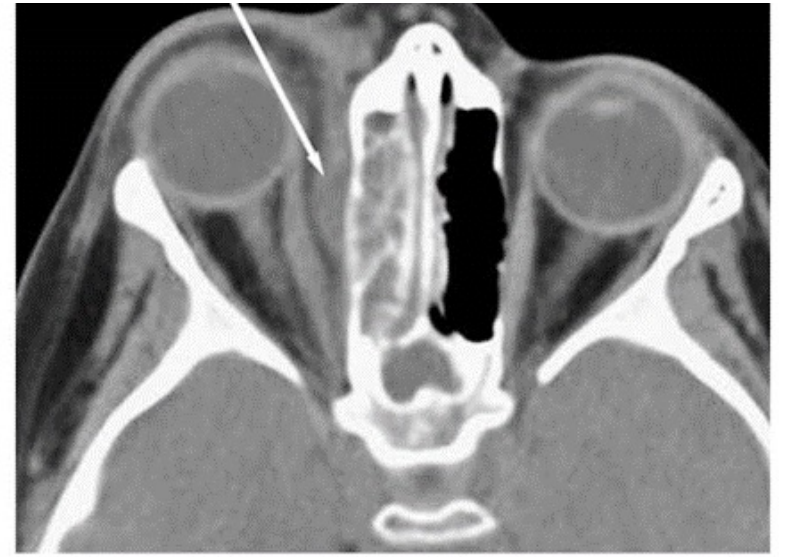
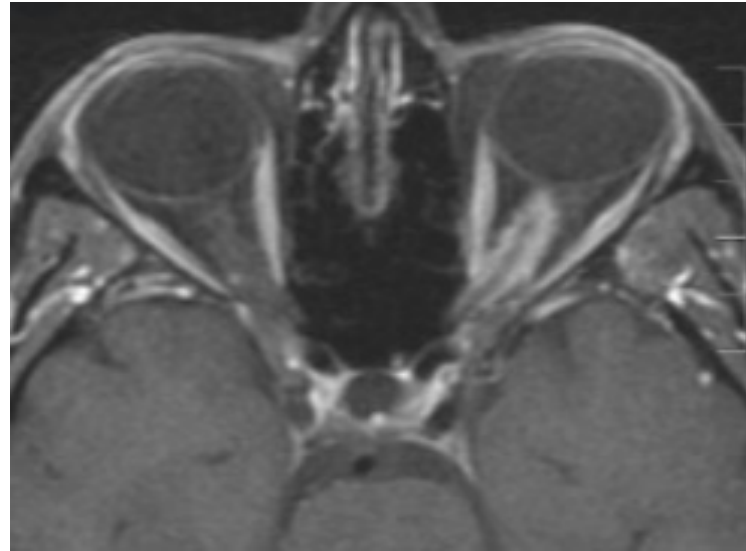
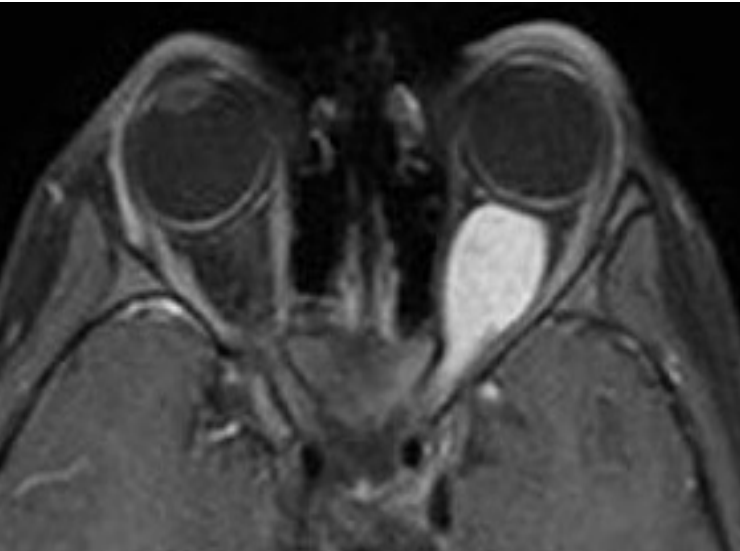
# CONGENITAL ANOMALIES



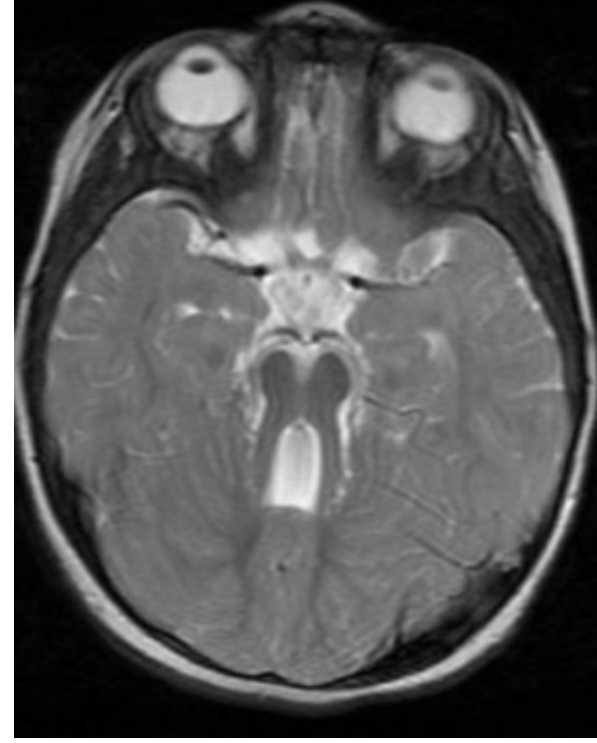
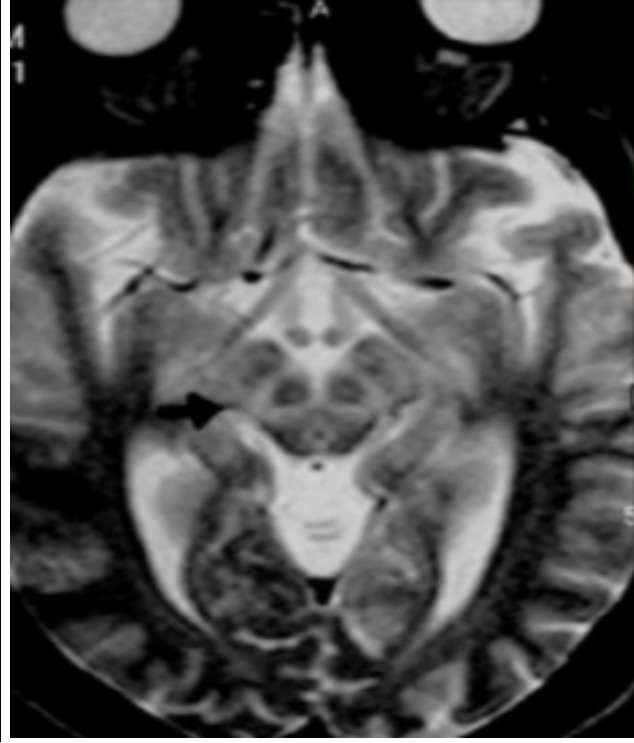
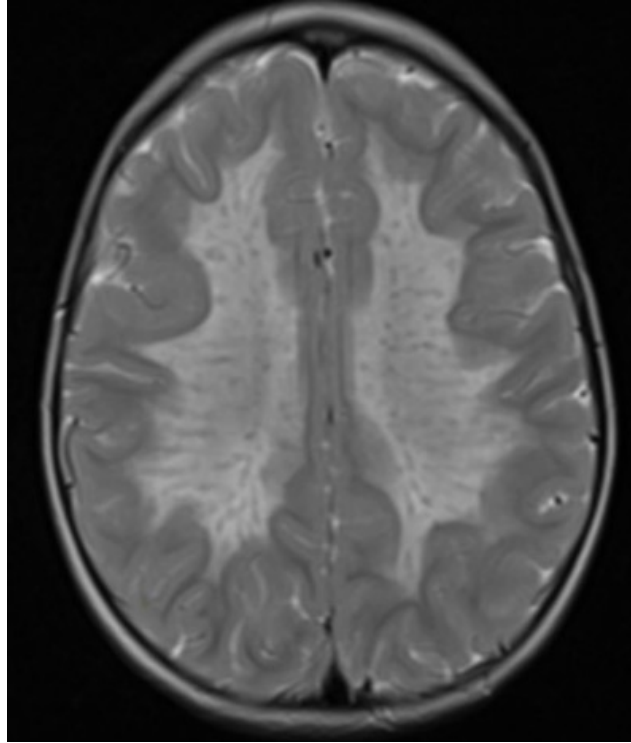
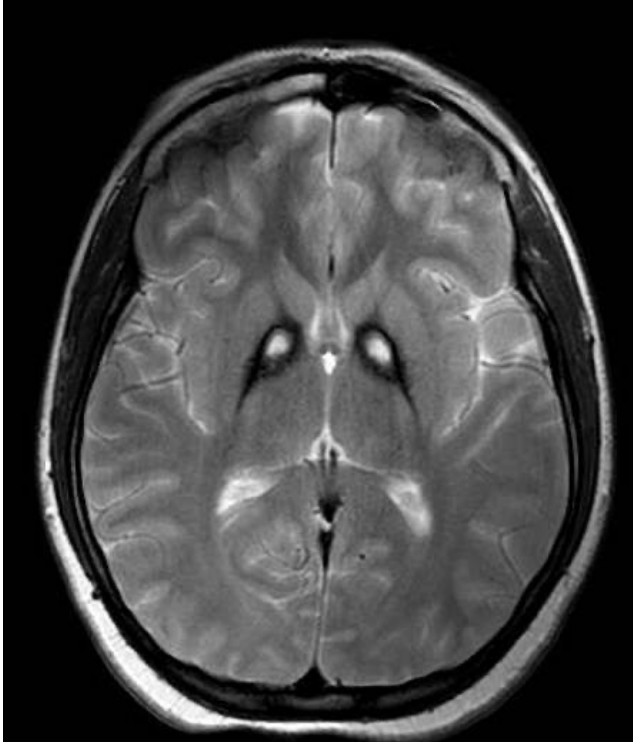


# ORBIT IMAGING

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# NAMED SIGNS



# **RT/ NUCEAR MEDICINE**

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# Effects of Radiation

STOCHASTIC	DETERMINISTIC
No threshold	Threshold exists
Delayed	Immediate
Cancer, Genetic mutations “All or none”	Skin erythema (MC), Cataracts, Epilation

MOA of radiation:

Ionisation power / linear energy transfer: Max-

Min-

Penetration: Max-

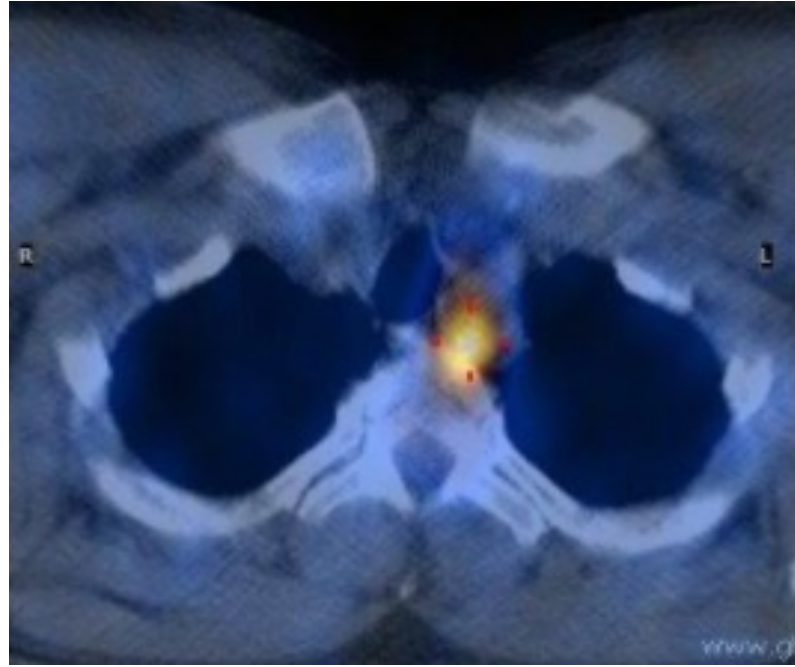
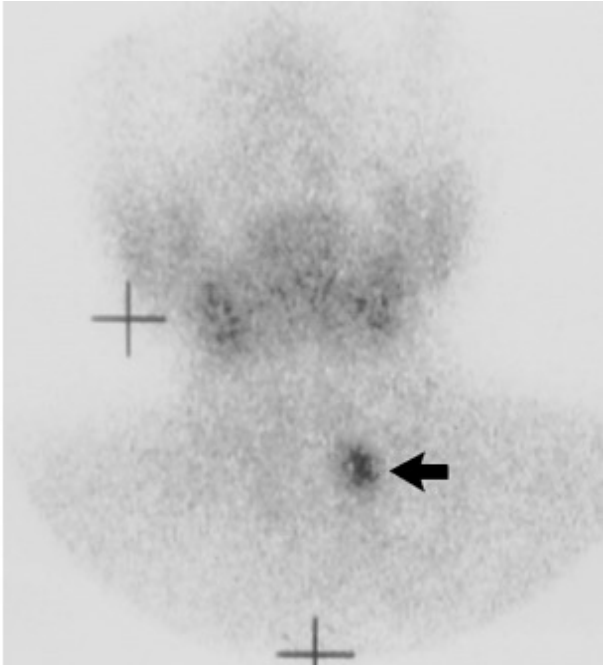
Min-

# RADIATION BASICS

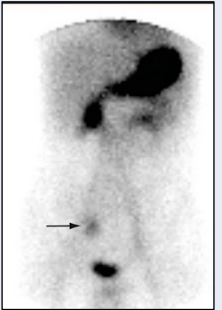
	Occupational Exposure	Public Exposure
Overall	20 mSv/ year averaged-5 year 30 mSv in any single year	1 mSv/y
Lens	150 mSv/y	15 mSv/y
Skin/ Extremities	500 mSv/y	50 mSv/y
Pregnant	2 mSv/y	1 mSv/y
Fetus	1 mSv/y	0.5 mSv/y

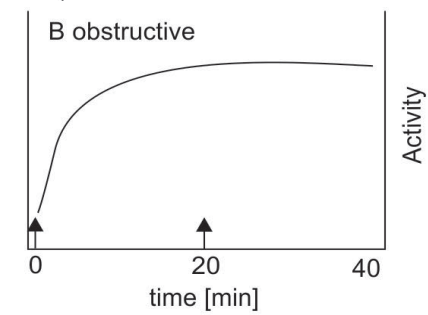
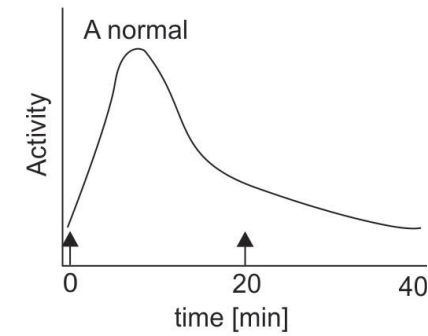
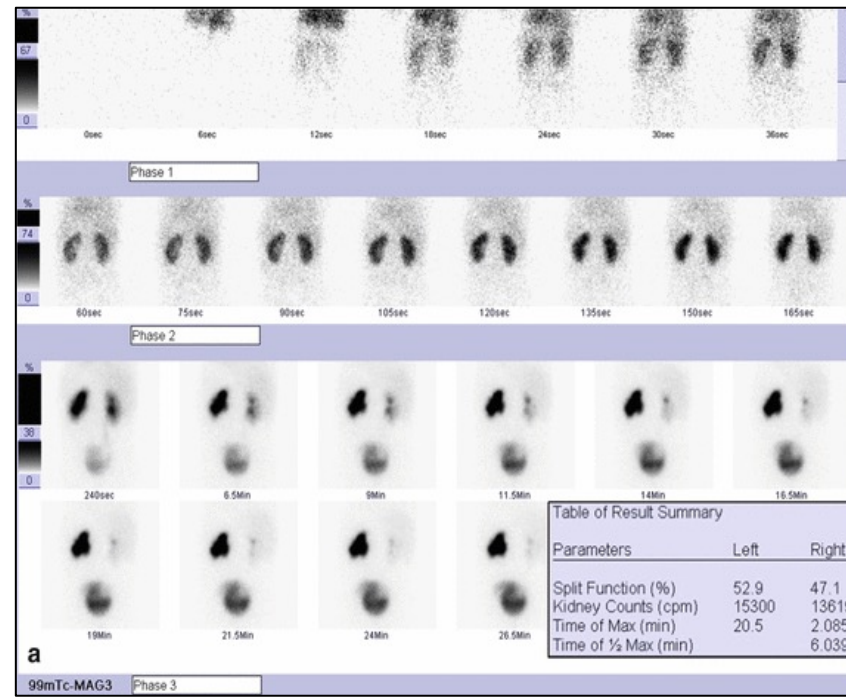
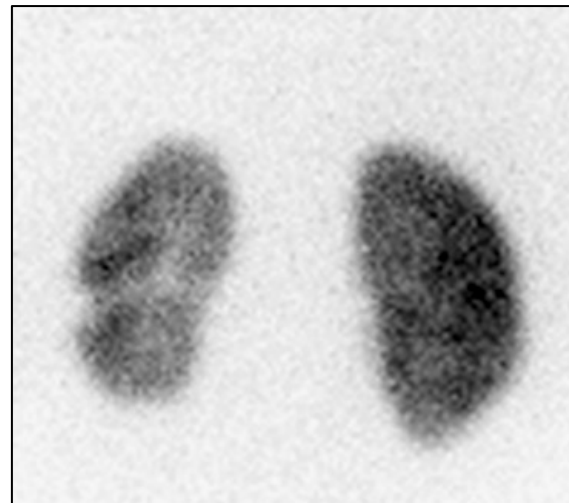
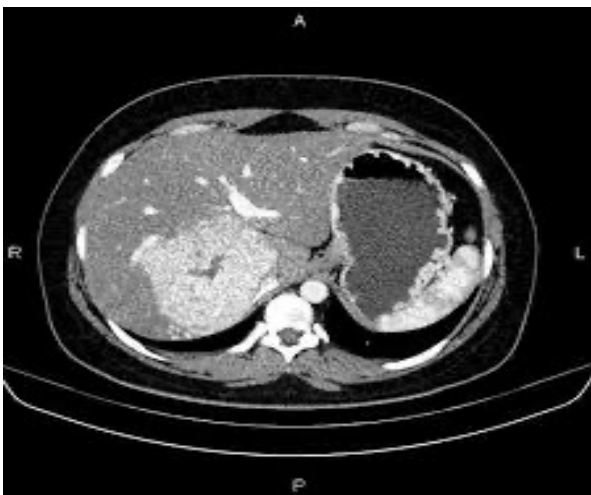
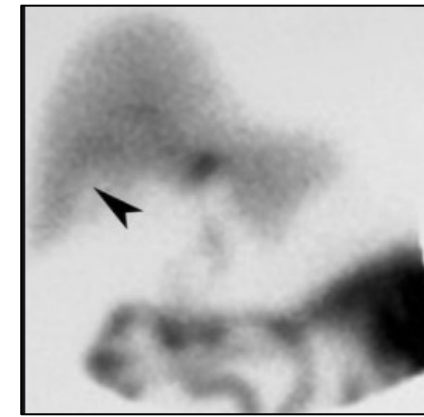
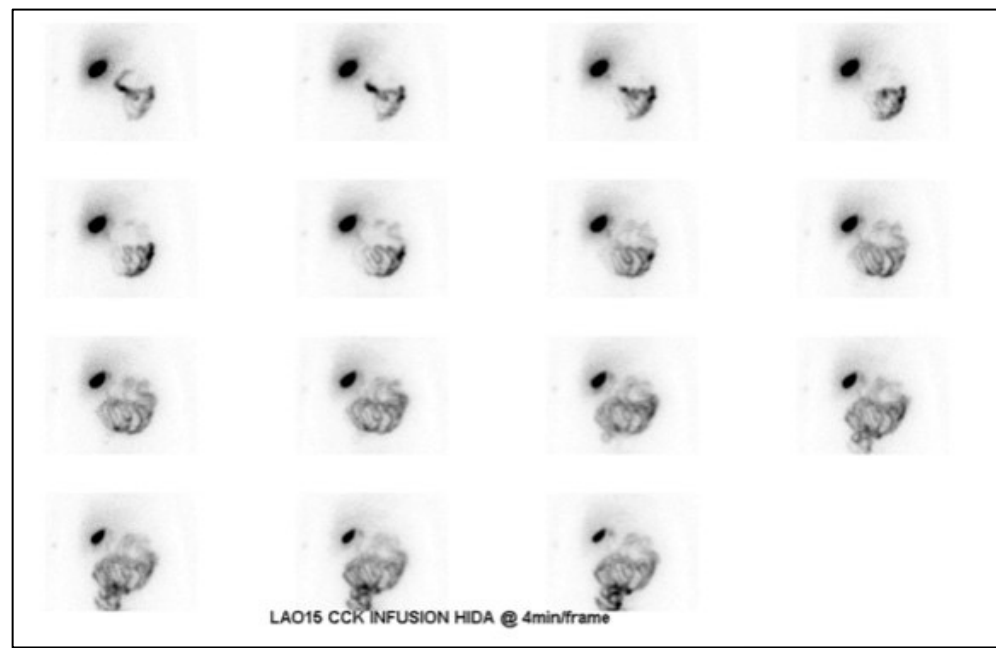
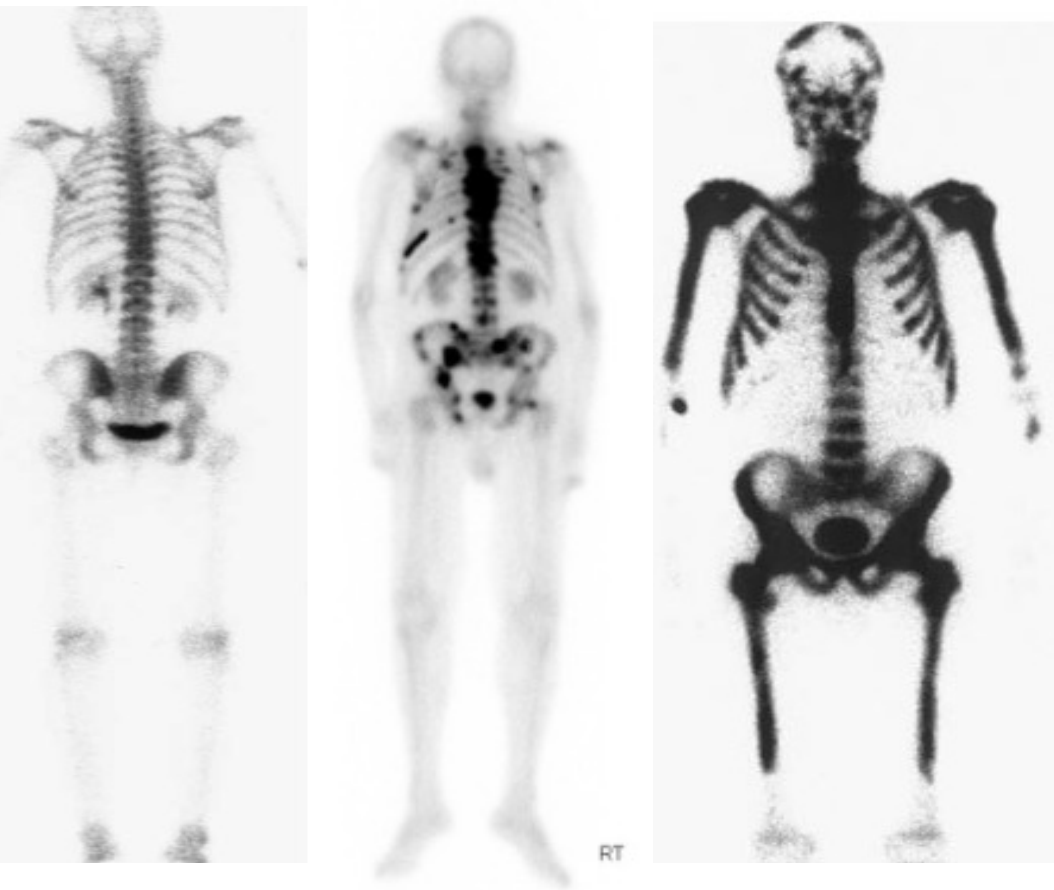


# Nuclear medicine



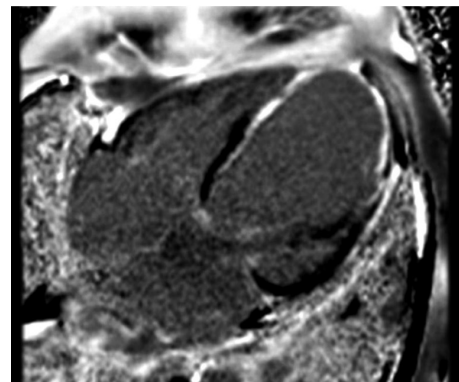
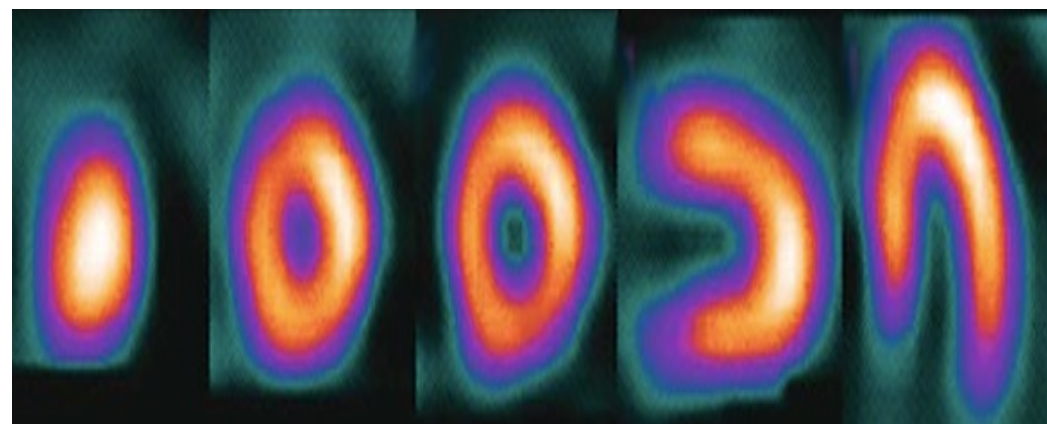
Radioisotope	Test
<b>Tc99m-MDP</b> (methylene diphosphonate)	<b>Hot spot:</b> <b>Triple phase (flow, blood pool, bone):</b> <b>Cold spot:</b>
<b>Tc99m-HIDA</b>	<b>Bile leaks-</b> <b>EHBA -</b> <b>Acute cholecystitis-</b>
<b>Tc99m Sulphur colloid</b>	
<b>Tc99m pertechnetate</b>	<b>Meckel's diverticulum:</b> <b>Rule of 2:</b> <b>Thyroid imaging</b> <b>Salivary gland hot spot:</b>
<b>Tc99m DMSA</b>	
<b>Tc99m DTPA / MAG3</b>	
<b>Captopril renography</b>	



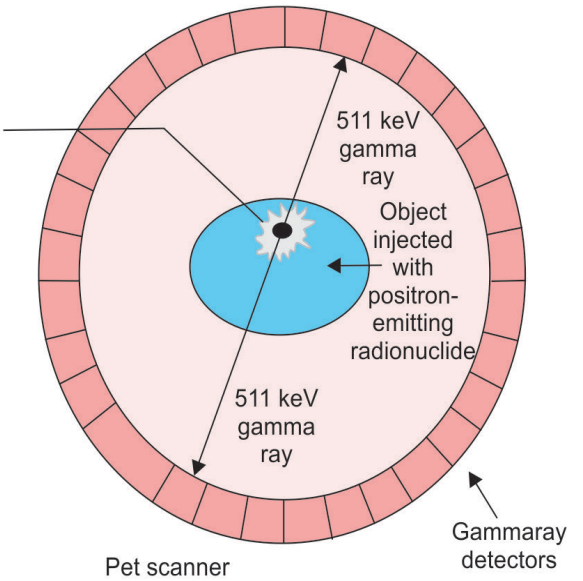
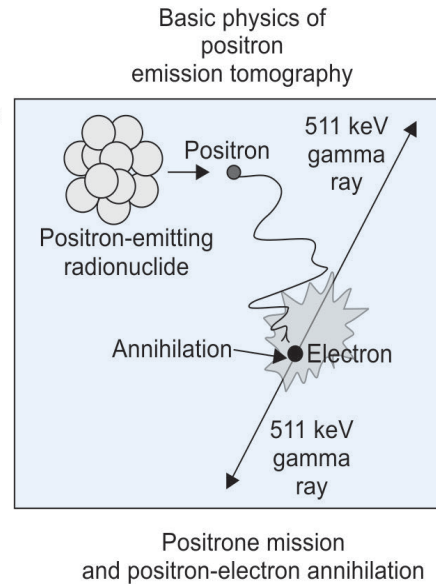
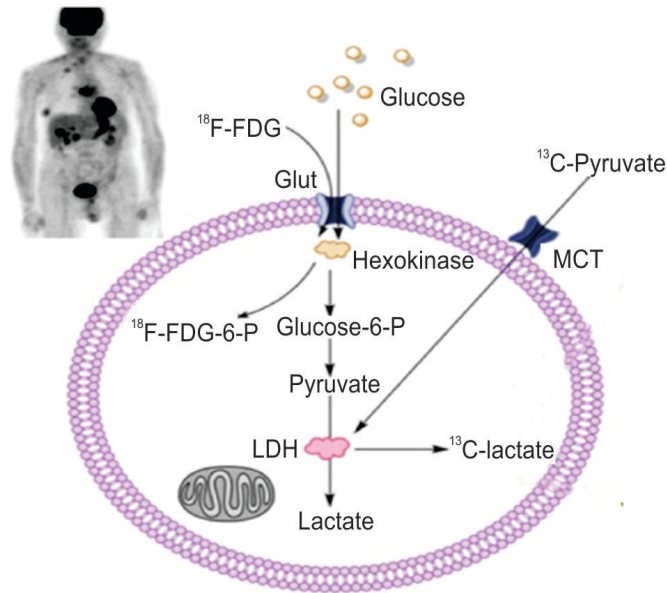
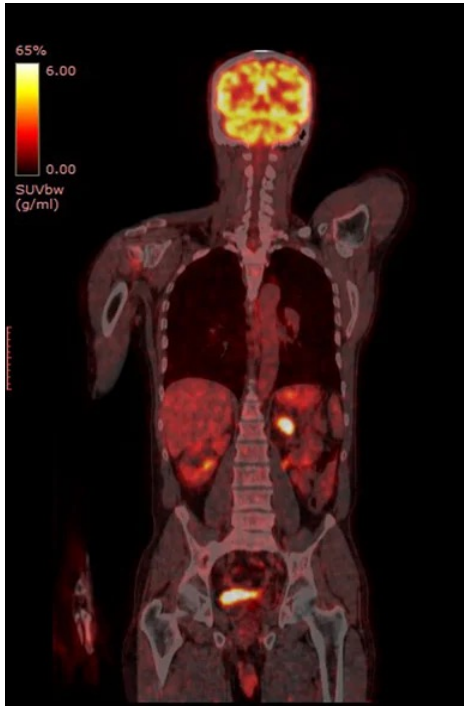


# Cardiac imaging

Scan	USE
Thallium-201 Tc99m-tetrafosmin Tc99m-Sestamibi	
Tc99m-pyrophosphate scan	
18-FDG PET	
MRI Tc99m-MUGA ECHO	

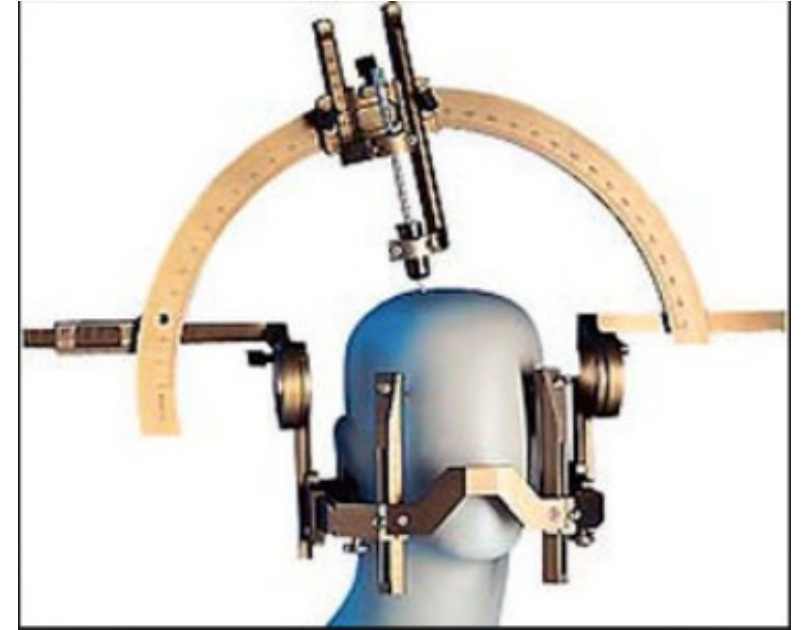


# PET SCAN



Radioisotope	Test
18-FDG PET	
NaF PET	
Choline PET, PMSA PET	
DOPA-PET	
DOTANOC PET	
C11 Pittsburg compound b PET	

# RADIOTHERAPY

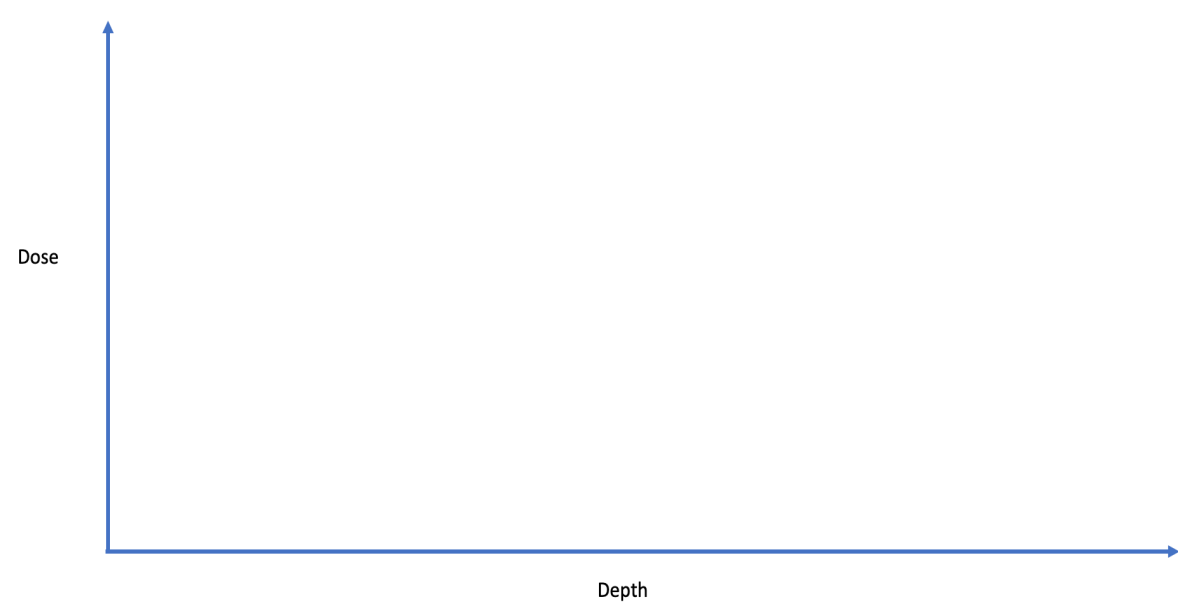


**Cyclotron:**

**IMRT:**

**FRACTIONATED RT:**

**Repopulation, Reoxygenation, Repair , Redistribution, Radiosensitivity**



**PERMANENT IMPLANT:**  
**GOLD**  
 Yt  
**PALLADIUM**  
 CS 131  
 I-125

**PURE B-EMITTER**  
 P-32  
 Sr  
 Yt

**Most common side effect of RT-**  
**MC RT-induced malignancy-**  
**MC brain tumor after cranio-spinal RT-**  
**MC RT-induced thyroid carcinoma-**  
**MC bone cancer after RT-**

<b>Element</b>	<b>HALF LIFE</b>
<b>18-FDG</b>	
<b>Tc 99</b>	
<b>I-123</b>	
<b>I-124</b>	
<b>I-125</b>	
<b>I-131</b>	
<b>Co-60 (Q)</b>	
<b>Cs-137</b>	
<b>Radium-226</b>	

Type	Most sensitive	Least sensitive
Cell Type		
Organ		
Blood cell		
Cell cycle phase		
Tissue		
Structure of eye		
Tumors		
Acute radiation syndrome		
Inverse square law		