

The background of the image is a blue-tinted photograph of a medical classroom. Two human skeletons are mounted on stands in the center. To the left, a sign reads 'MEDICAL ARTS'. To the right, there is a cabinet with various medical supplies. The overall scene is dimly lit, with the skeletons being the primary focus.

# Radiology OSPE

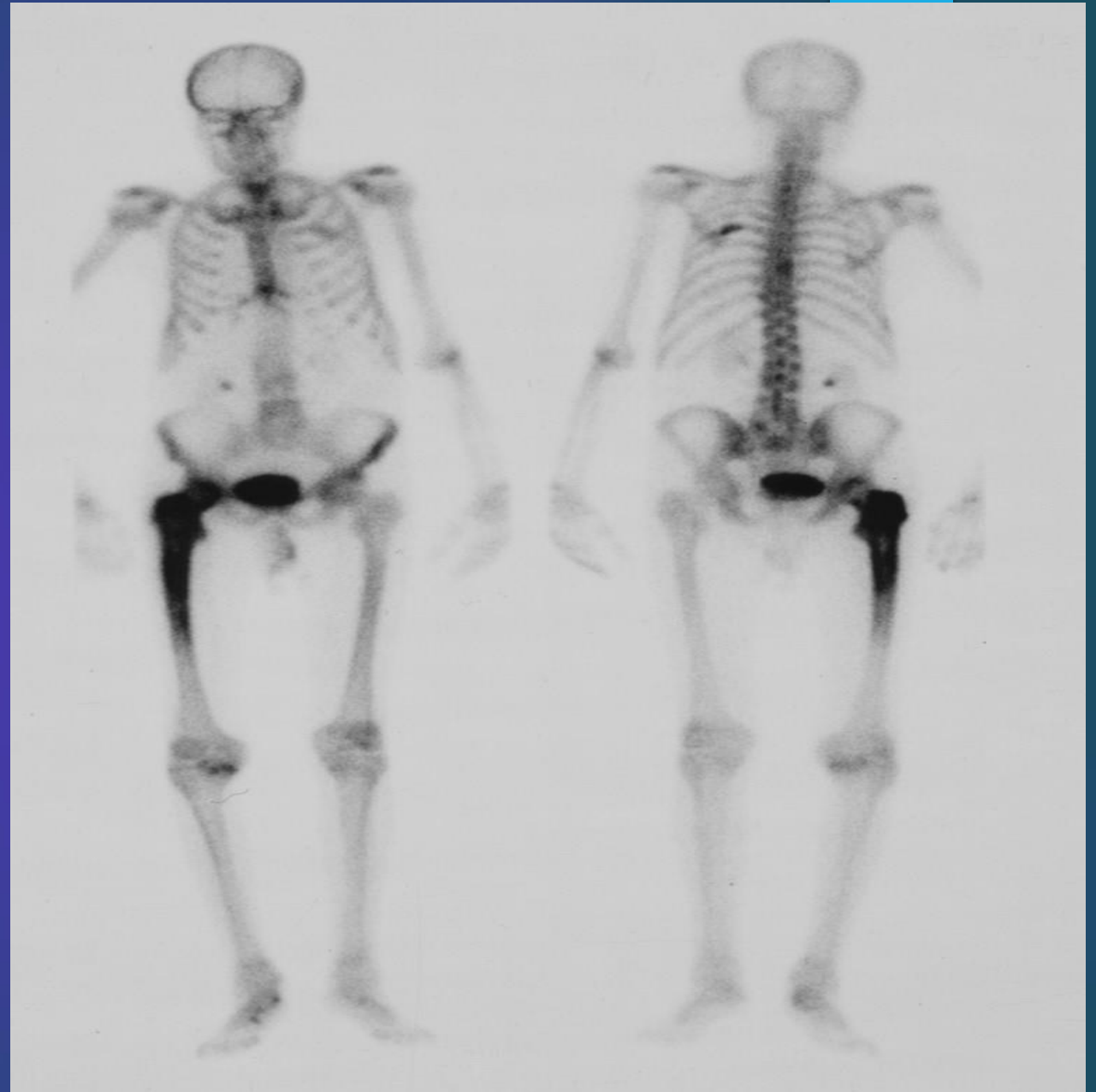
# Introduction to Diagnostic Imaging Modalities

**Radionuclide bone scan.**

**$^{99m}\text{Tc}$**

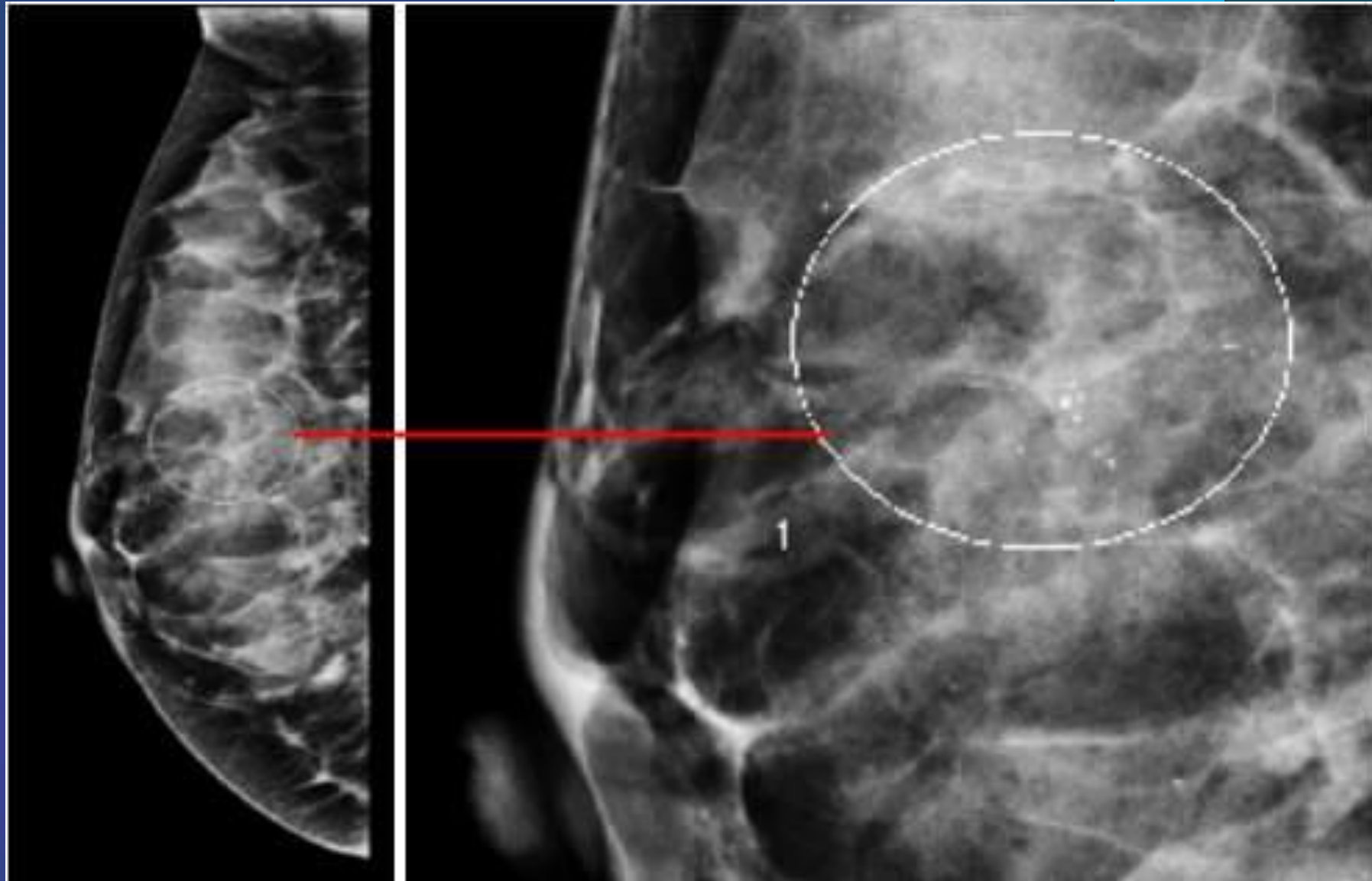
**The increased uptake in the femur**

**Paget's disease**



Palpable mass  
Breast pain and nipple discharge

Additional views. Such as magnification views are done to detect microcalcifications



**A. Imaging study?**

**B. What abnormality is demonstrated in the given image.**

**C. What is the most probable diagnosis**



A. Imaging study?

B. Describe the lesion shown in the given image.

C. List 2 features of the shown lesion

C. What is the most probable diagnosis



Suspicious breast mass

Mammography (right breast; craniocaudal view)

A mass with suspicious features, including **high density** and **indistinct margins**, is visible in the posterior third of the breast.

- A. Imaging study?
- B. What is the most probable diagnosis

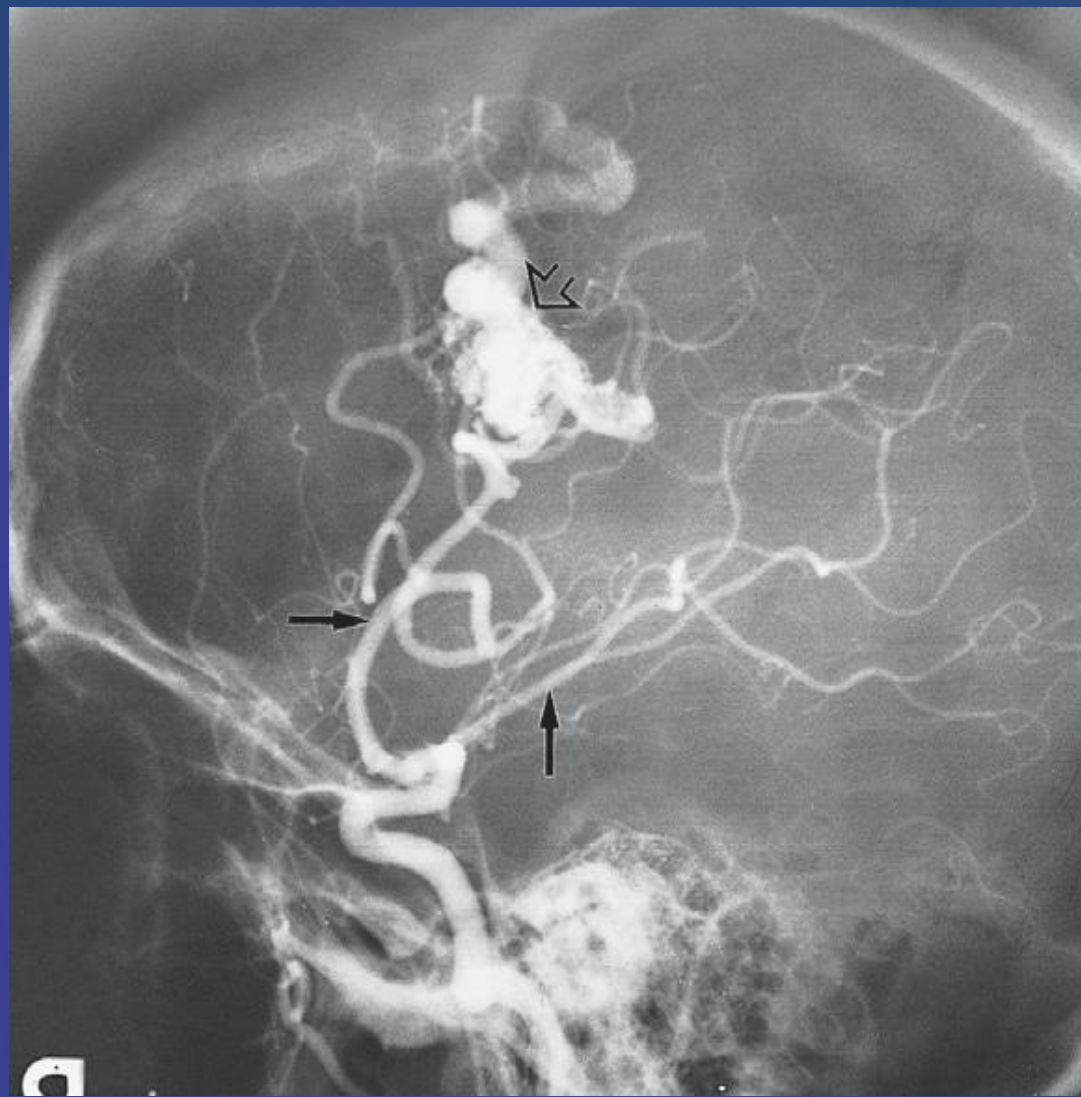
**CT angiogram (3D)  
Aortic aneurysm.**



**Contrast media, risk, precaution and management**

- A. Give the name of the imaging examination in the given image.  
B. Give the NAMES of the used contrast media for the examination.





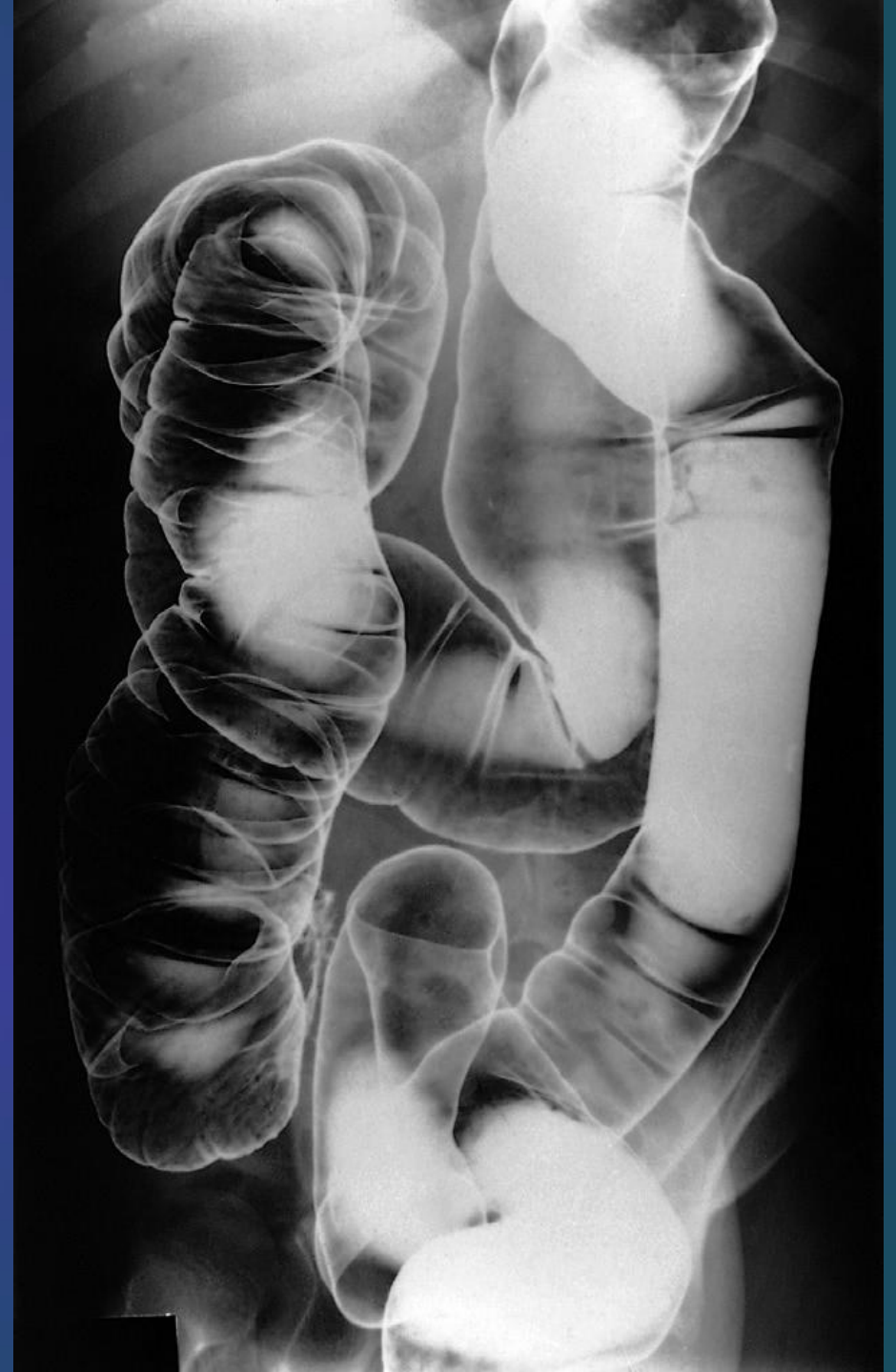
**A. Imaging modality or technique or study?**

**B. Type or name of contrast?**



Enema double contrast  
Barium & air (+ve Vs -ve)

- A. Give the name of the imaging examination in the given image.**  
**B. Give the NAMES of the used contrast media for the examination.**

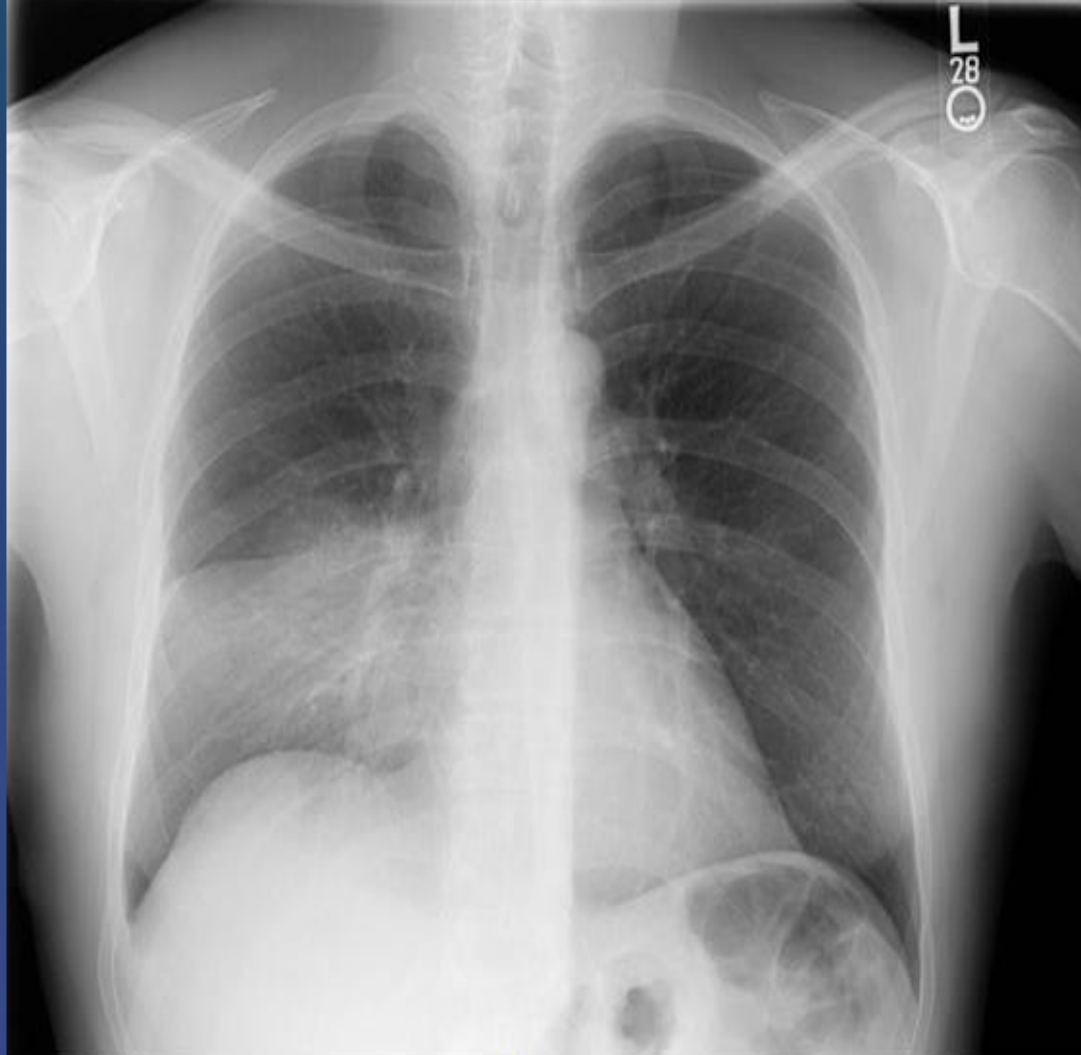


# RESPIRATORY AND CARDIOVASCULAR RADIOLOGY

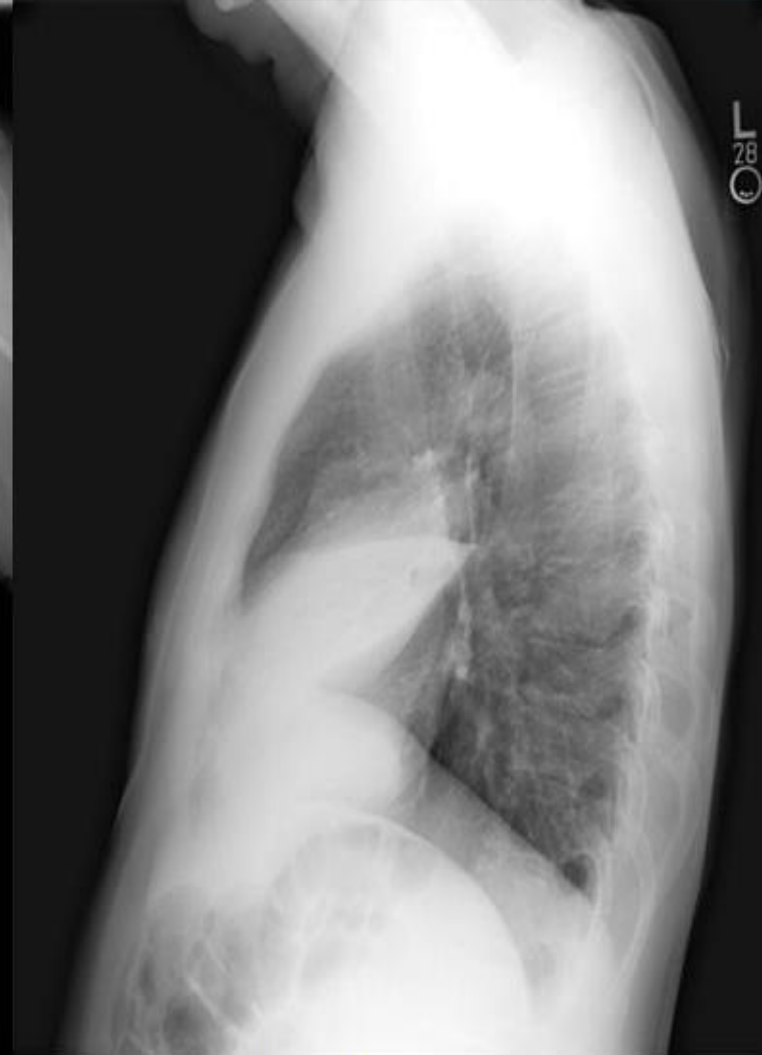
## RT lower lobe pneumonia



- A. What is the most likely diagnosis in the given images
- B. Which **lobe** of the lung affected by this disease in the given image.



Frontal



Lateral

- A. What is the most likely diagnosis in the given images
- B. Which **lobe** of the lung affected by this disease in the given image.

# Pneumonia

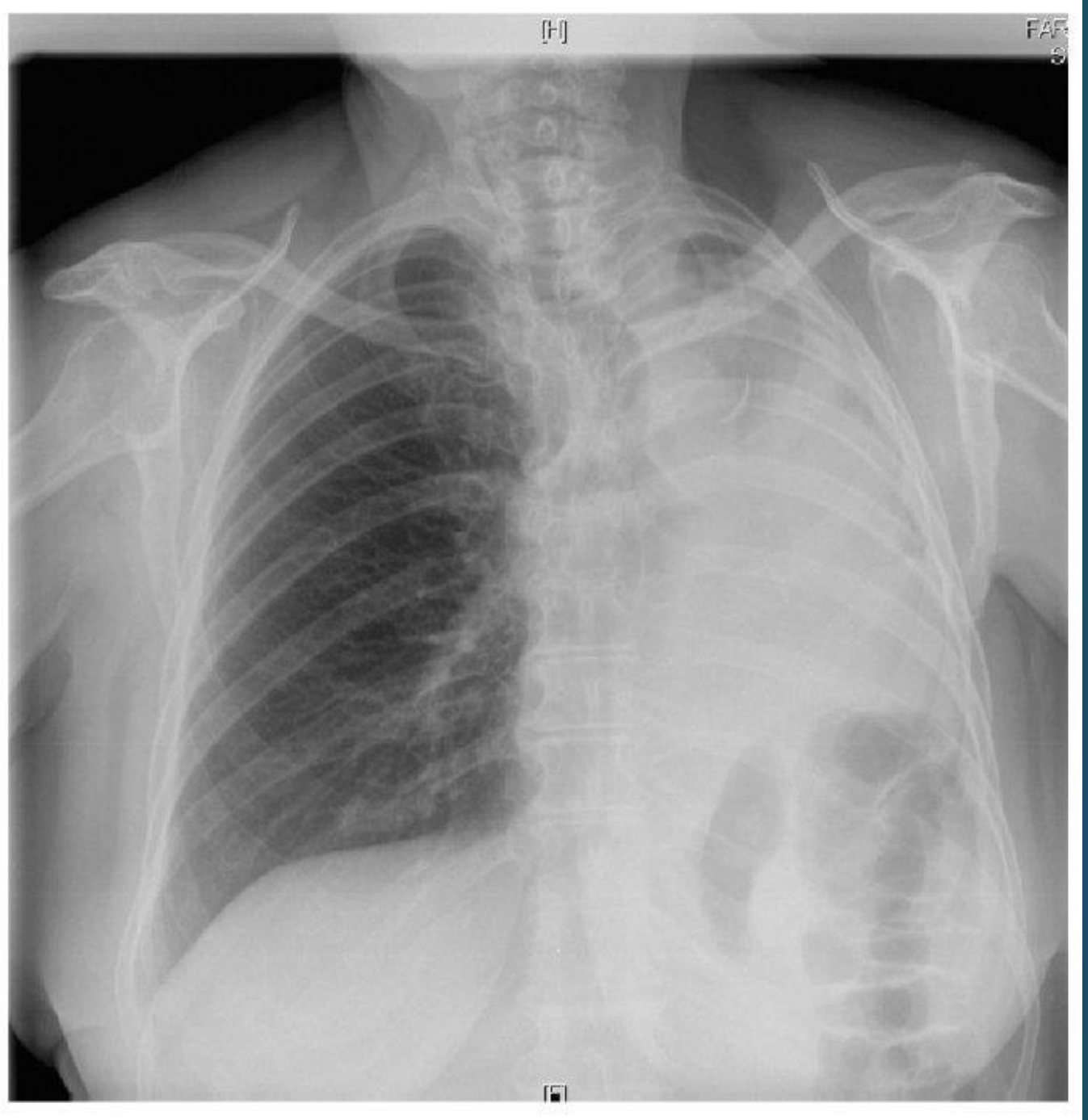
- ▶ The left hemithorax is opaque
- ▶ There is no shift of the heart or trachea
- ▶ The opacified hemithorax contains air bronchogram
- ▶ No loss of lung volume



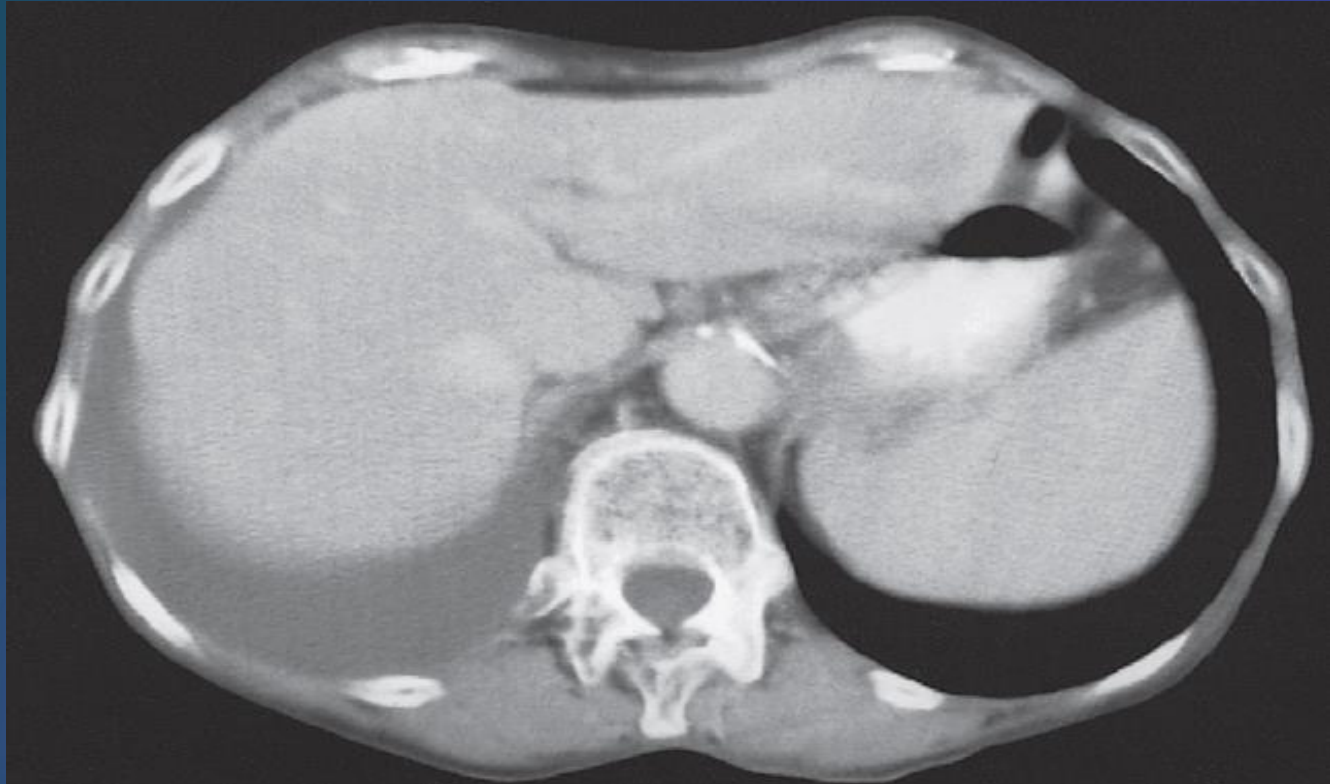


Female patient  
presents with chest  
pain and fever

**Modality ?**  
**Findings ?**  
**Diagnosis?**



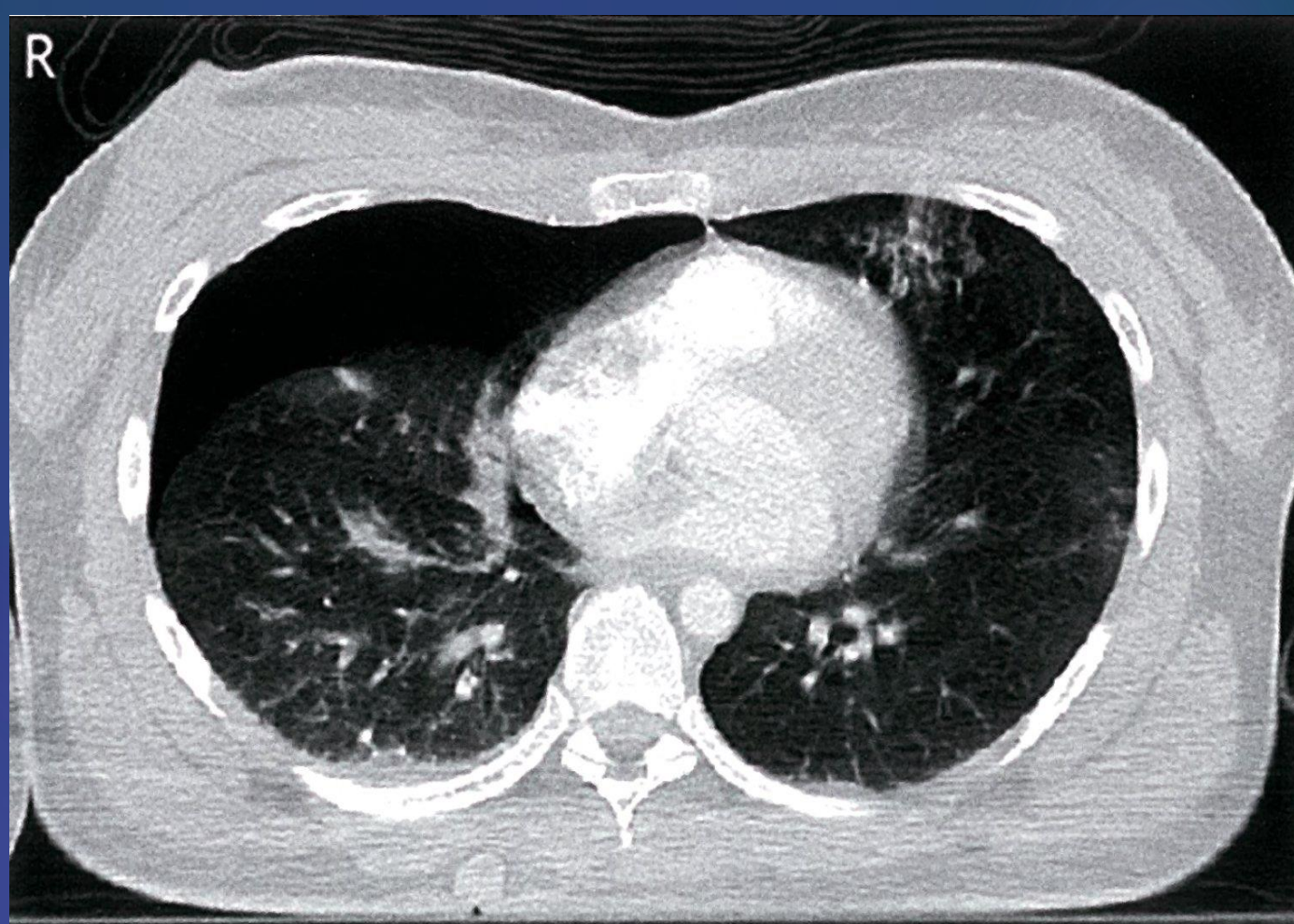
# Pleural effusion



- A. Imaging examination
- B. Sign (Image 2)
- C. Diagnosis



Meniscus sign



**Right anterior pneumothorax**

CT thorax (axial view; lung window)

**Pneumothorax.**



## Traumatic subcutaneous emphysema

X-ray chest (PA view)

Extensive **subcutaneous emphysema** is seen as **linear lucencies** throughout the soft tissues of the thorax, neck, and upper abdomen.



**Free air under the domes of diaphragm in pneumoperitoneum. It occur in perforation of bowel**





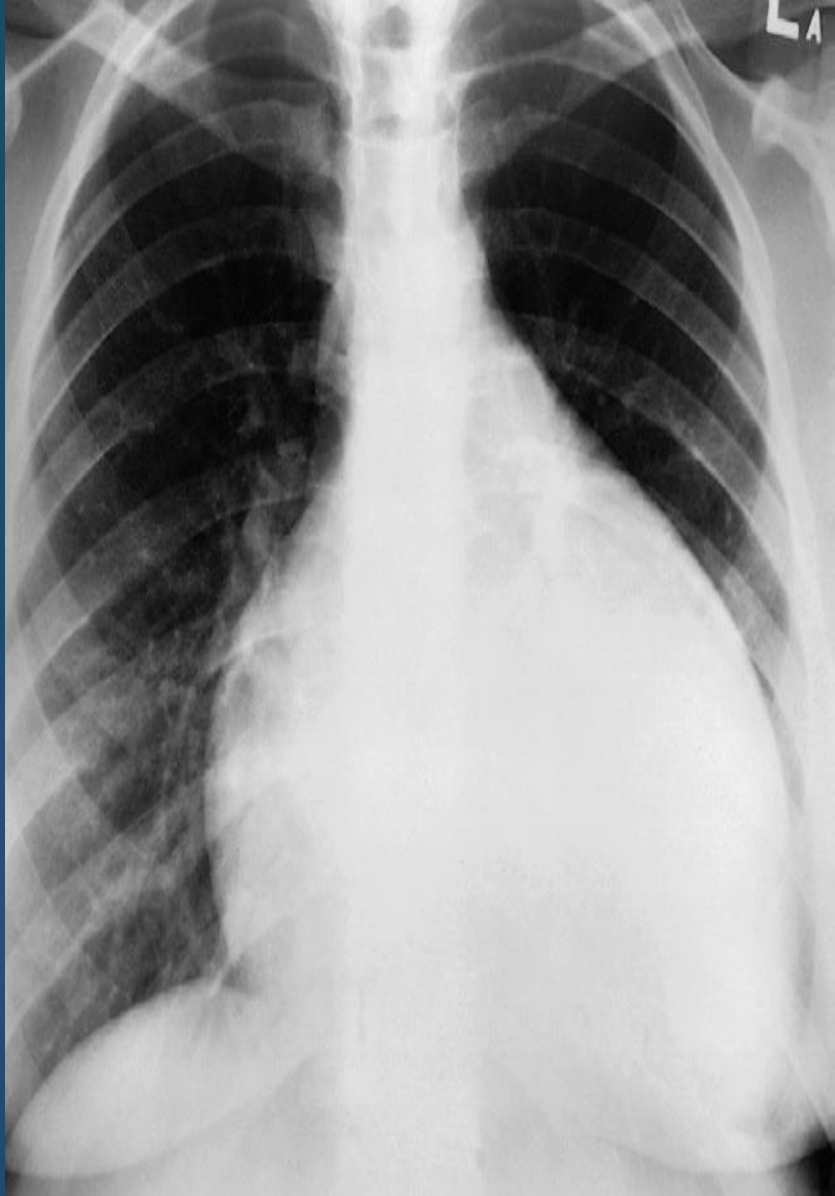
- A. Imaging examination
- B. What is the name of Sign & what does it usually mean?
- C. Diagnosis



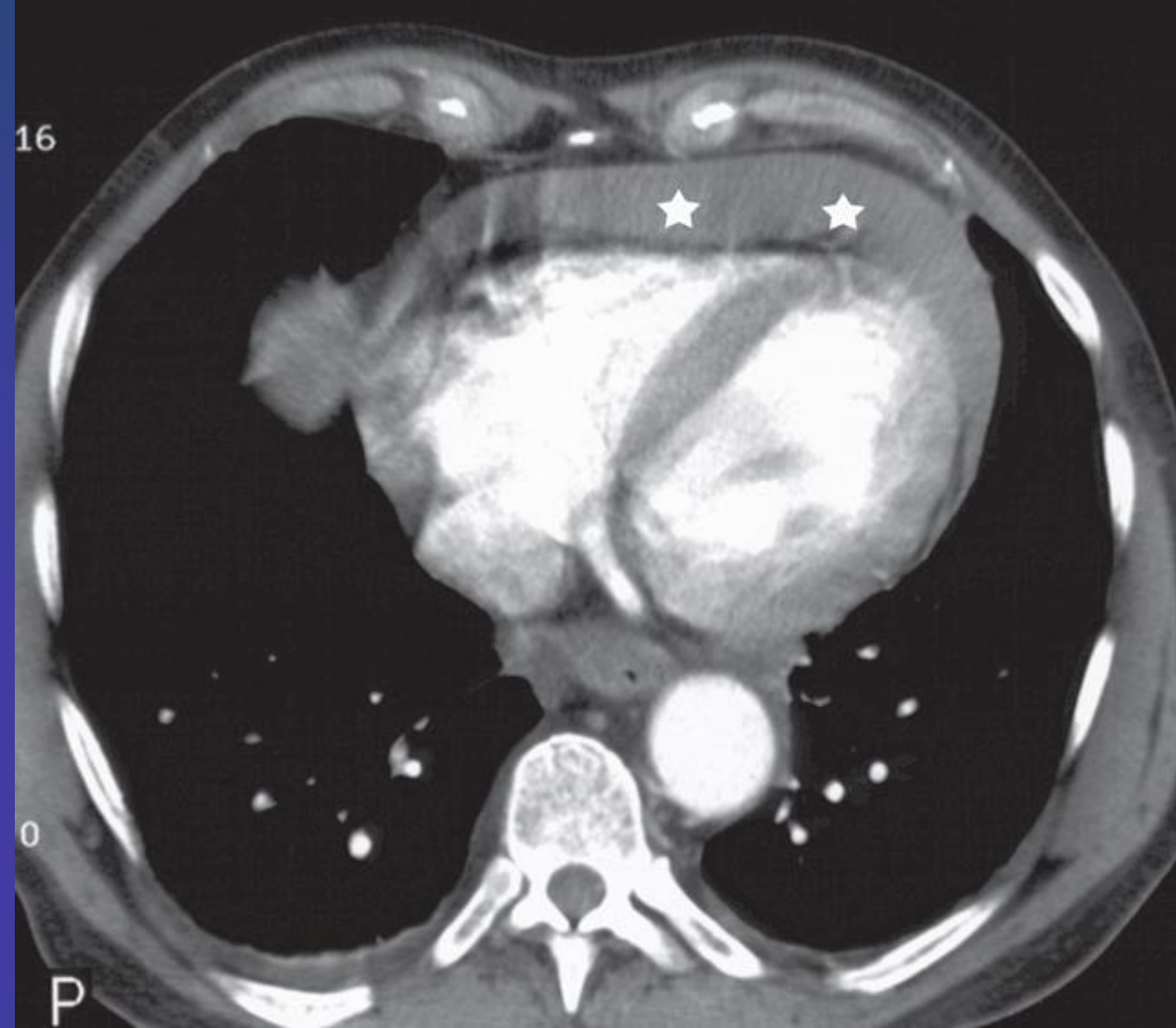
Contrast; axial plane, mediastinal window)

CT scans show right-sided pleural fluid collections (PC). Each collection has a lenticular (biconvex) shape and is accompanied by thickening of the adjacent parietal (red line) and visceral pleurae (green line).

The split-pleura sign  
empyema

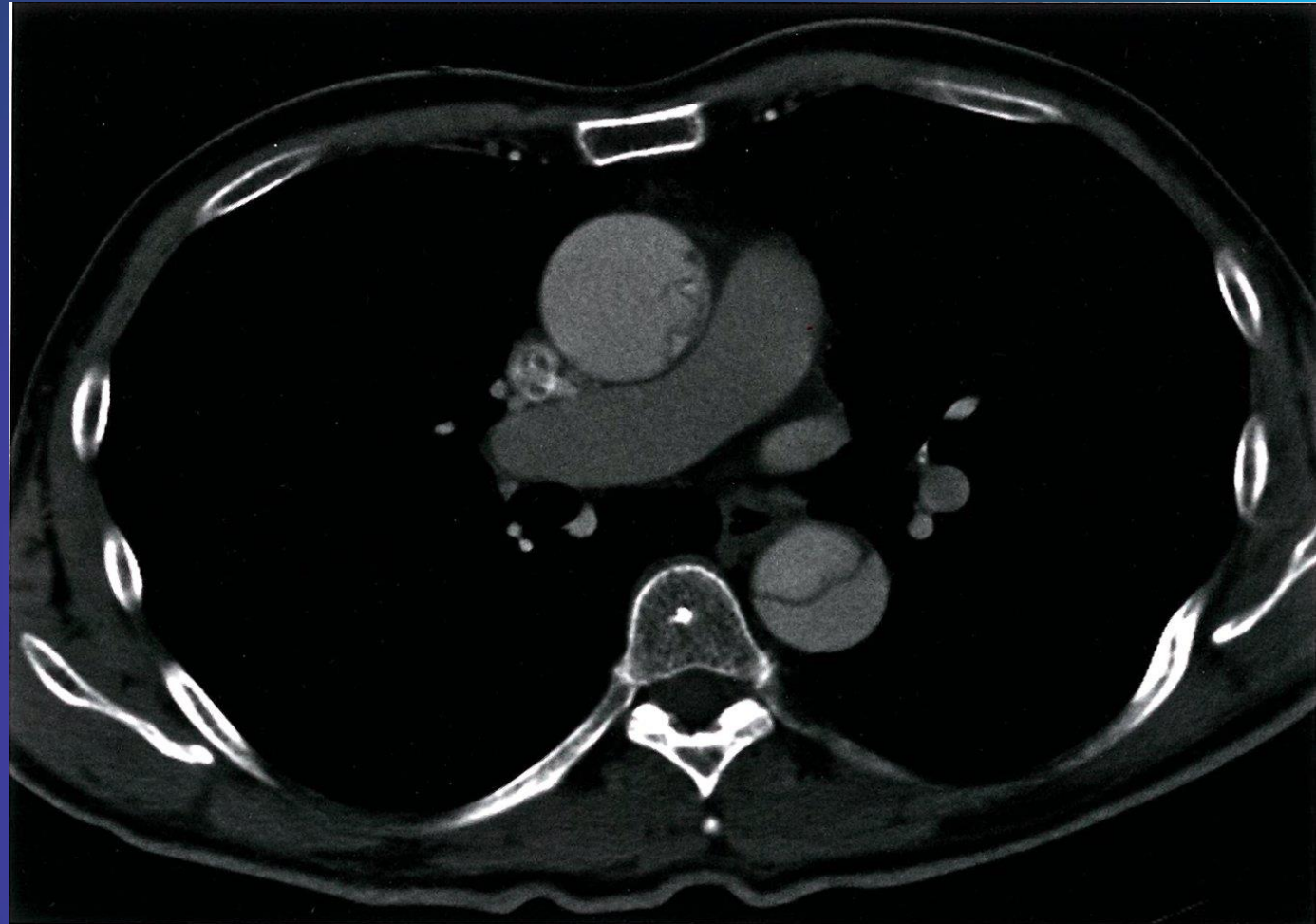


**Pericardial effusion**



- A. Imaging modality
- B. Findings or description
- C. What is the most likely diagnosis ?

Imaging study  
Most likely diagnosis

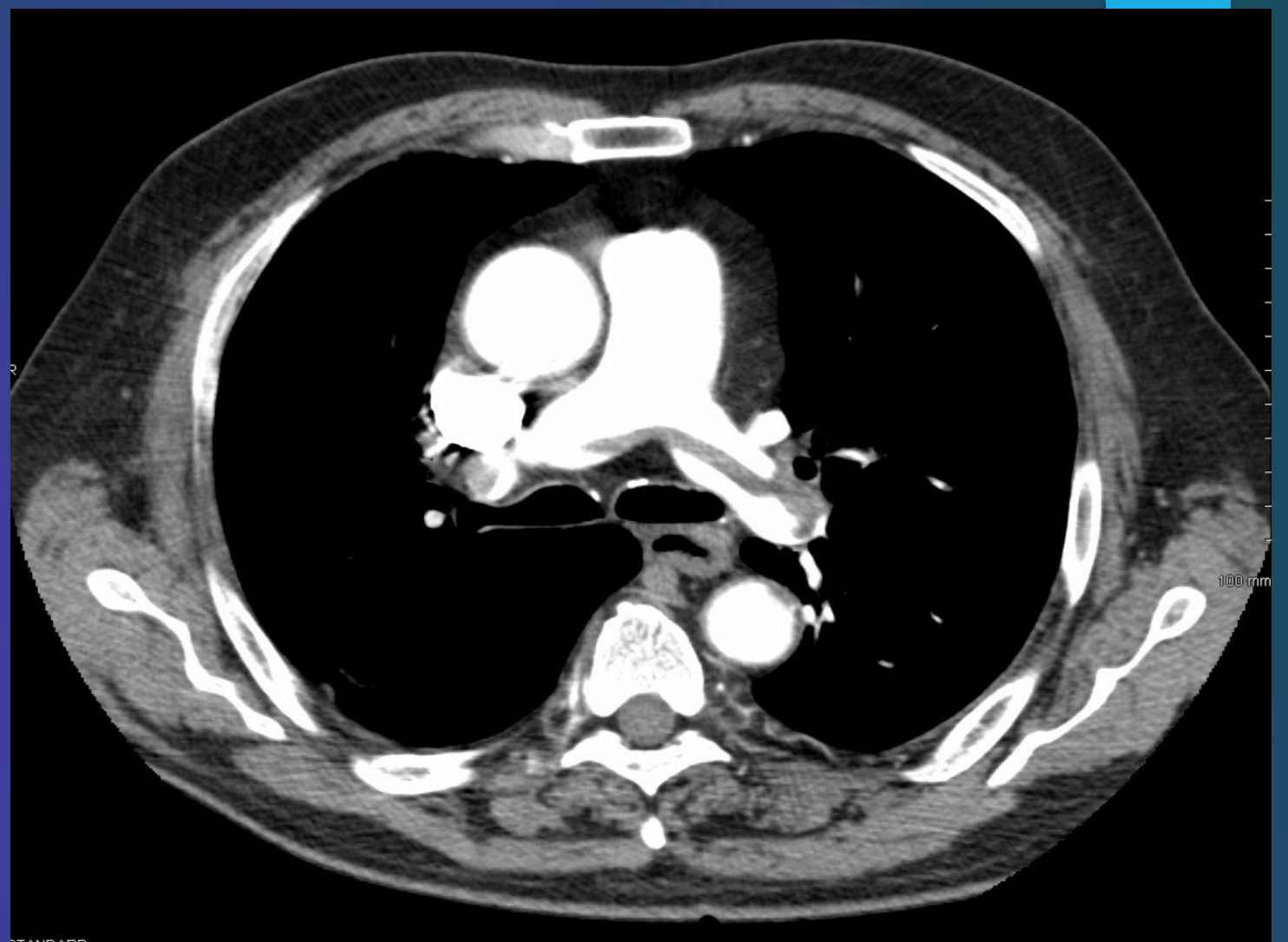


**CT thorax (with contrast; axial view)**

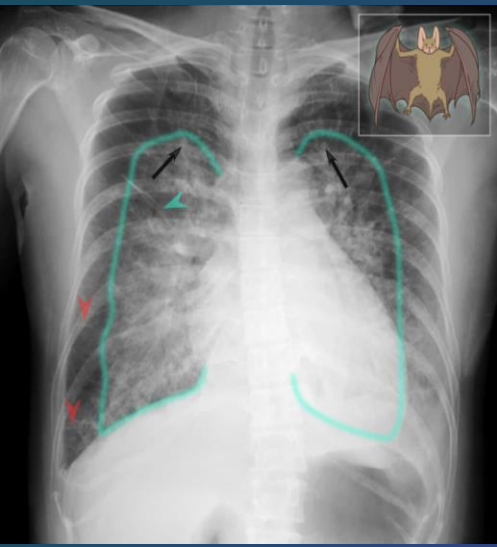
A **mucosal flap** can be seen dividing the lumen of the ascending and descending aorta. This radiological appearance confirms an **aortic dissection**.



Imaging examination  
Diagnosis



CT chest (with contrast; axial plane)  
Pulmonary embolism.



## A. Imaging examination

### 2. Findings or description

### 3. Diagnosis

#### **Pulmonary edema**

#### **X-ray chest (PA view)**

The cardiac silhouette is enlarged  
upper lobe vessels are prominent

Bilateral perihilar opacity **batwing**, or **butterfly** appearance.  
Thickened interlobular septae (**Kerley lines**).





**A. Imaging examination**  
**2. Findings or description**  
**3. Diagnosis**

**Neonatal respiratory distress syndrome (hyaline membrane disease).**

**X-ray chest (frontal view) of a premature infant**

1. General **granular opacity** of the lungs Note the **uniformity of distribution** of the changes in the lungs .
2. The **vessels**, the **heart borders** and the **diaphragm outlines** are **indistinct**
3. **Air bronchograms** are visible.



# **RADIOLOGY OF GI TRACT & BILIARY SYSTEM**



## A. Imaging examination

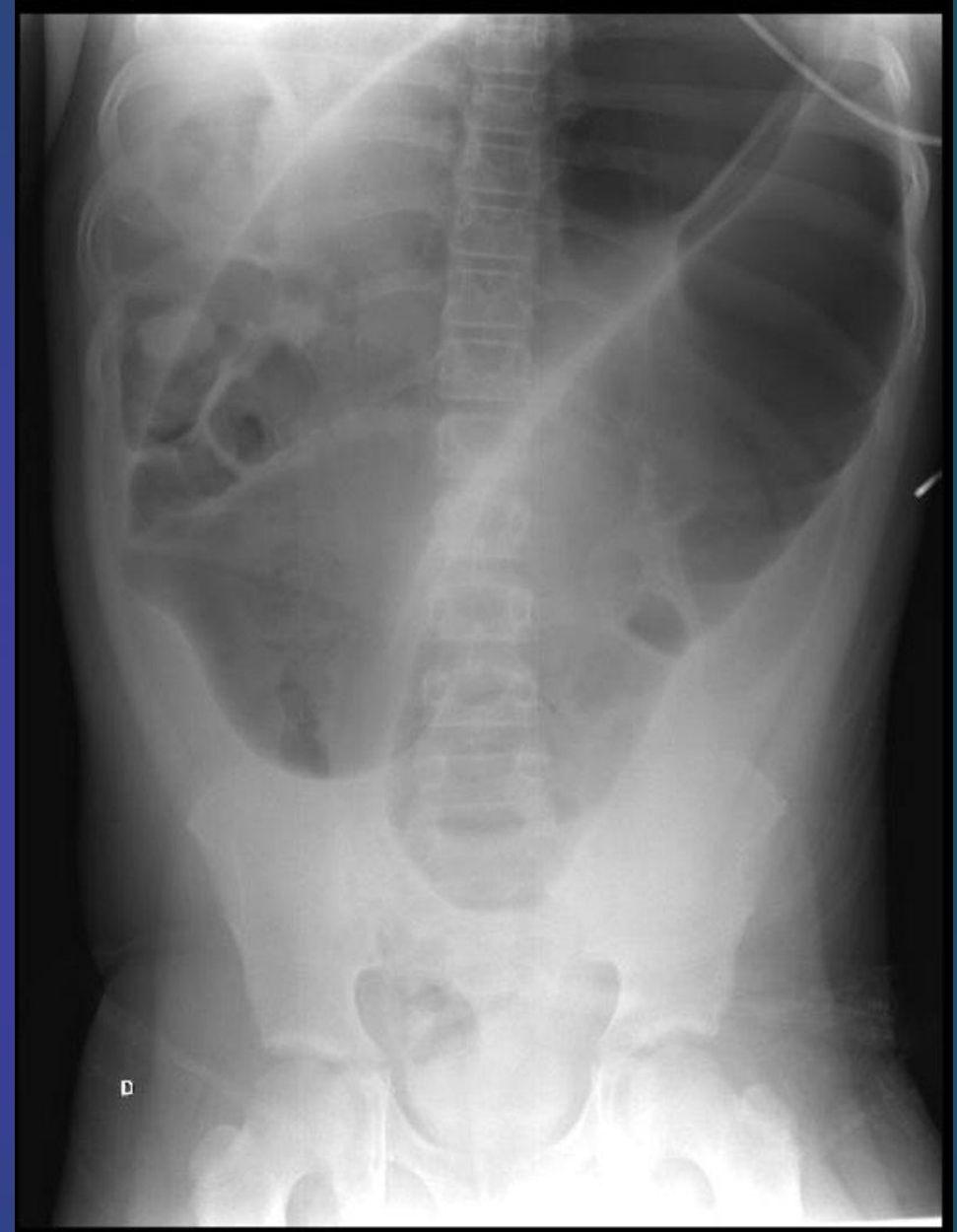
B. What is the name of **Sign** & what does it usually mean?

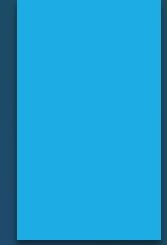
## C. Diagnosis

Sigmoid volvulus

X-ray abdomen (AP view)

Markedly dilated bowel . The configuration, including the double wall thickness of the two apposed bowel loops, resembles a bean “coffee bean sign”.

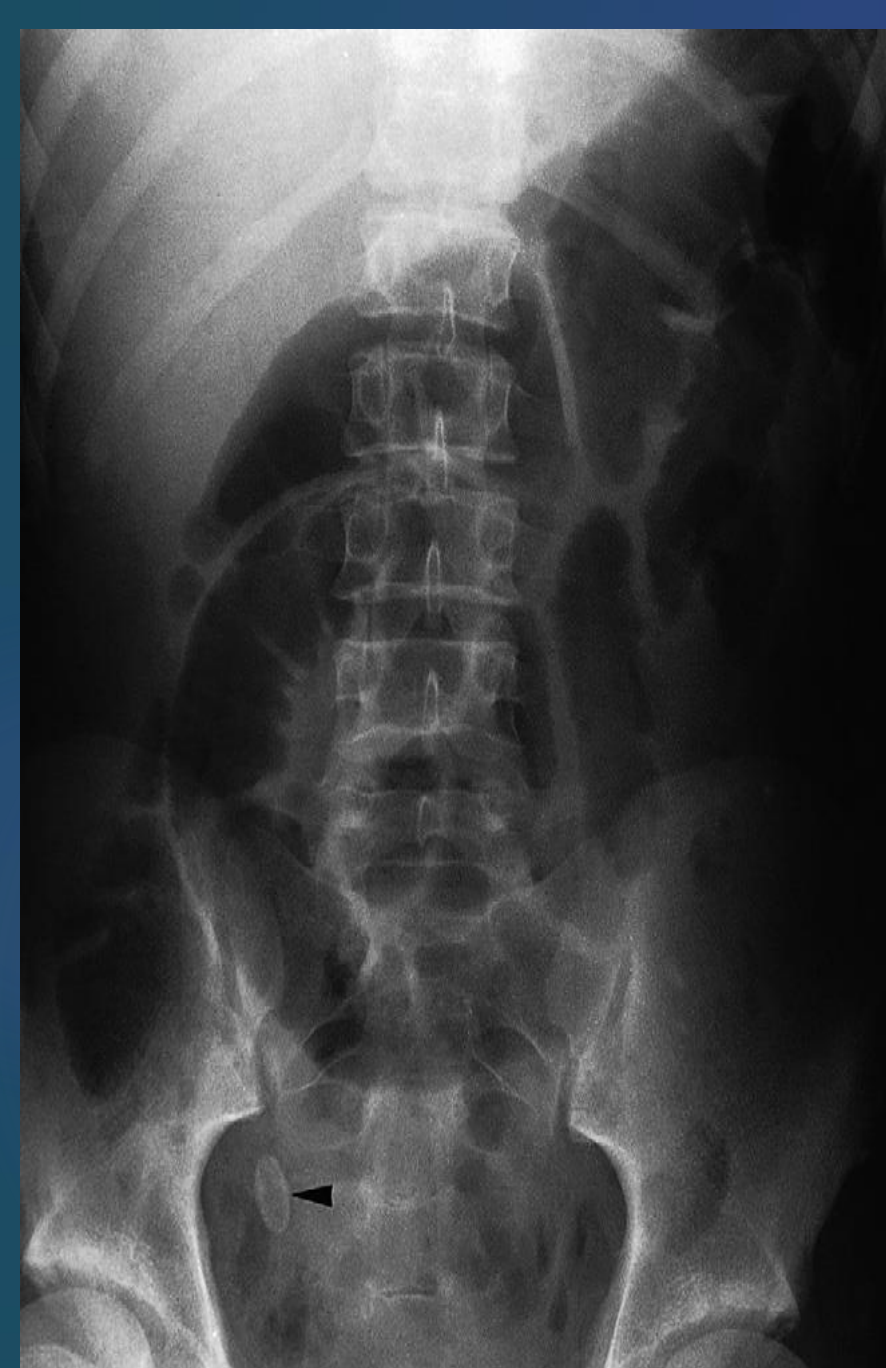




- A. Imaging examination
2. Findings or description
3. Sign
4. Diagnosis

*Appendicolith* The oval calcified shadow (arrowhead) is a **faecolith** in the **appendix**.

Note the **dilated loops** of **small bowel** in the **centre** of the **abdomen** due to **peritonitis** – the so-called **sentinel loops**.



- A. Imaging examination
- 2. Findings or description
- 4. Diagnosis

**Barium swallow** Pharyngeal pouch (Zenker's diverticulum). The pouch lies behind the oesophagus, which is displaced forward





## Chronic pancreatitis.

CT scan showing numerous small areas of calcification within the pancreas (arrows).

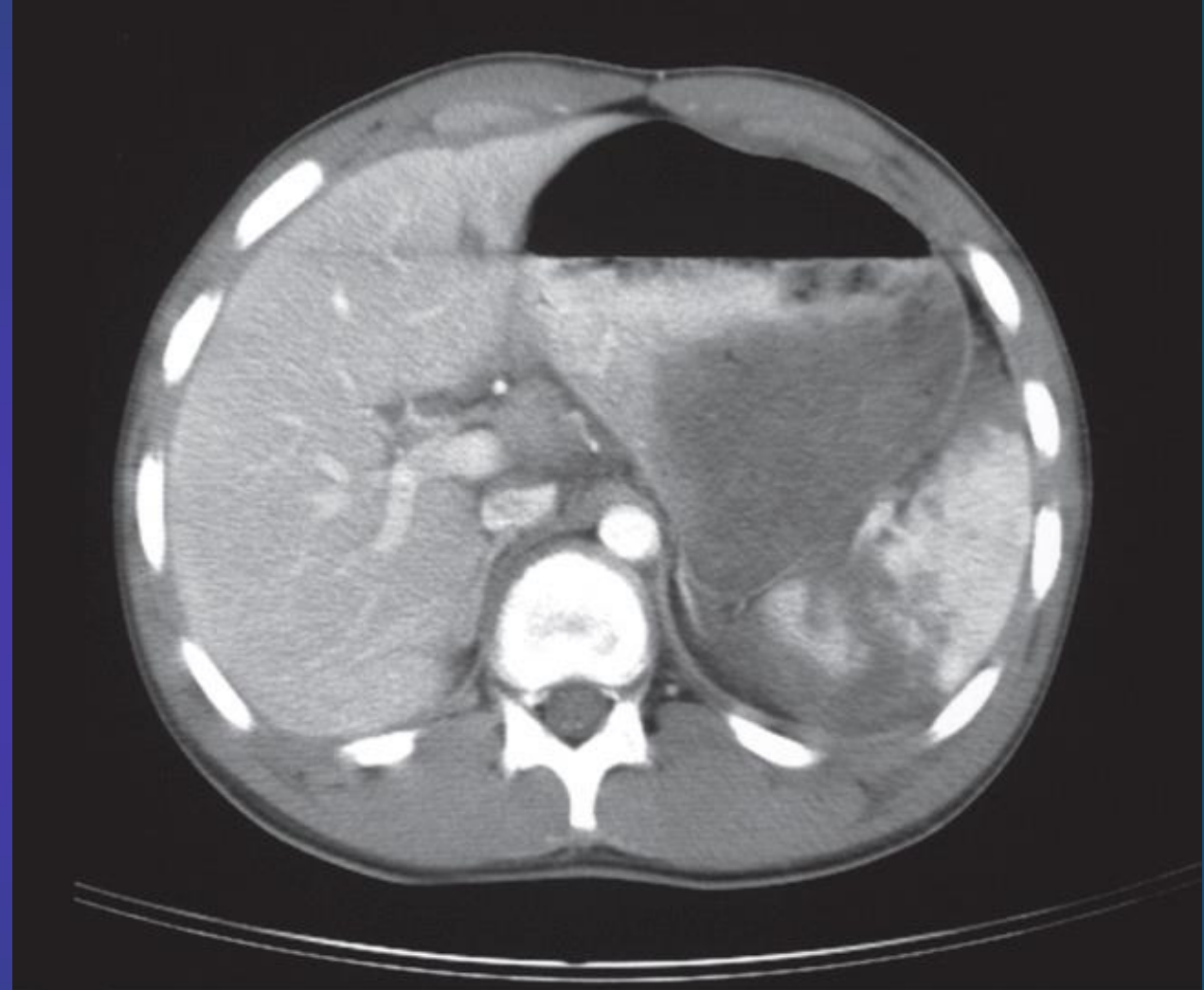


- A. Describe the abnormality marked by arrows in the given image.
- B. What is the most probable diagnosis in the given image.

# Ruptured spleen

CT.

The spleen is shattered with low density blood adjacent to the fragments.



A. Give the name of the used imaging modality .

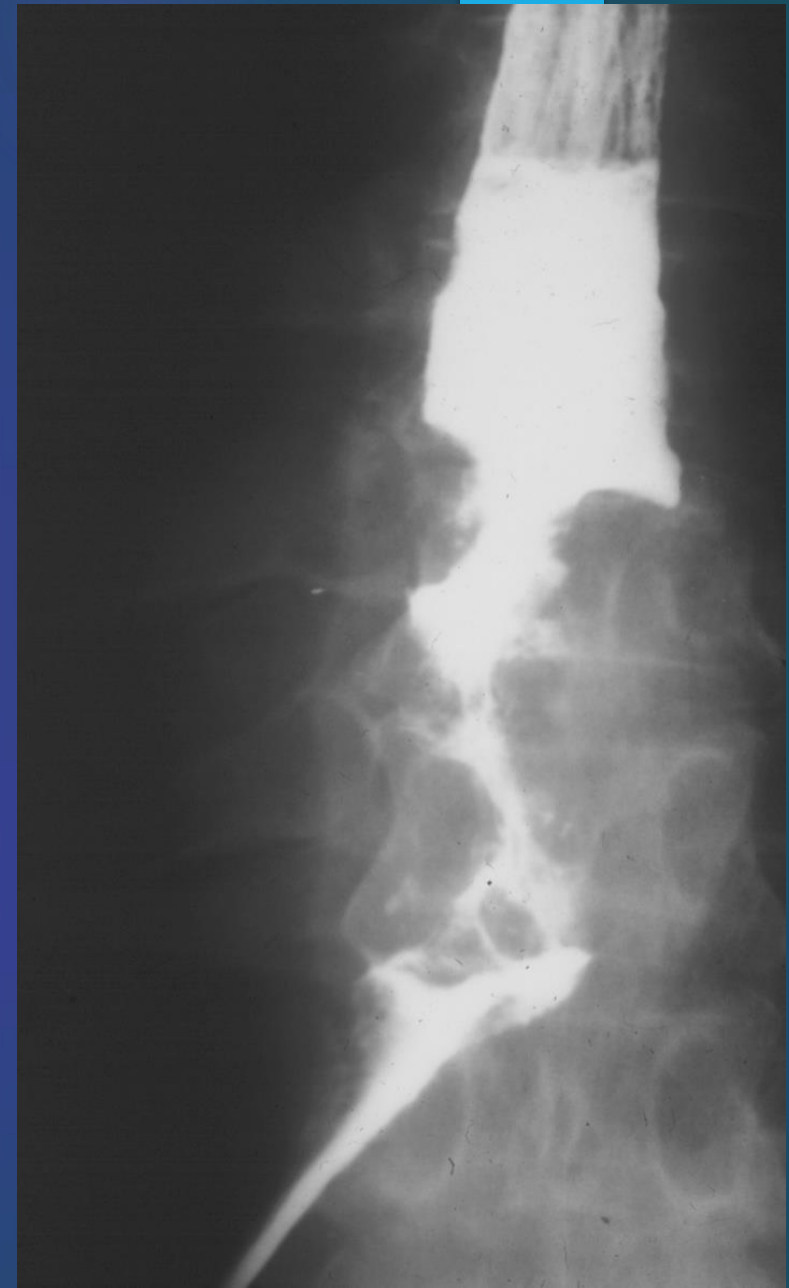
B. What abnormality is demonstrated in the given image?

# DYSPHAGIA

## Oesophageal carcinoma

### **BARIUM SWALLOW**

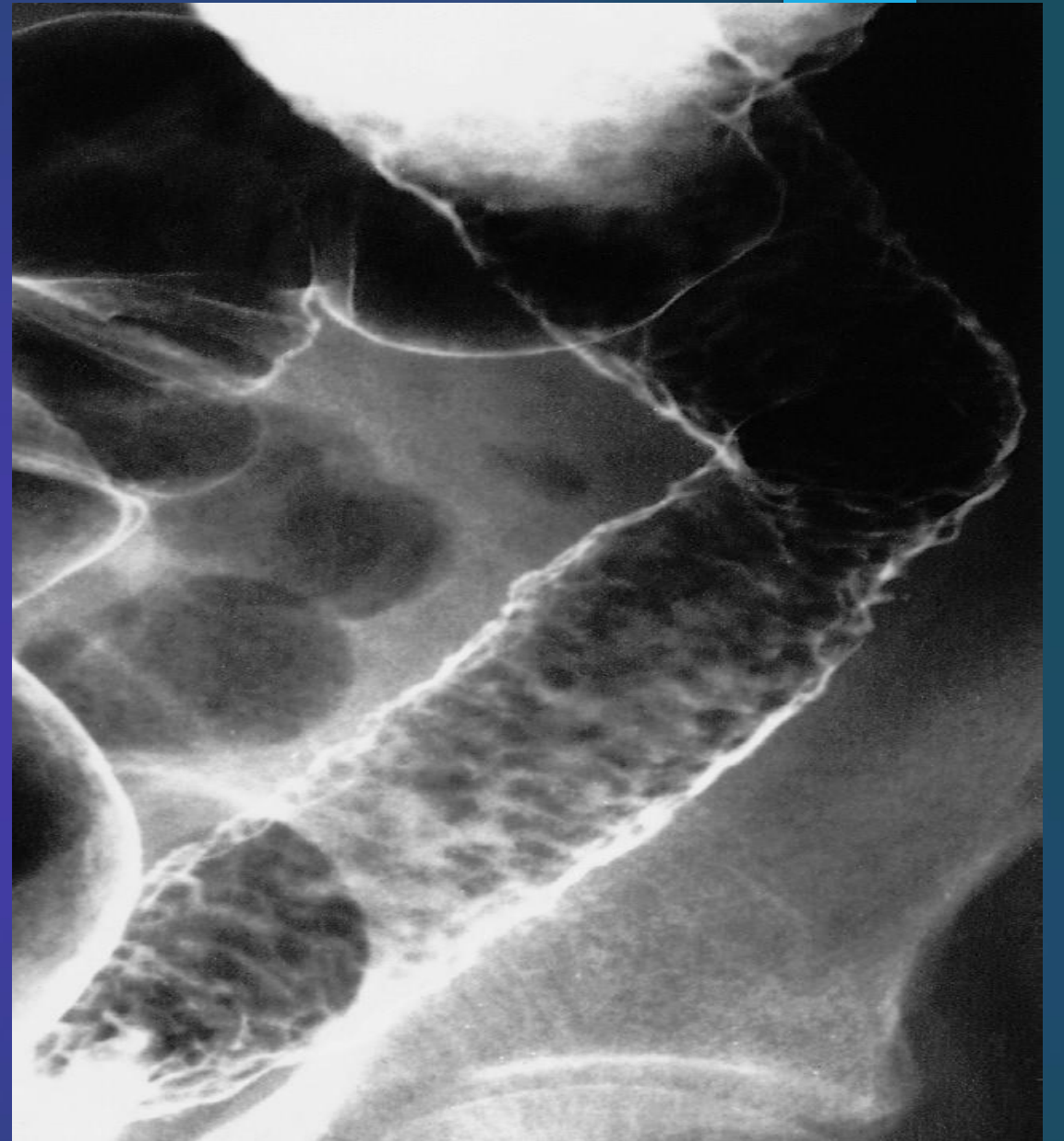
There is an irregular stricture with shouldering at the upper end.





# CROHN'S DISEASE

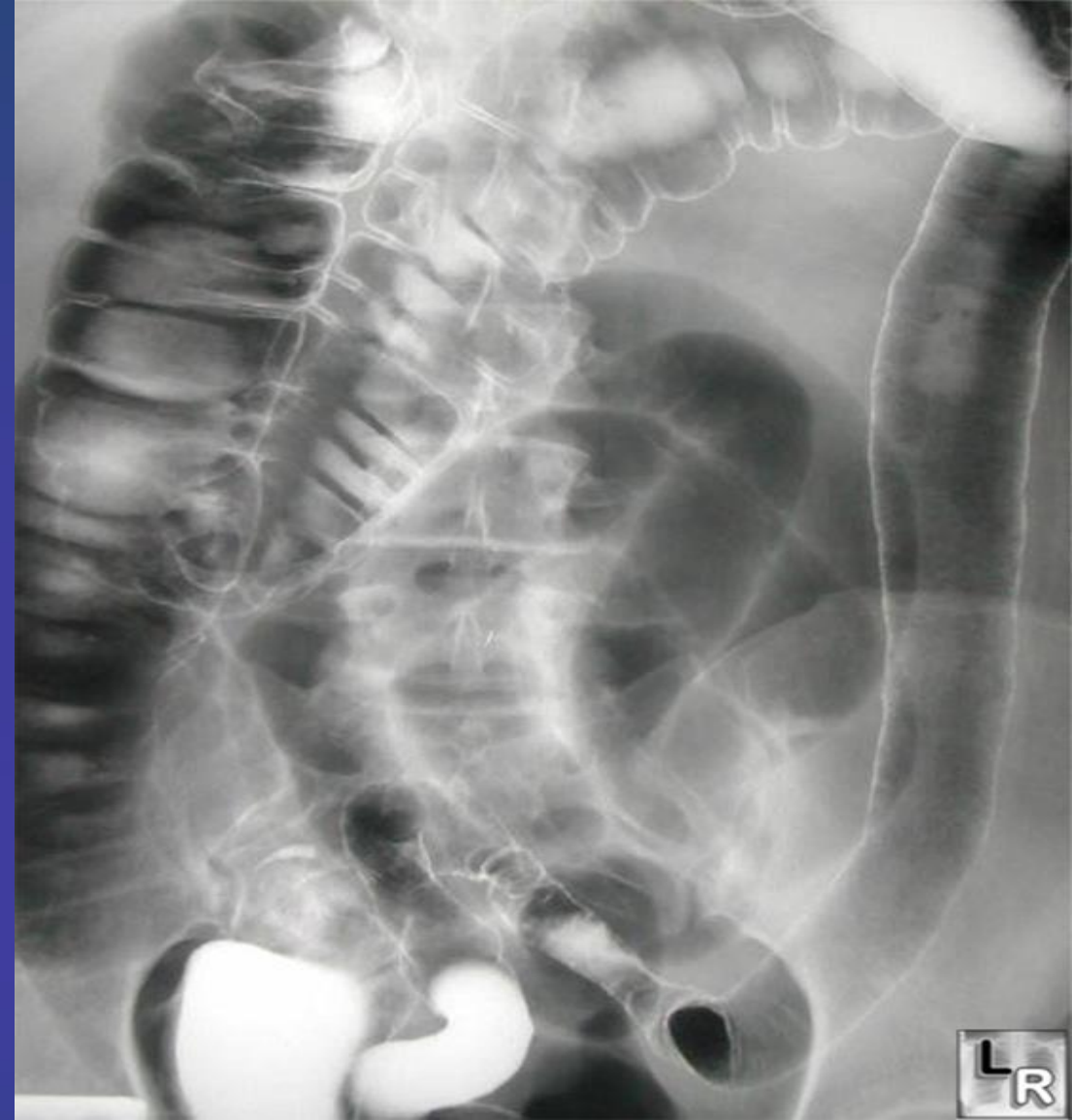
Cobble stone  
appearances







**Ulcerative colitis.**  
Single contrast barium enema  
The haustra are lost  
and the colon becomes narrowed and  
shortened, coming to resemble a rigid tube.



Double contrast barium enema  
**ULCERATIVE COLITIS**  
Narrowing and shortening of colon  
Feature less colon give lead pipe appearances

Abdominal pain  
and diarrhea

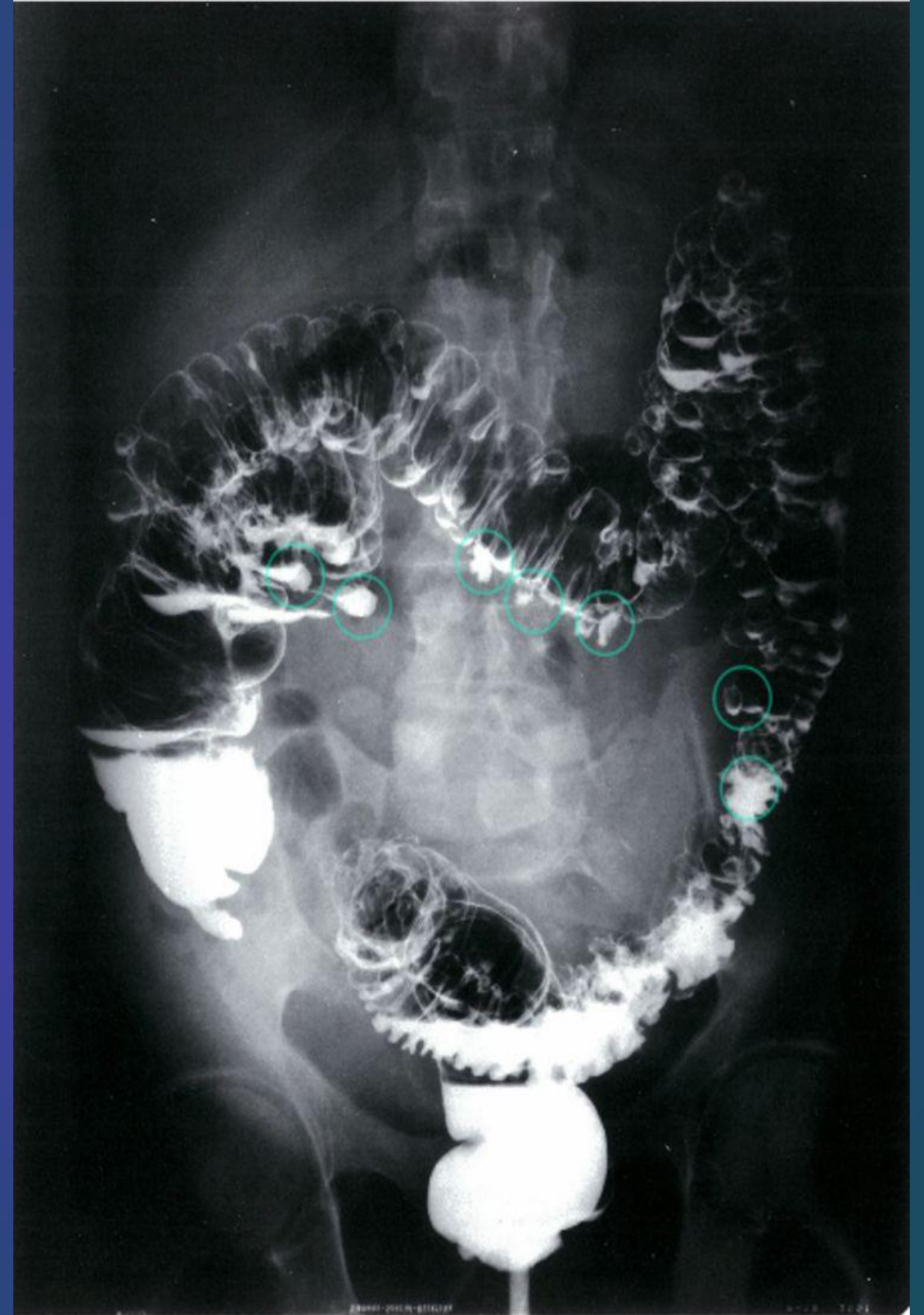
## A. Imaging examination

### 2. Findings or description

### 4. Diagnosis

#### **Diverticulosis**

Double-contrast barium enema of the colon  
Multiple diverticula in the colon can be seen  
(examples circled in green).





## Target sign in intussusception

Ultrasound abdomen (bowel; transverse plane)

Concentric alternating hyperechoic and hypoechoic rings are visible.. Together the alternating layers produce a **target-like appearance (target sign)**

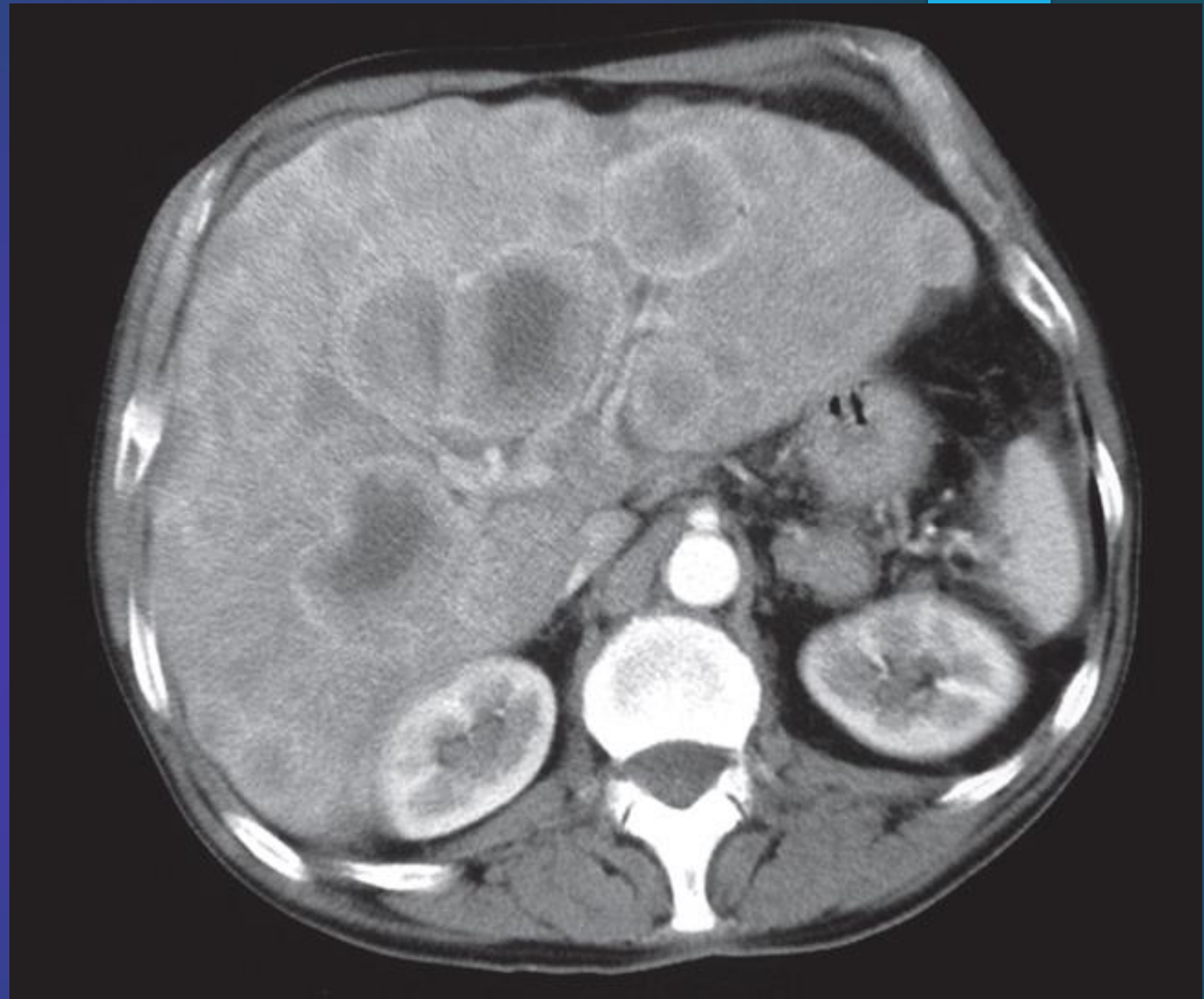


**The patient had carcinoma of the bronchus.**

**CT scan of liver metastases.**

**There are a large number of low density lesions in both lobes of the liver, which show enhancement around their edges.**

**LIVER METASTASIS**





- A. Imaging examination
- 2. Findings or description
- 4. Diagnosis



**Dilated biliary ducts.**

(b) CT scan showing dilated intrahepatic ducts (arrows) in the liver.

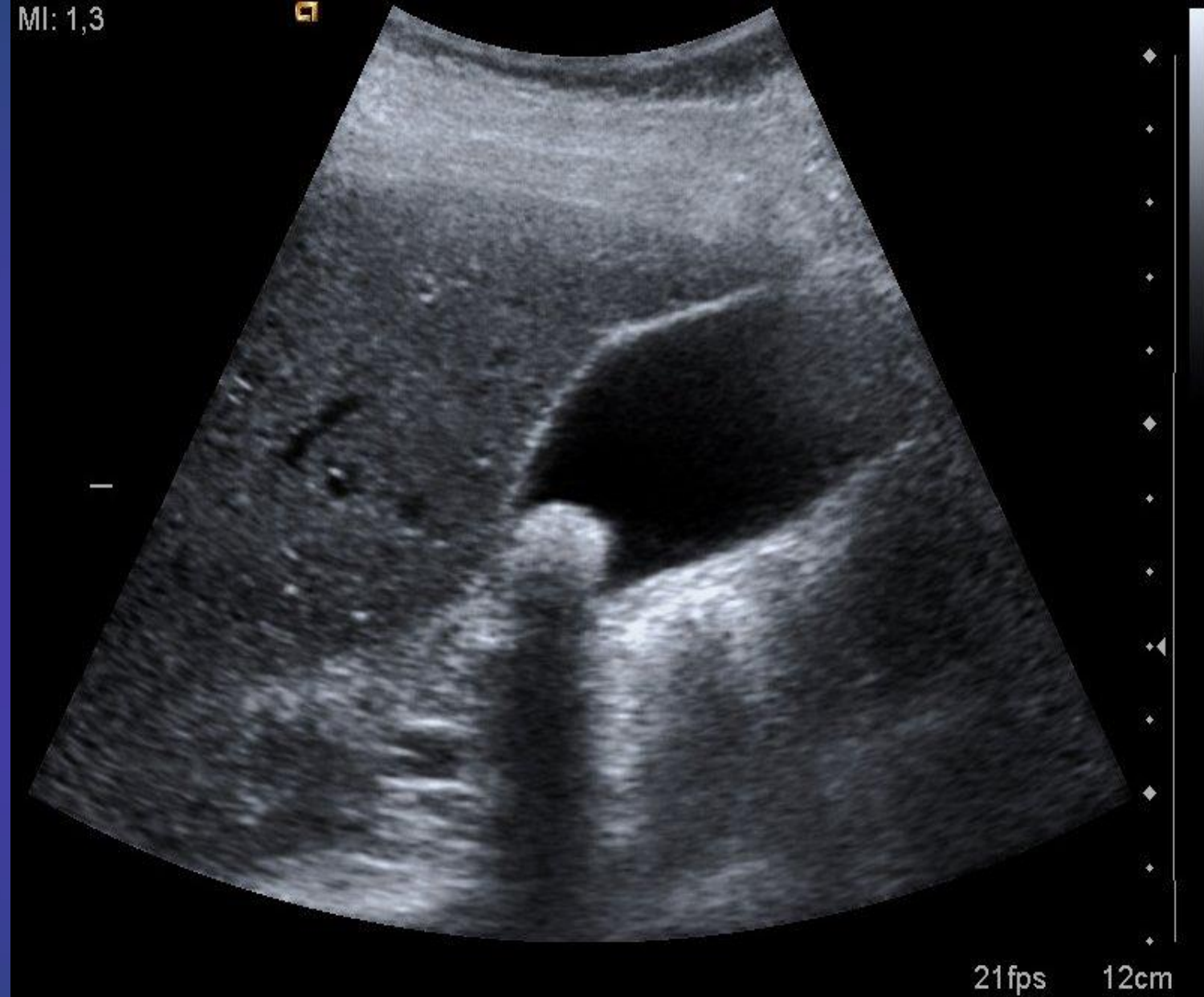
# LIVER ABSCESS





Acute abdomen

Cholelithiasis







**Perforated appendicitis due to fecalith**

CT abdomen (IV contrast; axial section)

There is distension of the appendix (. A well-defined, round, hyperdense lesion (black arrow), characteristic of an appendiceal fecalith. A small pocket of extraluminal air (red overlay)

# **RADIOLOGY OF MUSCULOSKELETAL SYSTEM (1)**

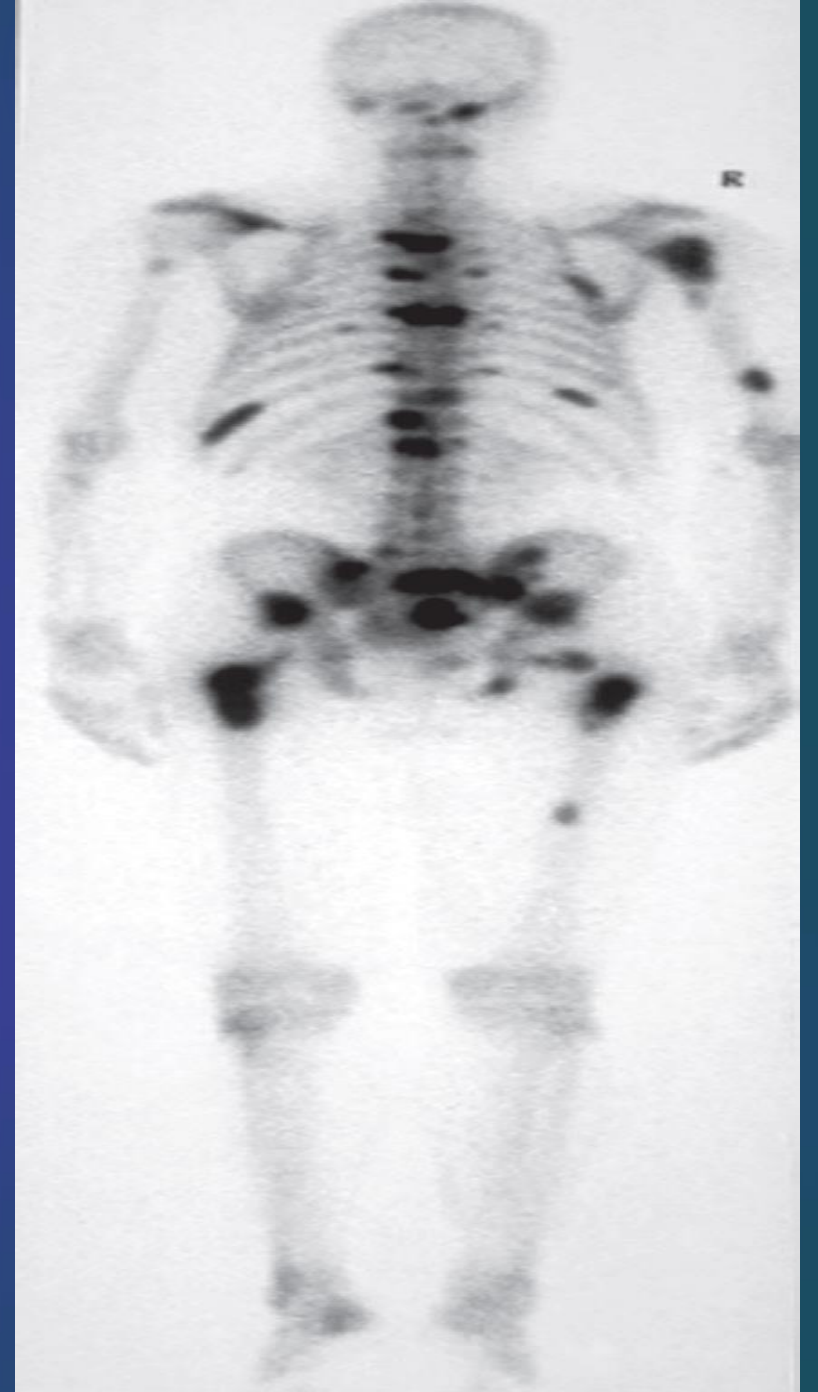
# Ca. Prostate

## SCINTIGRAPHY /RADIONUCLIDE BONE SCAN

Multiple areas of increased uptake

**Mets**

- A. Give the name of the used imaging modality
- B. What is the most probable diagnosis ?
- C. Describe the abnormality.



**Electric shock or epileptic seizure**



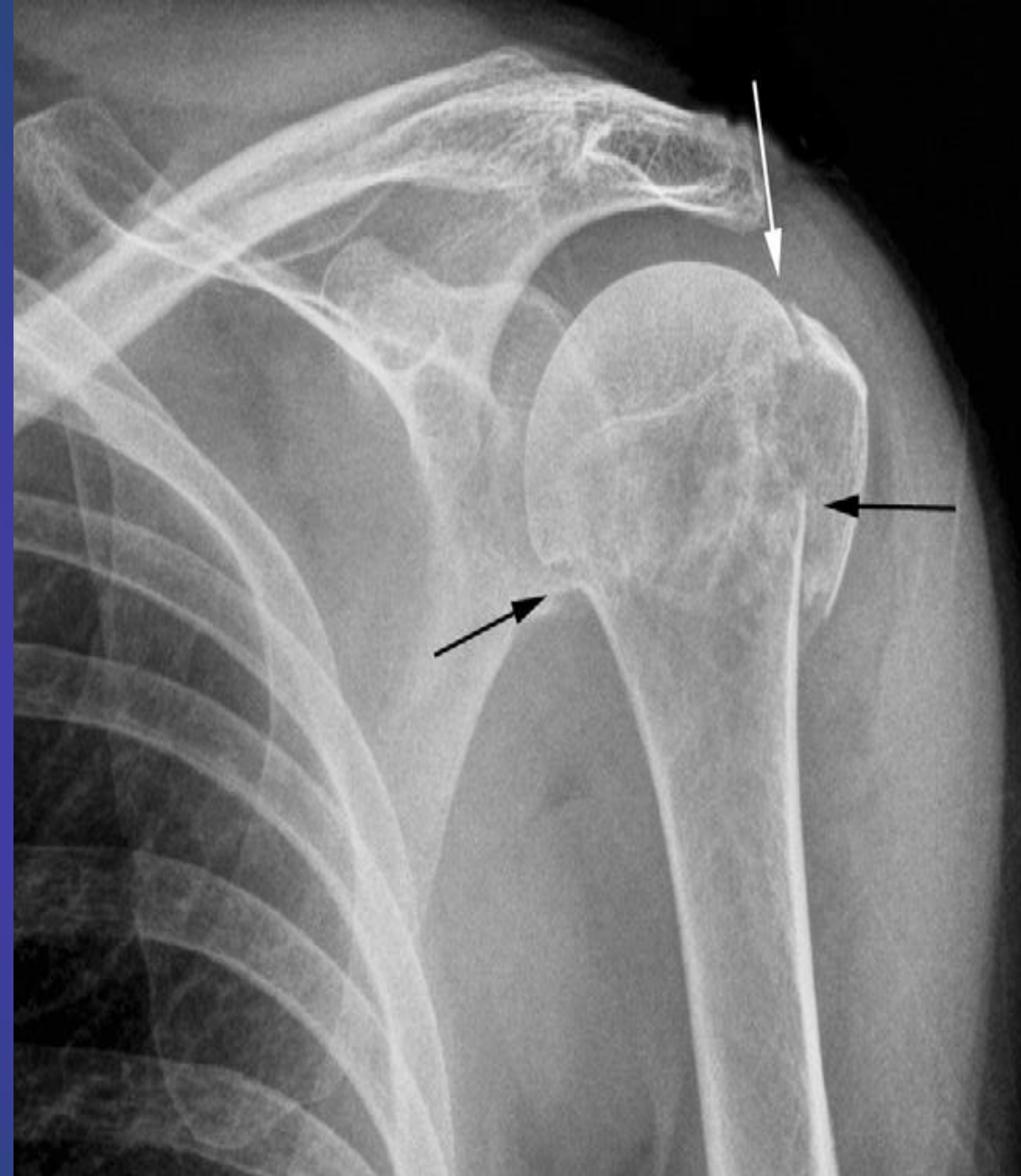
**'lightbulb' appearance of the humeral head.**

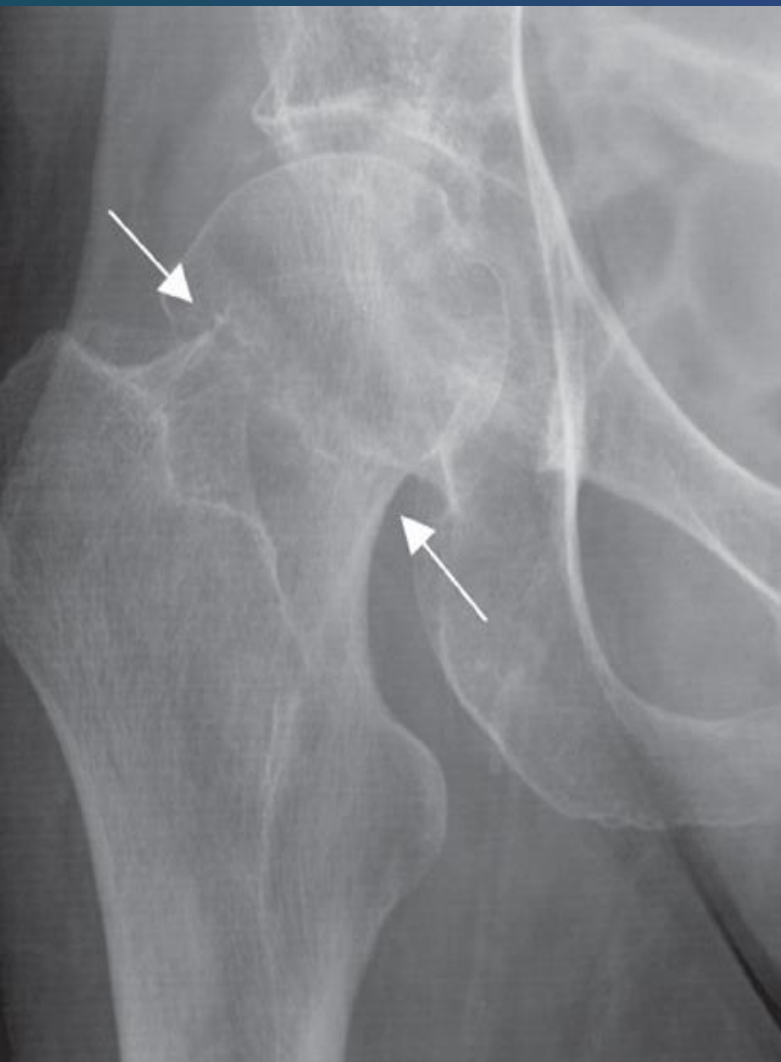
**Posterior dislocation of the shoulder**



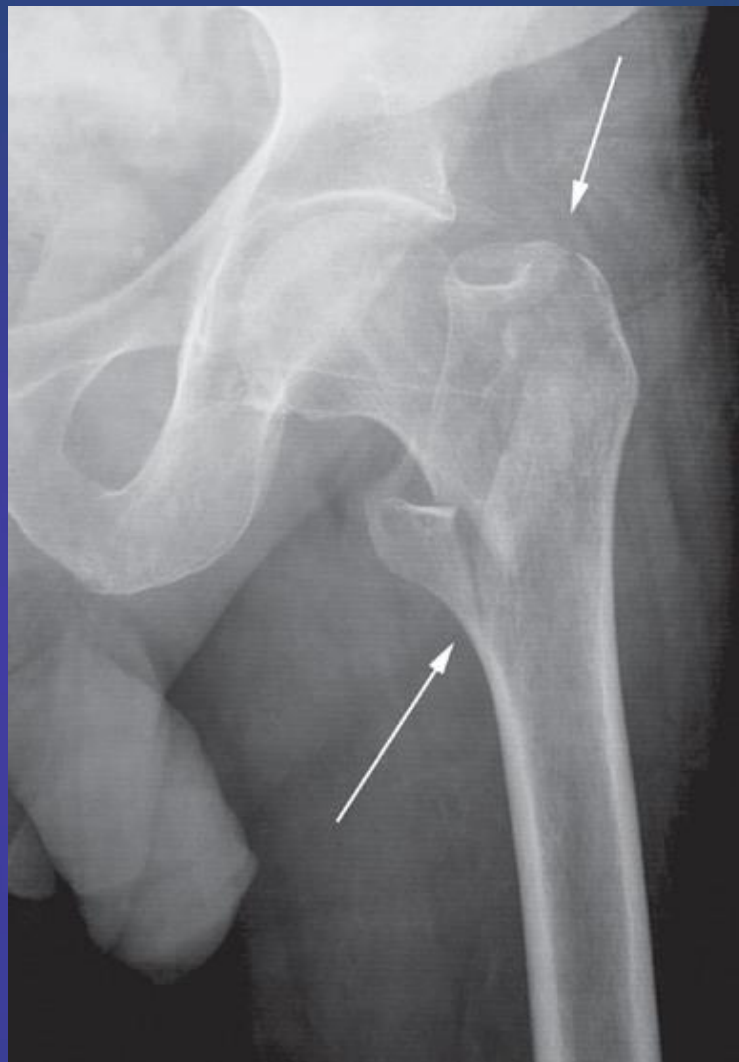
**Fracture of the neck of the humerus (black arrows)**

**The greater tuberosity is also fractured (white arrow)**





Impacted femoral neck fracture (arrows) causing only a sclerotic line and disruption of the trabecular architecture.



**Intertrochanteric fracture (arrows) between the greater and lesser trochanters.**



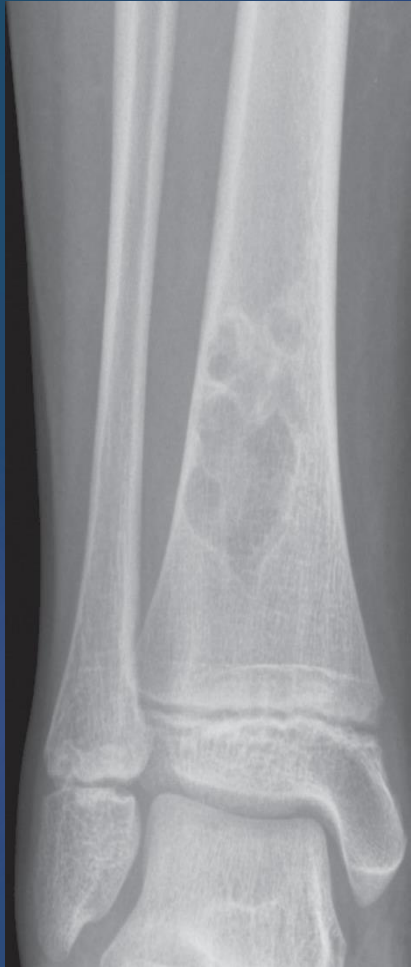
Pelvic ring fracture  
X-ray pelvis (AP view)  
Bilateral pubic ramus fractures are also present.



**Spiculated** (sunray) periosteal reaction in a case of **osteogenic sarcoma** (arrows).



**'Onion skin'** periosteal reaction in a case of **Ewing's sarcoma** (arrows). Here the periosteal new bone consists of several distinct layers.



Describe the lesion  
Diagnosis

A well-defined sclerotic edge can be seen indicating a **benign lesion**.  
**a fibrous cortical defect**

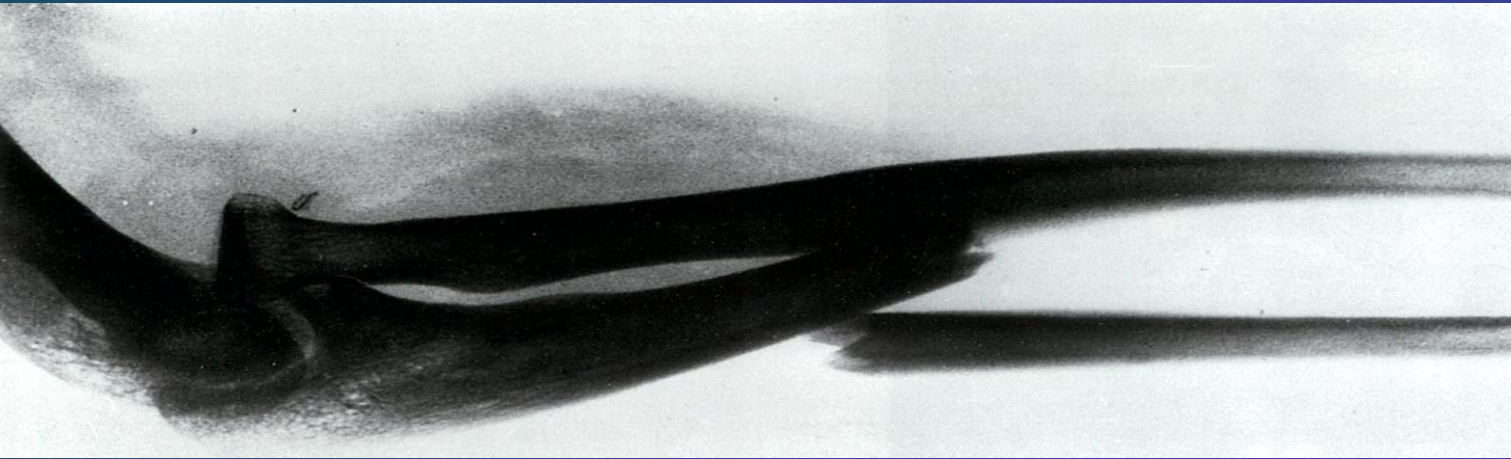


well-defined area of compact bone in the neck of the femur (arrow)  
This common finding is without significance.



**A. Describe the abnormality?**

**B. Name of fracture?**



**Monteggia fracture-dislocation**

**X-ray of the elbow (lateral view)**

Fracture of the **proximal ulna** with **anterior dislocation** of the **head** of the **radius**.

**Galeazzi fracture and fracture of the first metacarpal bone**

**X-ray of the distal lower arm (left, lateral view; right, PA view)**

A distal third radius fracture and distal ulnar head dislocation can be seen; this fracture pattern is referred to as a Galeazzi fracture. Fracture of the first metacarpal bone



Imaging modality?  
Finding  
Diagnosis



MRI scan. with a tear the anterior Cruciate ligament (disrupted).



Tear of the medial meniscus. Sagittal MRI through the medial part of the knee joint showing a tear in the posterior horn of the medial meniscus. The anterior horn appears normal.

# **RADIOLOGY OF MUSCULOSKELETAL SYSTEM (2)**

# Rickets

- Growth plate is widened
- Metaphysical margin is cupped and irregular

A. Give **ONE** radiological sign for an abnormal wrist/knee.

B. What is the most likely diagnosis in the given image?

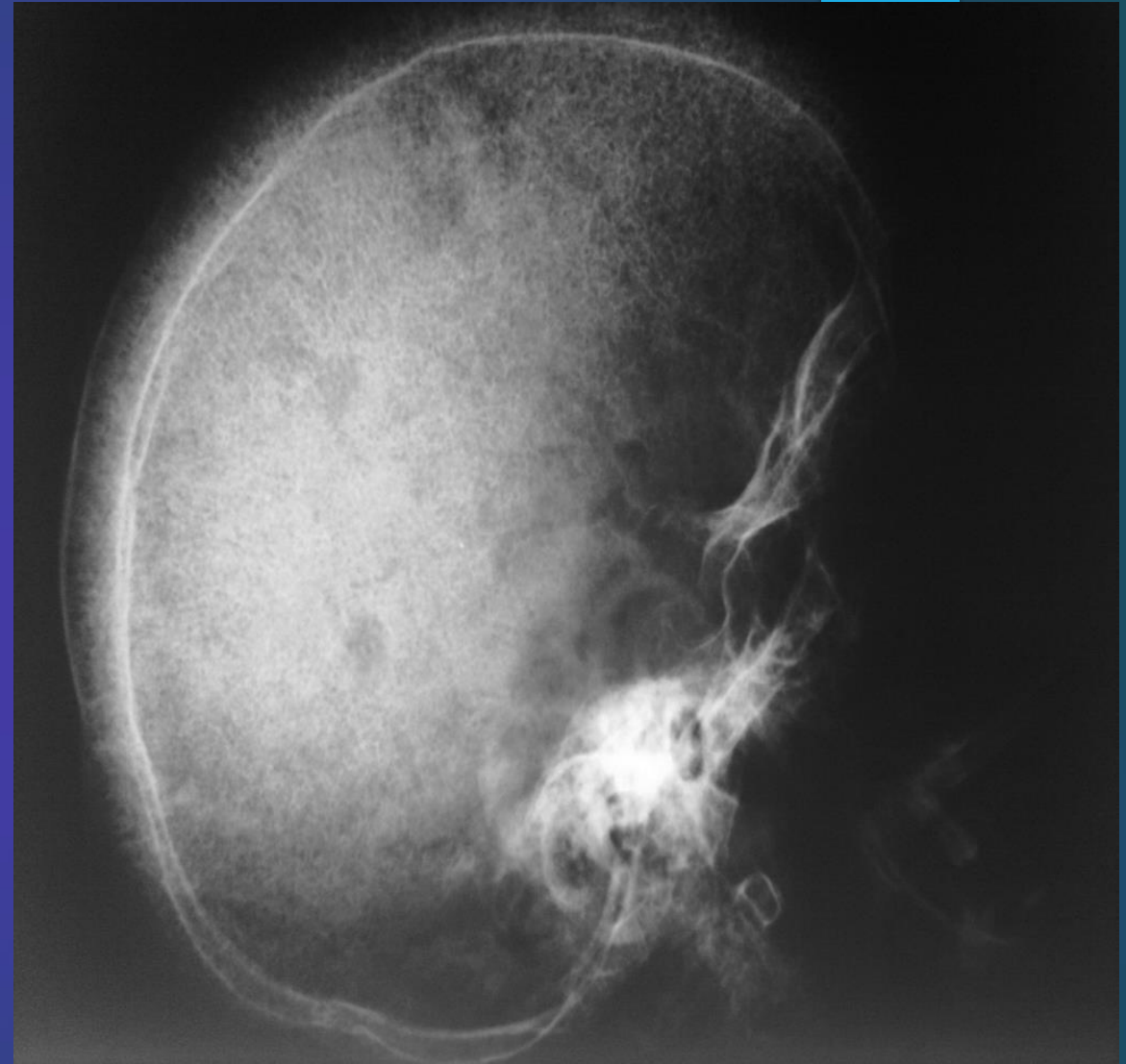




**Thalassemia**

**Skull x-ray**

**Hair on end appearance**



# Osteopetrosis

Generalized increase in bone density



# Rheumatoid Arthritis

## Radiological sign:.

- ✓ Around joint, periarticular osteopenia/osteoporosis
- ✓ Changes more to the proximal joints than distal
- ✓ Swan neck and Boutonnière deformity and extensive erosive







A. Give the name of the used imaging modality.

B. What name is given to this appearance of the spine?



Bamboo spine  
Ankylosing spondylitis

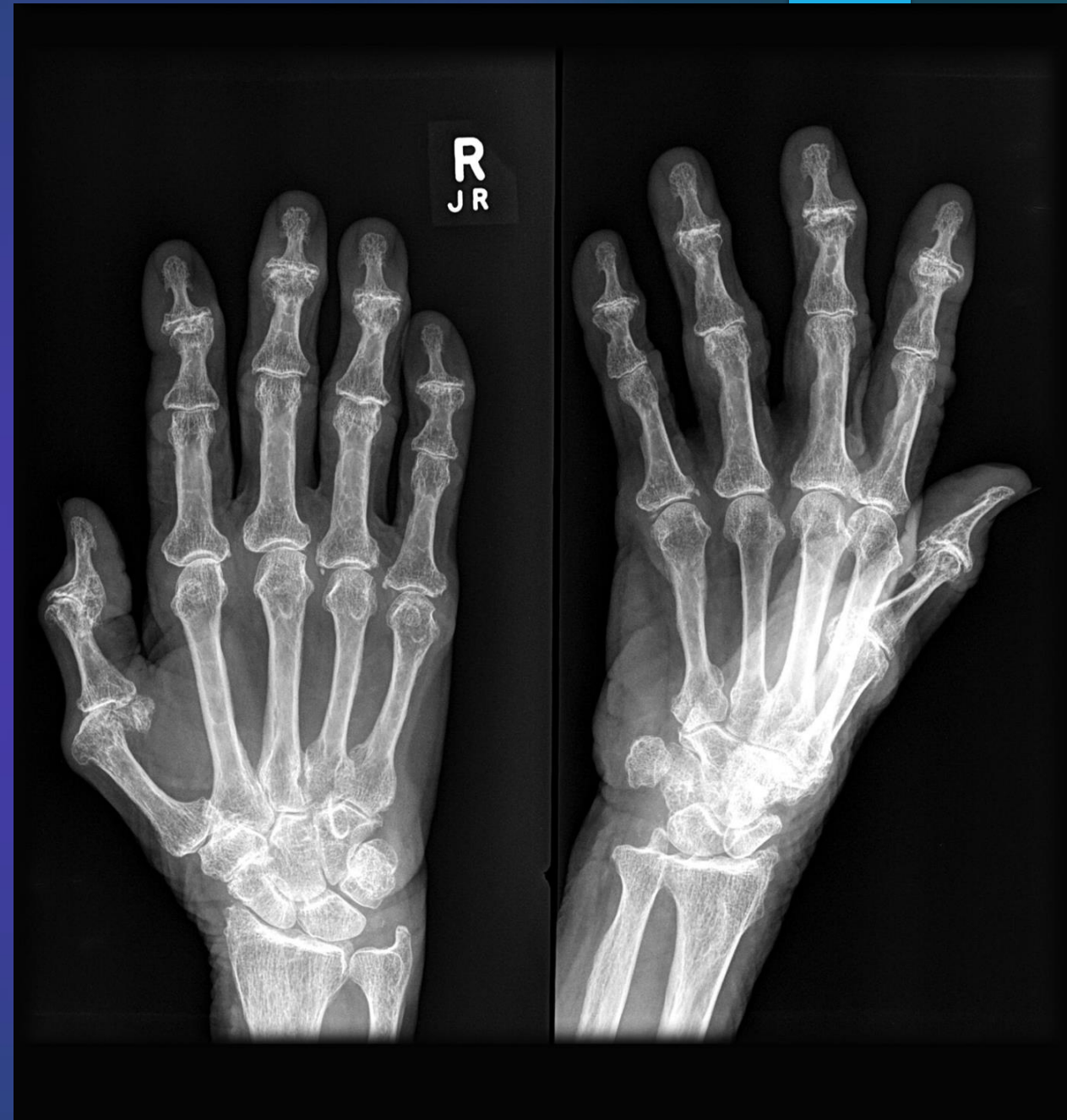
Rugger jersey spine' (renal osteodystrophy)



# Osteoarthritis

60-Year-old patient with pain in the hands.

- ✓ Distal: osteosclerosis
- ✓ **Osteophytes (Osteospike)**
- ✓ Reduction of the joint space, sclerotic changes.



**Imaging modality**  
**Findings**  
**Diagnosis**

Lateral compartment osteoarthritis of the knee  
X-ray right knee (AP view)

Marked lateral compartment narrowing is accompanied by subchondral sclerosis and osteophyte formation. Tibial spine osteophytes are also visible.





Bilateral osteonecrosis of the femoral head  
MRI hips (T1 weighted; coronal view) of a 32-year-old woman with groin pain

There is a well-defined crescent-shaped area of intermediate to low signal within the subchondral marrow of the left femoral head . On the right side, there is a slightly smaller area of abnormal oval-shaped signal within the epiphysis of the right femoral head.



**Coronal MRI scan** showing avascular necrosis of both femoral heads. The changes on the left are very severe and advanced. The changes in the right hip are relatively early and show a rim of low signal demarcating the ischemic area (arrows)



**Plain x-ray**

**Avascular necrosis of lunate**





## Giant cell Tumor.

Growth plate is closed  
Expansile lytic lesion,  
Eccentric in the  
metaphysis.



X-ray film shows :

Destruction of the upper end of the tibia

Periosteal reaction along the tibia.

**Osteomyelitis**



# Imaging of Urinary system

**Renal arteriogram**

**Anatomy ?**

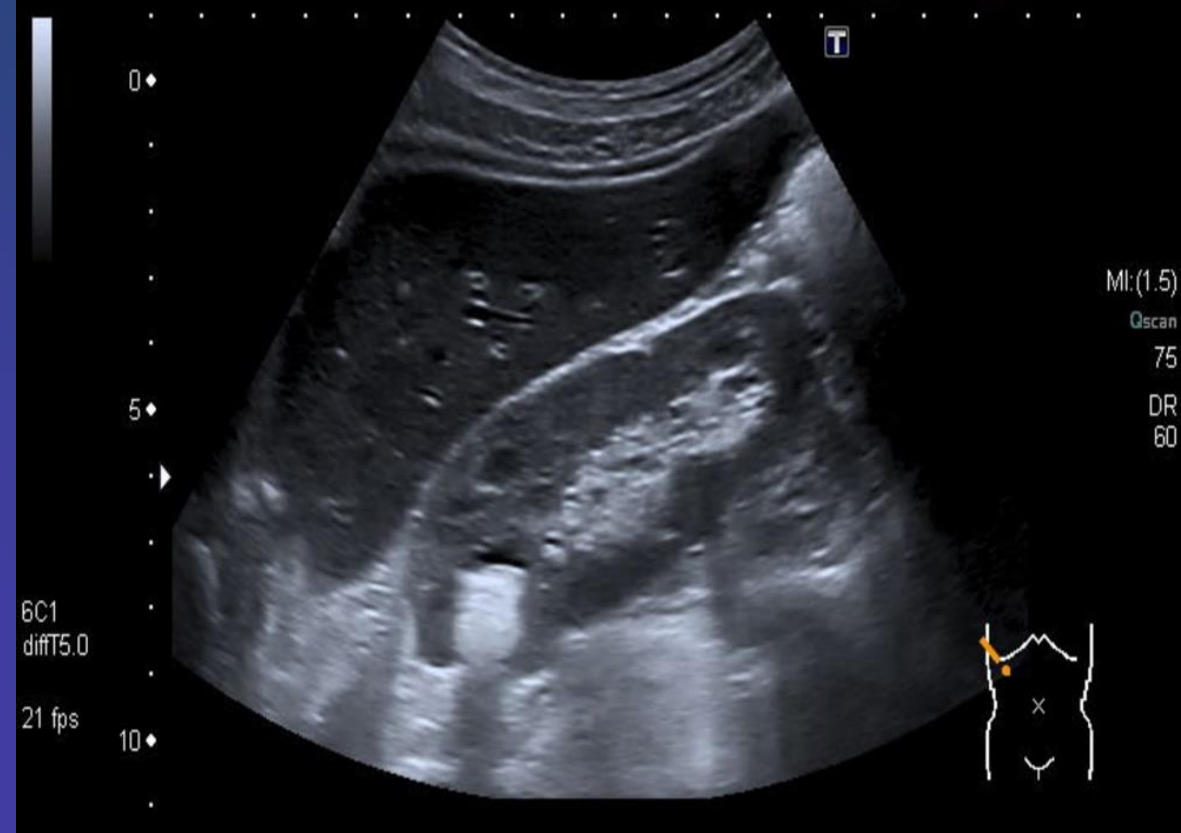






**Abdominal CT with IV contrast , coronal section**

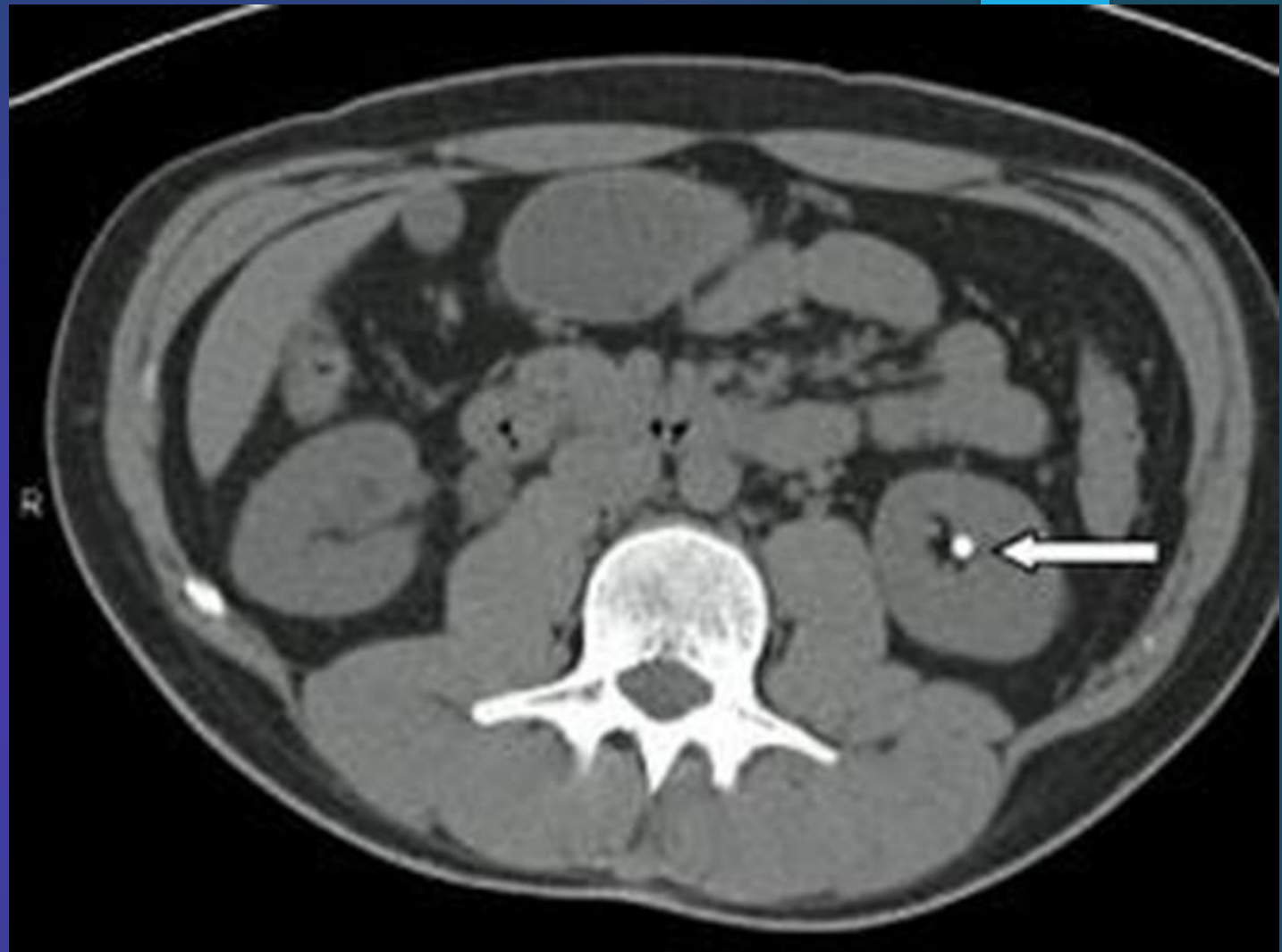
**Hyperdense calculi** located in the proximal third of the left ureter. As a result, the **proximal ureter and the renal pelvis** are dilated.



There is a round, hyperechoic lesion at the upper pole of the kidney in the renal parenchyma, which shows a dorsal acoustic shadow and is most likely **a kidney stone**.

# Kidney stone

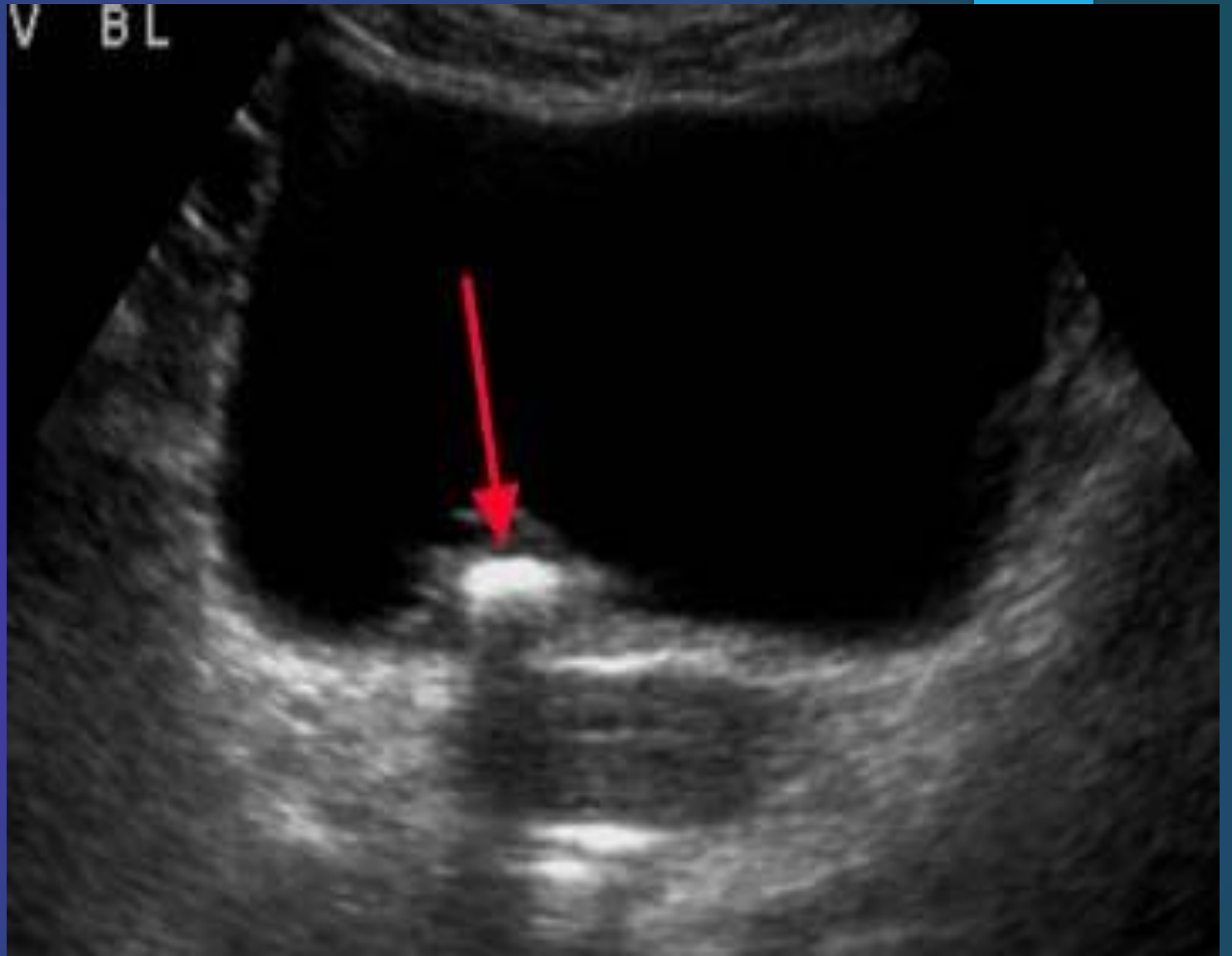
CT without contrast



- A. Give the name of the imaging examination in the given image.
- B. Identify the abnormality marked by arrow in the given image?

**Ultrasound**

**Bladder calculus**



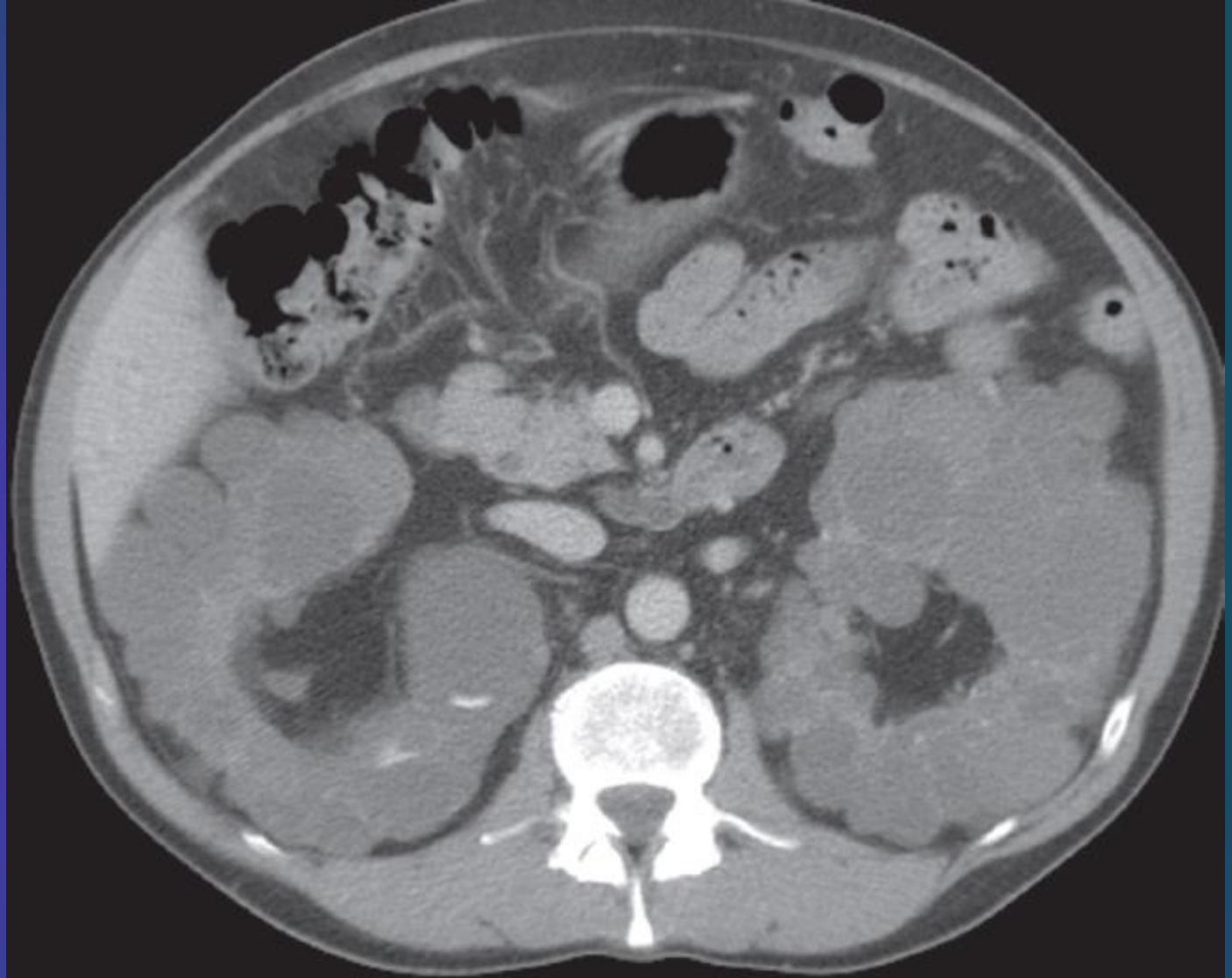


# Polycystic kidneys disease

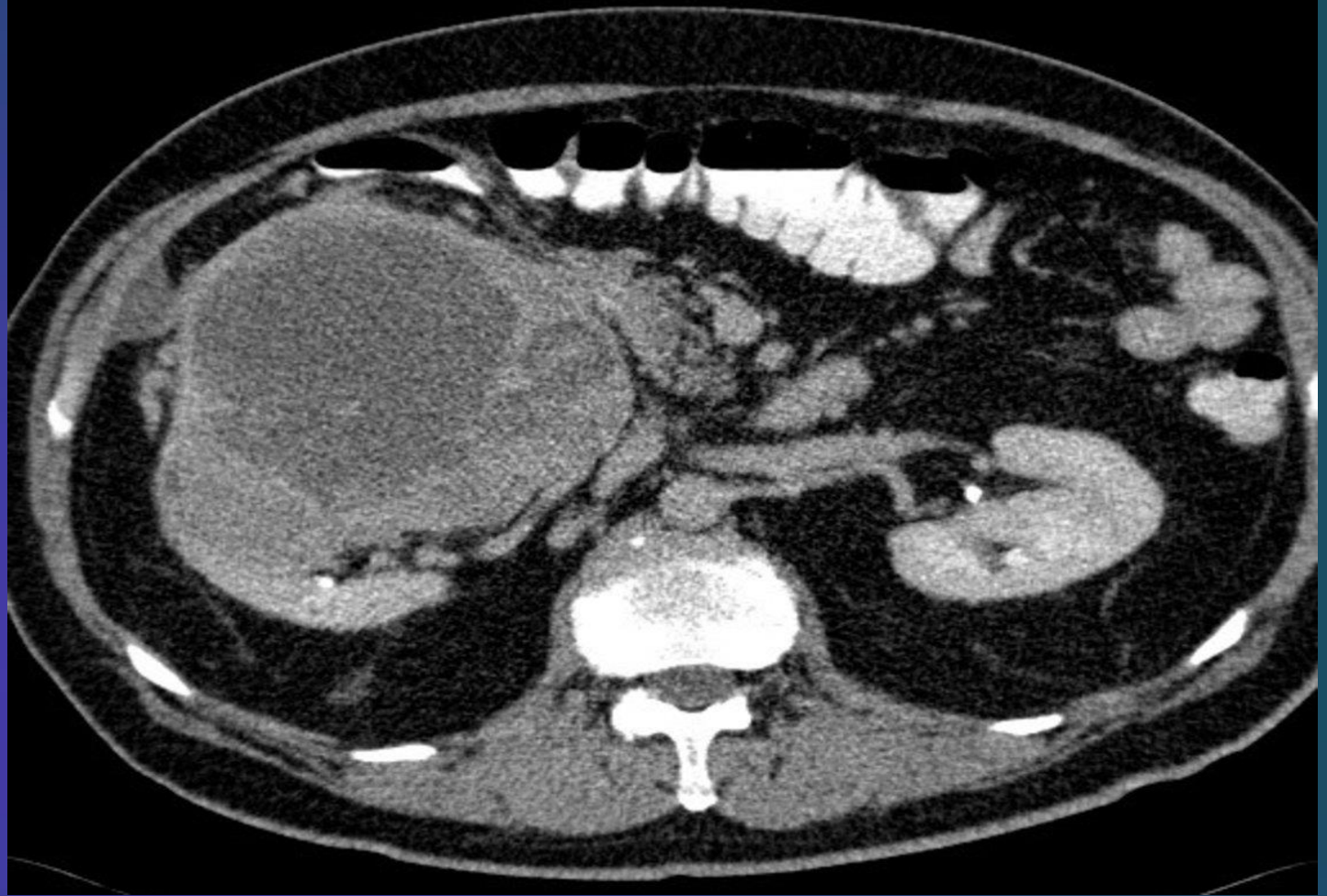


CT abdomen (with contrast; coronal plane)  
Both kidneys are markedly enlarged and feature multiple round-to-ovoid, hypodense lesions of various sizes compatible with cysts. Some smaller cysts are present in the liver.

**The CT features are consistent with autosomal dominant polycystic kidney disease (ADPKD).**



CT scan, taken after intravenous contrast enhancement, showing that both kidneys are greatly enlarged and almost entirely replaced by cysts of variable size.



**Axial CT of the abdomen after oral and IV contrast medium administration**

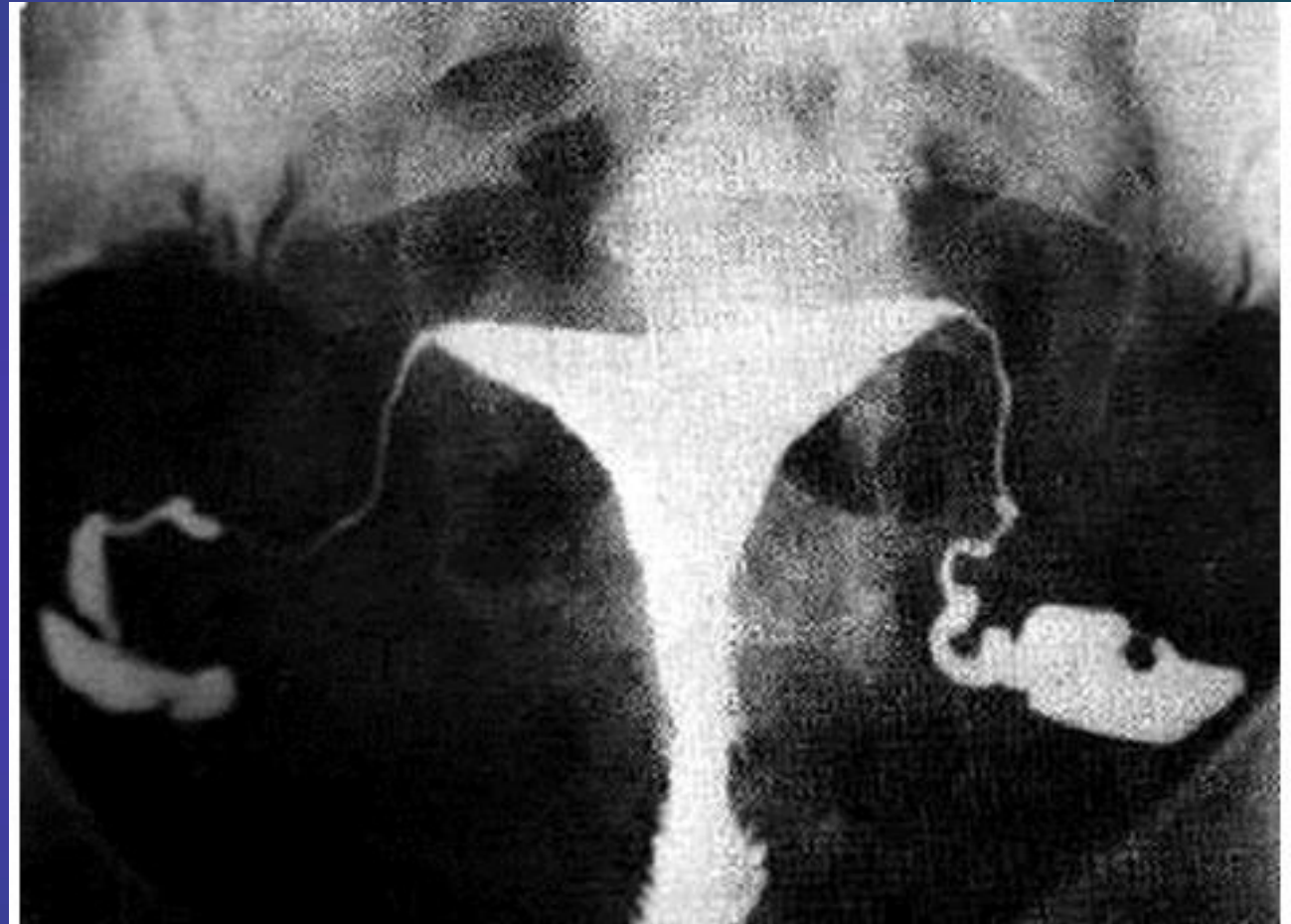
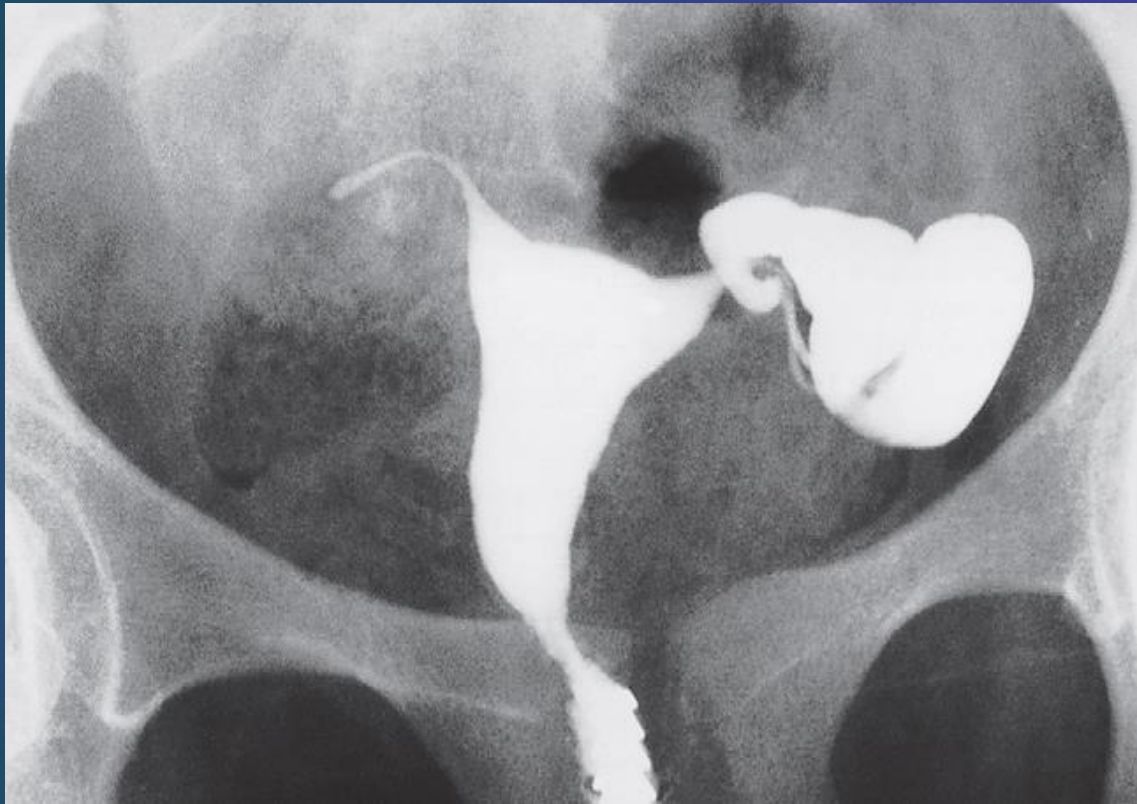
A large, relatively sharply demarcated tumor can be seen in the right kidney. This finding is characteristic of **renal cell carcinoma**.

# **FEMALE REPRODUCTIVE SYSTEM IMAGING**



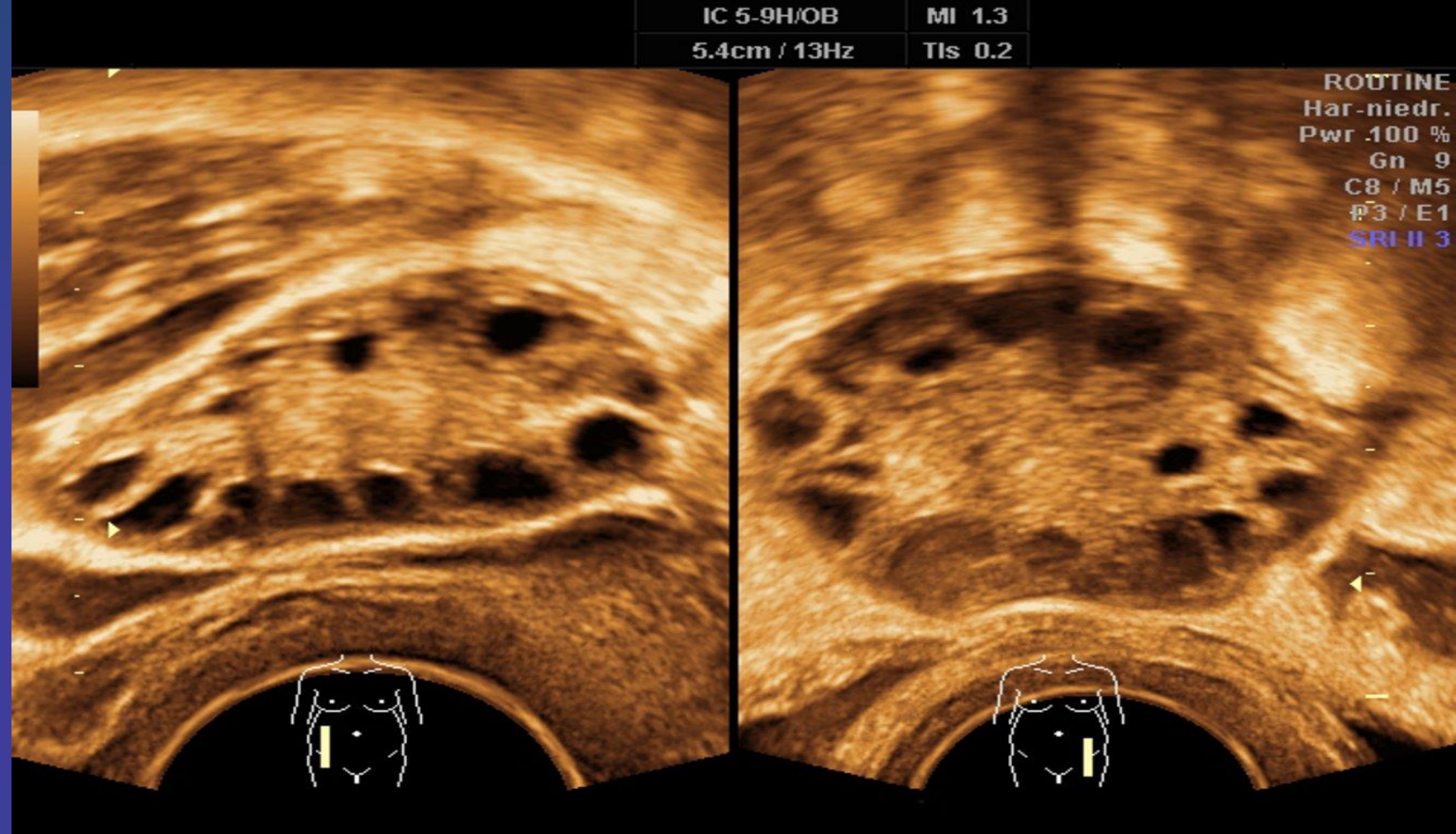
# HSG – Bilateral Hydrosalpinx

## HSG – Unilateral Hydrosalpinx





- A. Imaging study
- B. Describe the abnormality
- C. What is the most likely diagnosis.



Transvaginal ultrasound of the right and left ovary: both ovaries contain multiple anechoic cysts. There is a relative increase of stromal tissue and capsule thickness with increased ovarian size.

This is a typical finding in polycystic ovary syndrome.

# Calcified Uterine Leiomyoma

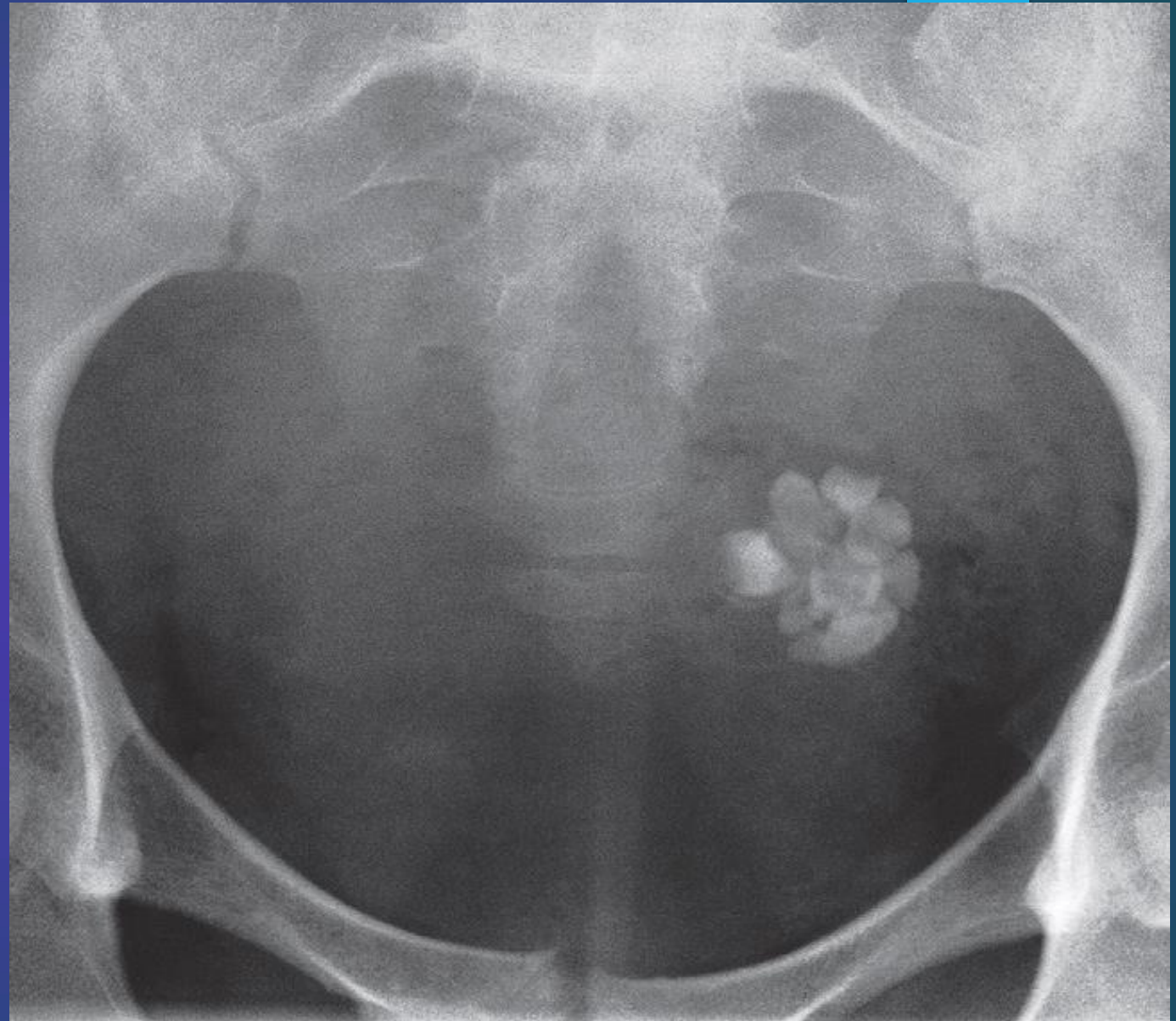


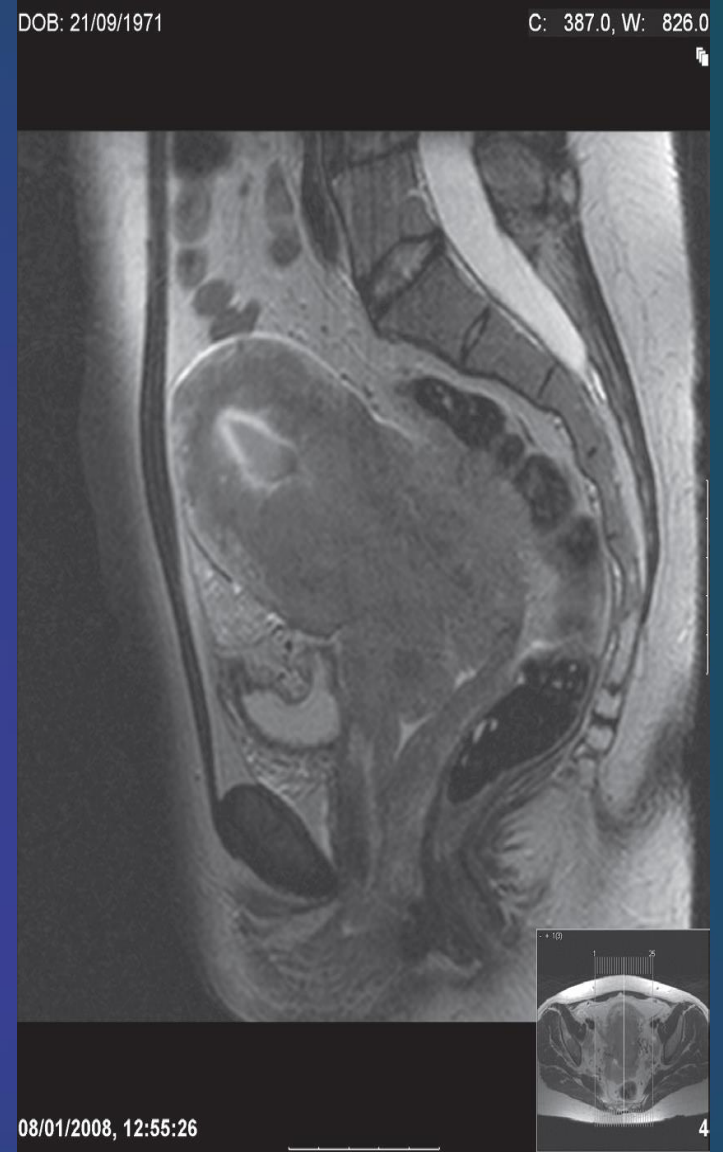
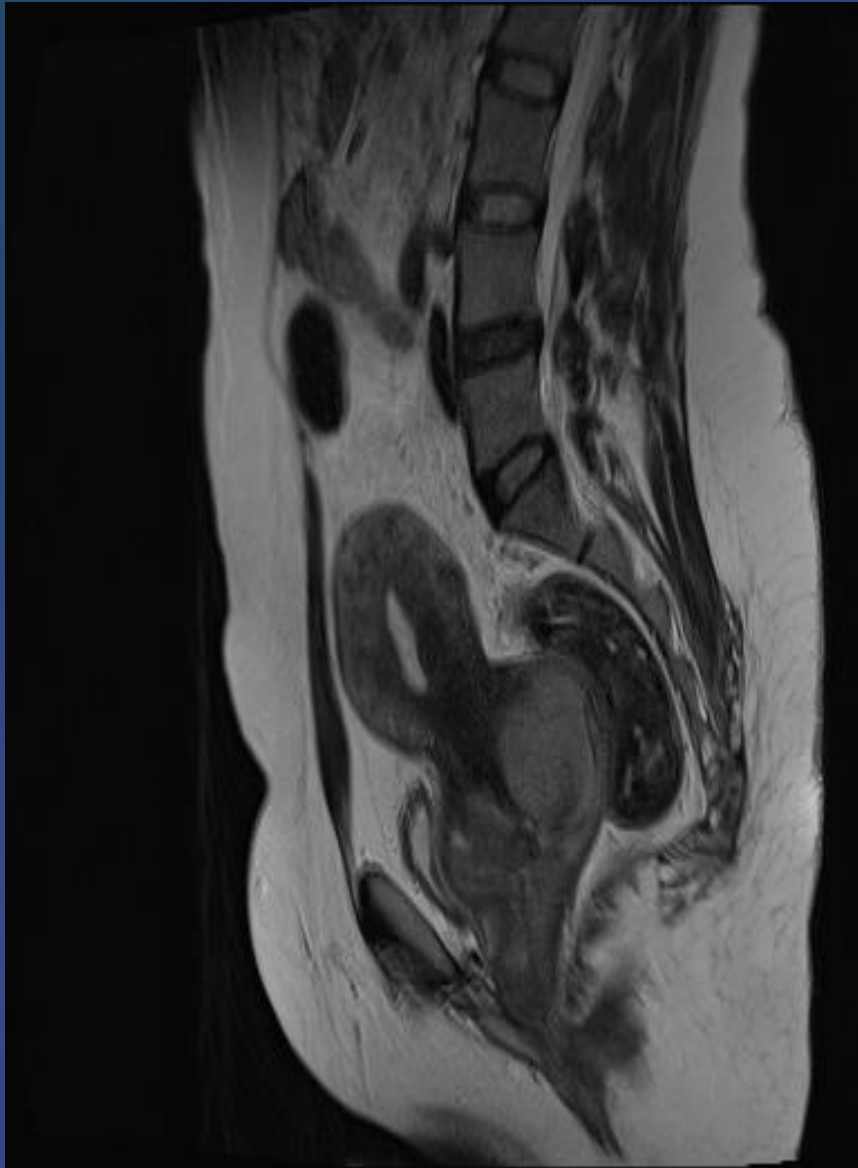
**Plain radiograph :** Calcification in a large uterine fibroid.



## **Dermoid cyst.**

Plain film of showing well-developed teeth within the cyst.



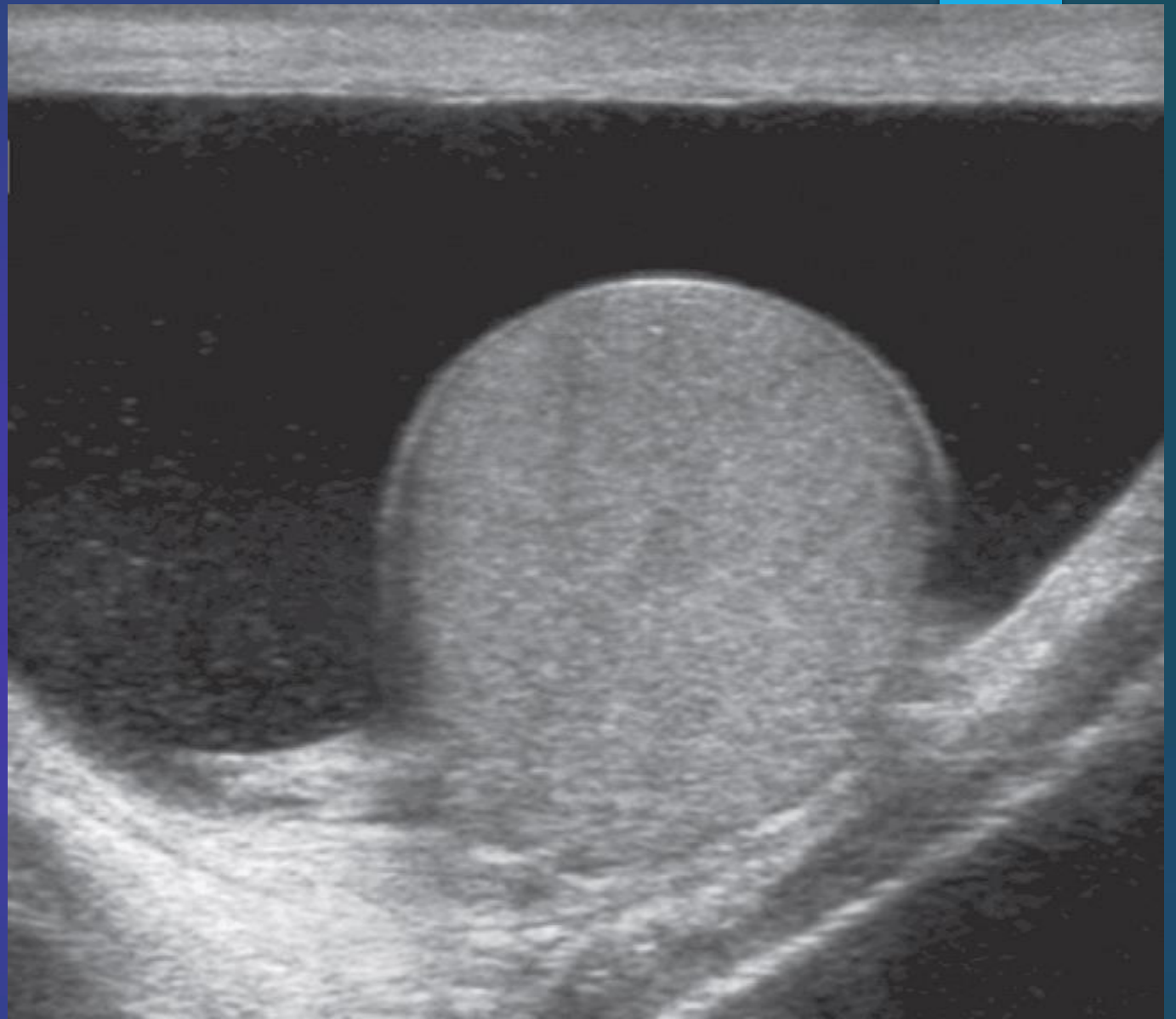


Two different cases. T2 weighted sagittal MRI showing carcinoma of cervix



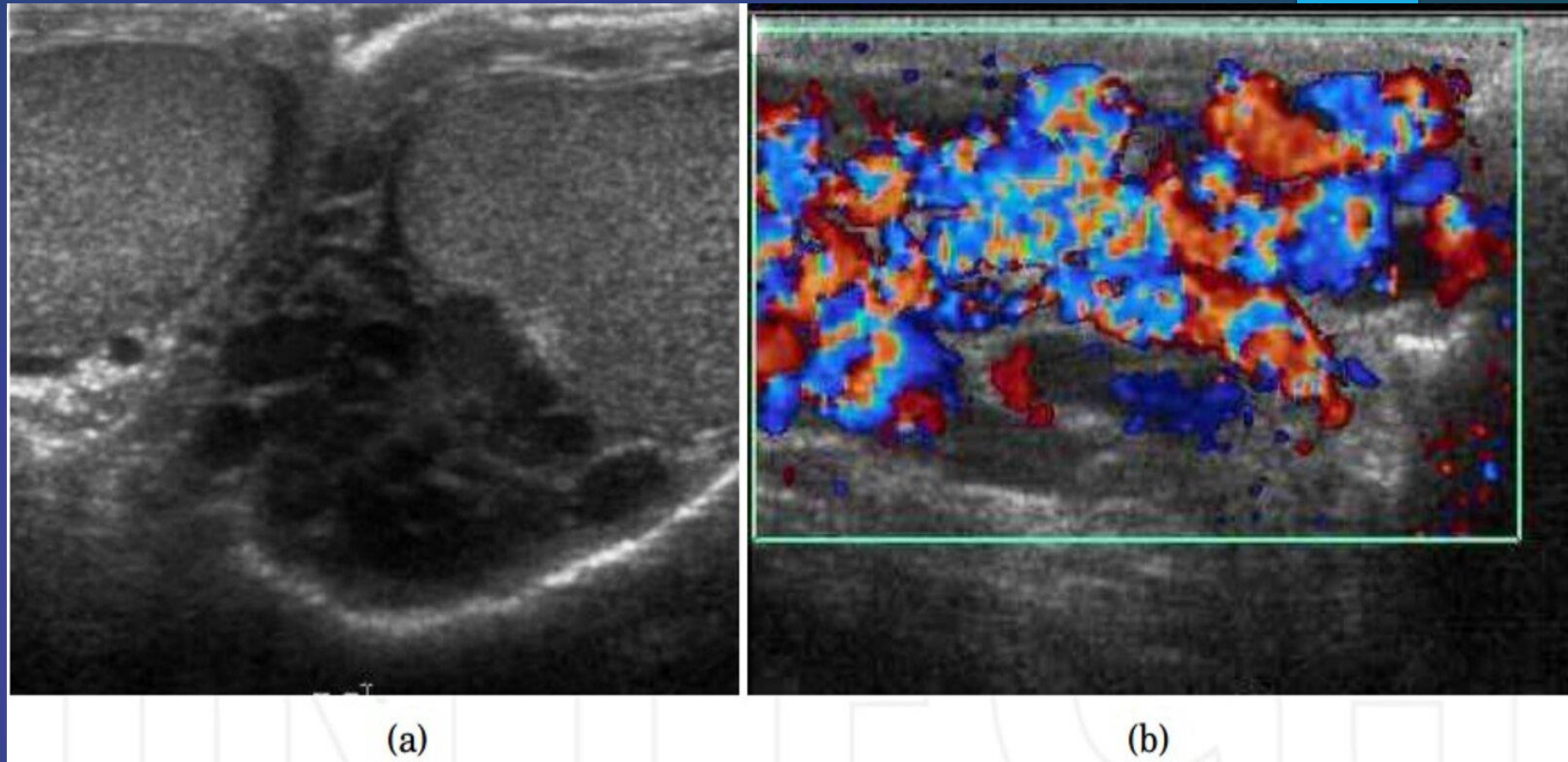
# **MALE REPRODUCTIVE SYSTEM IMAGING**

## Scrotal US



**A hydrocoele** is demonstrated surrounding an otherwise normal testis .

# A man presents with testicular atrophy and infertility



## Ultrasound of the scrotum

Dilated pampiniform veins can be seen within the left scrotum. Doppler sonography (image b) shows the **venous reflux**. These findings are characteristic of **varicocele**.

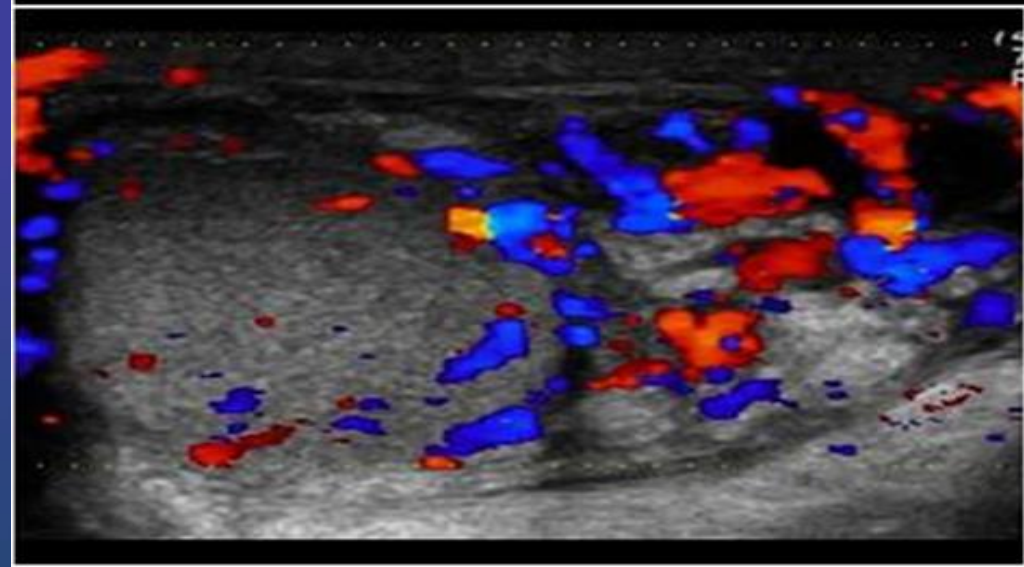
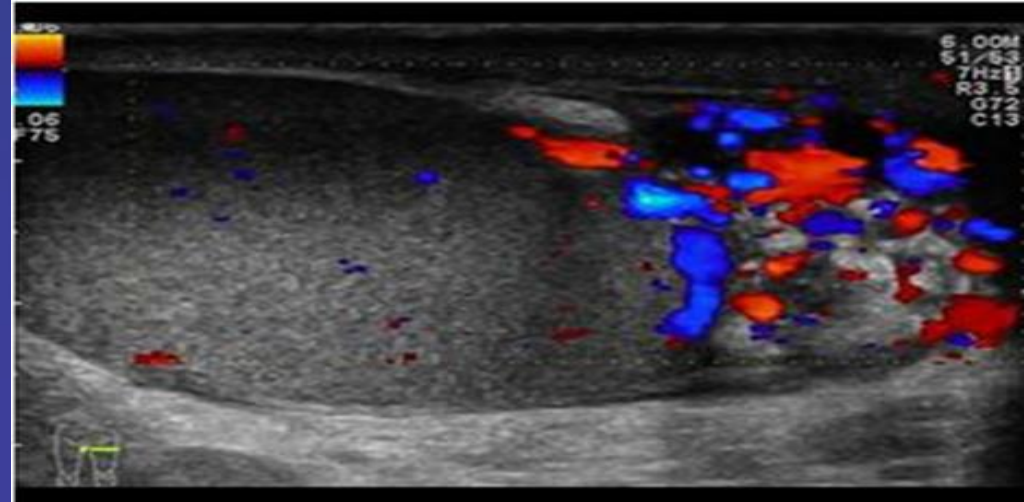
## Epididymitis

**Clinical presentation:** Ranges from mild tenderness to a severe febrile process with acute unilateral scrotal pain.

**Ultrasound:** Reactive hydrocele and scrotal wall thickening, edematous epididymis and shows increase vascularity on Doppler

Patient presented with **scrotal** pain and swelling

- Give the name of imaging examination.
- Describe the abnormality
- What is the most probable diagnosis in the ?





# Ultrasound

# Orchitis

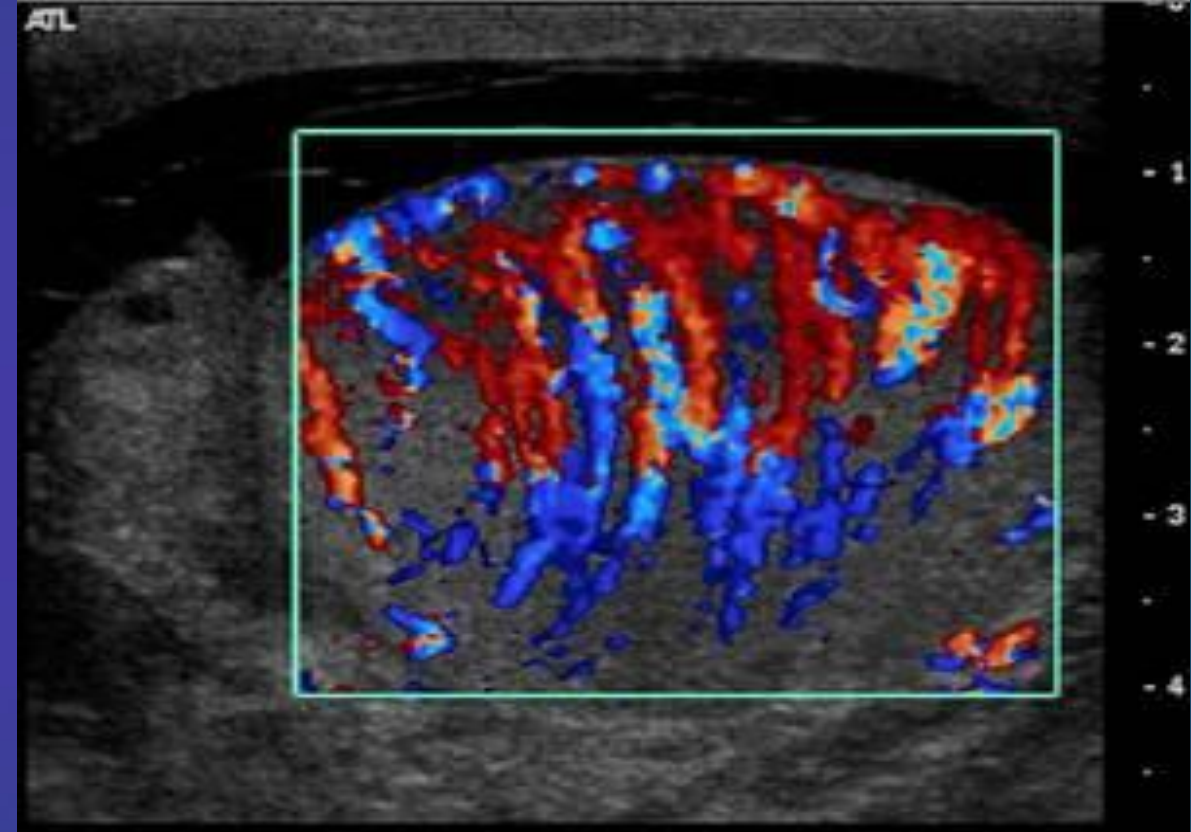
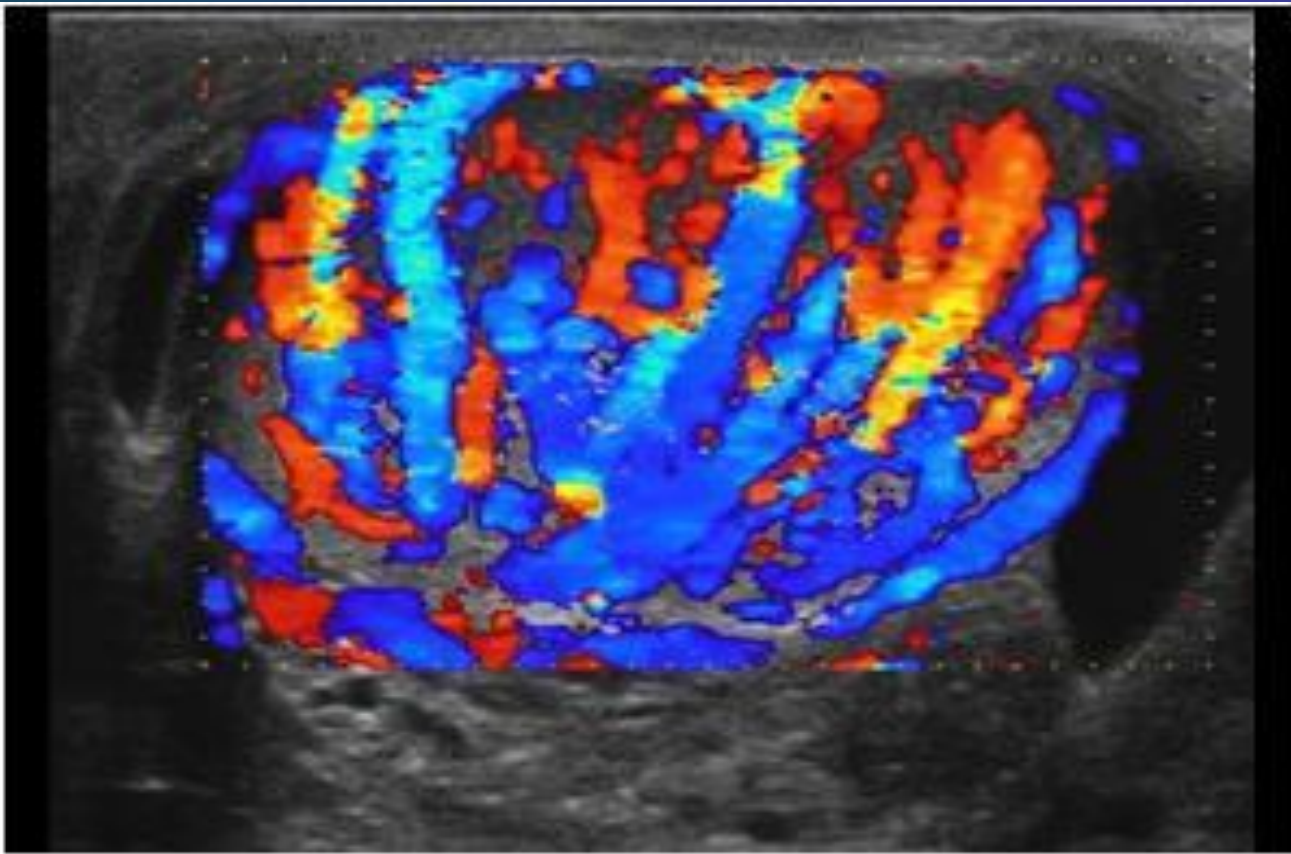
Ultrasound is the gold standard investigation.

Hypoechoogenicity: Focal or diffuse

Hypervascularity: Focal or diffuse

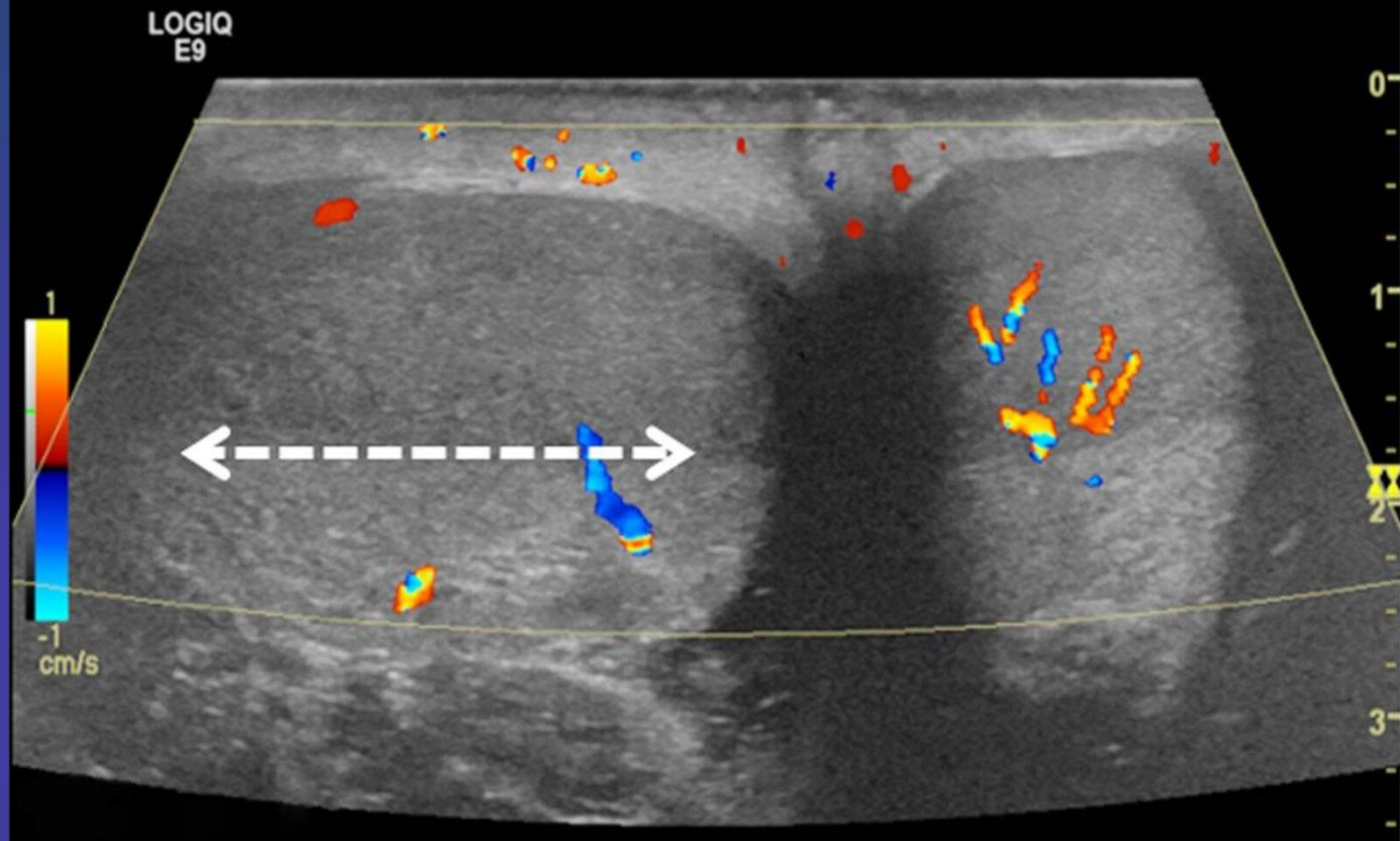
Swelling - Scrotal wall thickening

Patient presented with scrotal pain and swelling



- A. Give the name of imaging examination.
- B. Describe the abnormality
- C. What is the most probable diagnosis in the ?

- A. Give the name of imaging examination.
- B. Describe the abnormality
- C. What is the most probable diagnosis ?



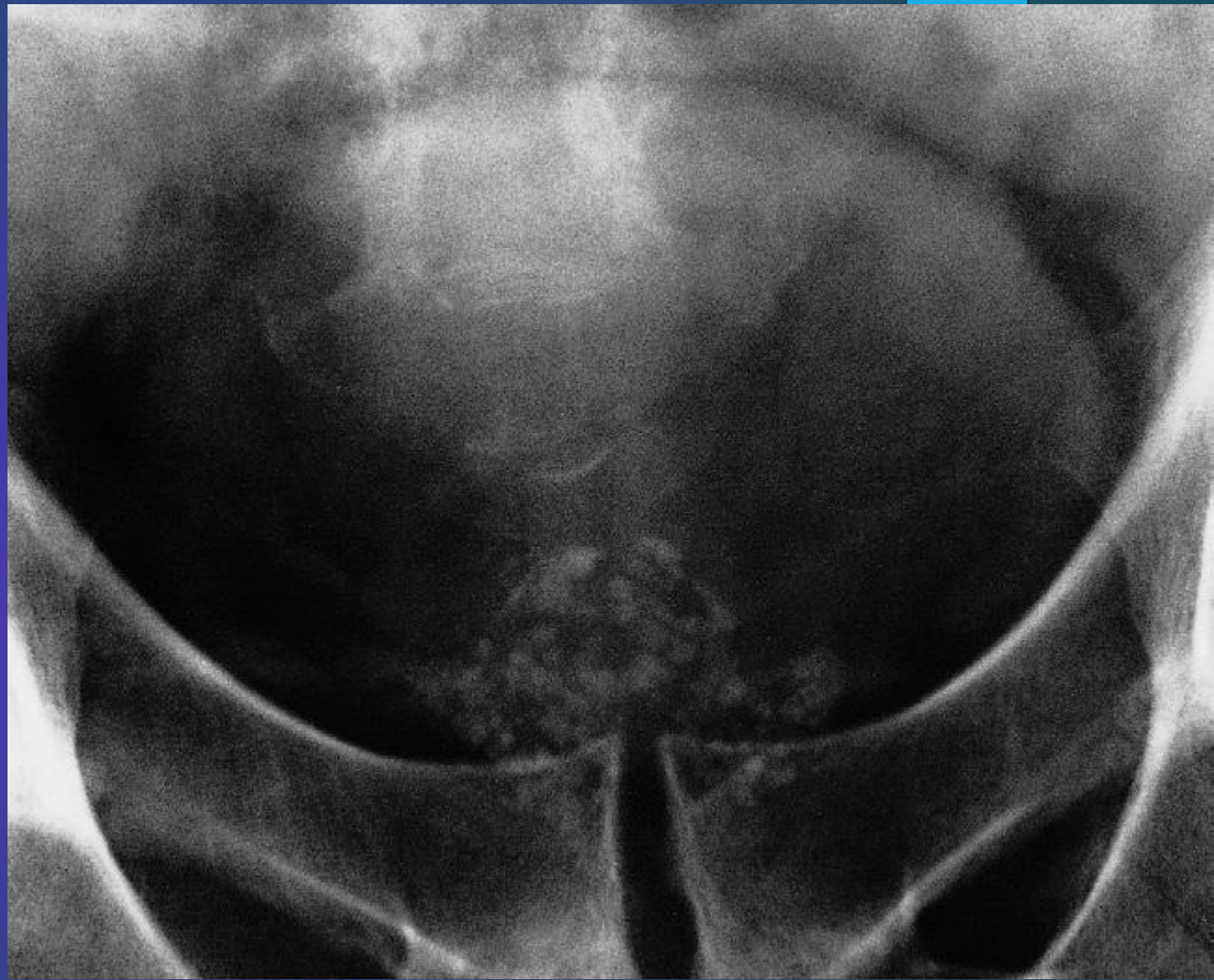
**Color Doppler ultrasound of both testes** (transverse plane) of a 14-year-old boy who woke up with acute right scrotal pain  
The **right testis** shows **intratesticular** flow slightly **reduced** compared to the **left testis**.

These findings are consistent with **testicular torsion**.



**77 year –old-man**

**symmetrical about the  
midline, are seen just  
inferior to the bladder.**



**Prostatic calcification**

# Skull & Brain Imaging



# Contrast CT

**Enhanced lesion:** Lesion which shows contrast uptake

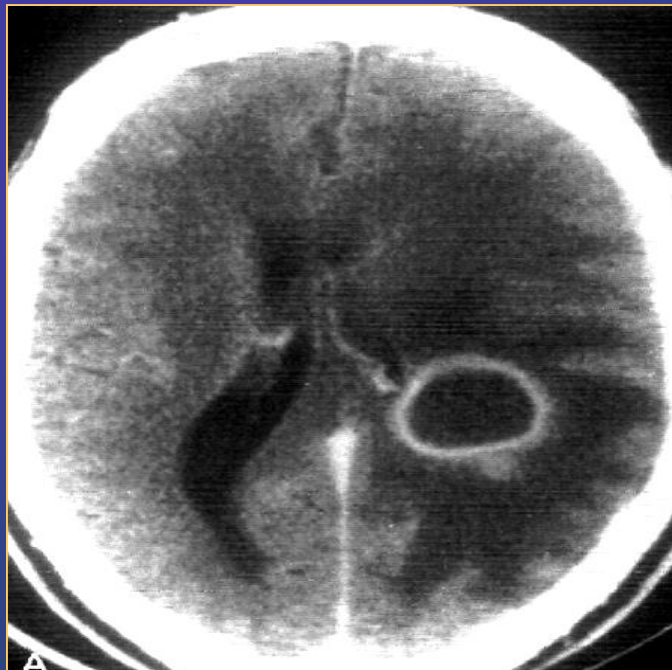
☐ Homogenous

☐ Ring

☐ Serpiginous [AVM]

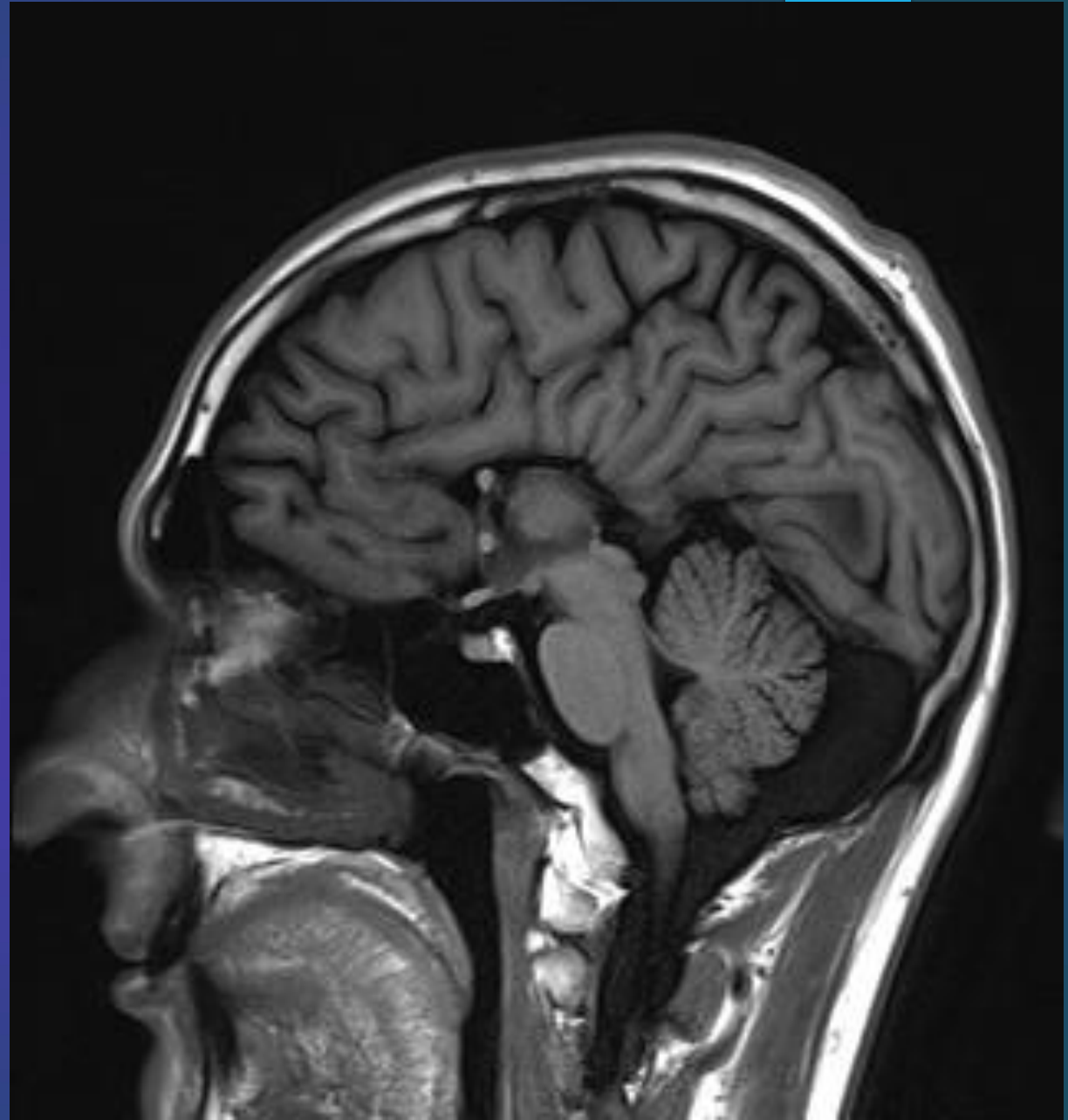
**A. Give the name of the pattern of contrast enhancement of the lesion**

**B. Give ONE cause for the pattern of contrast enhancement shown**



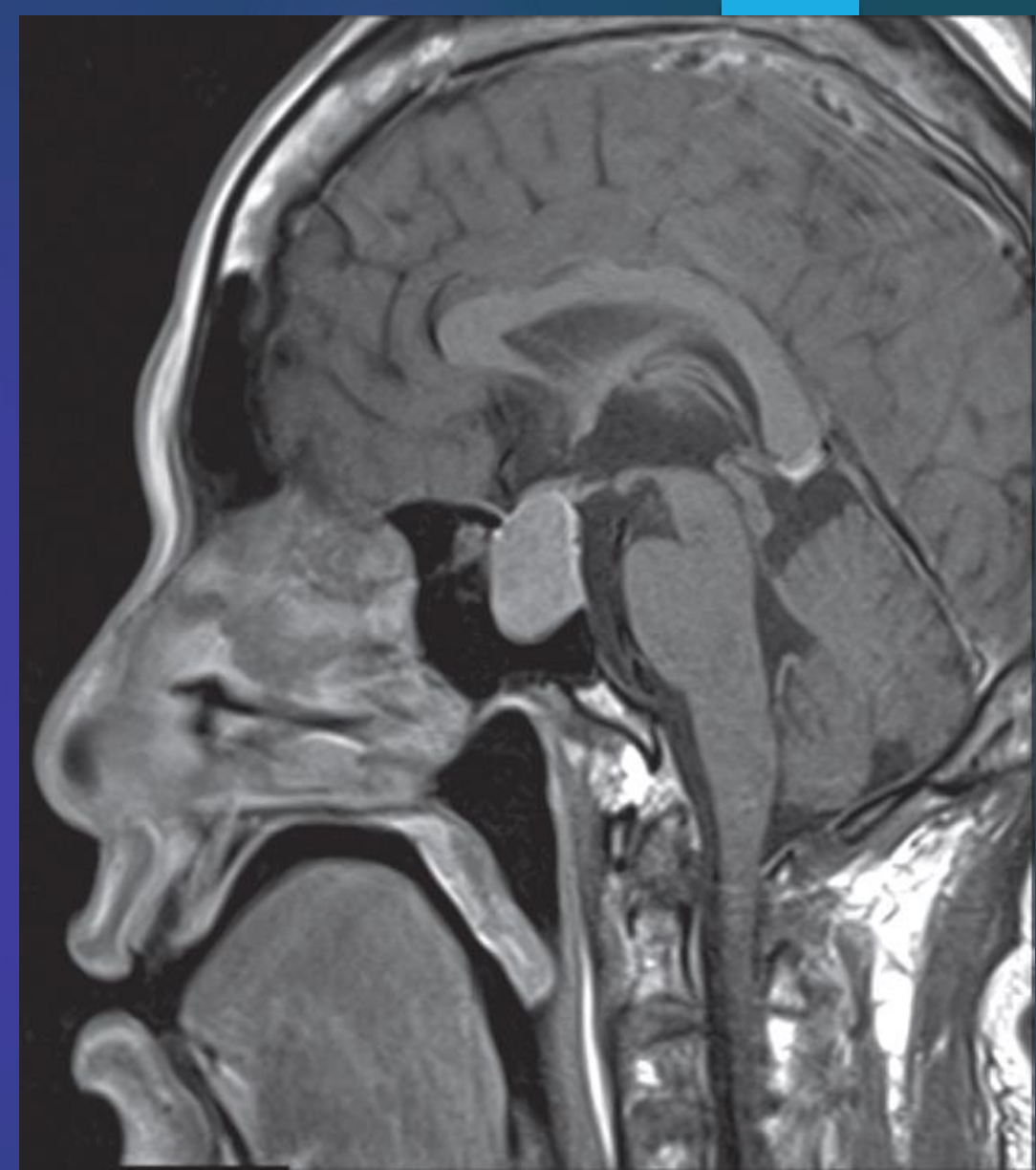
**Agenesis of corpus callosum**

**Sagittal T1 MRI brain**



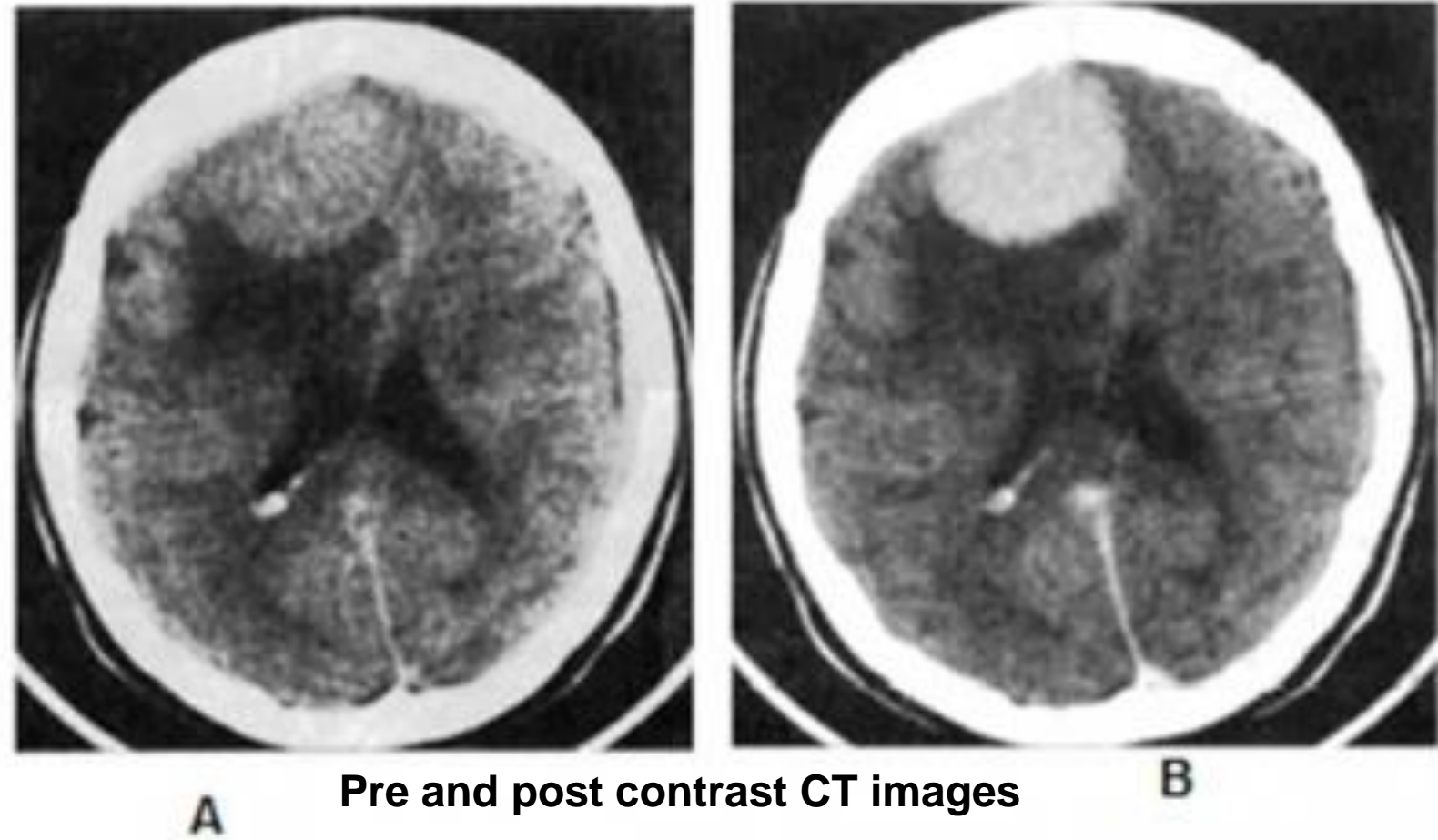
# Pituitary macroadenoma

Sagittal T1 post contrast MRI showing a macroadenoma



- A. Identify the name of the imaging examination in the given image.
- B. What is the most probable diagnosis in the given image:?

# Meningioma



- **Findings**

- Hyperdense well-demarcated oval extra-axial mass
- Calcifications
- Associated with perifocal edema.
- The lesion shows homogeneous enhancement on the contrast enhanced CT

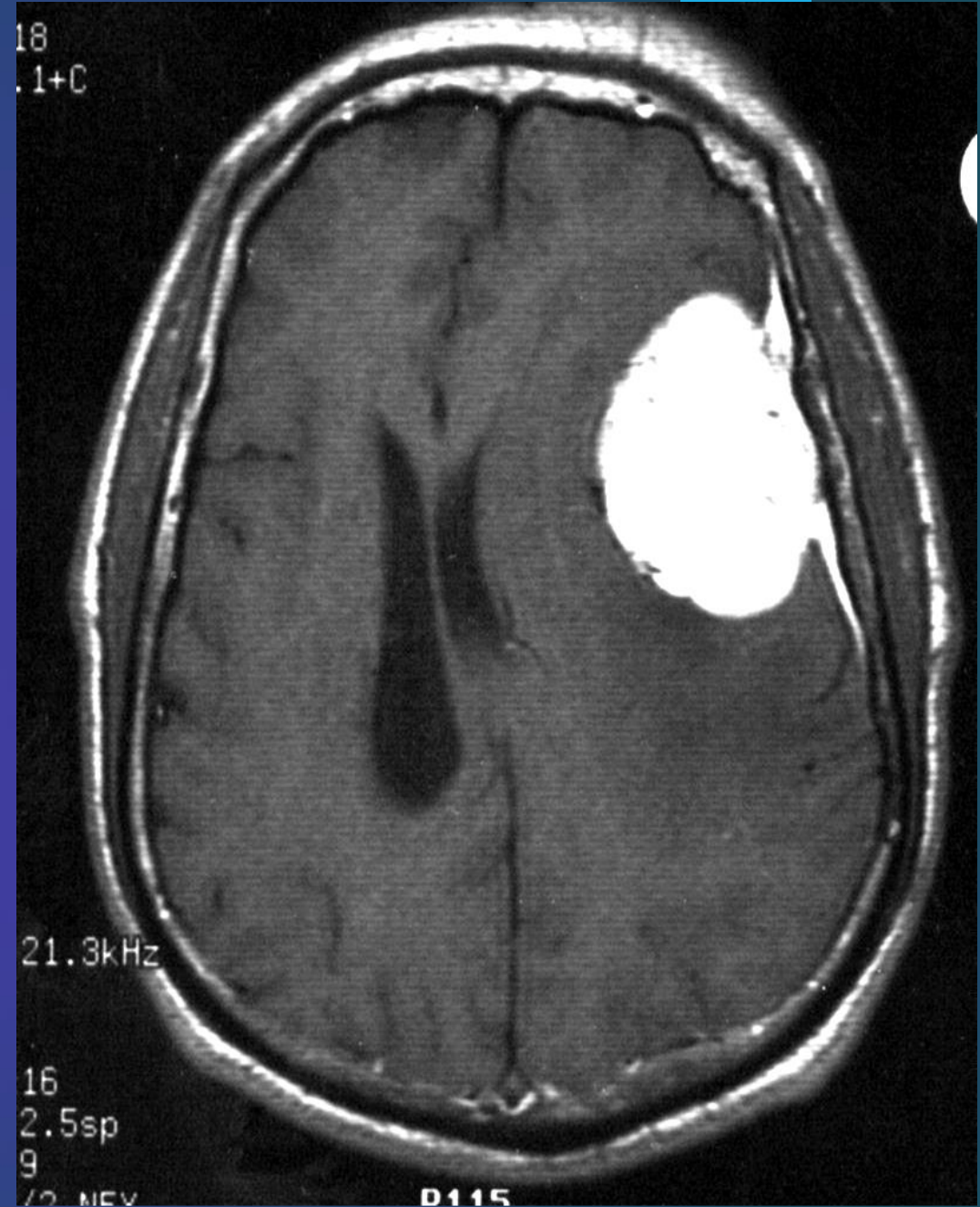


# Meningioma MR

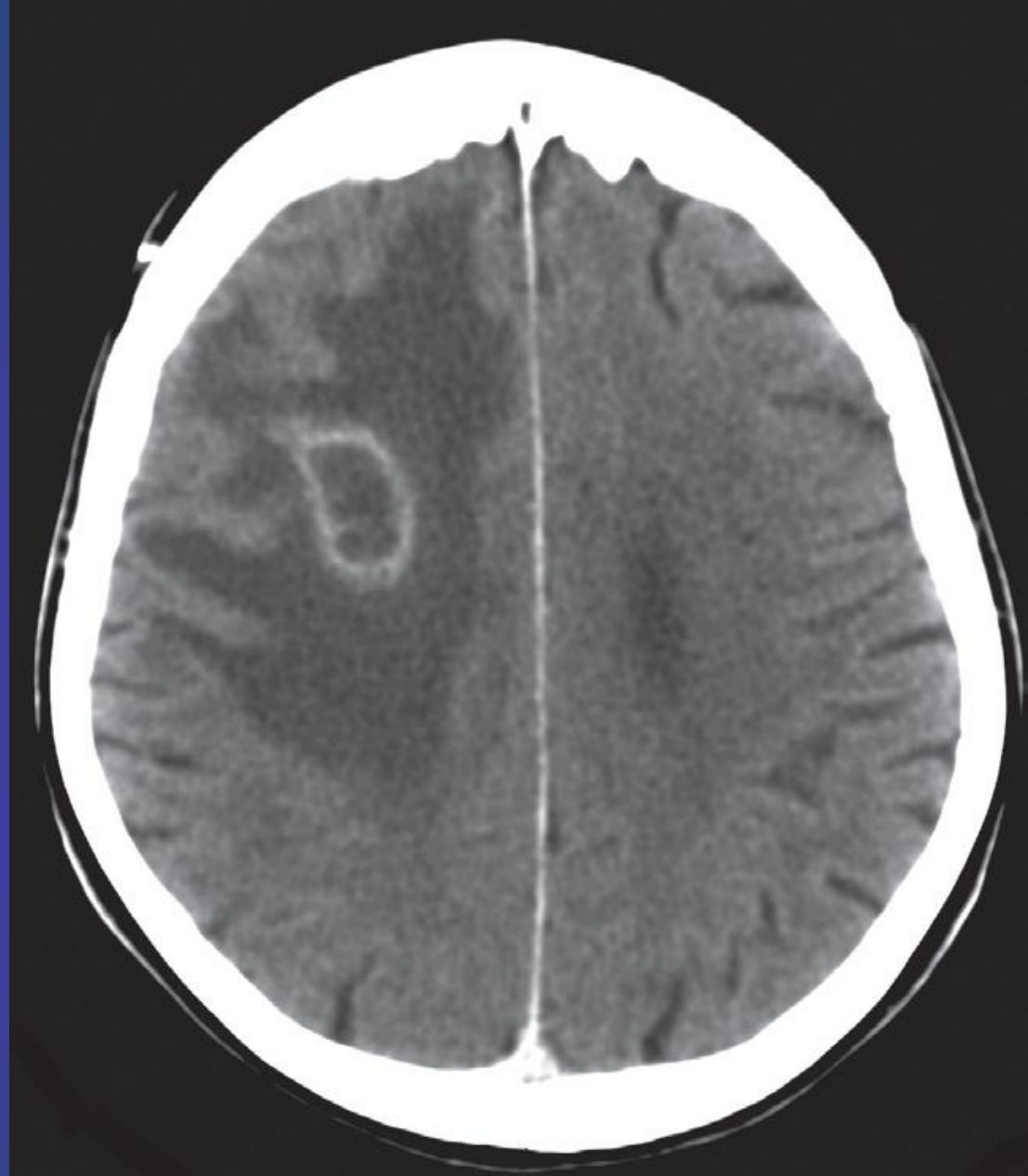
- ▶ Dural based
- ▶ Homogenous enhancement  
[Gd- DTPA] [Dural tail]

Axial T1 post contrast MRI showing a **Meningioma**

- Give the name of the **pattern** of contrast enhancement of the lesion in the given image.
- Give **ONE** cause for the pattern of contrast enhancement shown in the given image



Cerebral abscess. (a) Post contrast CT scan showing a right frontal low density ring-enhancing lesion with surrounding vasogenic oedema



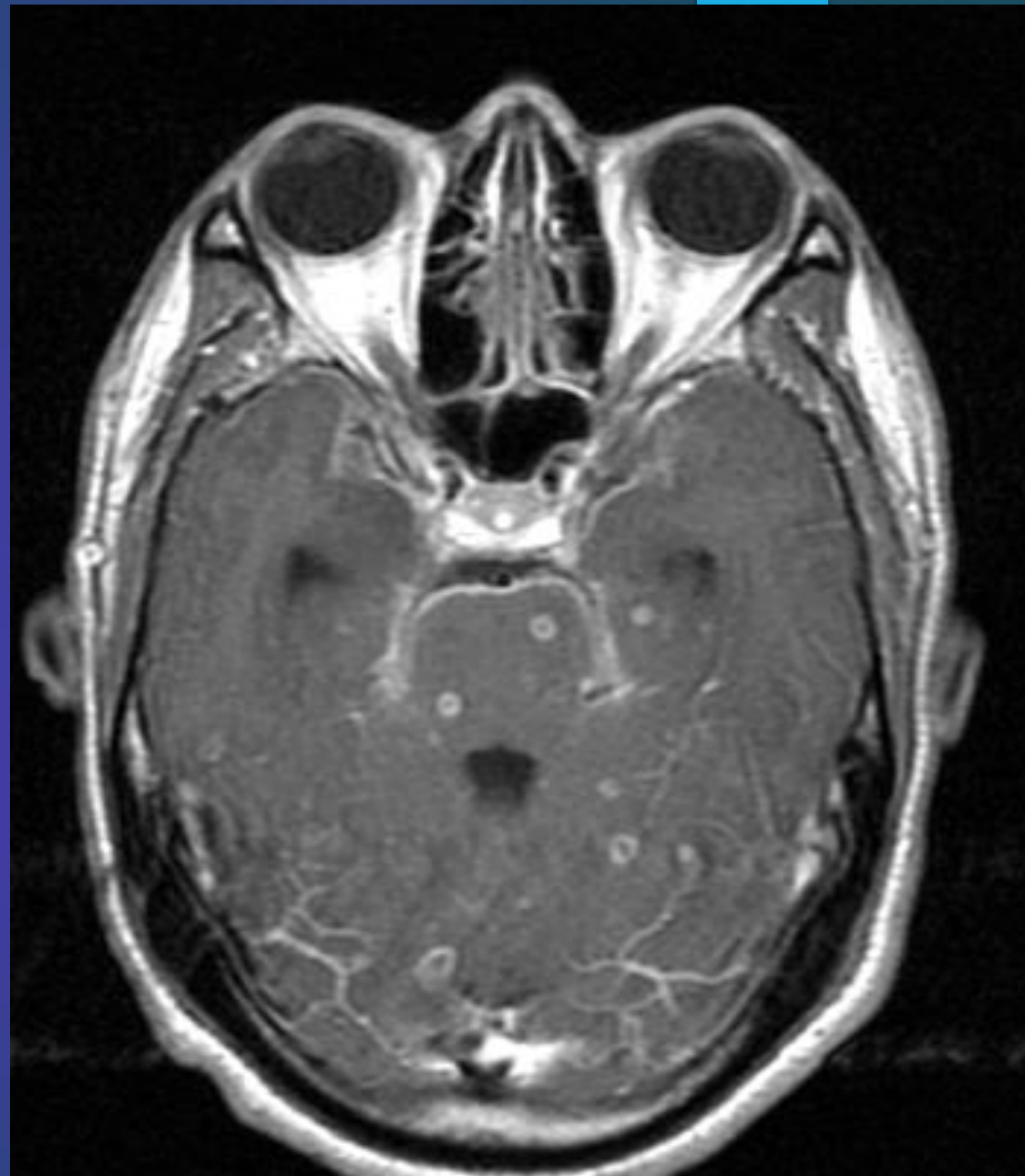
- A. Give the name of the **pattern** of contrast enhancement of the lesion in the given image
- B. Give **ONE** cause for the pattern of contrast enhancement shown in the given image

Axial T1 MRI post contrast.

Multiple ring enhancing lesions

Tuberculomas.

Chronic cough / Pulmonary TB



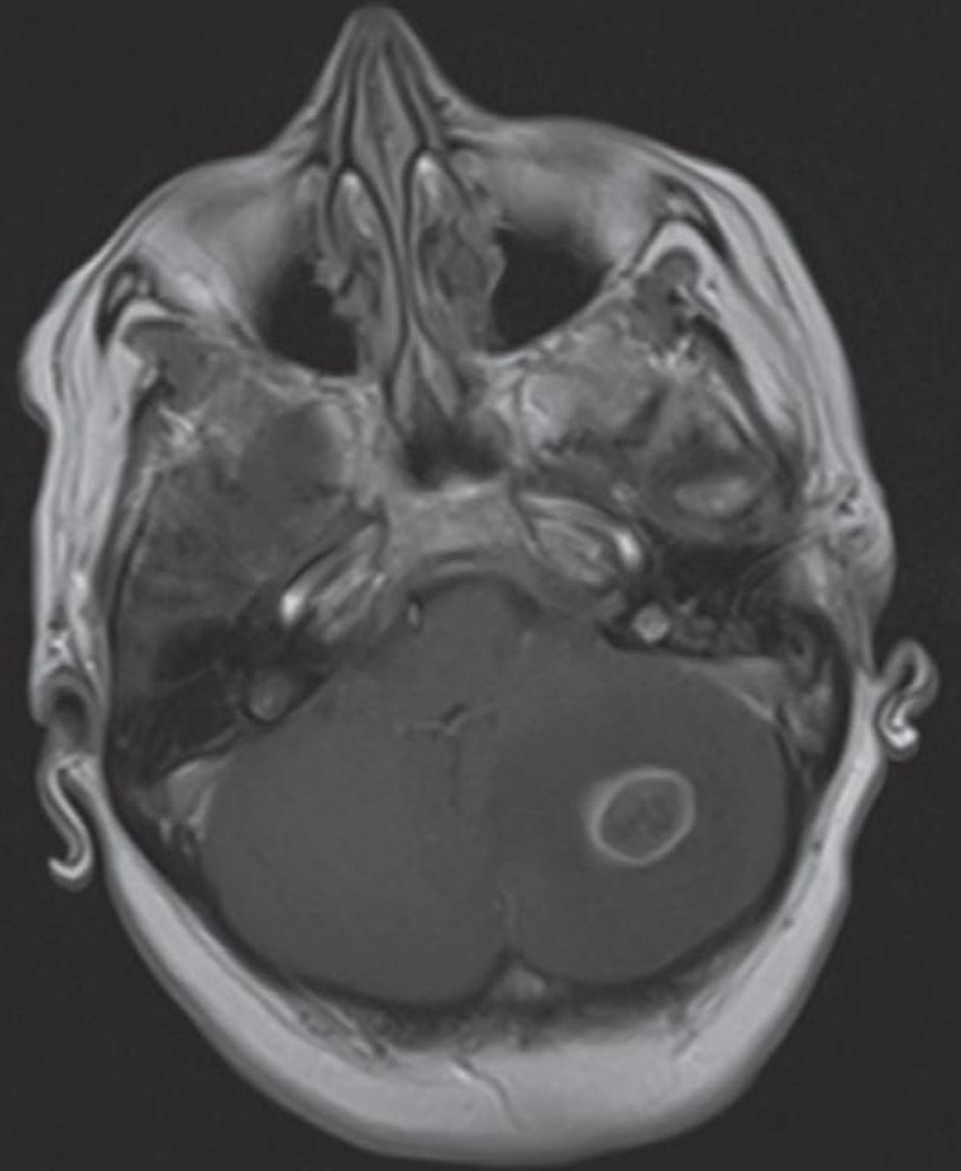
- A. Give the name of the **pattern** of contrast enhancement of the lesion in the given image?
- B. Give **ONE** cause for the pattern of contrast enhancement shown in the given image?



# Metastatic brain tumors

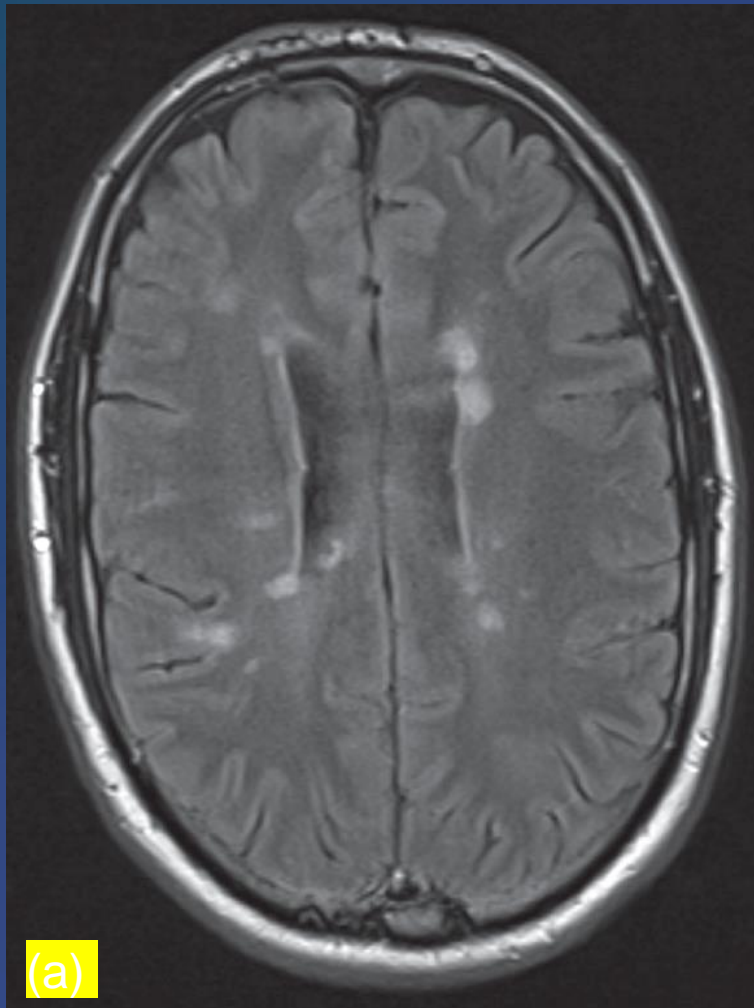
## Metastases.

Enhanced axial T1 weighted MRI scan showing a ring-enhancing cerebellar metastasis



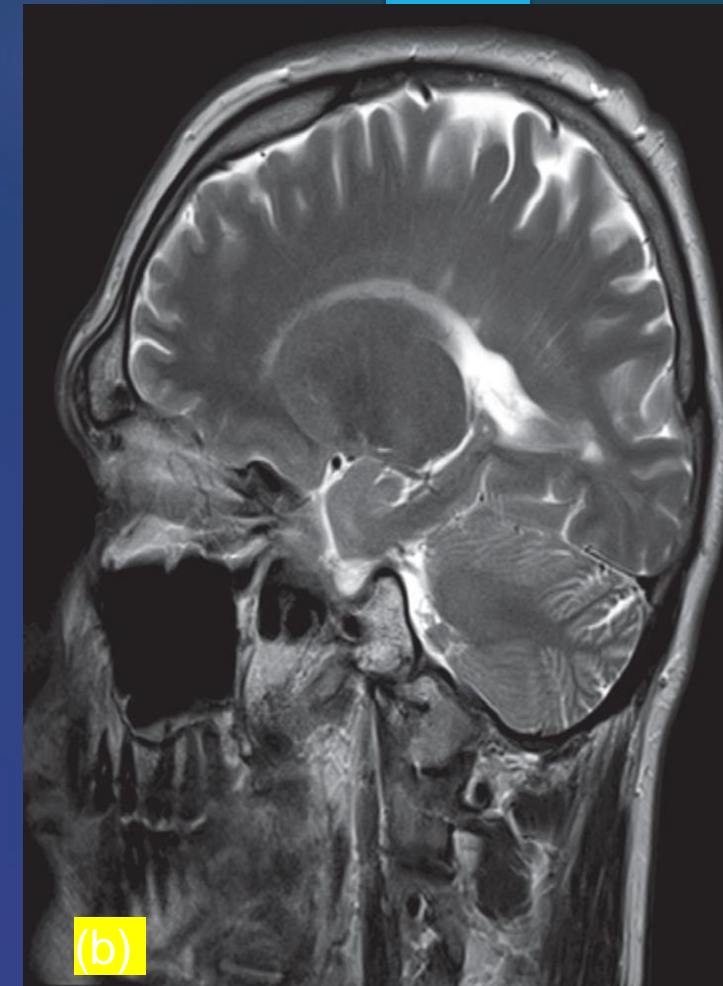
- A. Give the name of the **pattern** of contrast enhancement of the lesion in the given image?
- B. Give **ONE** cause for the pattern of contrast enhancement shown in the given image?





Patients presents with optic neuritis

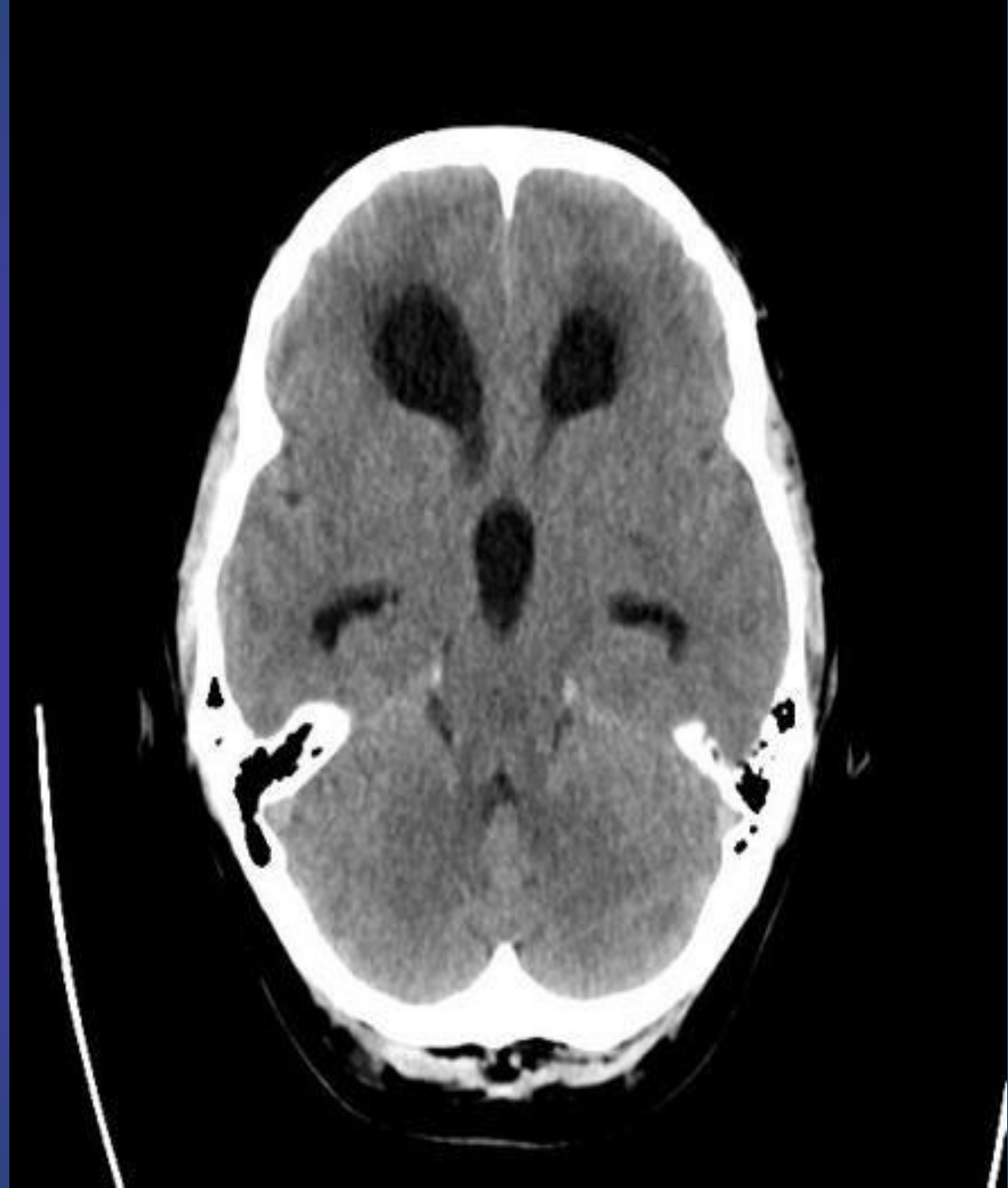
Modality  
Findings  
Diagnosis



- (a) **Axial FLAIR sequence at the level of the lateral ventricles** shows periventricular areas of linear and ovoid hyperintense signal orientated perpendicular to the body of the right lateral ventricle. This feature is known as **Dawson fingers** and is strongly associated with **multiple sclerosis**.
- (b) **Parasagittal T2-weighted MRI** shows plaques of demyelination as high signal in the white matter, particularly along the margins of the lateral ventricles

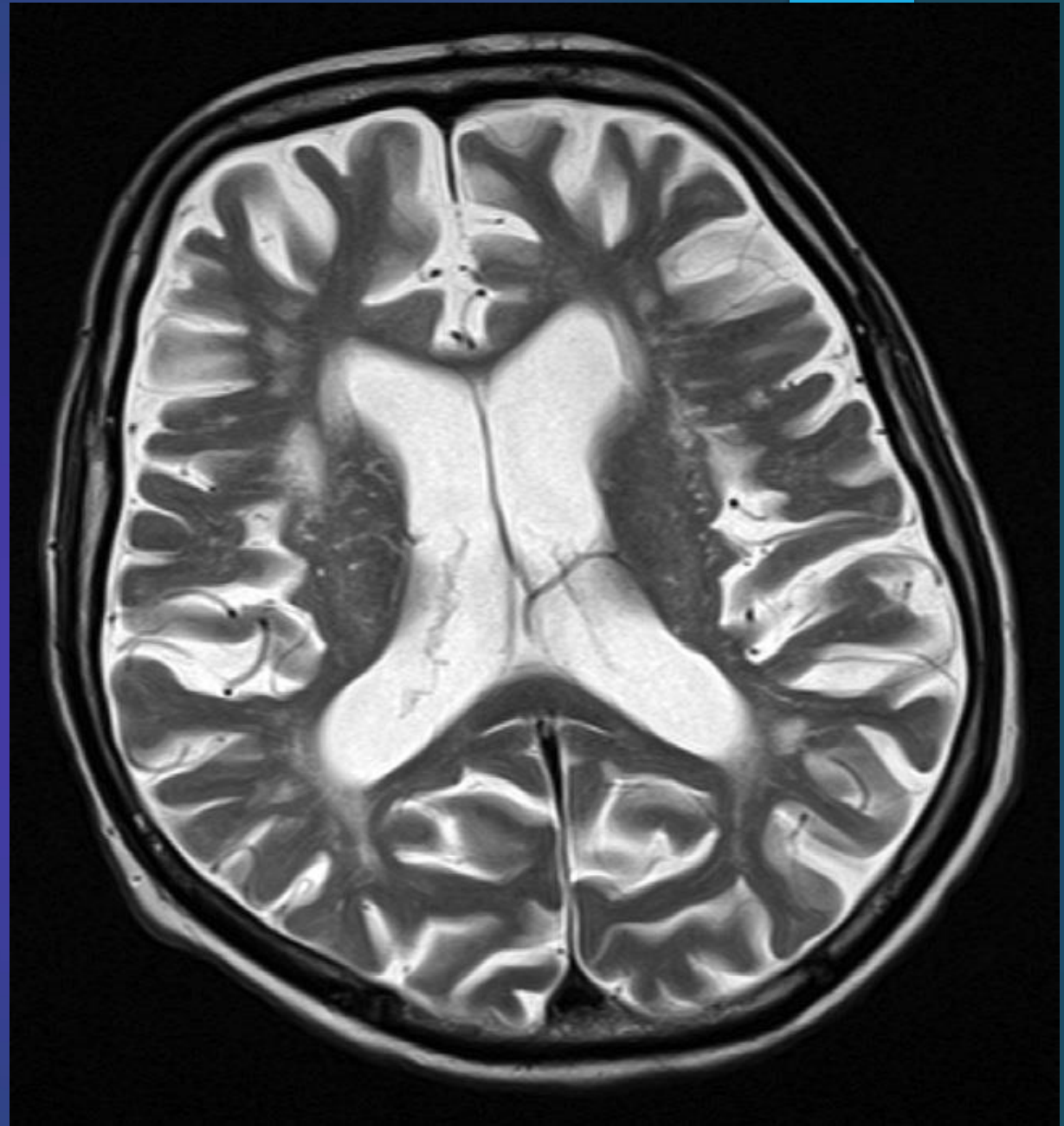
**Hydrocephalus**

**CT brain**



## Cerebral atrophy

Axial T2-weighted MRI showing prominence of the ventricles and generalized widening of the cerebral sulci in keeping with age-related atrophy.



**Modality**  
**Findings**  
**Diagnosis**



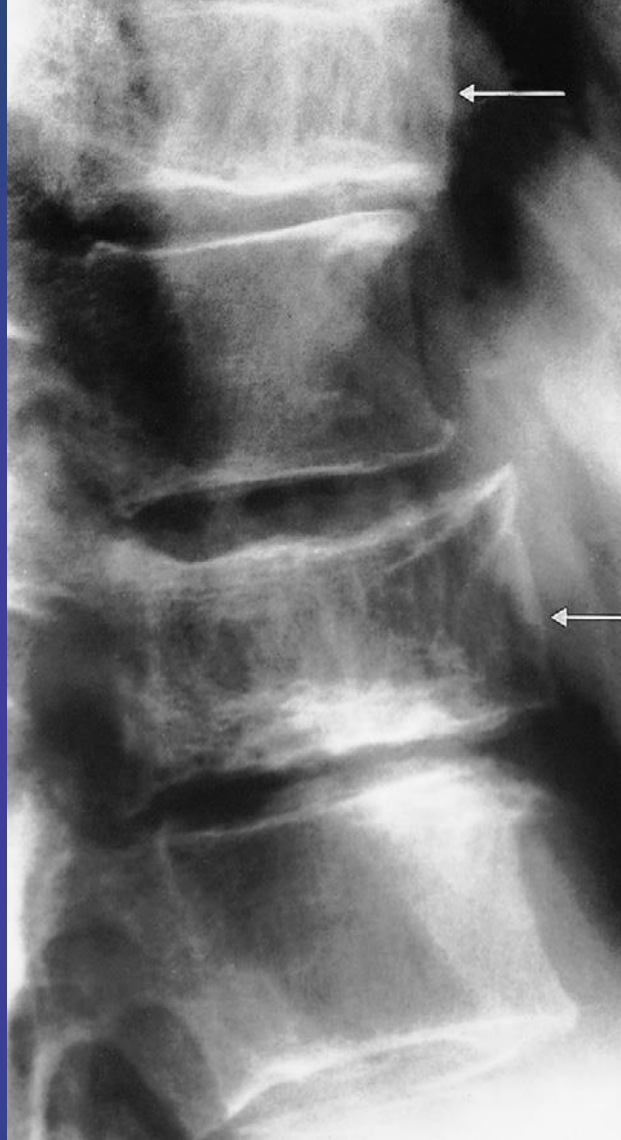
**CT paranasal sinuses (coronal plane) of a patient with acute sinusitis**  
**The right maxillary sinus is completely opacified. Extensive soft tissue density material is also present in the ipsilateral nasal cavity and the right ethmoid sinus is nearly completely opacified.**



# *Imaging of the spine and spinal cord*



Dense vertebra (arrow) due to metastases from carcinoma of the breast.



Paget's disease: increased density and coarse trabeculae in the wider than the normal vertebral bodies (arrows)



Haemangioma  
Vertical striations are present in this normal-sized vertebra

- A. Give ONE radiological manifestation for an abnormal vertebrae marked by arrow.**  
**B. Identify the most likely cause of the abnormal vertebrae shown**

## Cervical disk herniation

**MRI cervical spine (T2-weighted; sagittal plane)** of a patient with symptoms of **cervical myelopathy**

**A herniated disk at C5–6** effaces the **dural sac** and **compresses** the **spinal cord**. Hyperintense compression-induced **edema** is seen within the **cord**.





*Syringomyelia*

*Sagittal T2 MRI*





young adult women with optic neuritis

**T2-weighted MRI showing a plaque of demyelination (arrow) in a patient with multiple sclerosis**





**Modality**  
**Findings**  
**Diagnosis**

**MRI lumbar spine (sagittal plane)**

There is anterolisthesis of the L4 vertebral body.

**Spondylolisthesis**



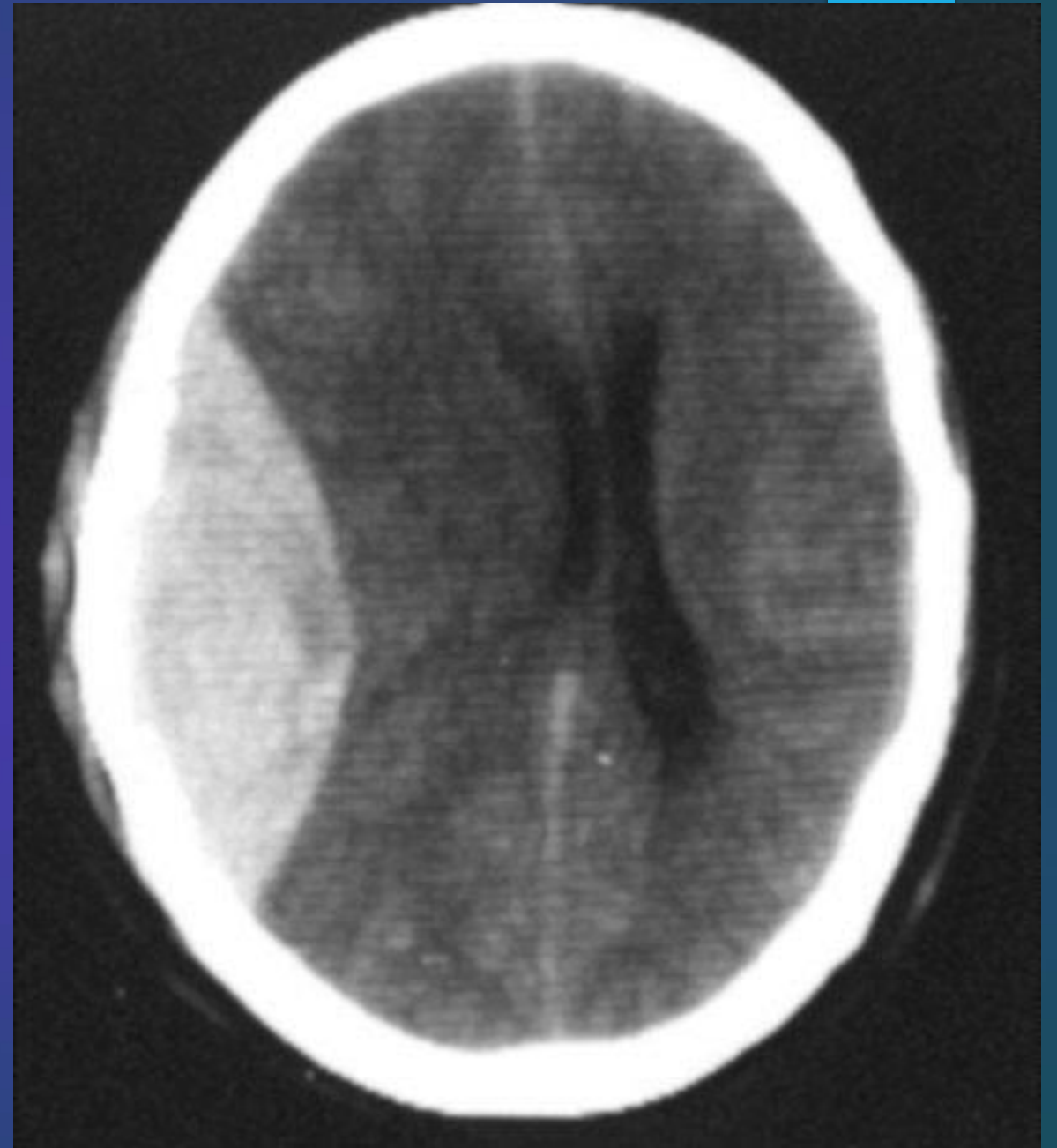
**X-ray lumbar spine (lateral view)**

Anterior displacement of L4 on L5 is visible. In addition, there is degenerative disk disease with narrowing of the L4–L5 disk space.

# CT Brain IN EMERGENCY

# Epidural hematoma

- ▶ Convex inner margin (lens-shaped)
- ▶ High density area





**Acute subdural hemorrhage**

**CT brain**



# Chronic subdural hemorrhage

CT brain



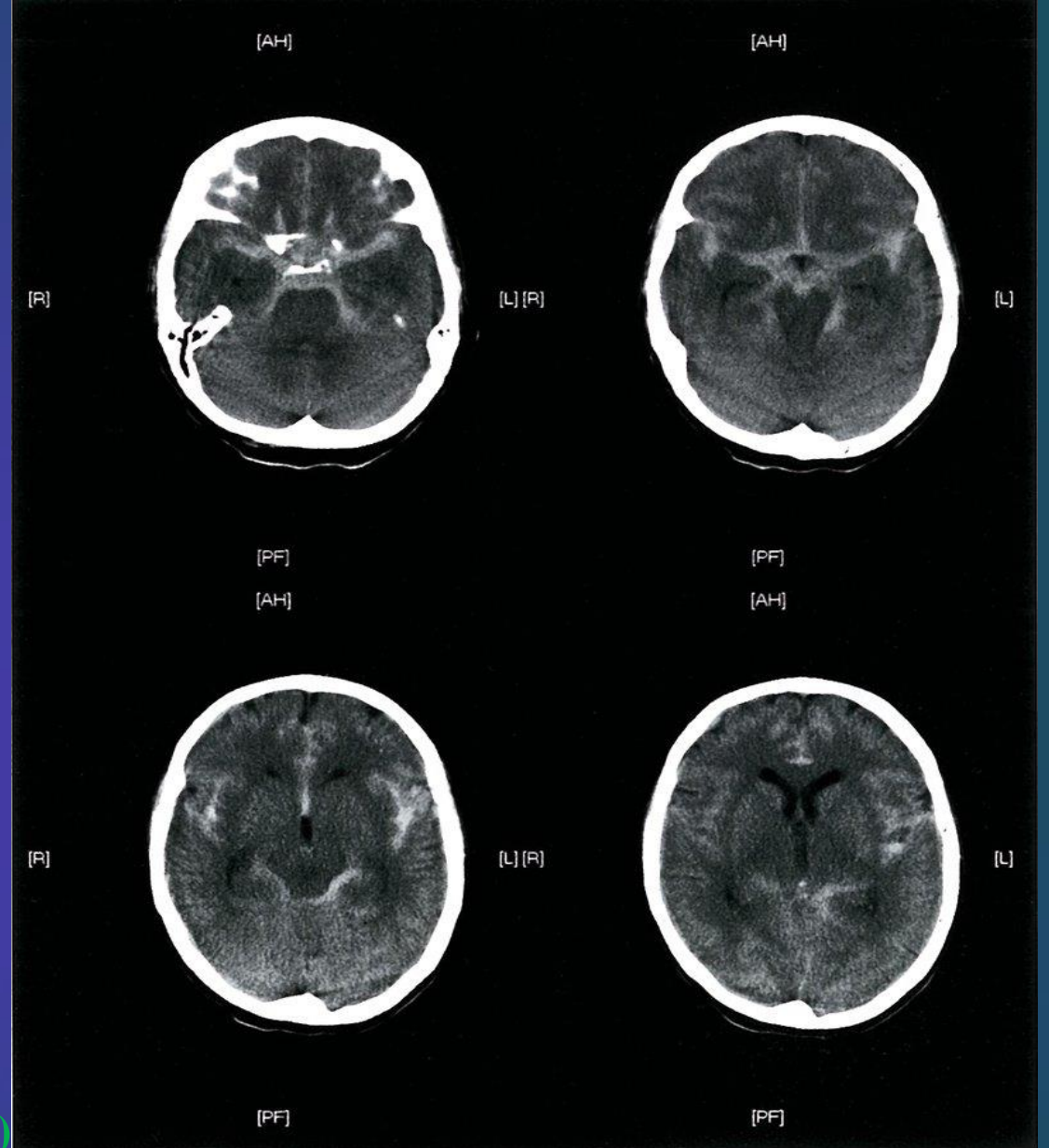
**Acute on chronic subdural hematoma**

**CT brain**



- A. Give the name of the used imaging modality in the given image.**
- B. What is the most likely diagnosis in the given image.**

**A. Imaging study.**  
**B. What is the most likely diagnosis?**



**Subarachnoid hemorrhage**

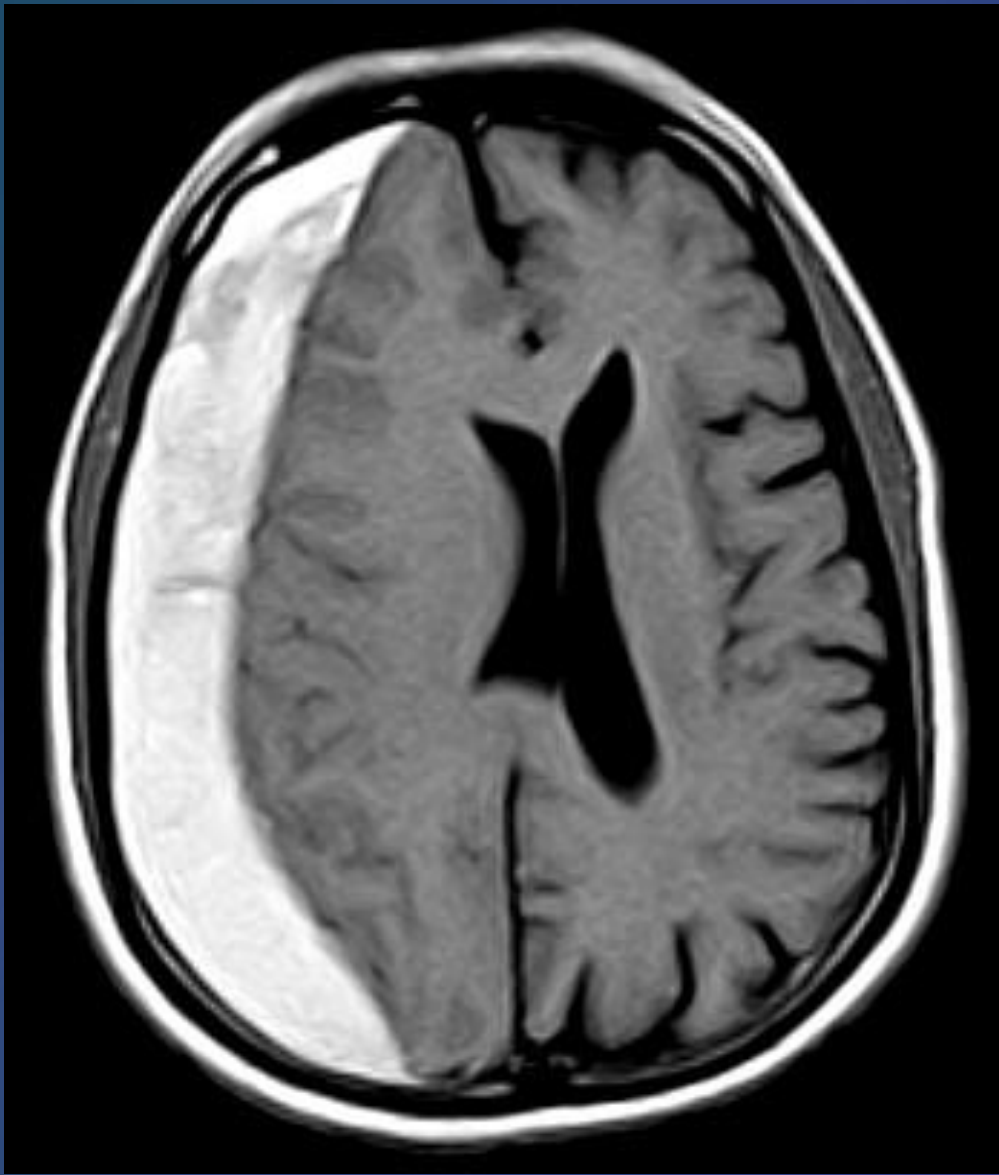
**CT head (without contrast; axial plane)**

Multiple areas of high attenuation in the basal cisterns, Sylvian fissures, and sulci are characteristic of extensive **subarachnoid hemorrhage**.



# Intra ventricular hemorrhage





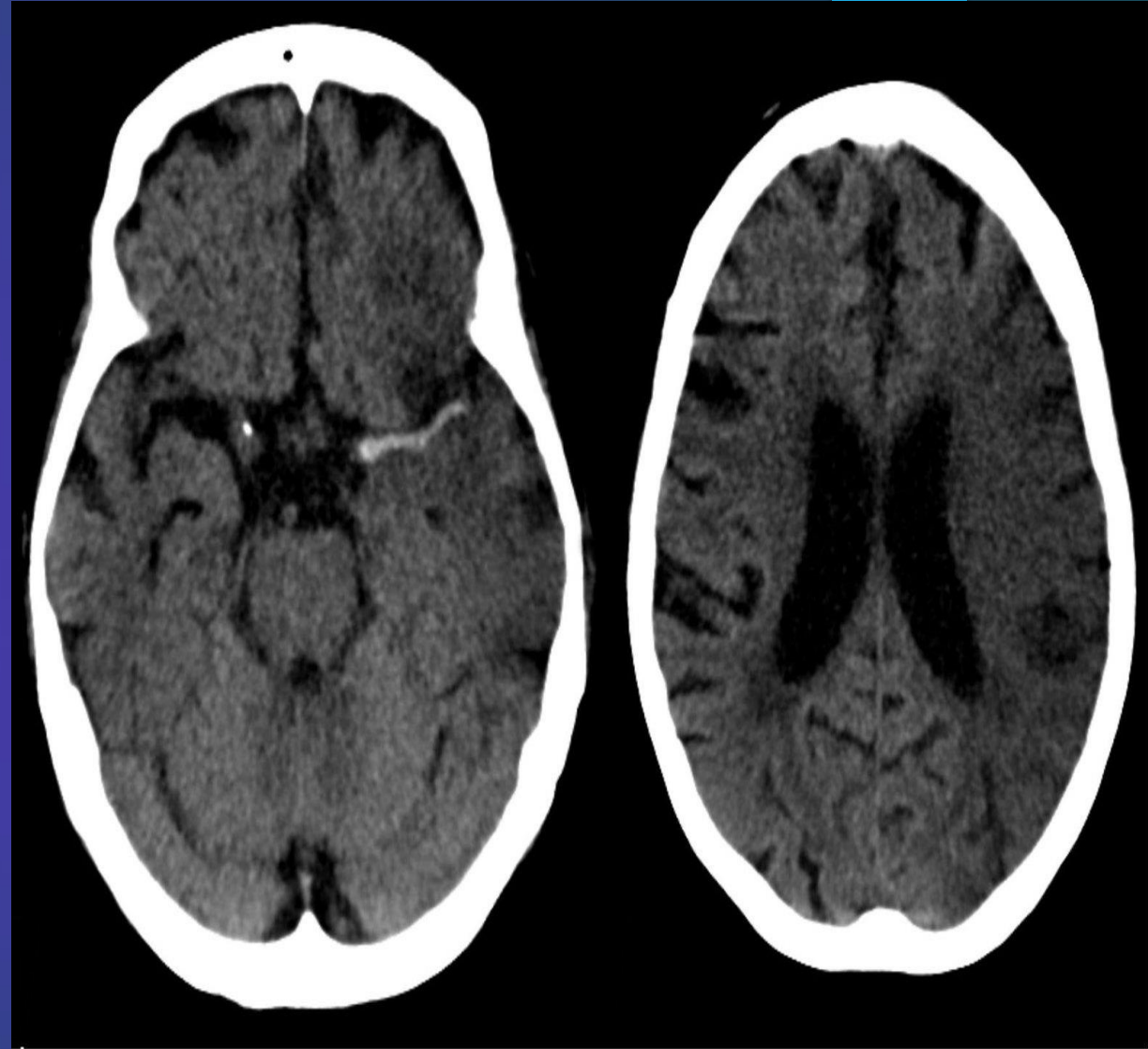
**Subacute subdural hematoma**

# Intracerebral hemorrhage



**Infarction appear  
hypodense on CT**

**Sign ?**





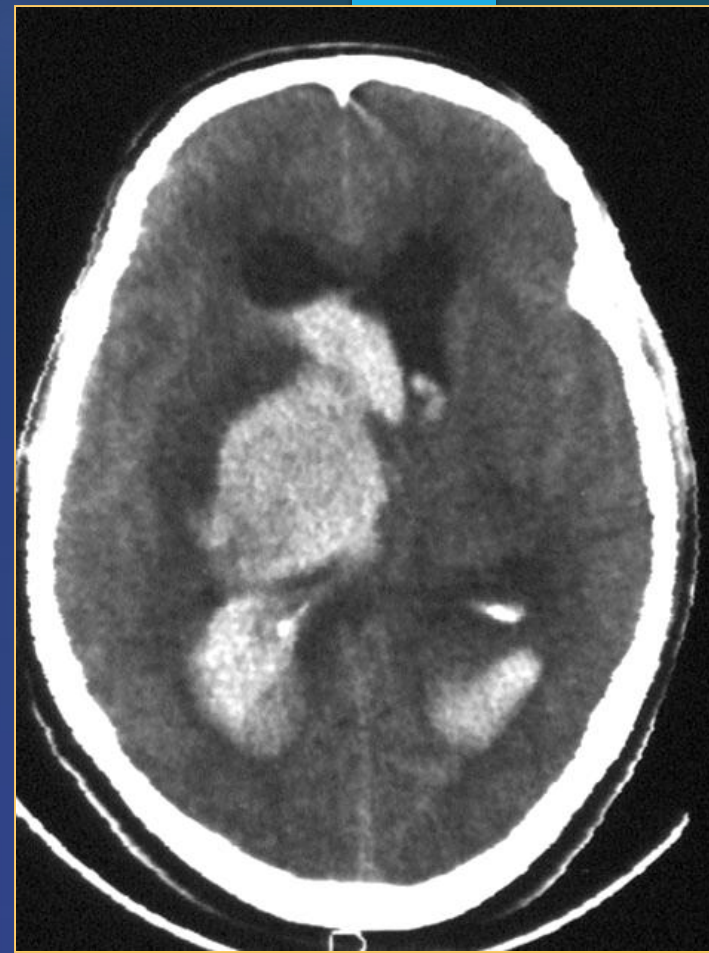


**Dense basilar artery and middle cerebral arteries on CT**

Thrombus in vessel is hyperdense relative to flowing blood



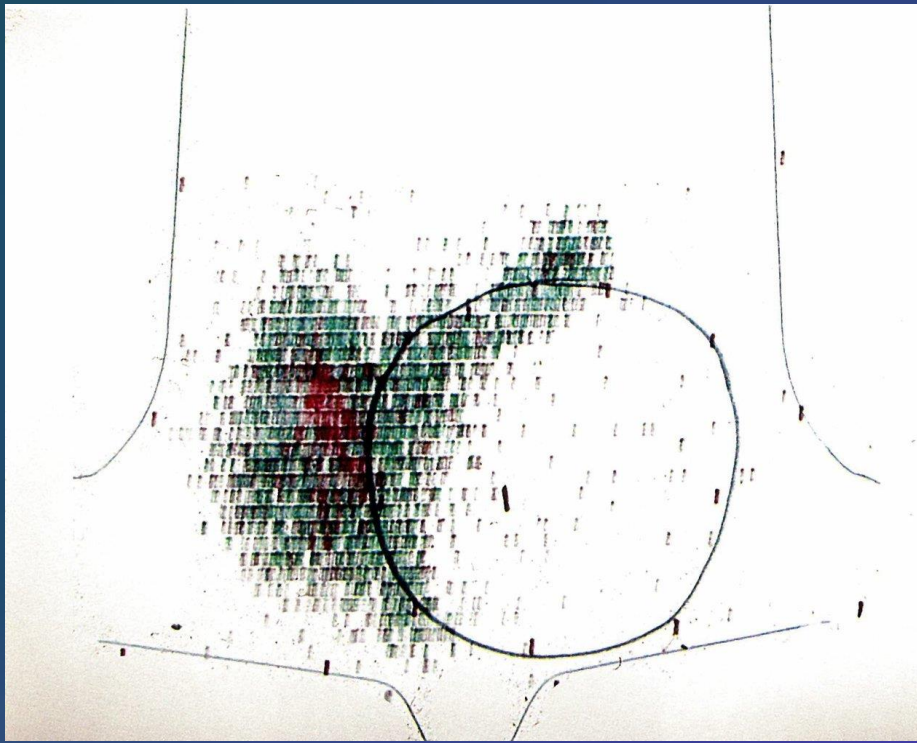
**Vasogenic edema**



**Cytotoxic edema**

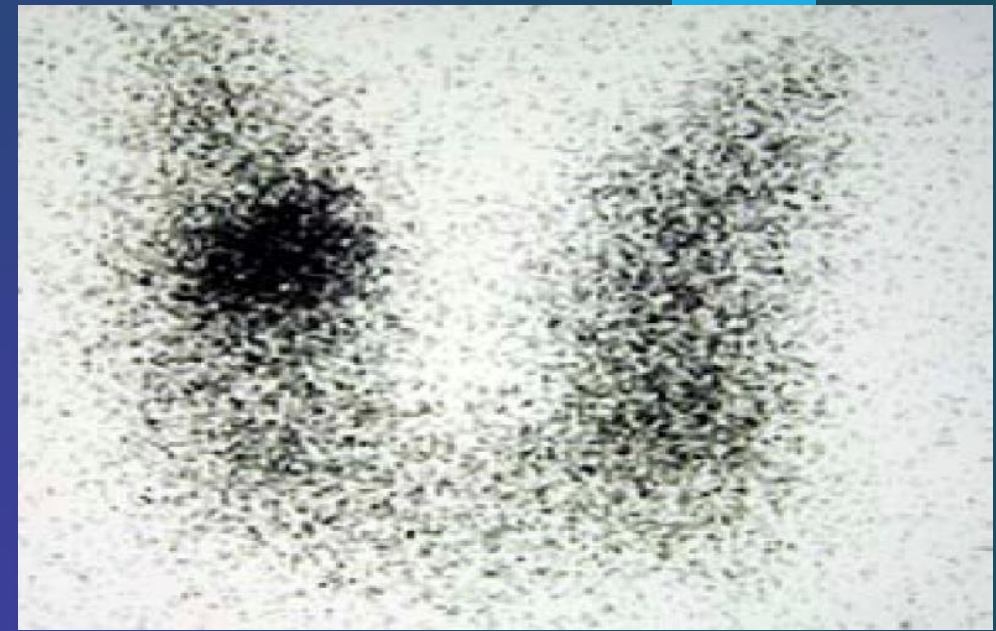
# Thyroid and parathyroid Imaging





### **Cold nodule on thyroid scintigraphy**

A large **cold nodule** (black circle) is visible within the left thyroid lobe as an area of **decreased radiotracer uptake**.



### **Thyroid scan hot nodule**

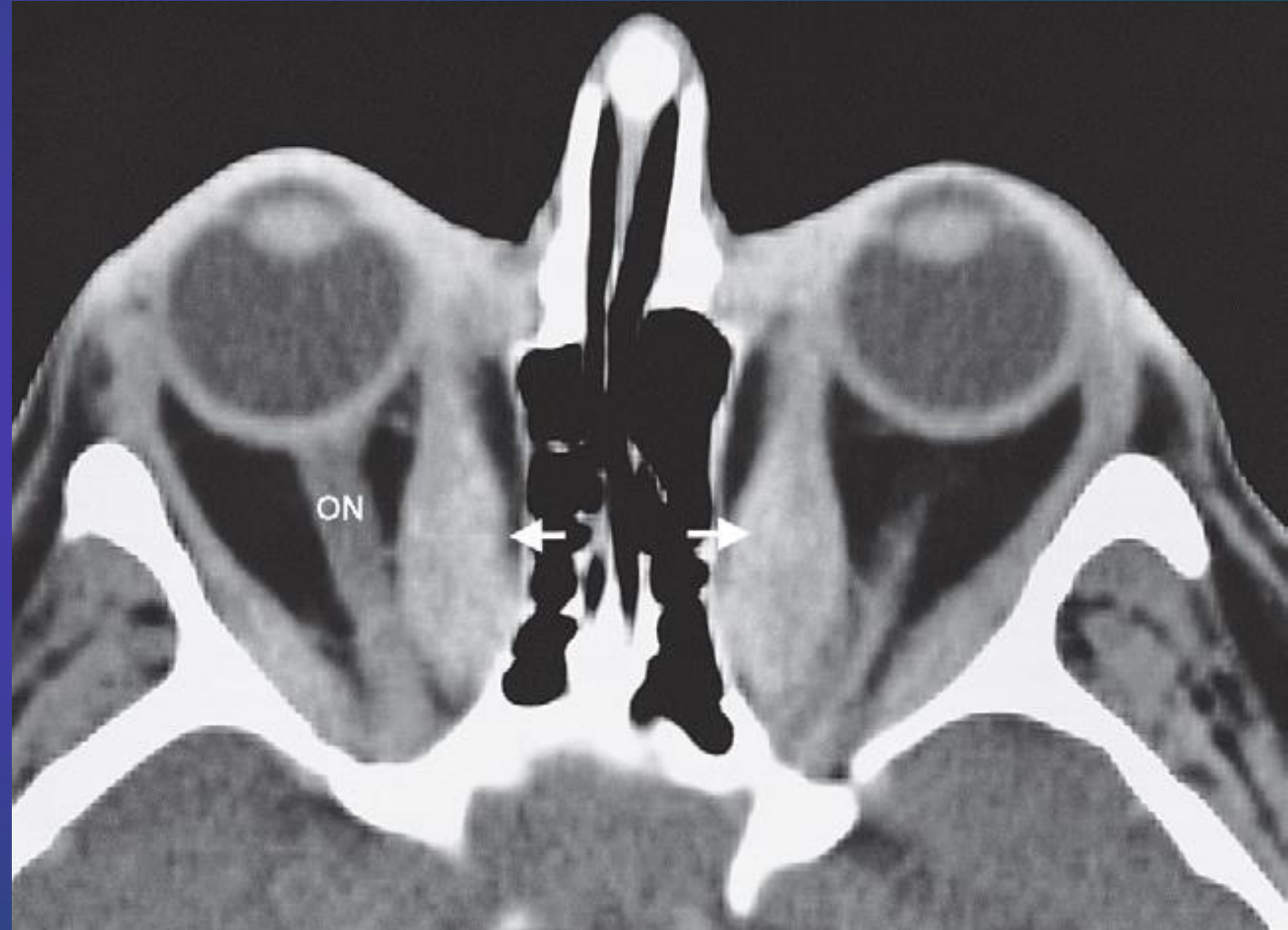
**Nuclear medicine thyroid scintigraphy (Tc-99m pertechnetate)**

The rounded area in the right thyroid lobe represents a so-called **hot thyroid nodule**, which shows **increased radioisotope uptake** compared to the rest of the thyroid gland.



## Thyroid eye disease.

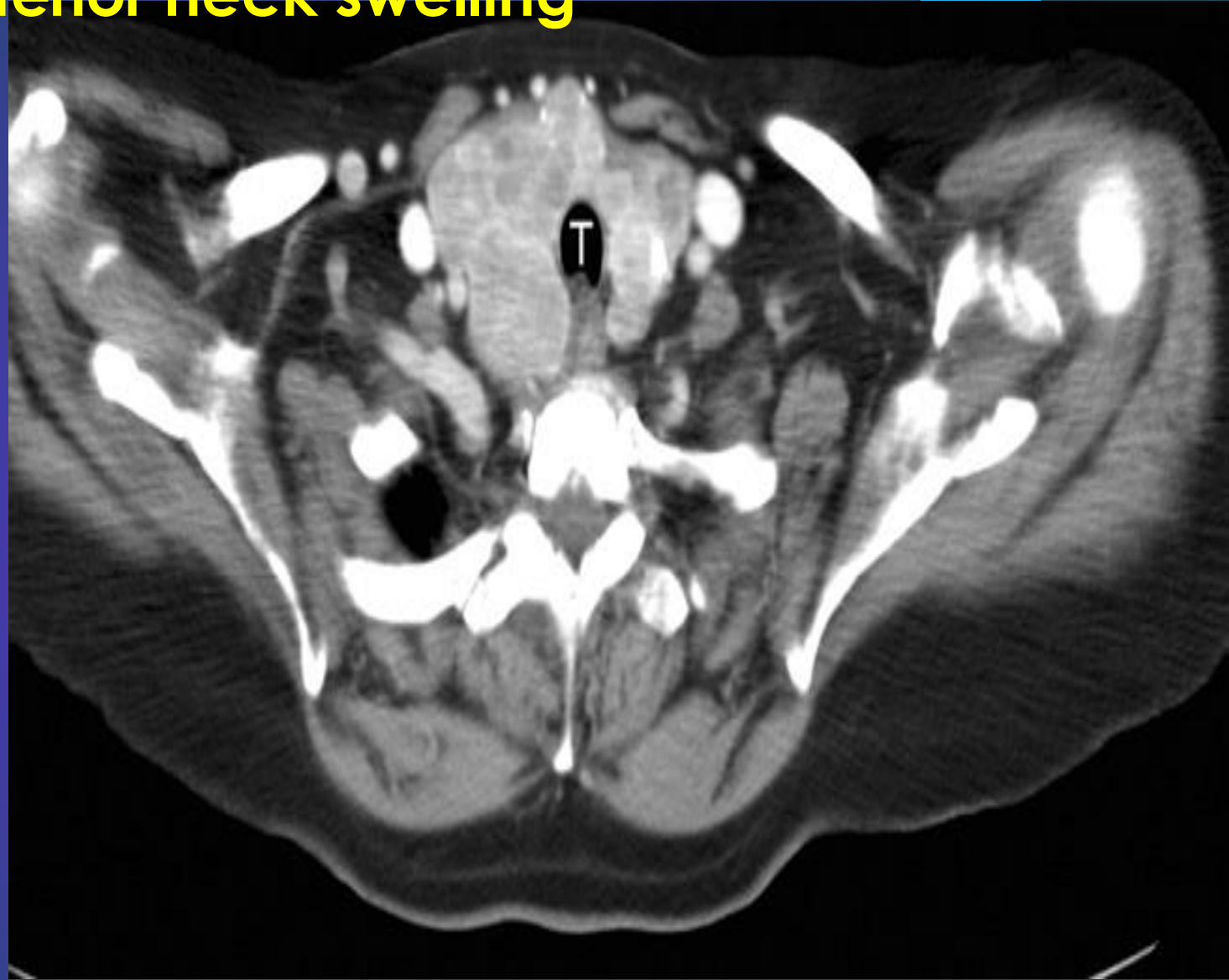
CT scan through the orbits showing enlargement of the extraocular muscles, particularly the medial rectus (arrows).



Patient presented with anterior neck swelling

## Multinodular goitre

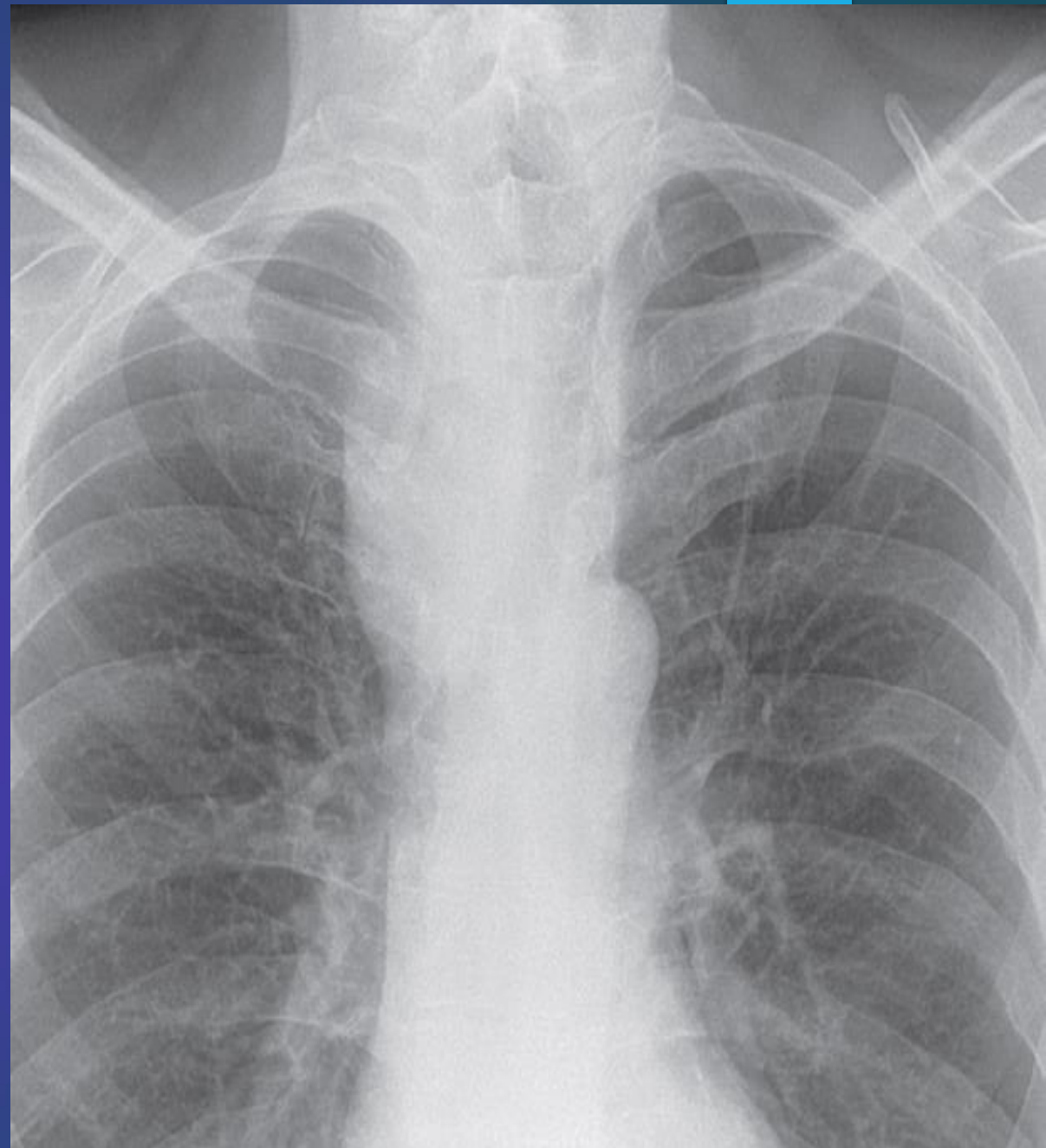
The enlarged thyroid enhances avidly after intravenous contrast showing many nodules of varying size.



- A. Give the name of the used imaging modality in the given image.
- B. What is the most probable diagnosis in the given image?

## **Retrosternal goitre.**

**XR showing a large, right-sided, superior mediastinal mass displacing the trachea.**





Thank you & Good Luck

