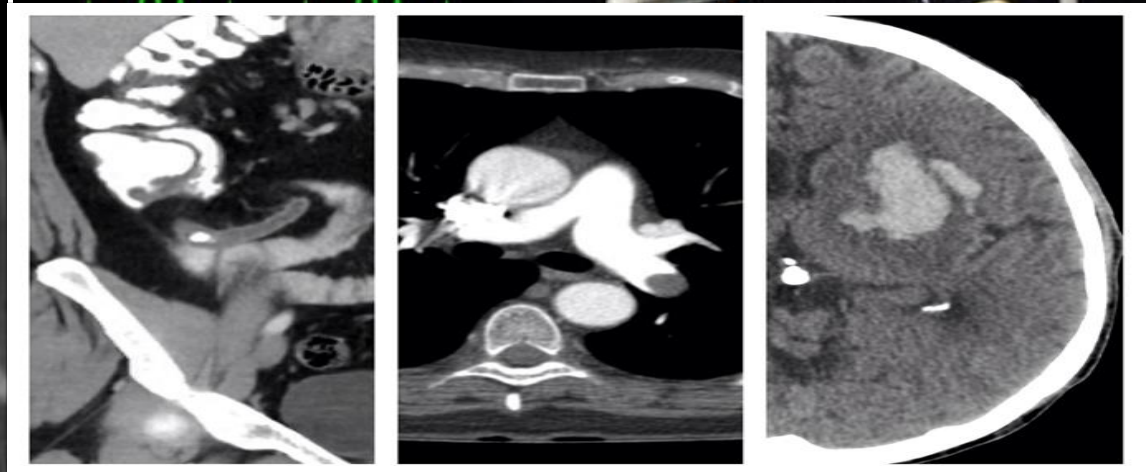


Emergency radiology

بسم الله الرحمن الرحيم



كلية الطب
جامعة نكربت
TUCOM



Emergency Radiology

What to order, When

Emergency Radiology

What are the different
Radiological investigation



Emergency Radiology

Common Topics

- CNS Emergencies
 - Face & Neck Emergencies.
 - Spinal Emergencies.
 - Chest Emergencies.
 - Cardiovascular Emergencies.
 - Abdominal Emergencies.
 - Gynecological & Obstetrical Emergencies.
 - Male Genitourinary Emergencies.
 - Pelvic Emergencies.
 - Extremities Emergencies.
 - Pediatric Emergencies
-

Emergency Radiology

CNS Emergencies:

Skull Fractures

Hemorrhage: (Traumatic–NonTraumatic)

- Extra-axial
- Parenchymal

Cerebral infarction.

Spinal trauma

Emergency Radiology

CNS Emergencies:

Skull Fractures:

What to order:

- Plain X-ray of the skull (AP-lateral view)
- Computed tomography of the Brain (Axial – Coronal) (bone window)

When:

- History of trauma – evident injury of the scalp
-

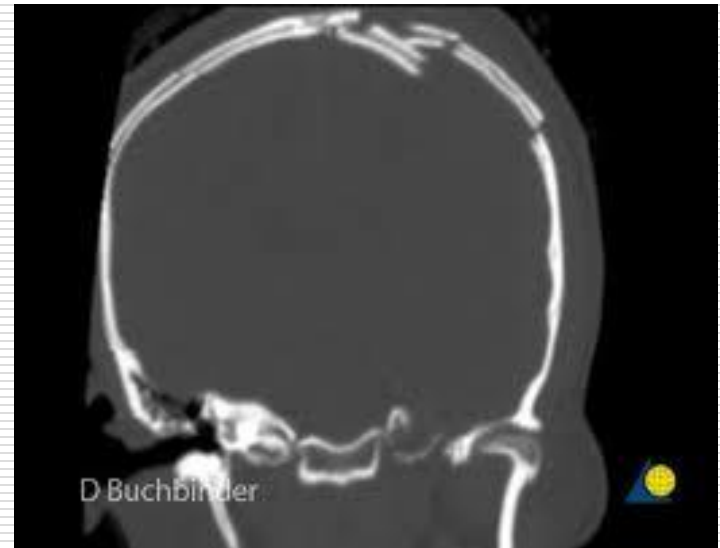
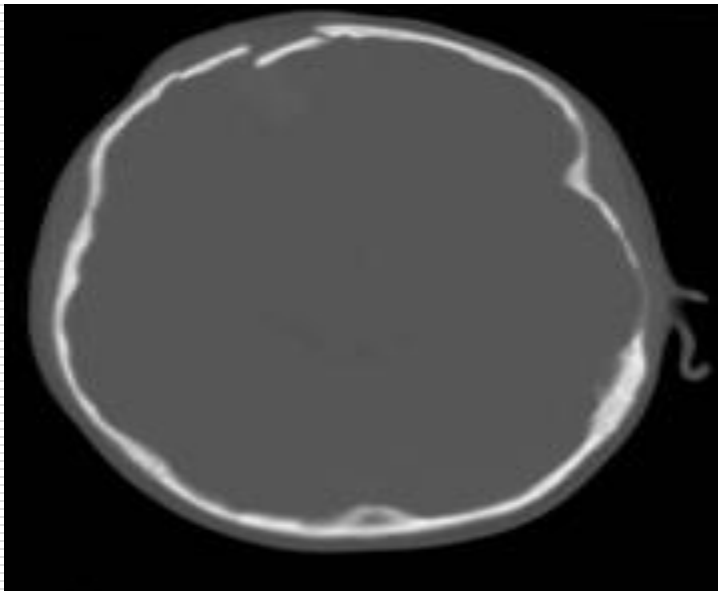
Emergency Radiology

Skull fractures (Plain X-ray)



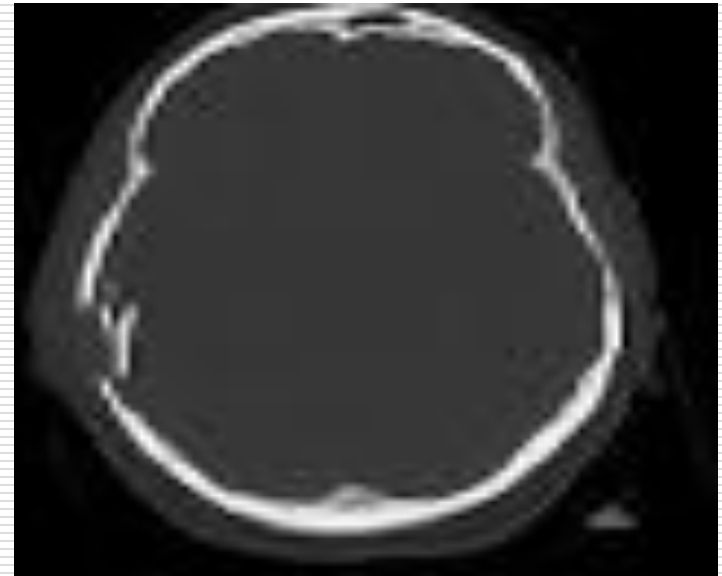
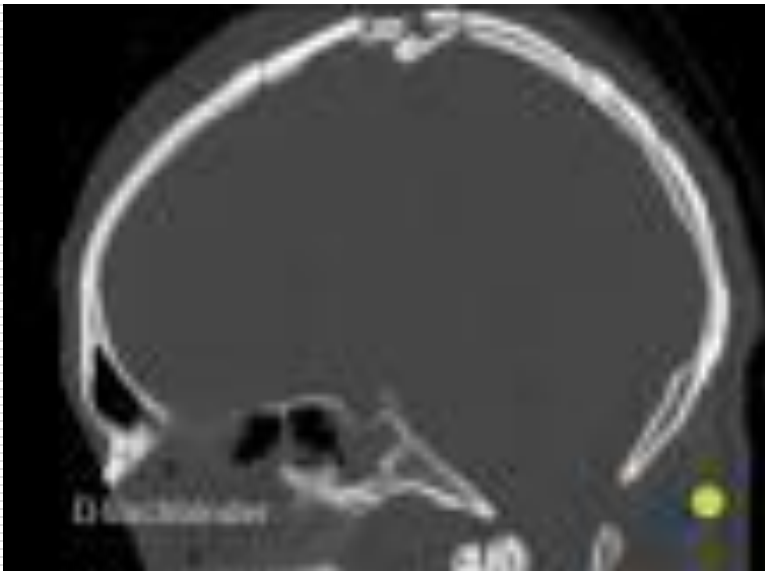
Emergency Radiology

Skull Fractures (CT Scan)



Emergency Radiology

Skull Fractures (CT Scan)



Emergency Radiology

CNS Emergencies:

Hemorrhage: Traumatic and Non Traumatic

What to order:

Computed tomography (CT) of the Brain Plain.

When:

Head trauma – focal neurological defect.

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CNS Emergencies:

Hemorrhage: Traumatic

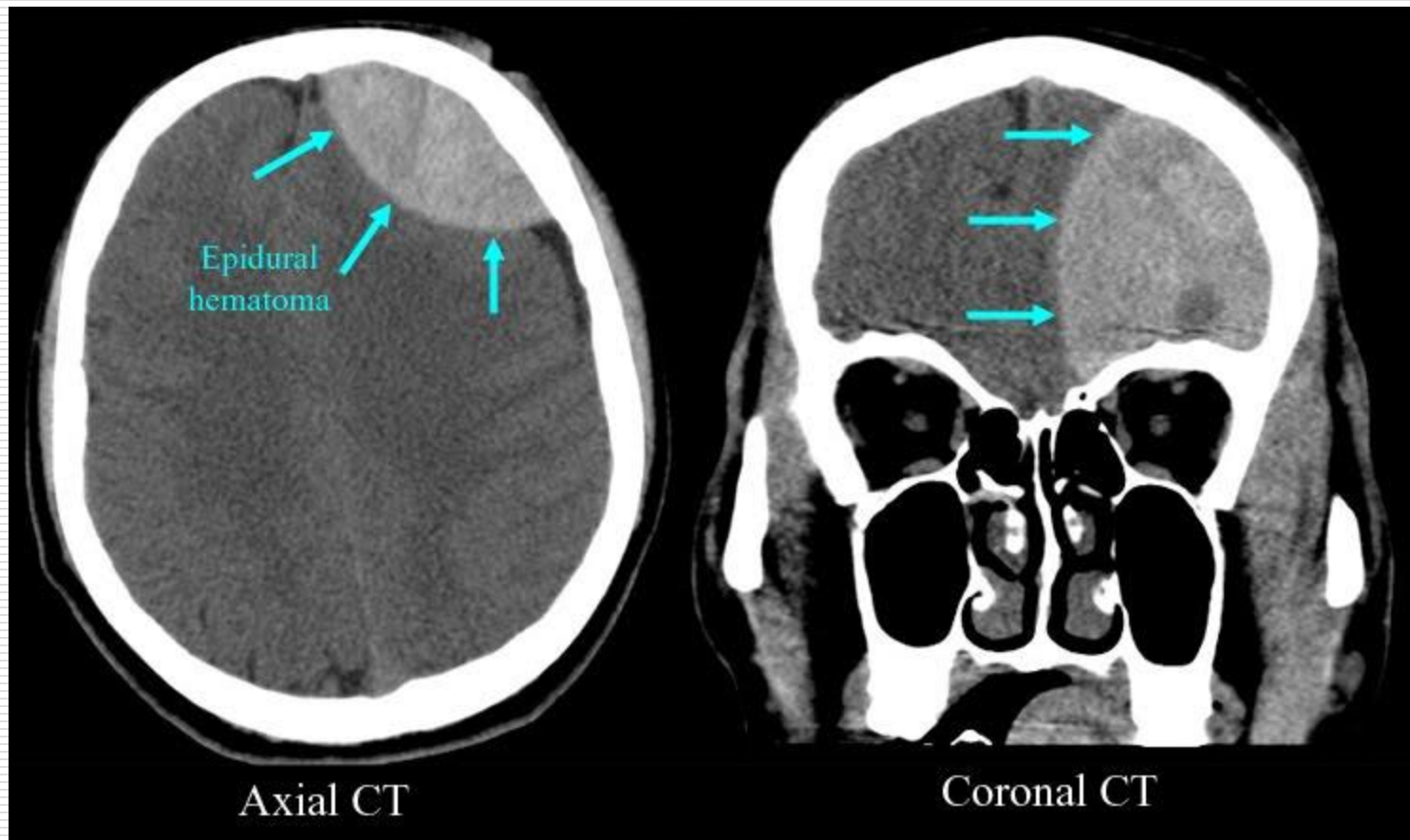
Findings in:

Extra Dural Blood

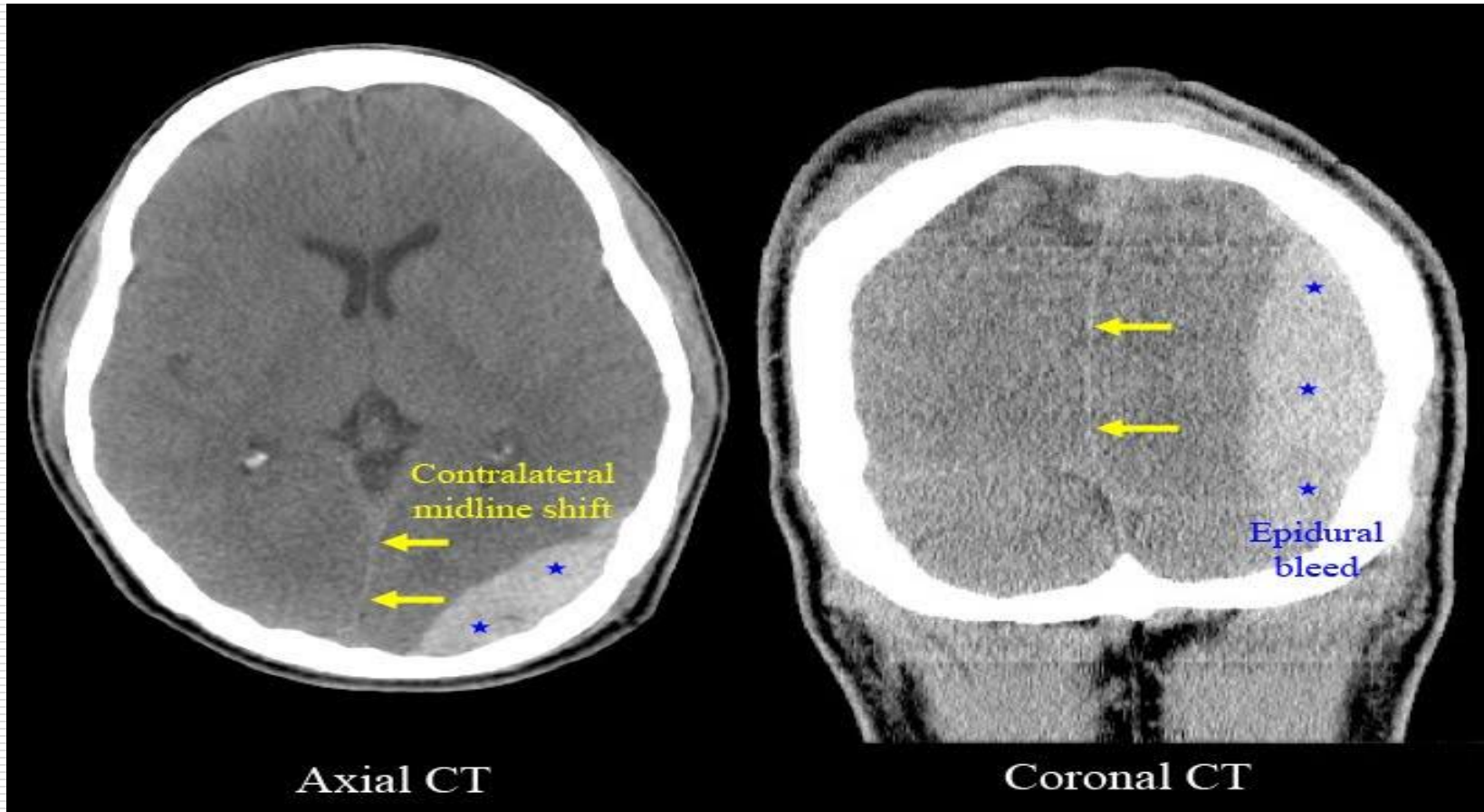
Sub dural Blood.

Cerebral contusion.

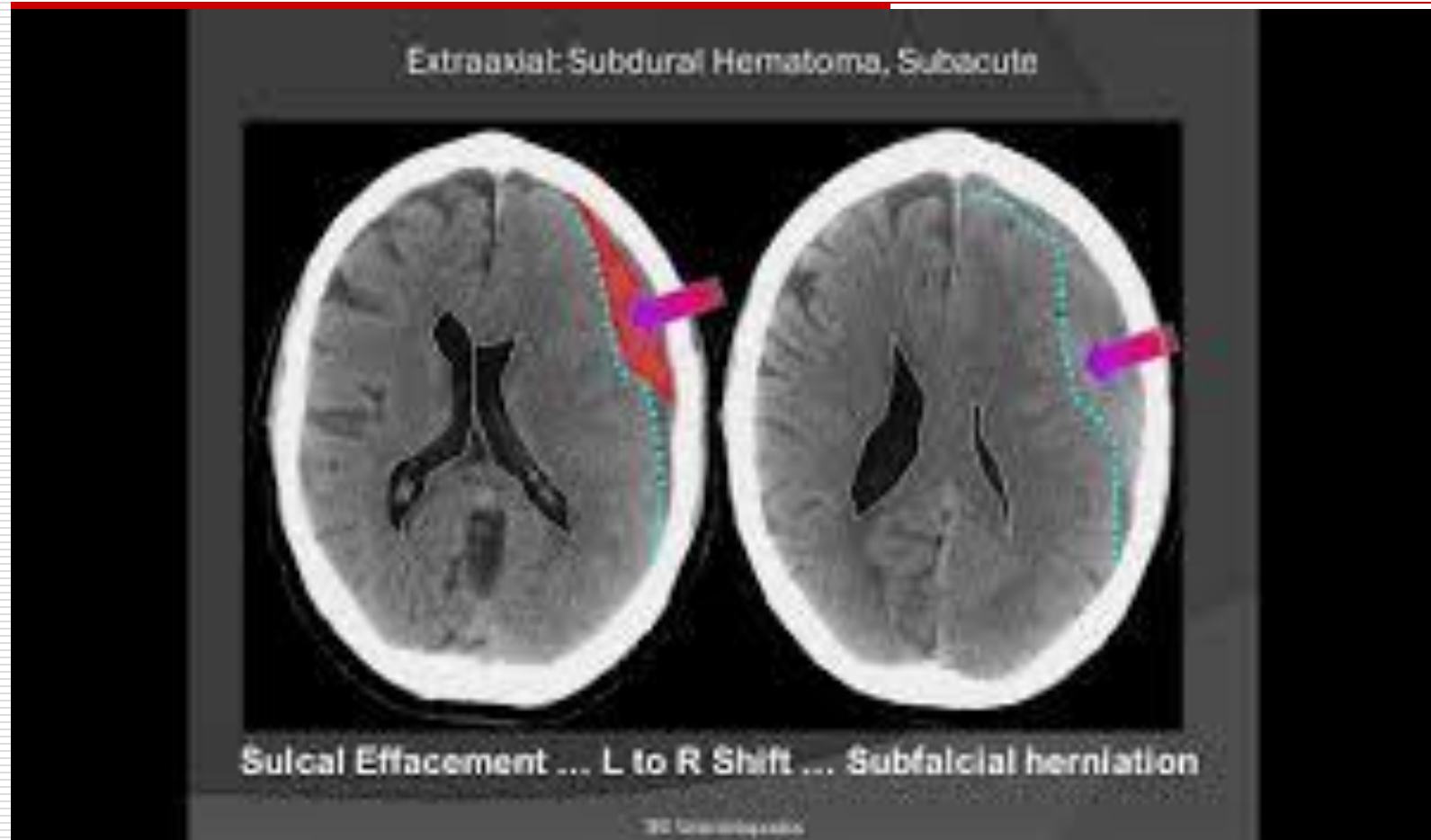
Emergency Radiology



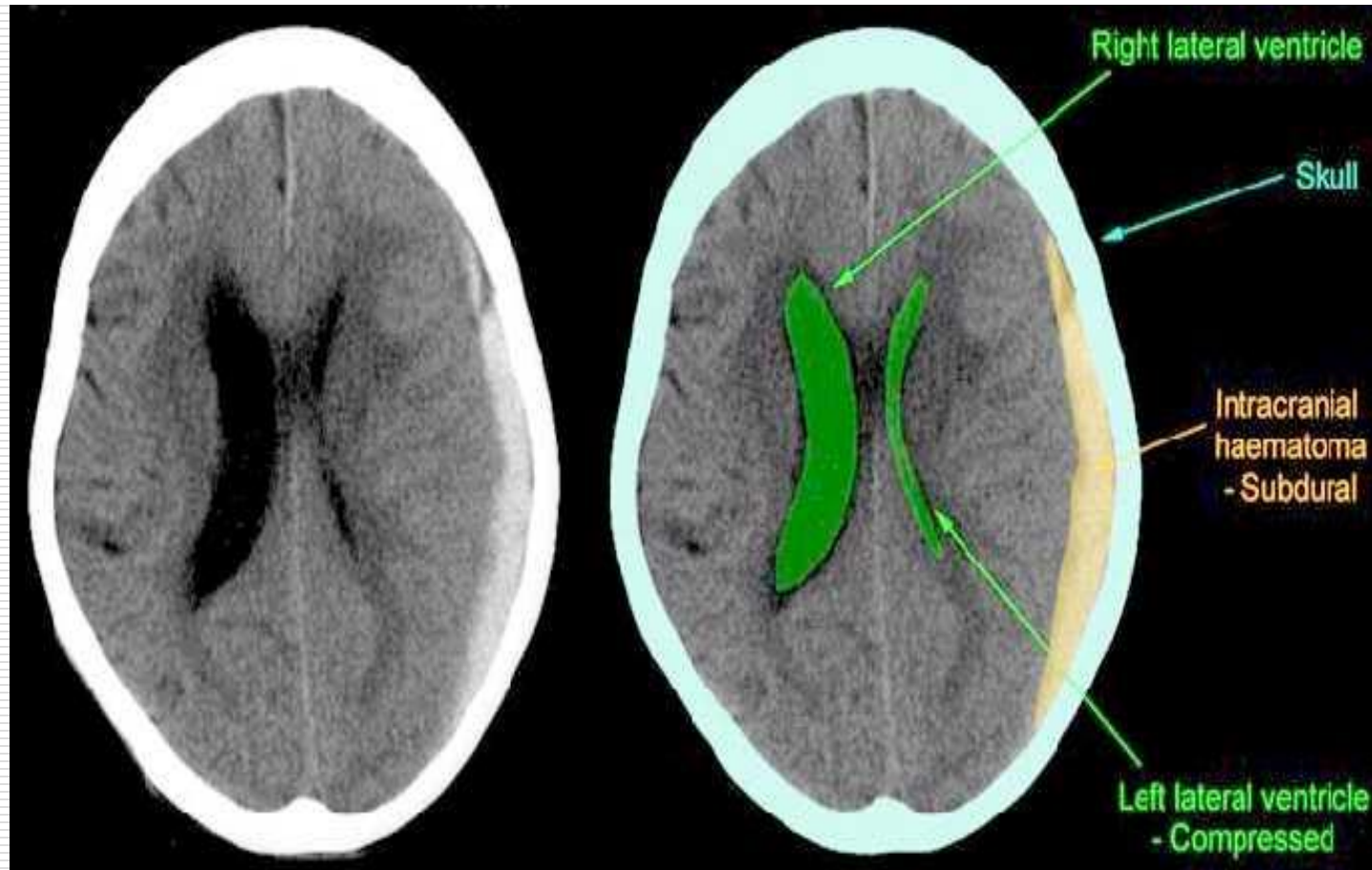
Emergency Radiology



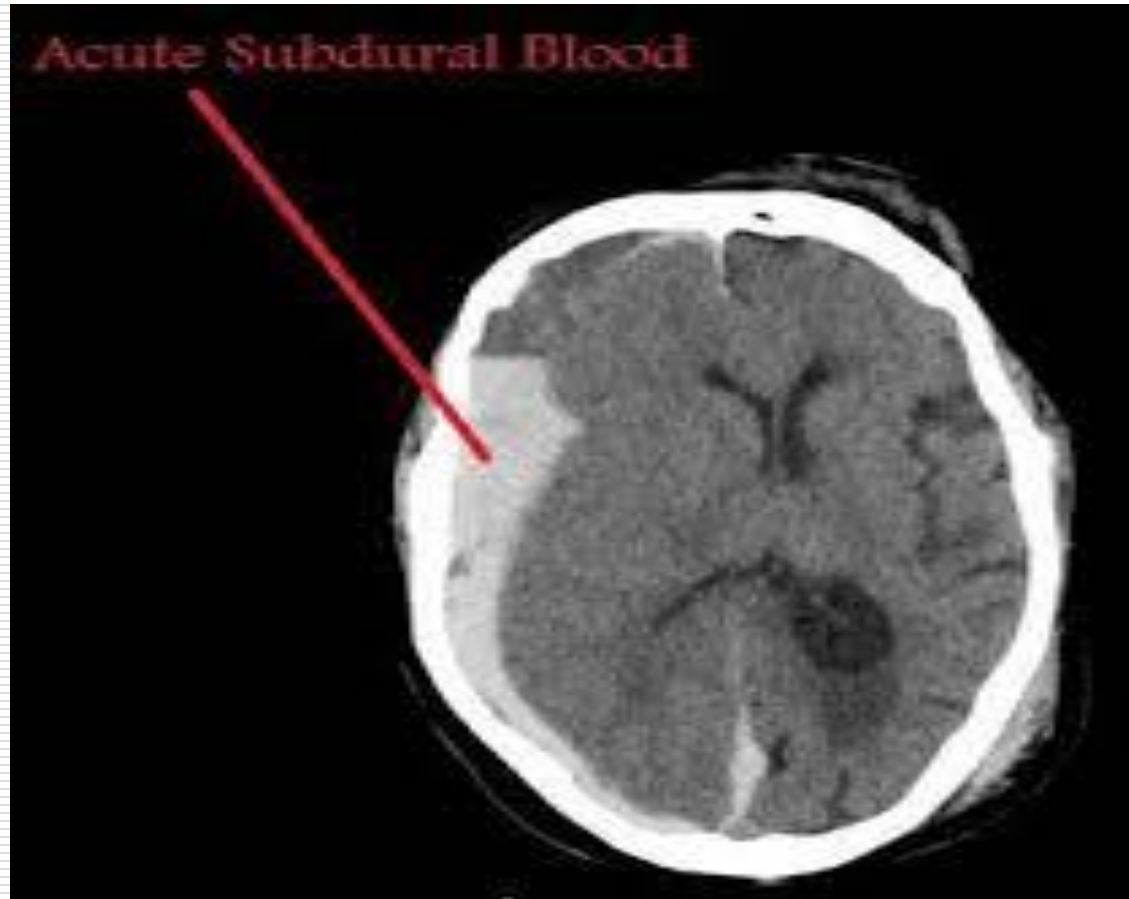
Emergency Radiology



Emergency Radiology



Emergency Radiology



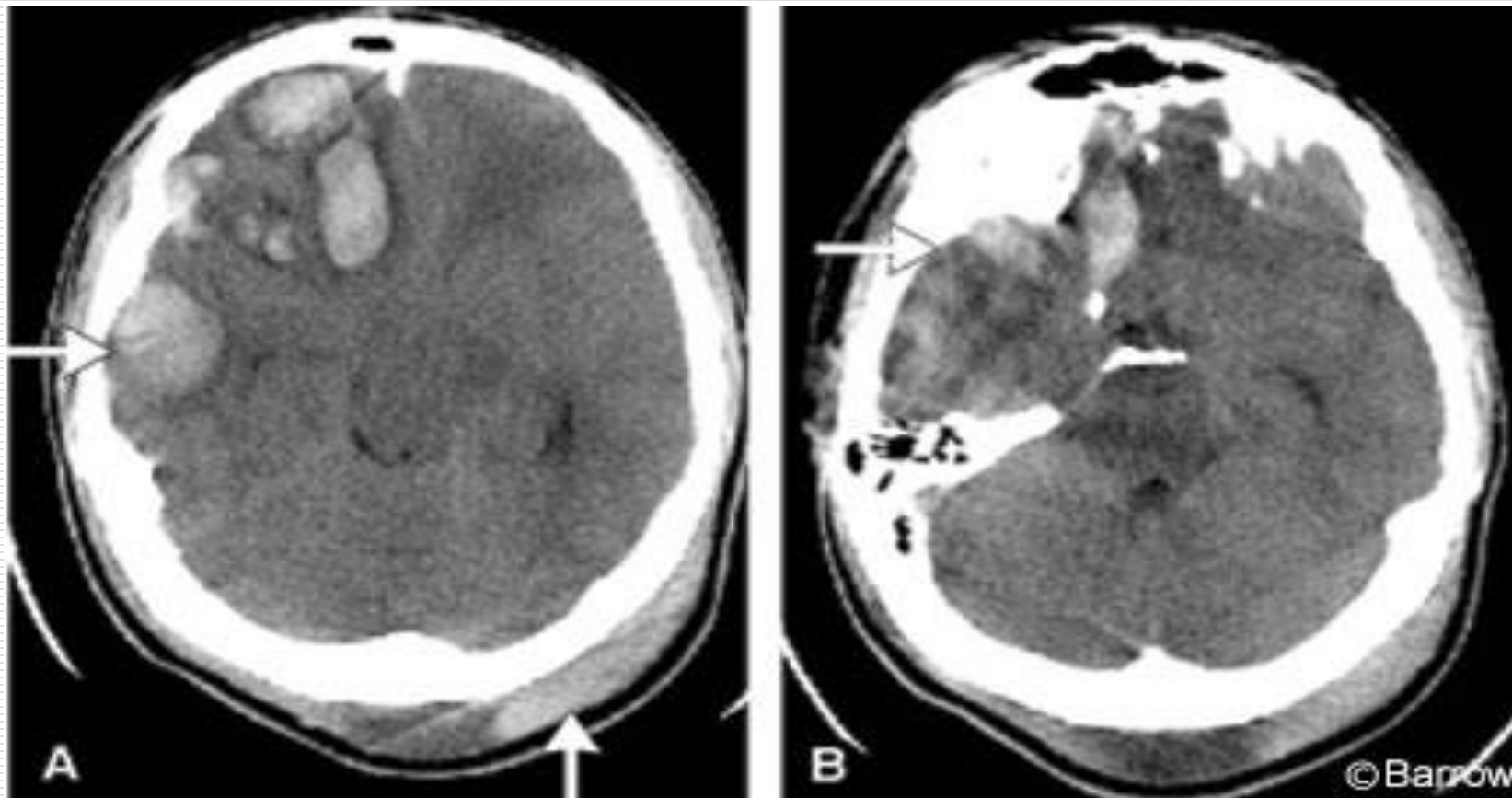
Emergency Radiology

Figure 5. Intraparenchymal Hemorrhage (CT Scan)



image is courtesy of Dr. Frank Berkowitz, MD, Department of Radiology, Georgetown University Hospital.

Emergency Radiology



Intracerebral hematomas

Emergency Radiology

CNS Emergencies:

Hemorrhage: Non Traumatic

Findings in:

- Subarachnoid Blood
 - Intraparenchymal Blood.
 - Intraventricular Blood
-

Emergency Radiology



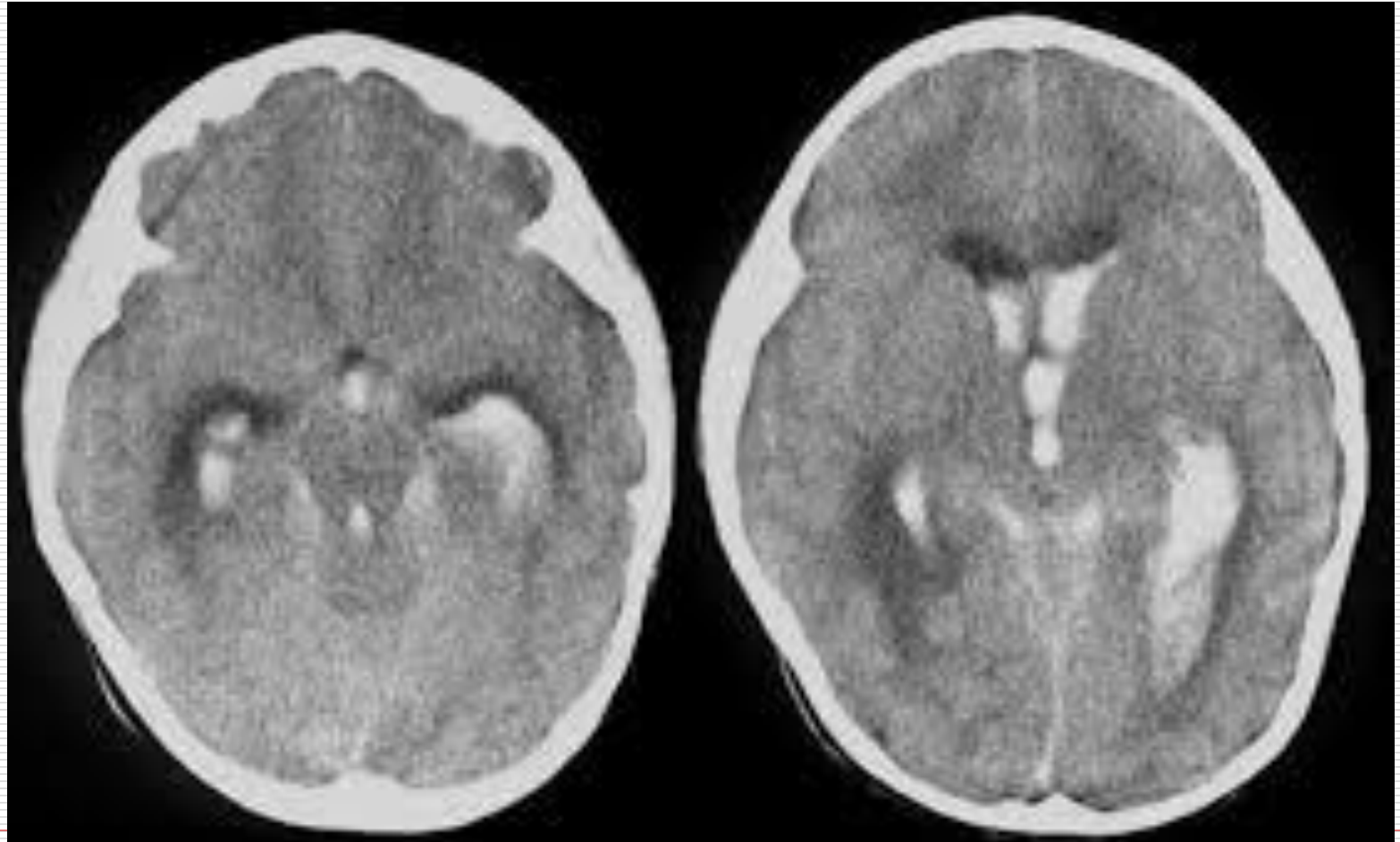
Emergency Radiology



Emergency Radiology



Emergency Radiology



Emergency Radiology

CNS Emergencies:

Cerebral Infarction:

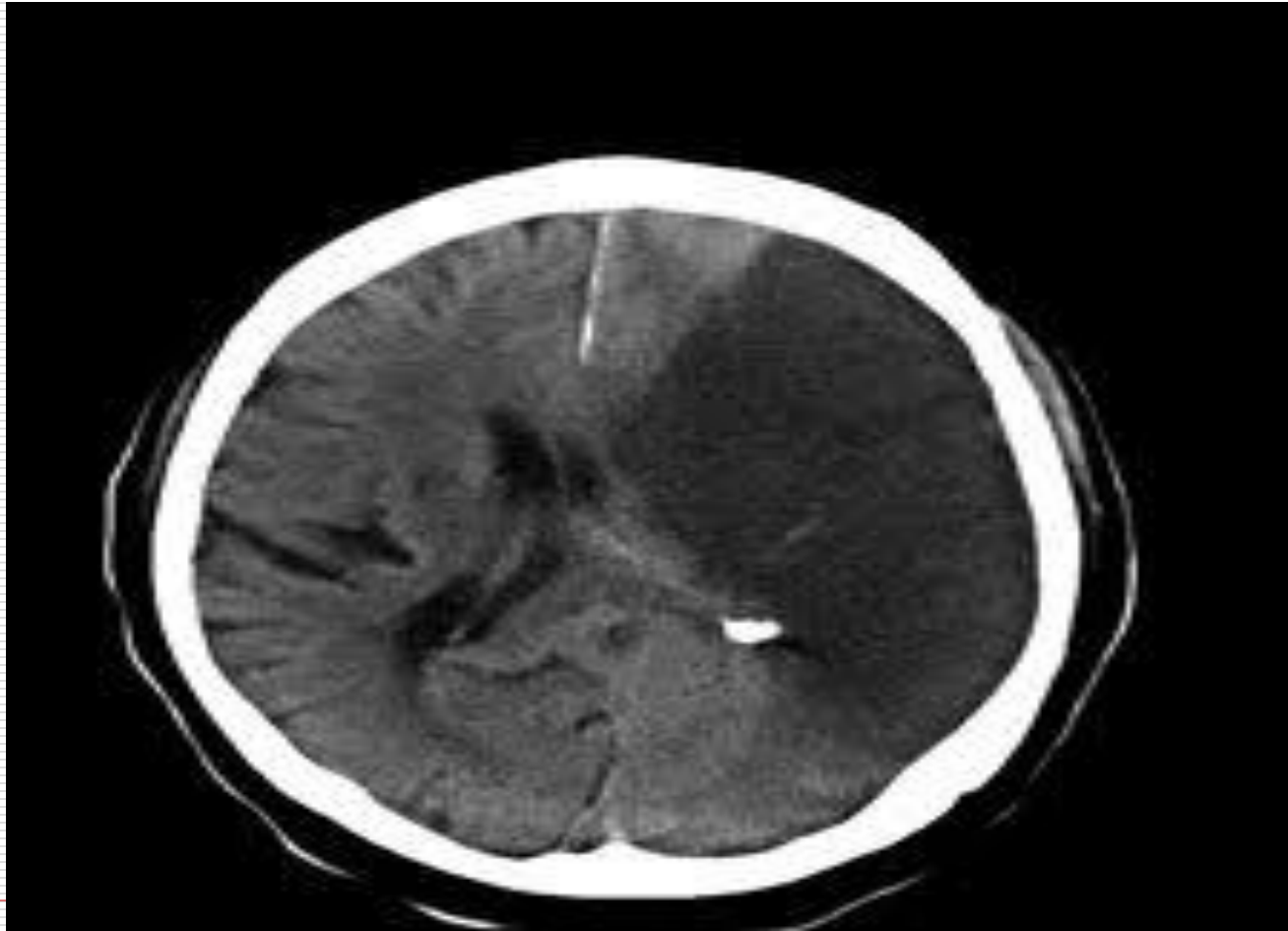
What to order:

- Computed tomography (CT) of the Brain
- Magnetic Resonance Imaging (MRI) : DWI

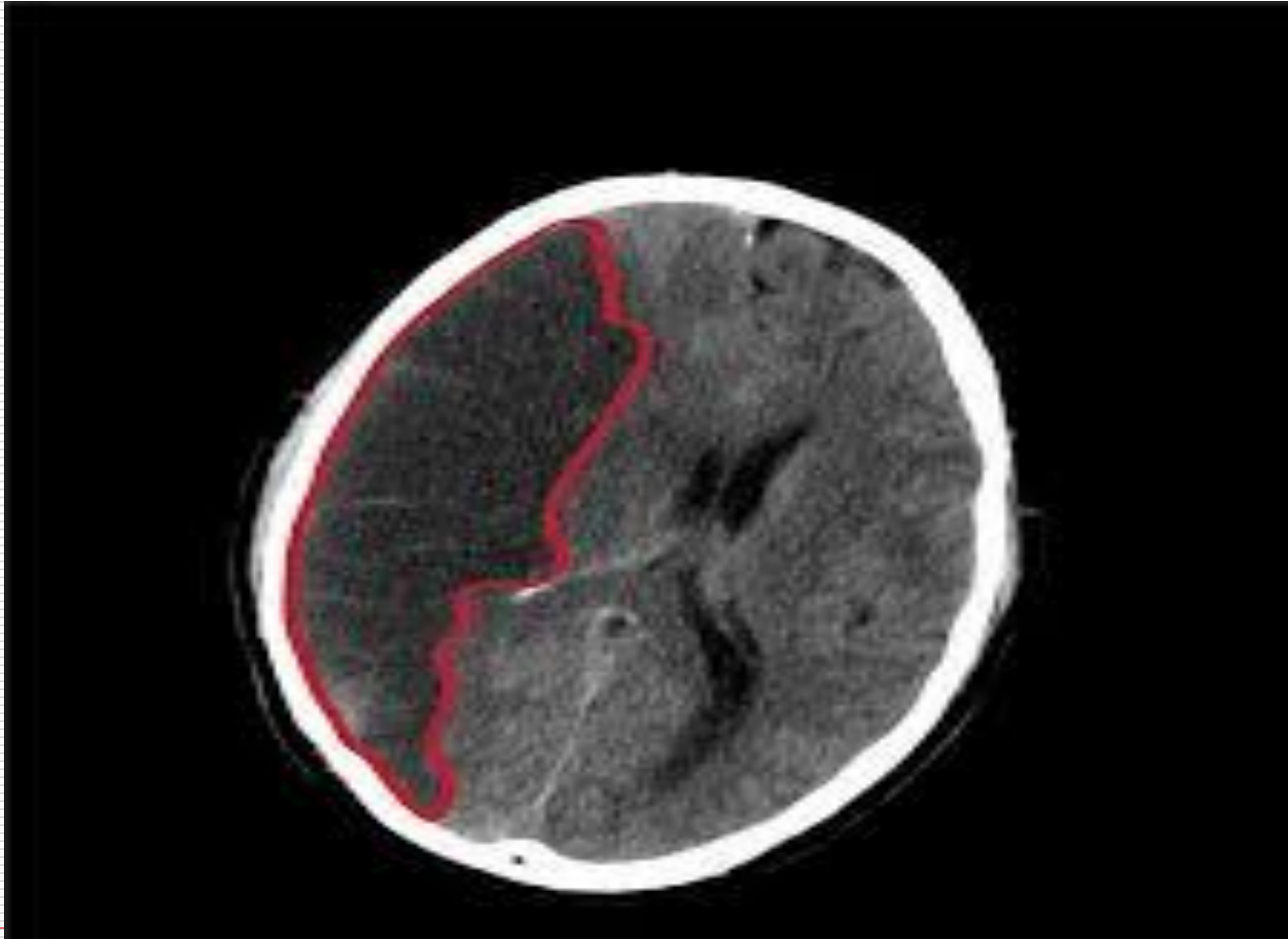
When:

Focal neurological defect - Stroke

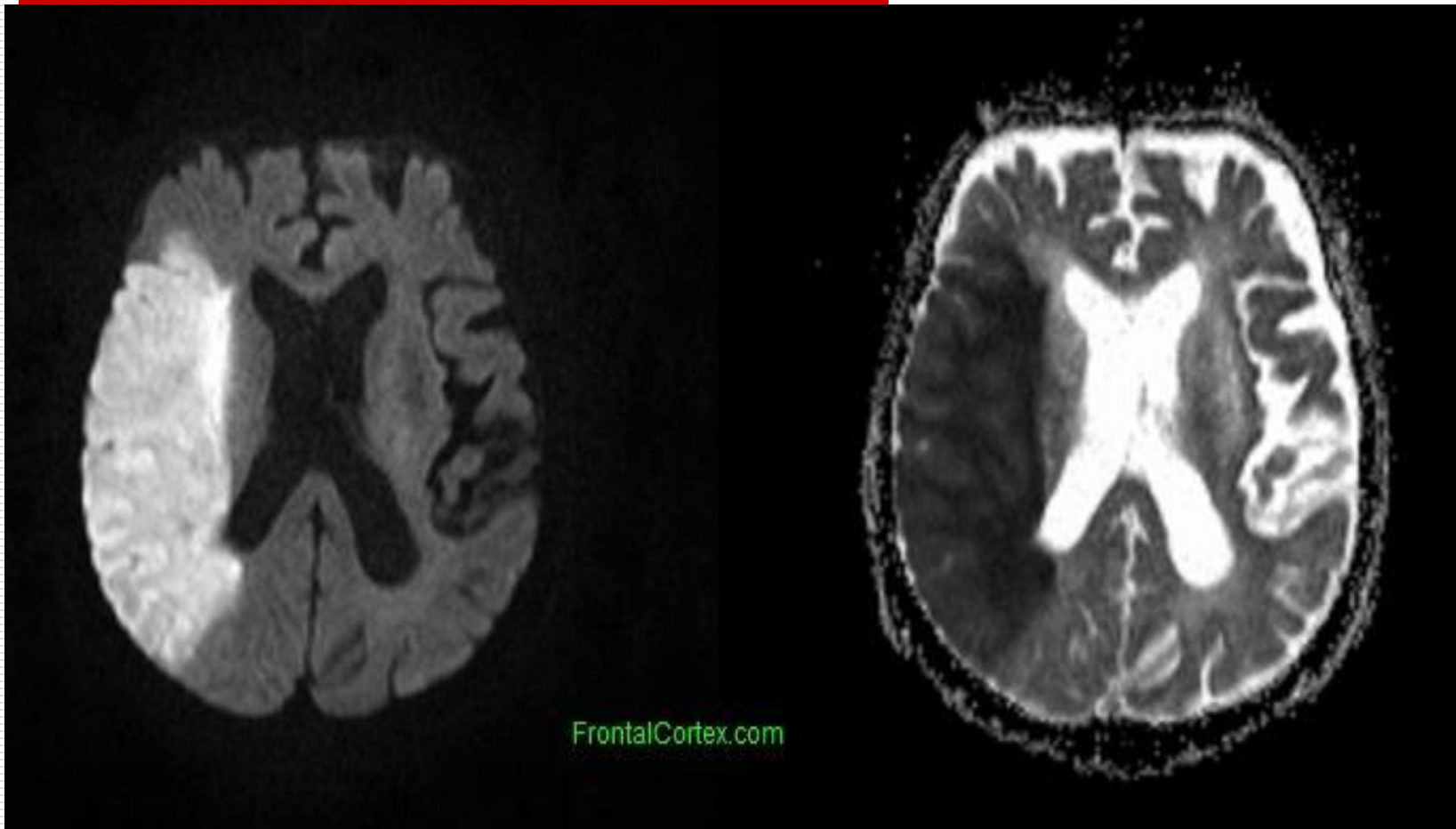
acute left side cerebral infarction



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Acute right side cerebral infarction



Emergency Radiology



Emergency Radiology

Facial Emergencies:

What to order?

Plain X-ray of the Skull (Lateral view – PA view)
Computed Tomography of the facial bones
Bone window–Axial & coronal–3D recon.)

When?

History of trauma to the face –
disfigurement – Severe facial contusions

Emergency Radiology



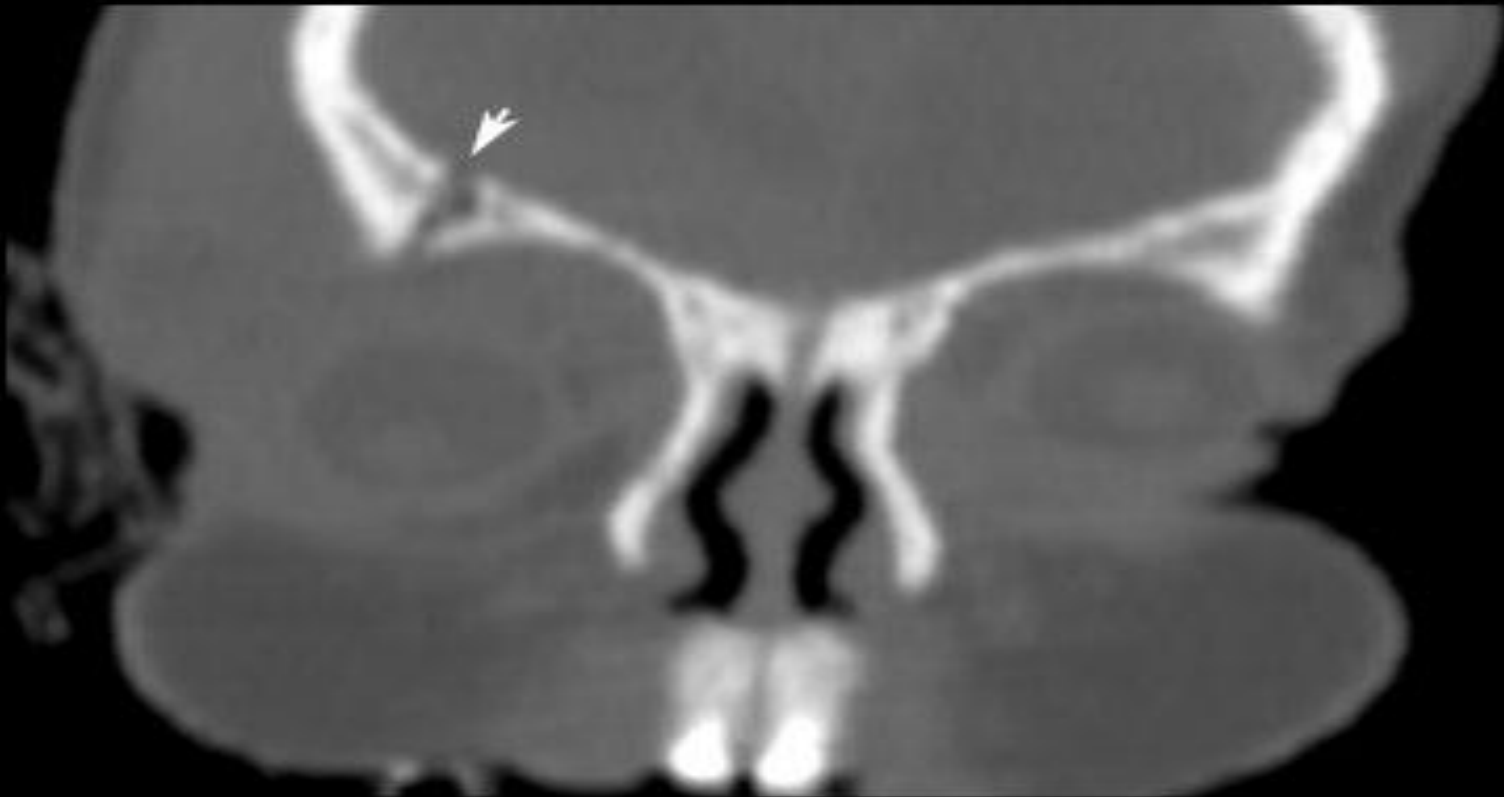
Fracture of left mandibular ramus

Emergency Radiology



Nasal bone fracture

Fracture right side orbital roof



U of Iowa 2004

Fracture right maxilla



Emergency Radiology





Emergency Radiology

Spinal Emergencies:

Trauma

- Vertebral fracture (Varieties)
 - Spinal cord injuries.
-

Emergency Radiology

Spinal trauma:

What to order?

- Plain X-ray of the spine (Lateral view – AP view)
- Computed Tomography of the Spine (Bone & Soft tissue settings–3D recon.)
- MRI of the spine. (for cord injury)

When?

- History of trauma – Falling from height.
-

Spine

Imaging Techniques:

- Plain film.....trauma
- MRI.....can see spinal cord & nerves.
- CT.....spinal trauma; burst fractures
- Radionuclide bone scan.....metastases
- Myelography.

Spinal Trauma

- Plain films: Look for Fractures & alignment.
- CT in Major trauma:
no manipulation
difficulties in monitoring patients in MRI.
- In unconscious patients:
CT of C. spine with CT of head....
Reconstruction of the images in sagittal and coronal planes.
- Look for fracture C1,C2 (atlanto-axial interval) & C7-T1
- CT can show # laminae & pedicles
bony fragments inside the spinal canal (burst #)
- MRI

Spinal Stability

The spine is divided into 3 columns:

- Ant.....ALL & ant 2/3 verteb body
- Middle.....post 1/3 of verte. body & PLL
- Post.....Pedicles, laminae & spinus pro.

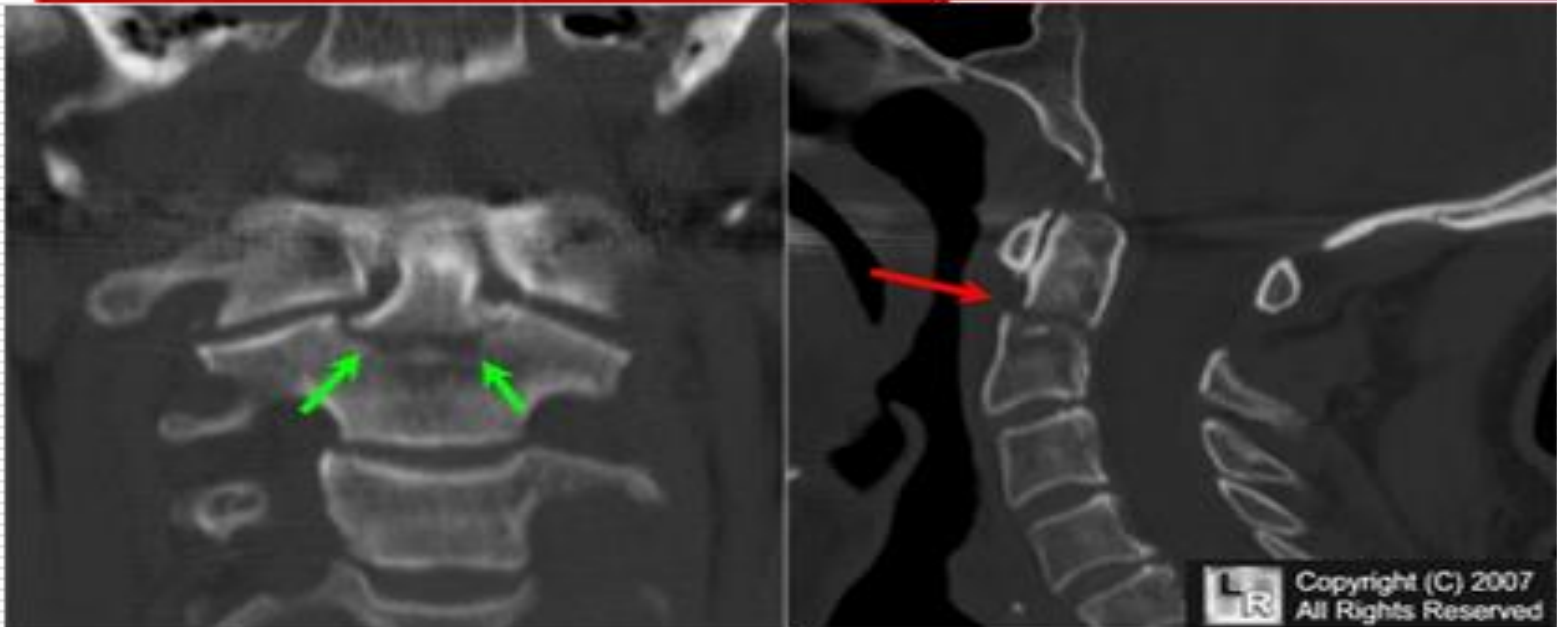
The spinal stability depends on the integrity of the middle and post. columns.

Fractures of ant. 1/3 stable # like the commonly seen wedge fractures of osteoporosis

- Jefferson #.... Lat. Masses of atlas
- Hangman's #.....Arch of C2 ...Severe hyperextension.
- Tear drop #....
On the ant. surface of verte. body ...
as a result of severe flexion injury.....may indicate a
serious injury
- Whiplash injury

Odontoid fracture

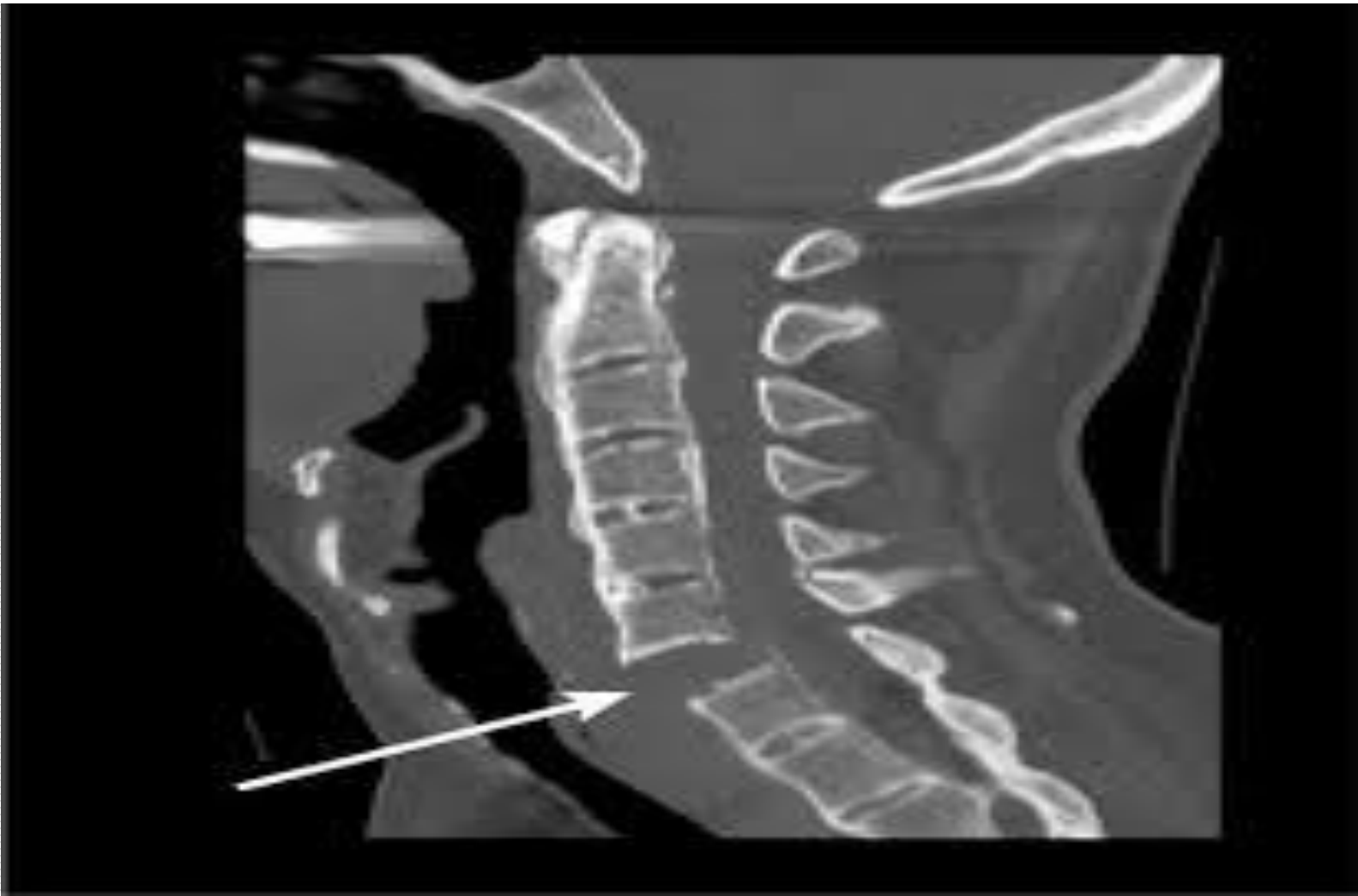
Emergency Radiology



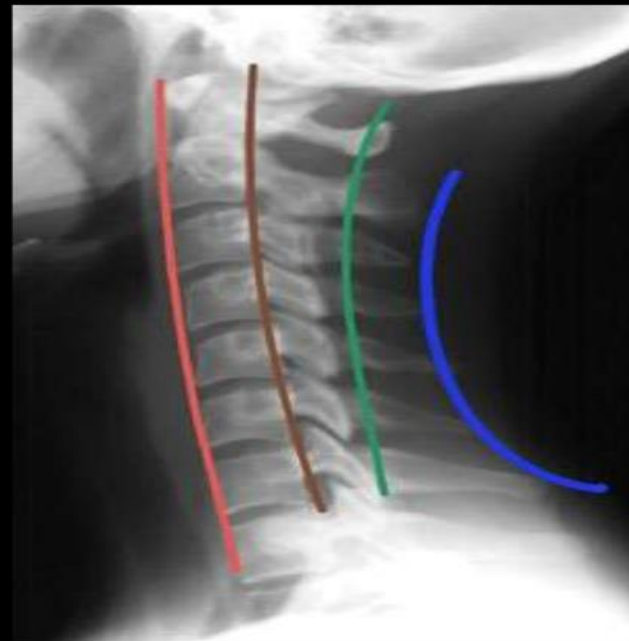
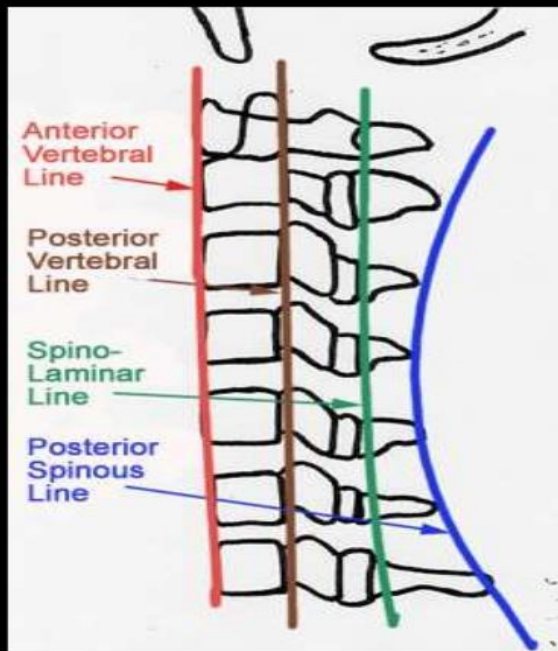
Odontoid fracture



Anterior islocation of C5-6 vertebra



Alignment



Traumatic spondylolisthesis of C4-5

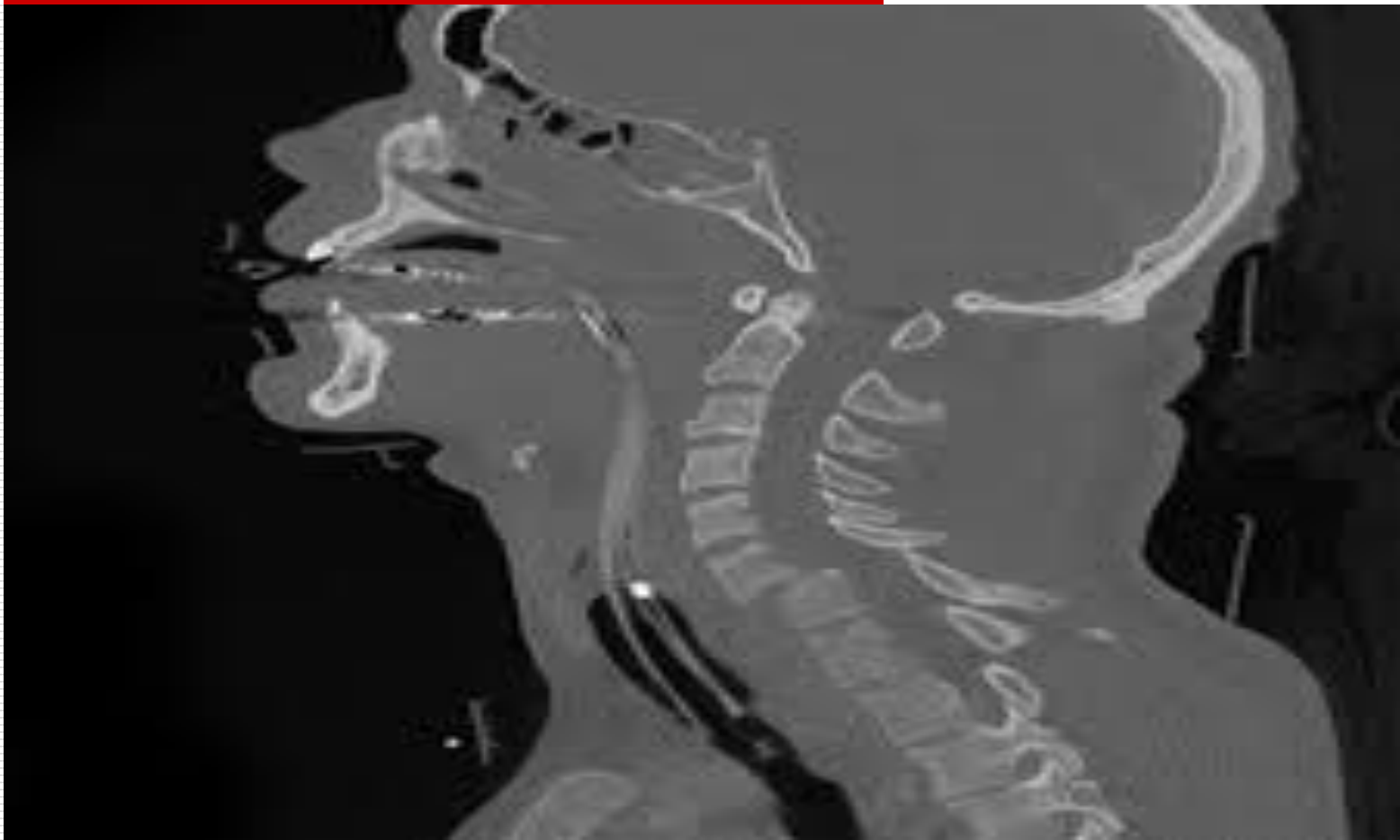


Figure 1



Figure 2

Emergency Radiology



Axial compression injuries



❑ Burst fracture at lower cervical level

MRI sagittal T2 .spinal cord injury



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Chest Emergencies:

Chest Trauma

- Rib fractures – Traumatic Hemothorax – pneumothorax – pneumomediastinum – pulmonary contusion, laceration & hematoma – Esophageal injury – diaphragmatic injury – etc.
 - Airway Foreign Body.
-

Emergency Radiology

Chest Emergencies:

What to order?

- Plain X-ray of the Chest (PA view – Lateral view)
- Computed Tomography of the Chest
- Angiography (Aortography)

When?

History of trauma – Difficulty of breathing.

Chest trauma ,contusion right lung
,rib fracture ,surgical emphysema





Pneumothorax

Emergency Radiology

**Tension
pneumothorax**

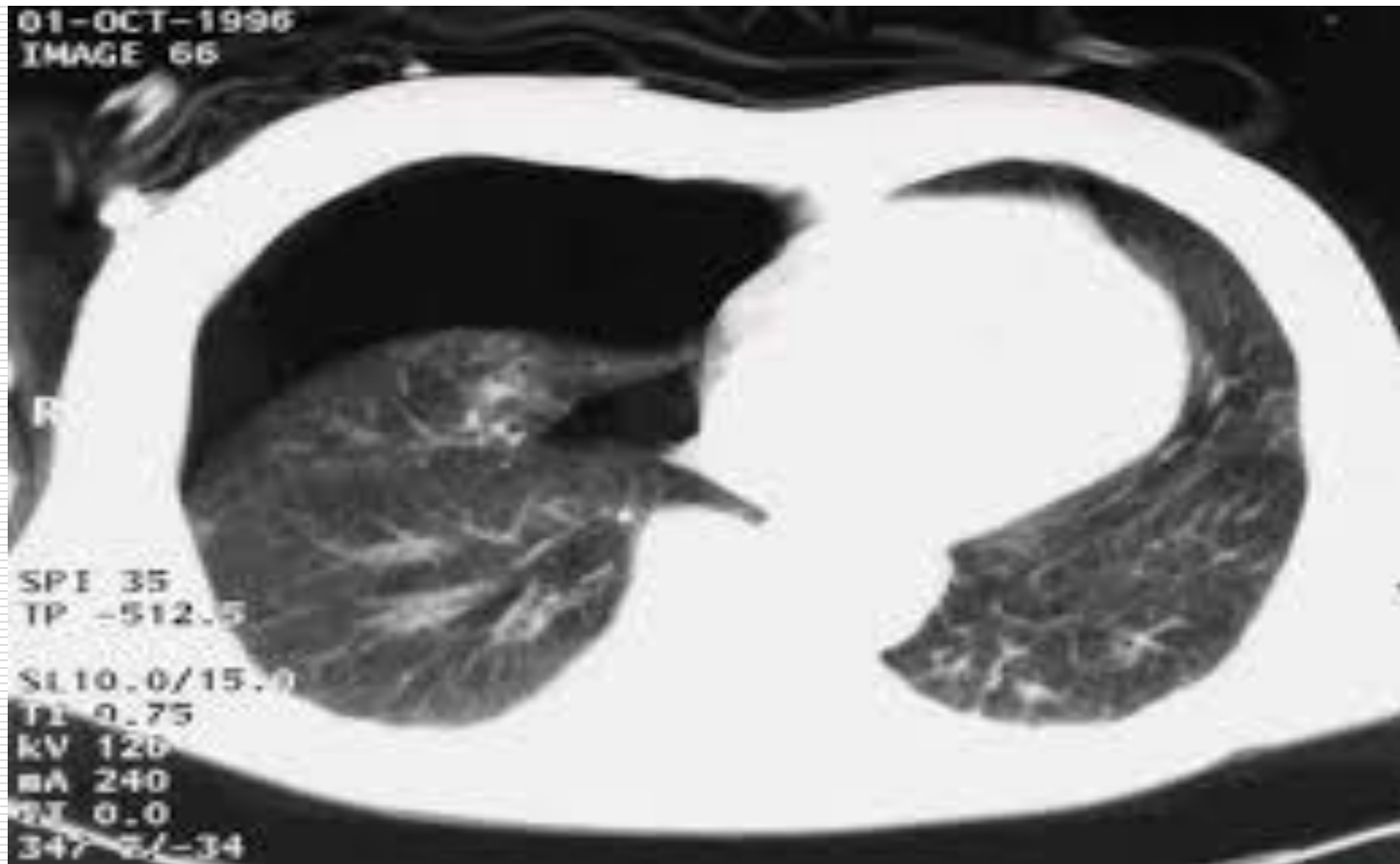


Emergency Radiology

□ Tension
pneumothorax



pneumothorax



pneumothorax



Emergency Radiology

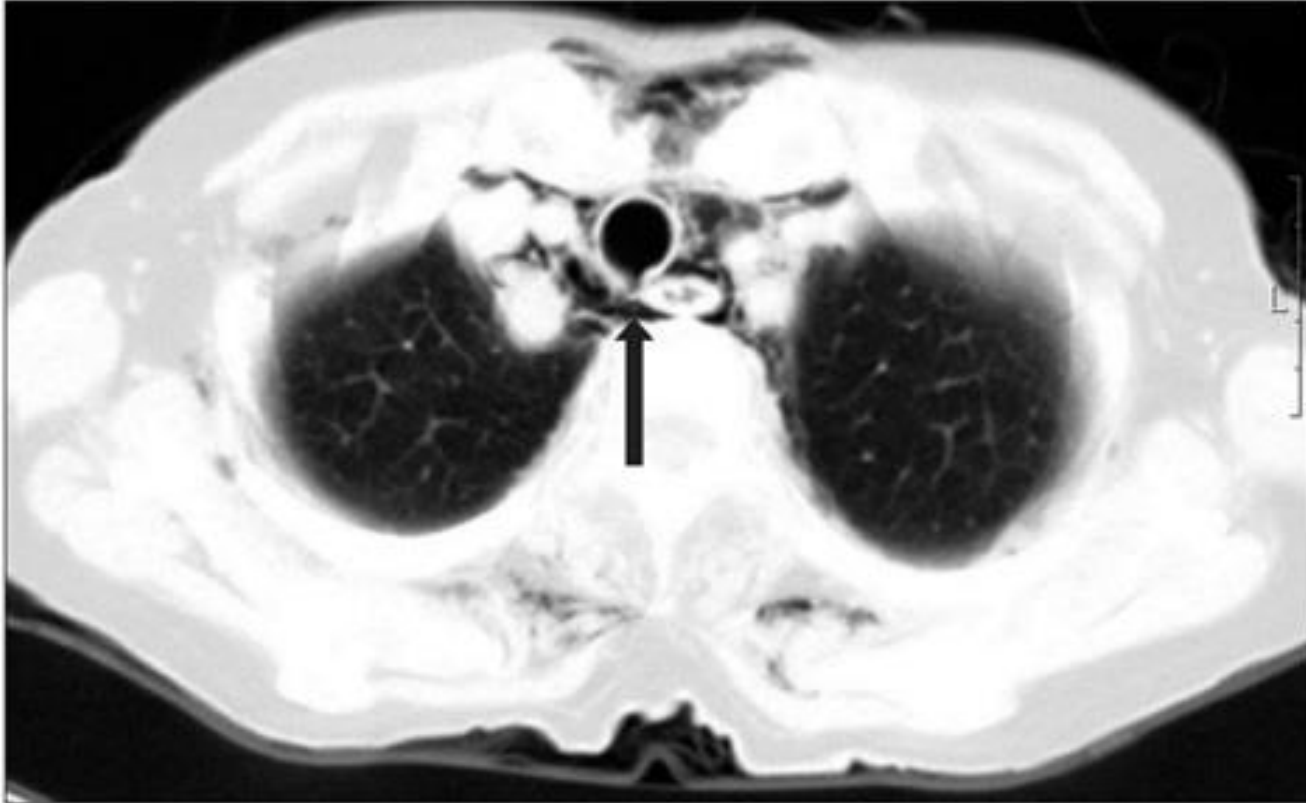


hydropneumothorax

Emergency Radiology



Emergency Radiology



pneumomediastinum

Emergency Radiology

pneumomediastinum



Emergency Radiology

Chest Emergencies:

FB of the Airway:

What to order?

Plain X-ray of the Chest (PA view - Lateral view)

Computed Tomography of the Chest

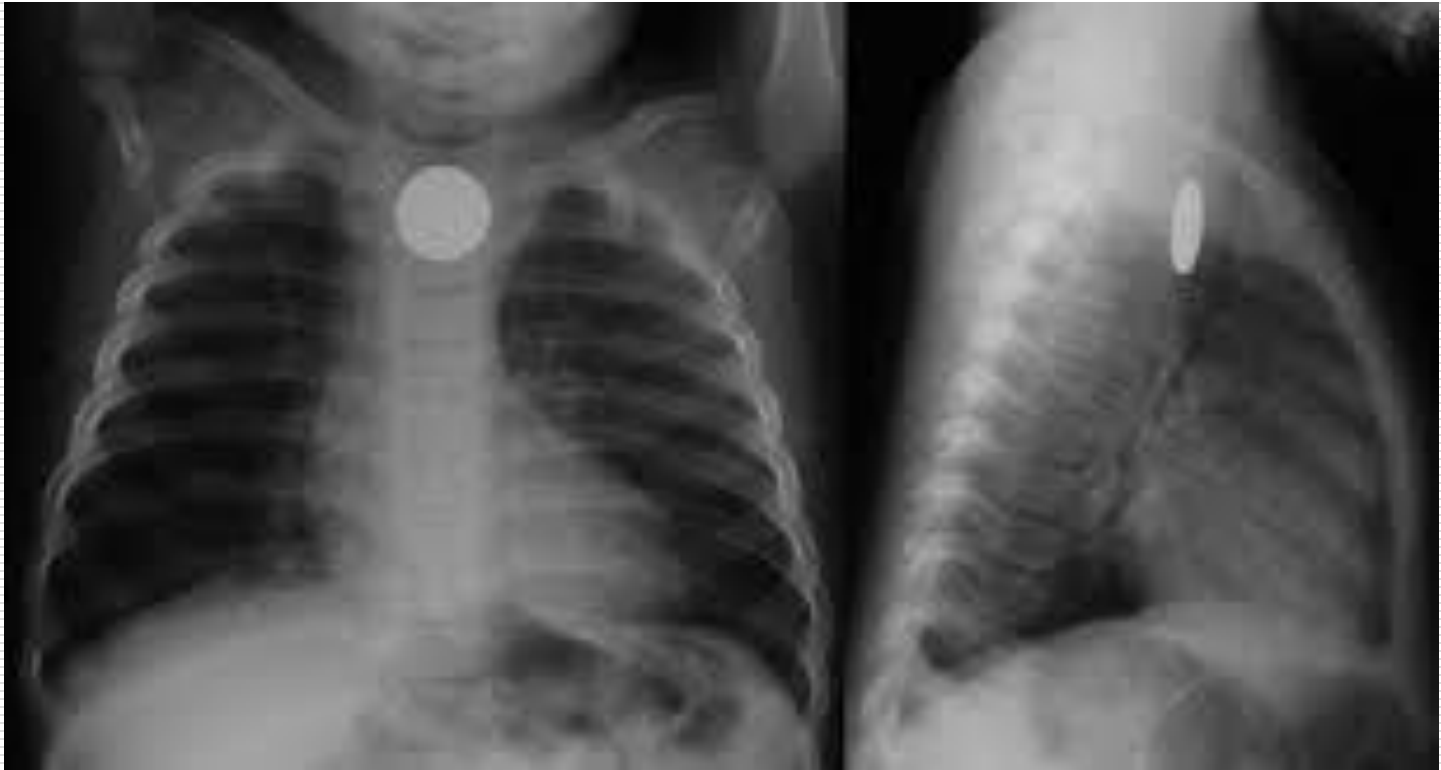
When?

Children – difficulty in breathing – Unconscious patient

Hyperinflation rt lung



Emergency Radiology



Emergency Radiology

Cardiovascular Emergencies:

- CHF
 - Pericardial effusion
 - Aortic dissection, trauma.
 - Pulmonary Edema
 - Pulmonary Embolism.
 - Peripheral ischemia (acute)
 - DVT.
-

Emergency Radiology

Cardiovascular Emergencies:

CHF:

What to order?

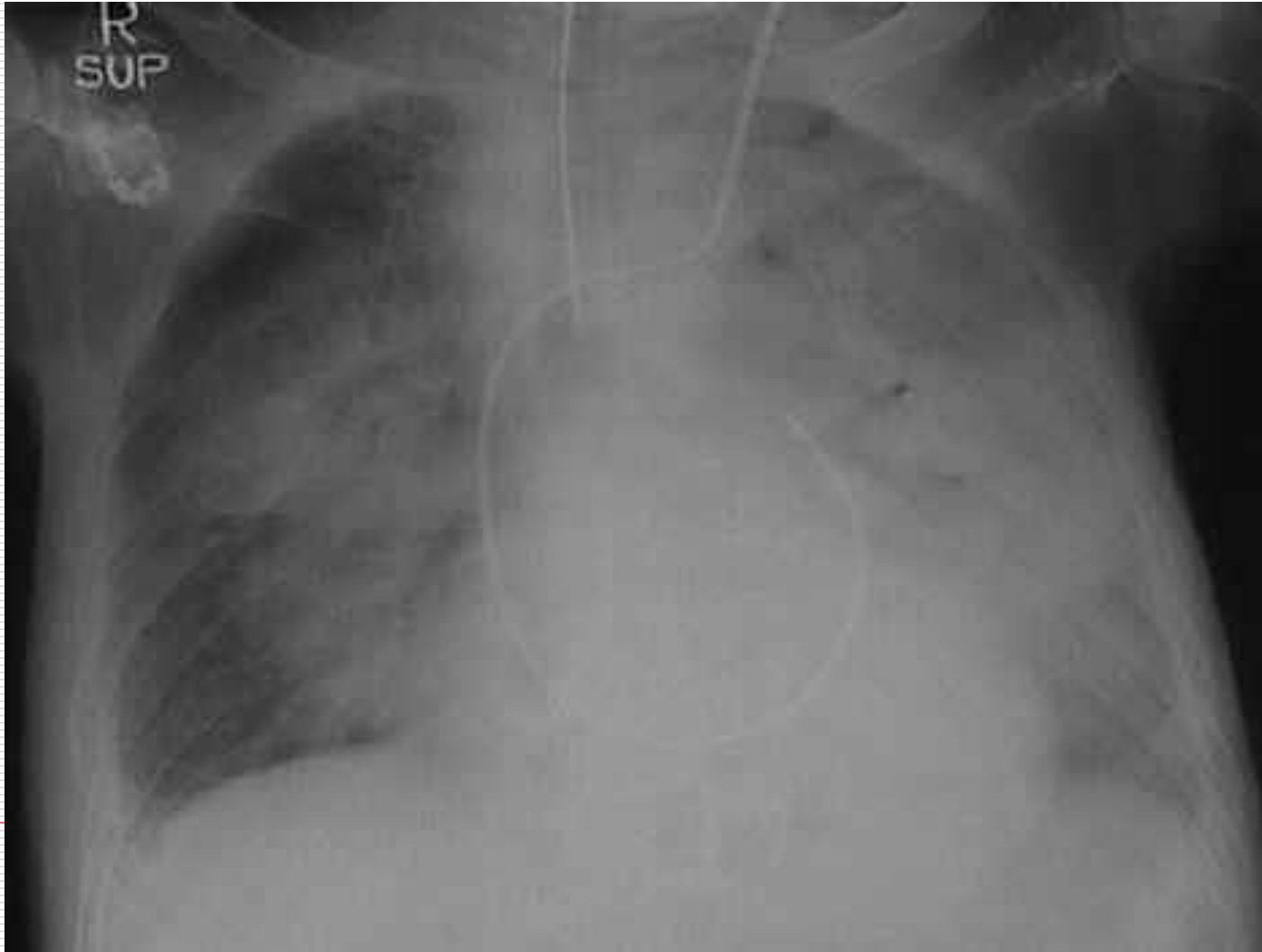
Plain X-ray of the Chest (PA view - Lateral view)

Echocardiography

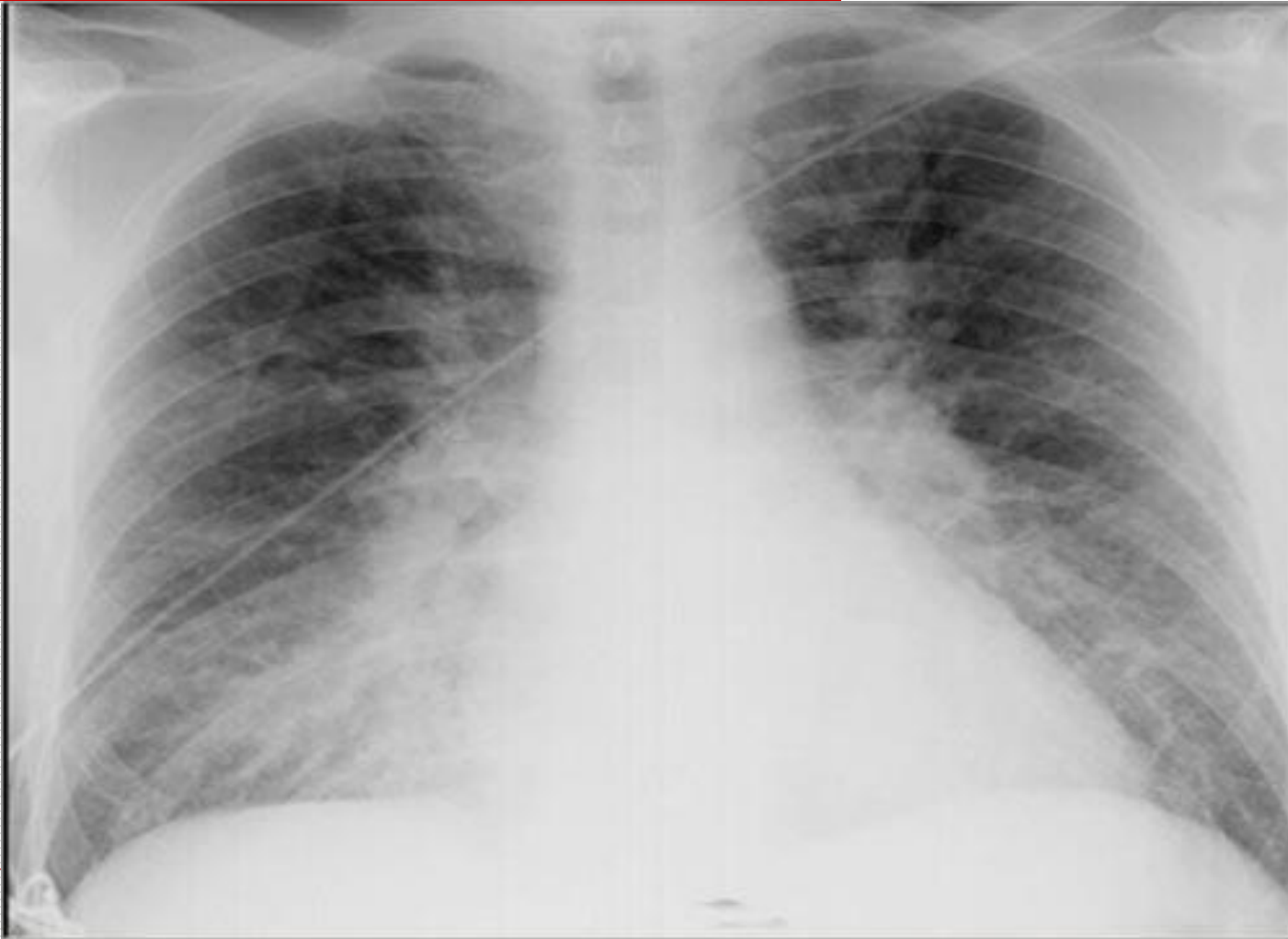
When?

Dyspnea – signs of low cardiac output

HF



HF radiological findings?



Emergency Radiology

Cardiovascular Emergencies:

Aortic dissection:

PULMONARY EMBOLISM

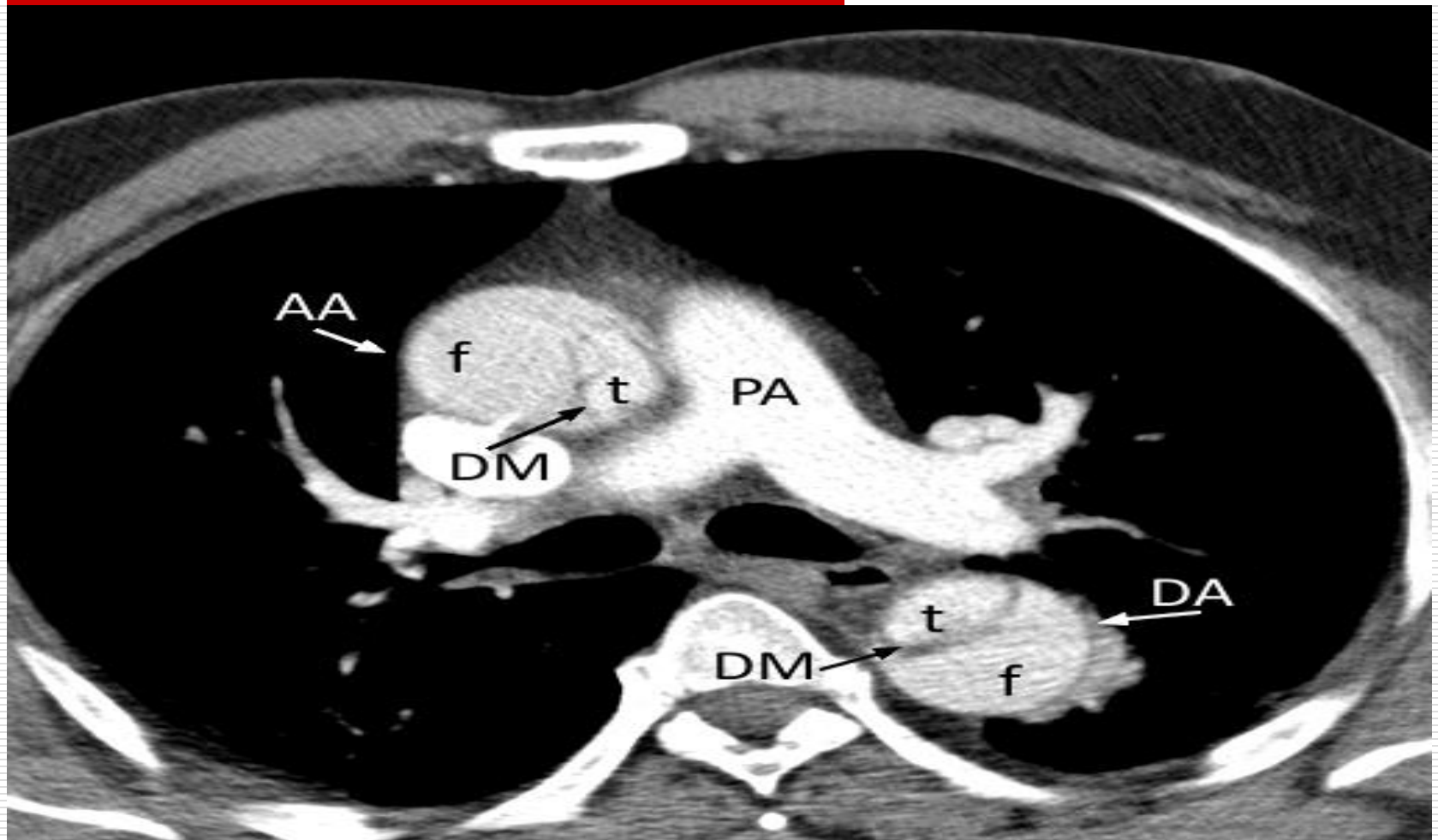
What to order?

- Plain X-ray of the Chest (PA view–Lat. view)
- CT scan with contrast.
- MRI
- Aortography

When?

Sudden severe tearing substernal chest pain

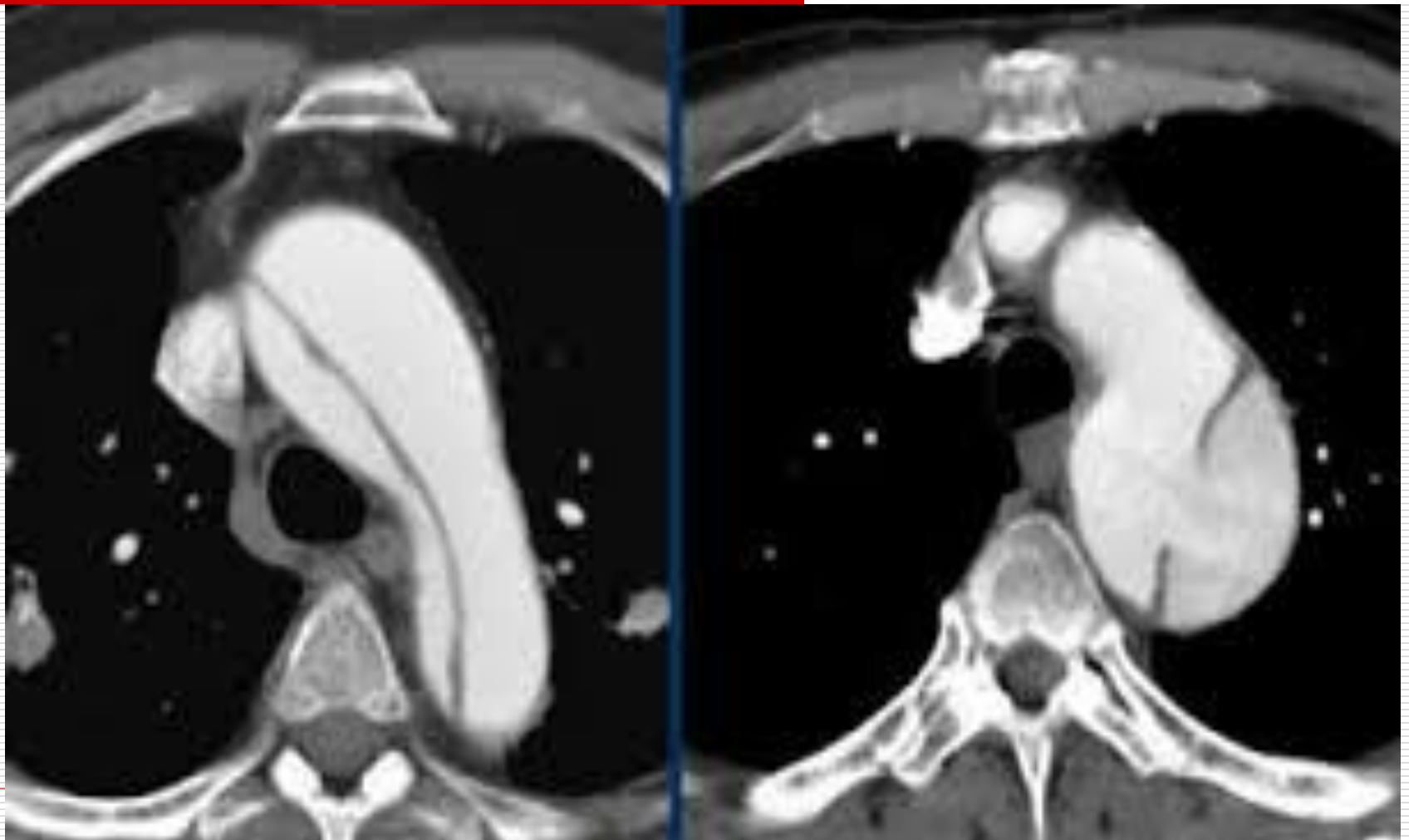
Dissecting aortic aneurism



DISSECTING AORTIC ANEURISM



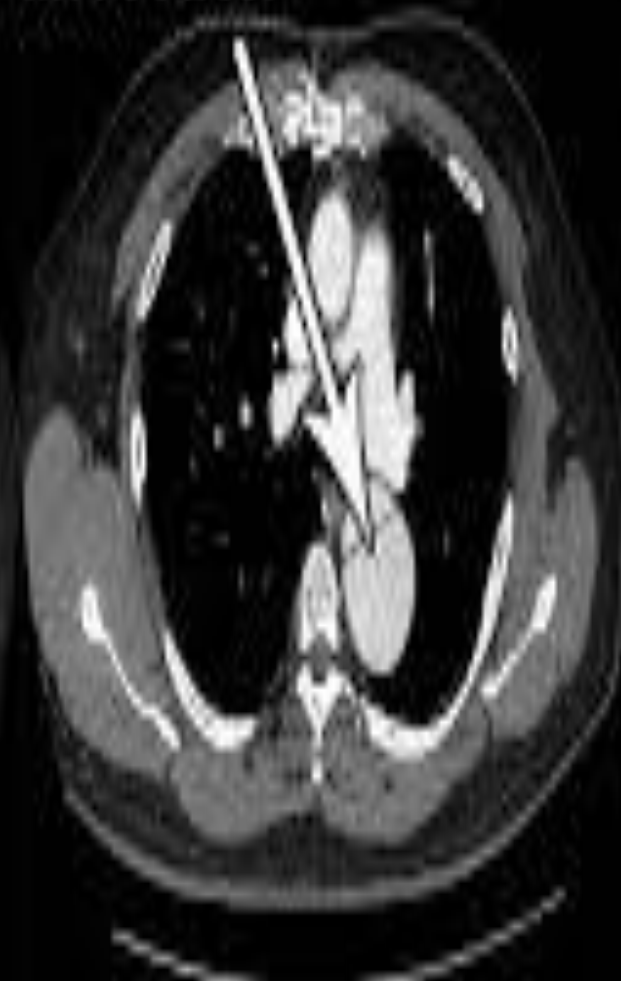
Emergency Radiology



aortic dissection



Axial (level of aortic arch)

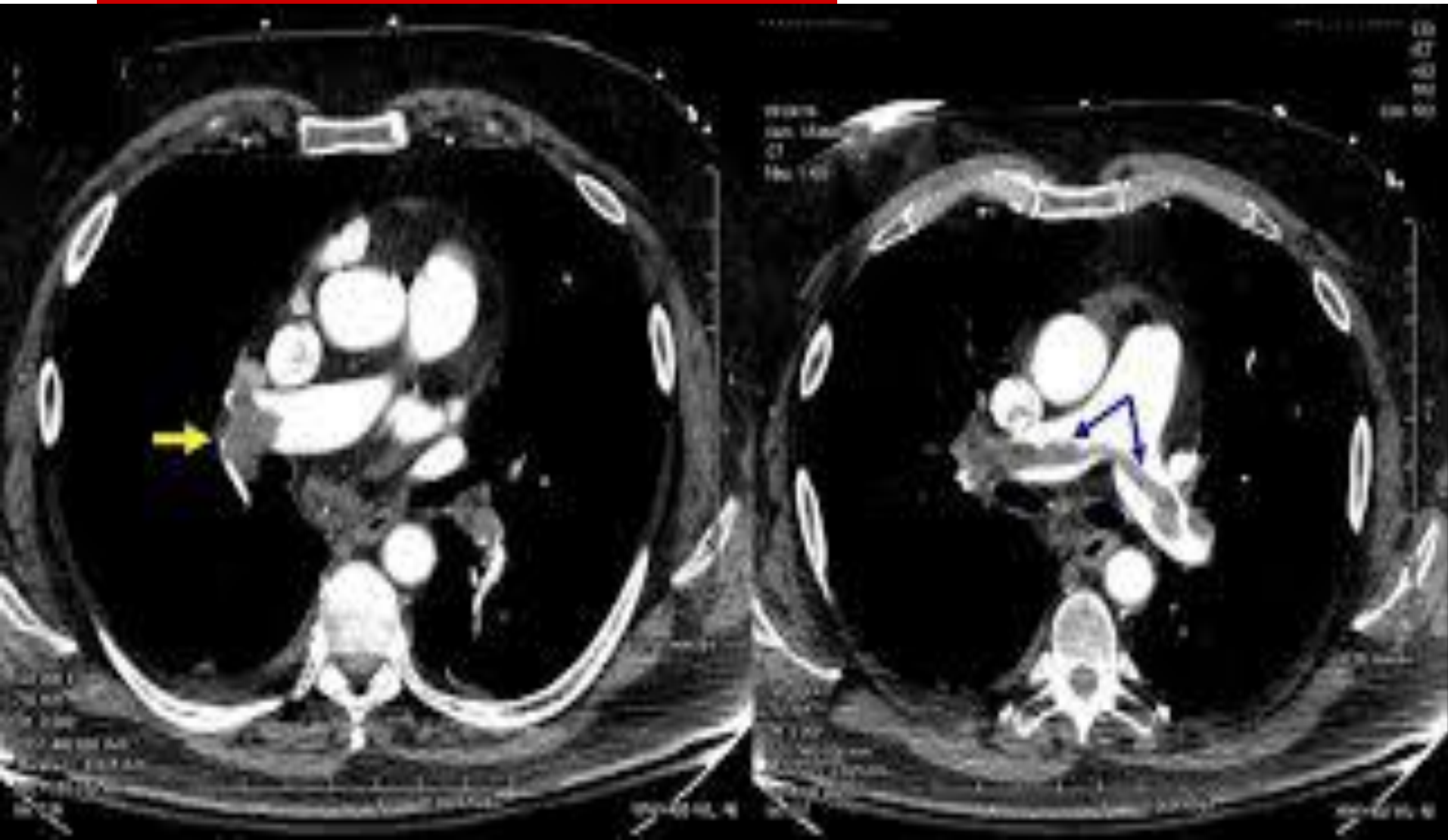


Axial (descending)



Coronal view

Pulmonary embolism



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Cardiovascular Emergencies:

Acute peripheral ischemia:

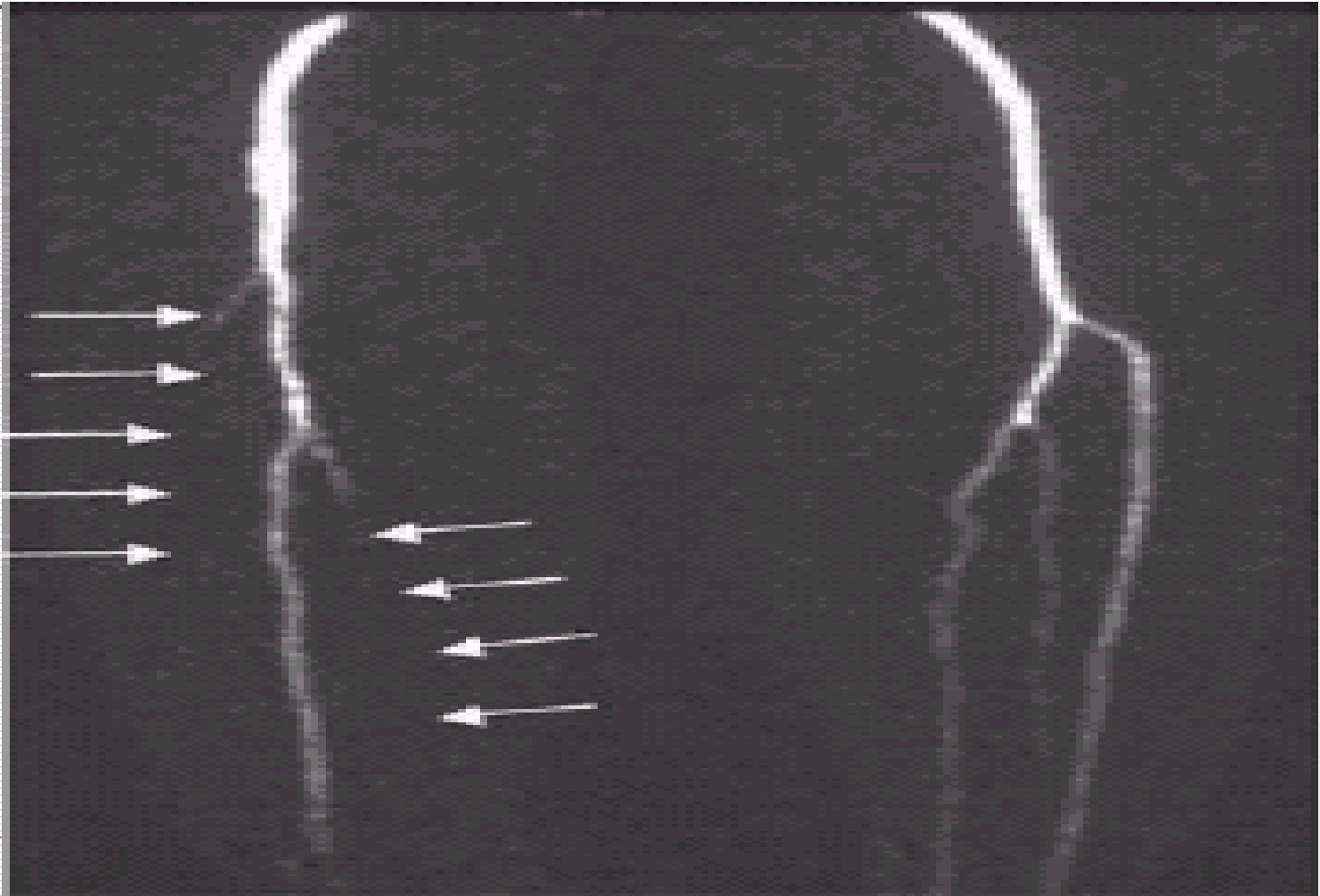
What to order?

- Arteriography
- Color doppler Ultrasound

When?

Sudden onset of severe pain, coldness, numbness or pallor in a portion of an extremity.

Emergency Radiology



Emergency Radiology



Emergency Radiology

Cardiovascular Emergencies:

DVT (Deep Vein Thrombosis):

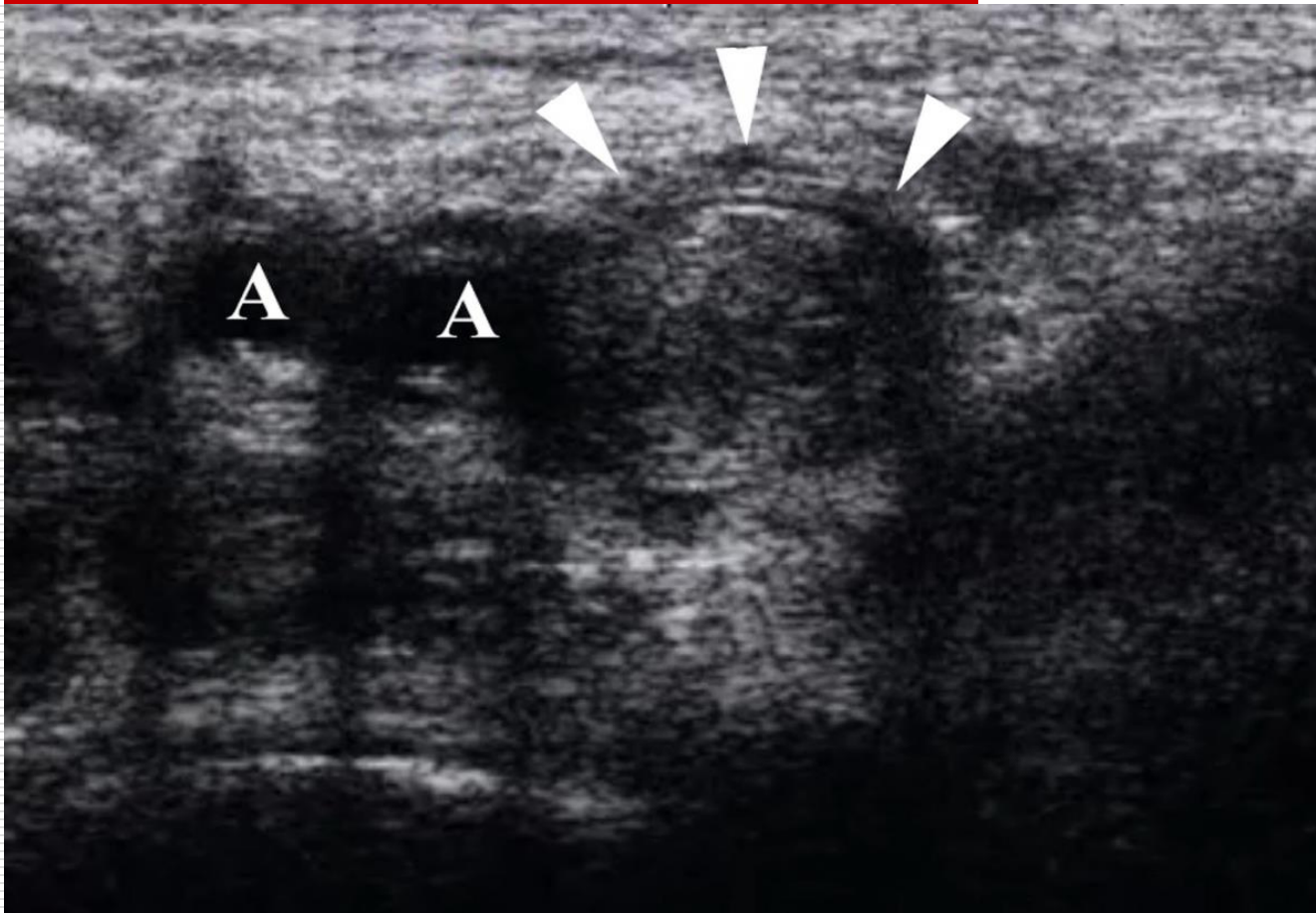
What to order?

- Color Doppler Ultrasound.
- Venography

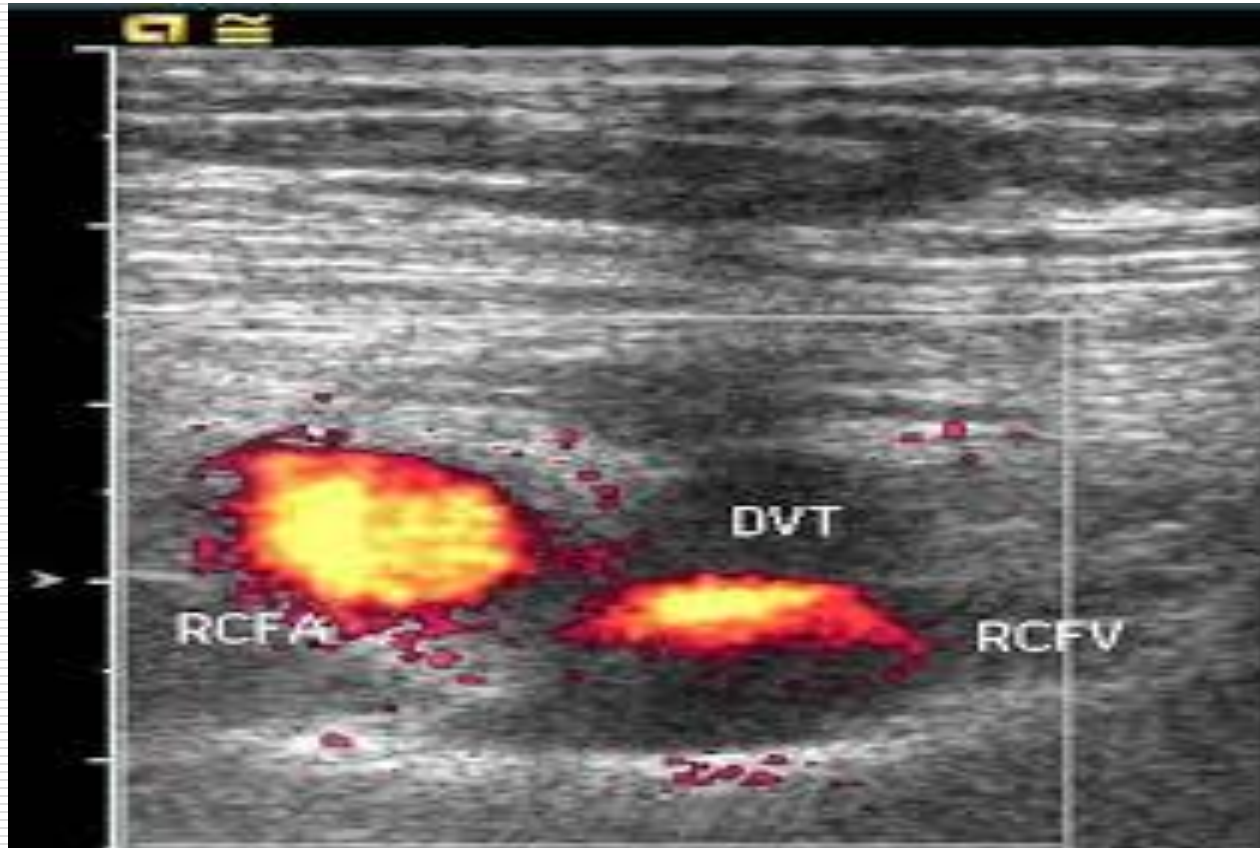
When?

Asymptomatic – pain – edema – skin discoloration.

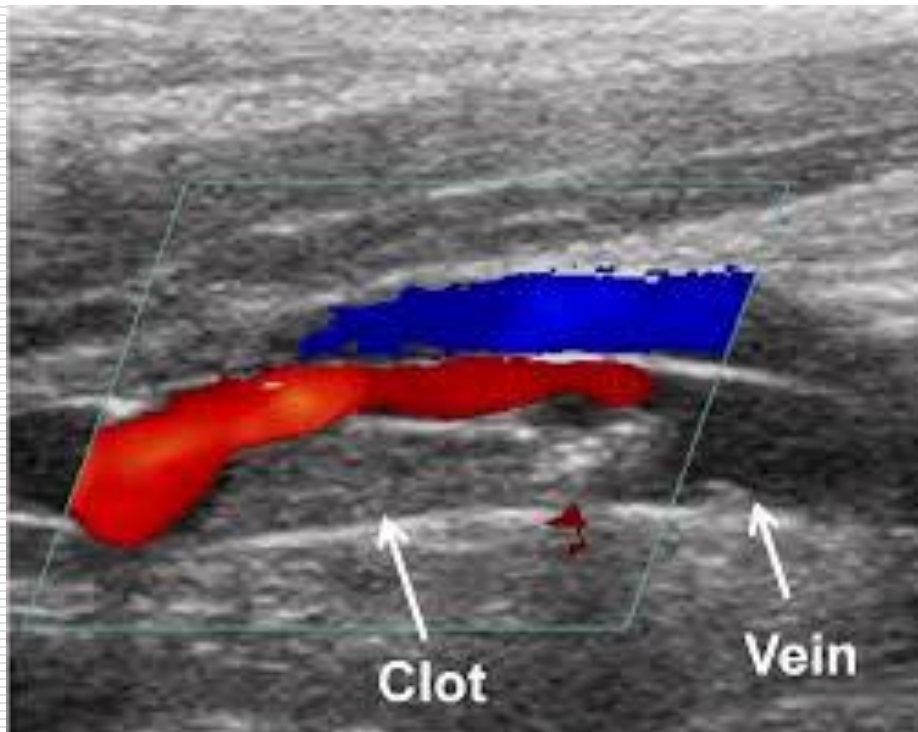
DVT Thrombus



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Emergency Radiology



Emergency Radiology

Abdominal Emergencies:

Abdominal Trauma

- Hemoperitoneum
- Visceral injuries (Liver, Spleen, Kidney, UB, etc.)

Non-Traumatic emergencies.

- Intestinal obstruction, Appendicitis, GUT perforation,
 - Ascites, Jaundice, peritonitis, GI bleeding
-

Emergency Radiology

Abdominal Emergencies:

Abdominal trauma:

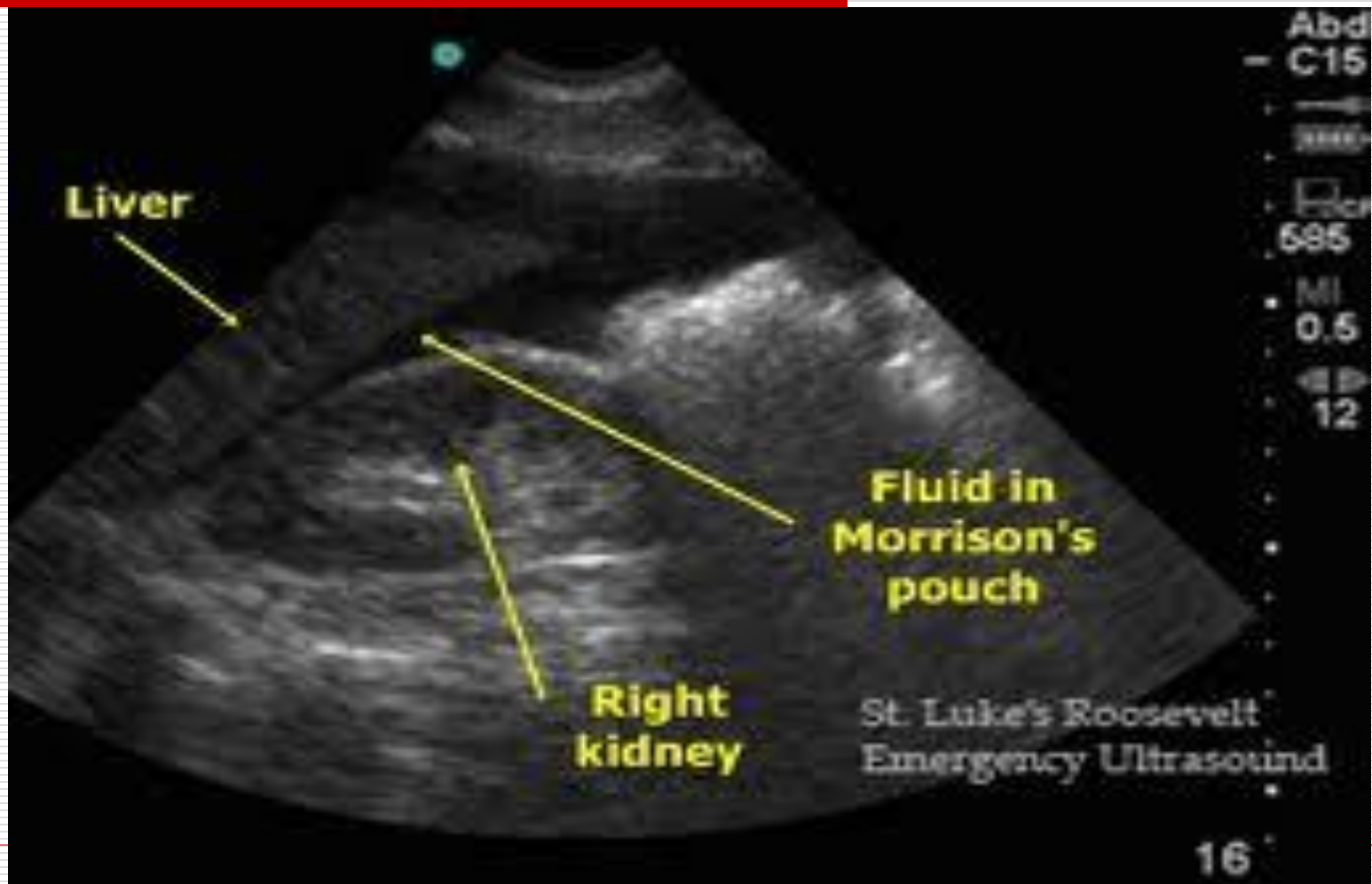
What to order?

- Chest & Abdominal radiographs.
- Ultrasound (FAST)
- CT scan
- Arteriography.

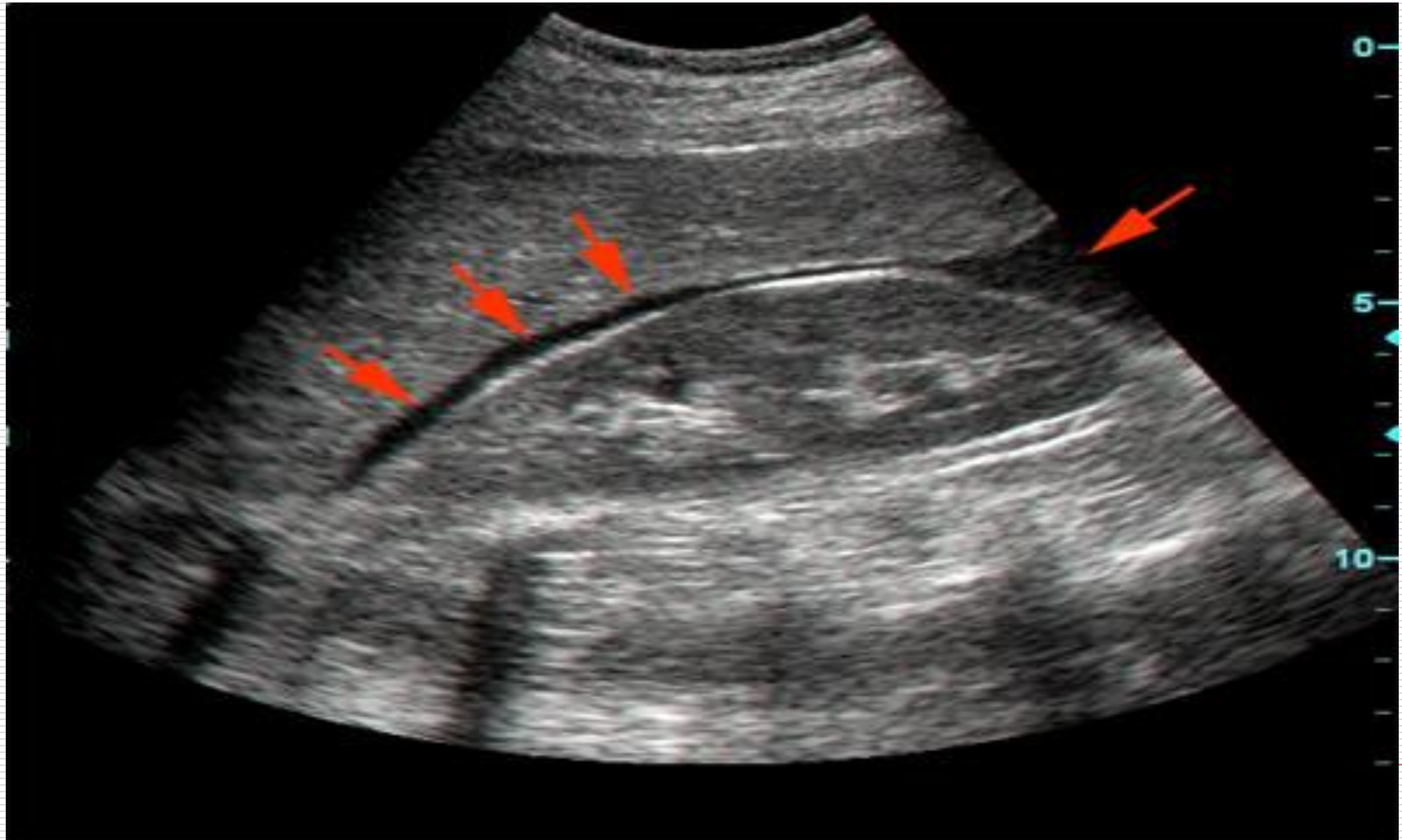
When?

History of trauma to the abdomen – Motor vehicle accidents

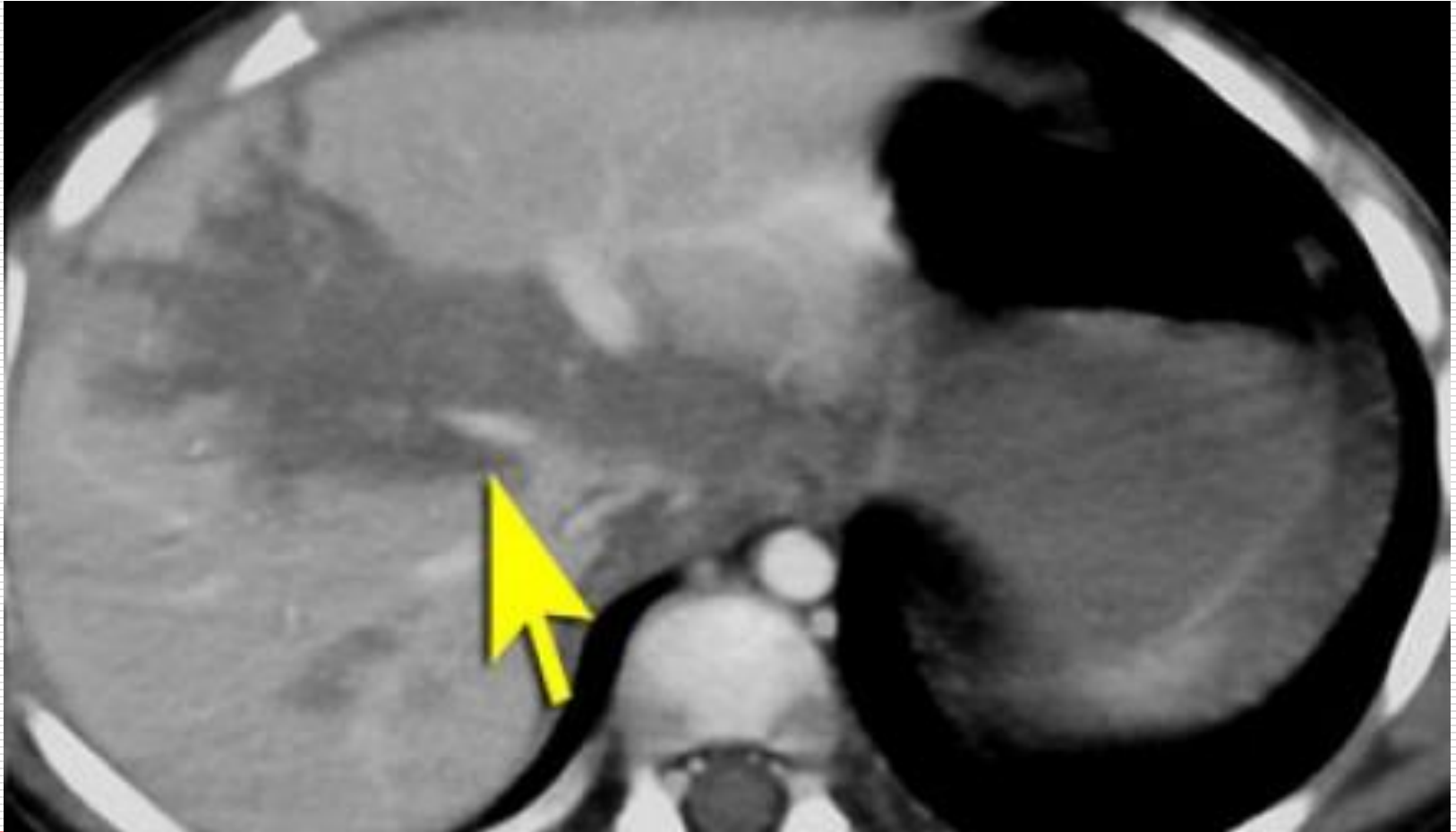
Emergency Radiology



Emergency Radiology



Liver injury



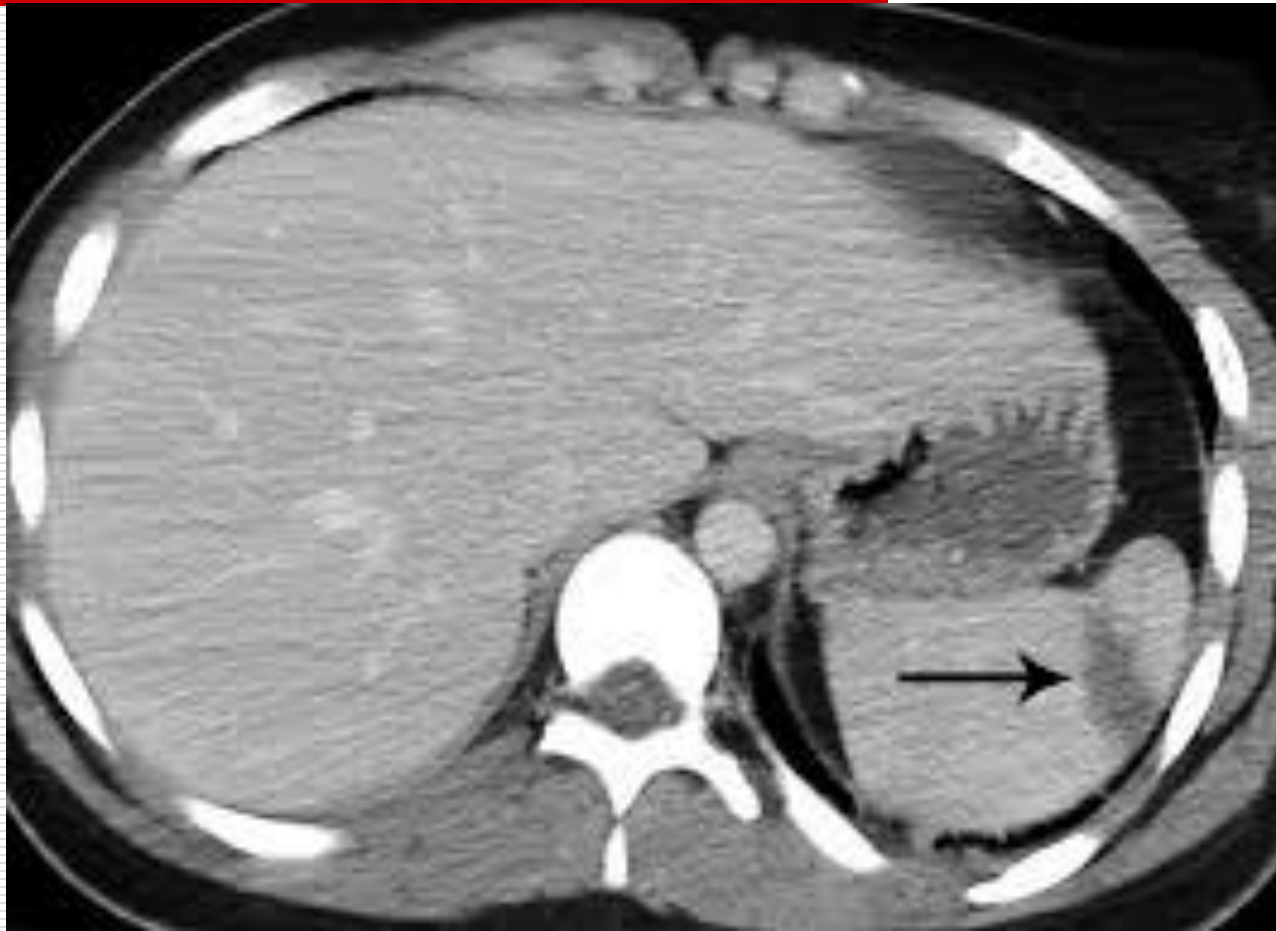
Emergency Radiology



Spleen injury



Splenic laceration



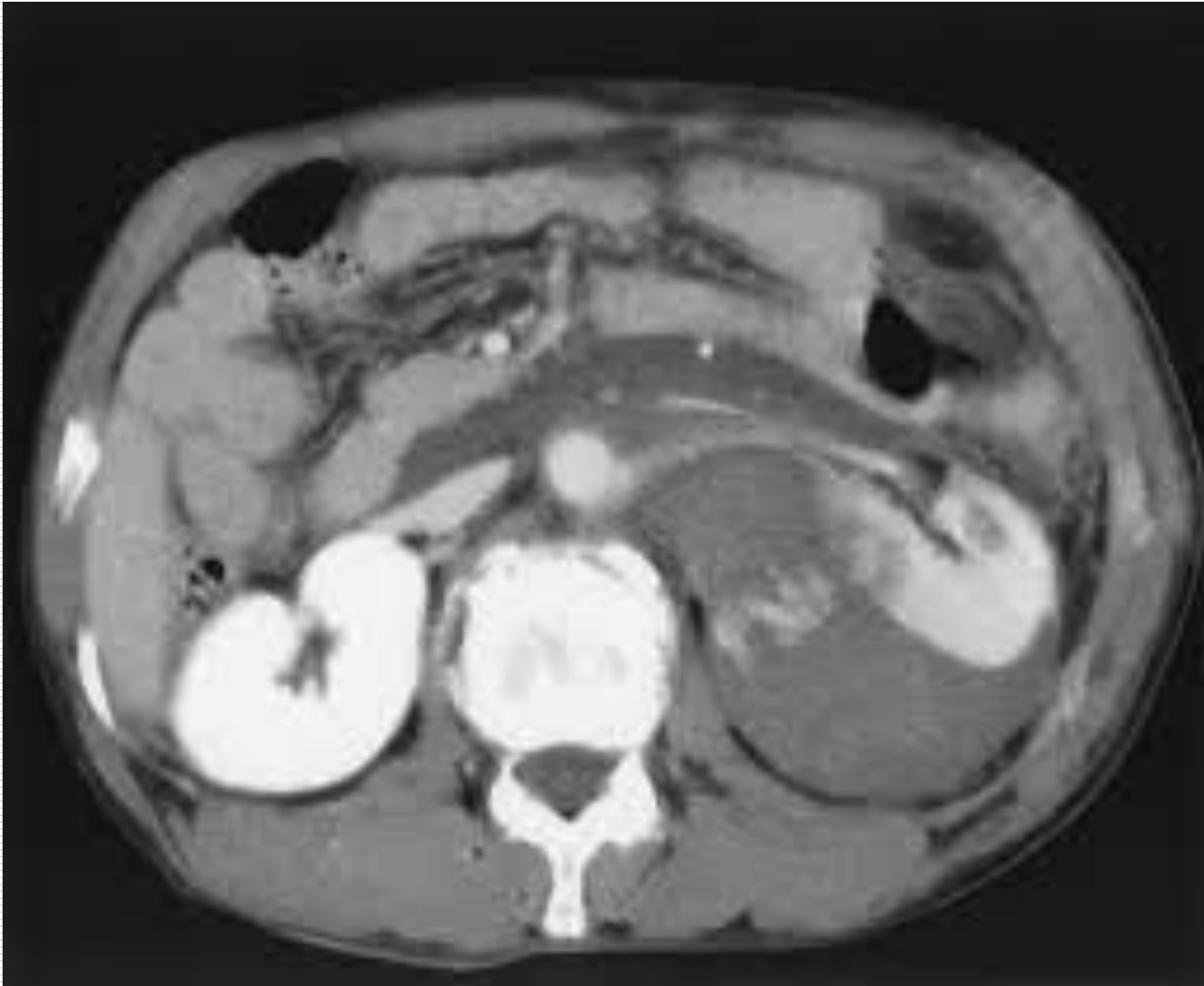
Pancreas laceration (fracture pancreas)



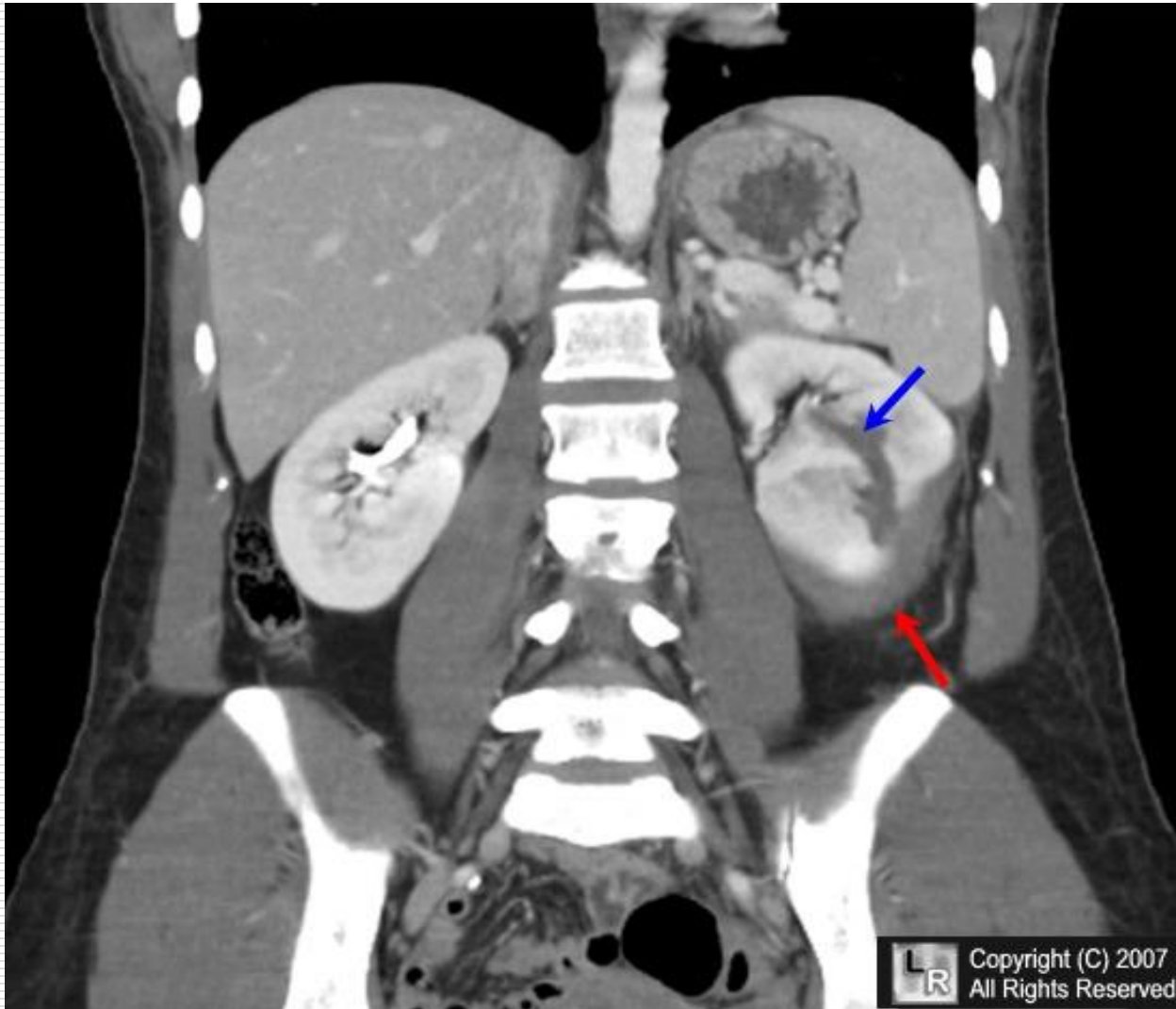
Fragmented kidney and perinephric hematoma



Perinephric hematoma



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Abdominal Emergencies:

Intestinal Obstruction

What to order?

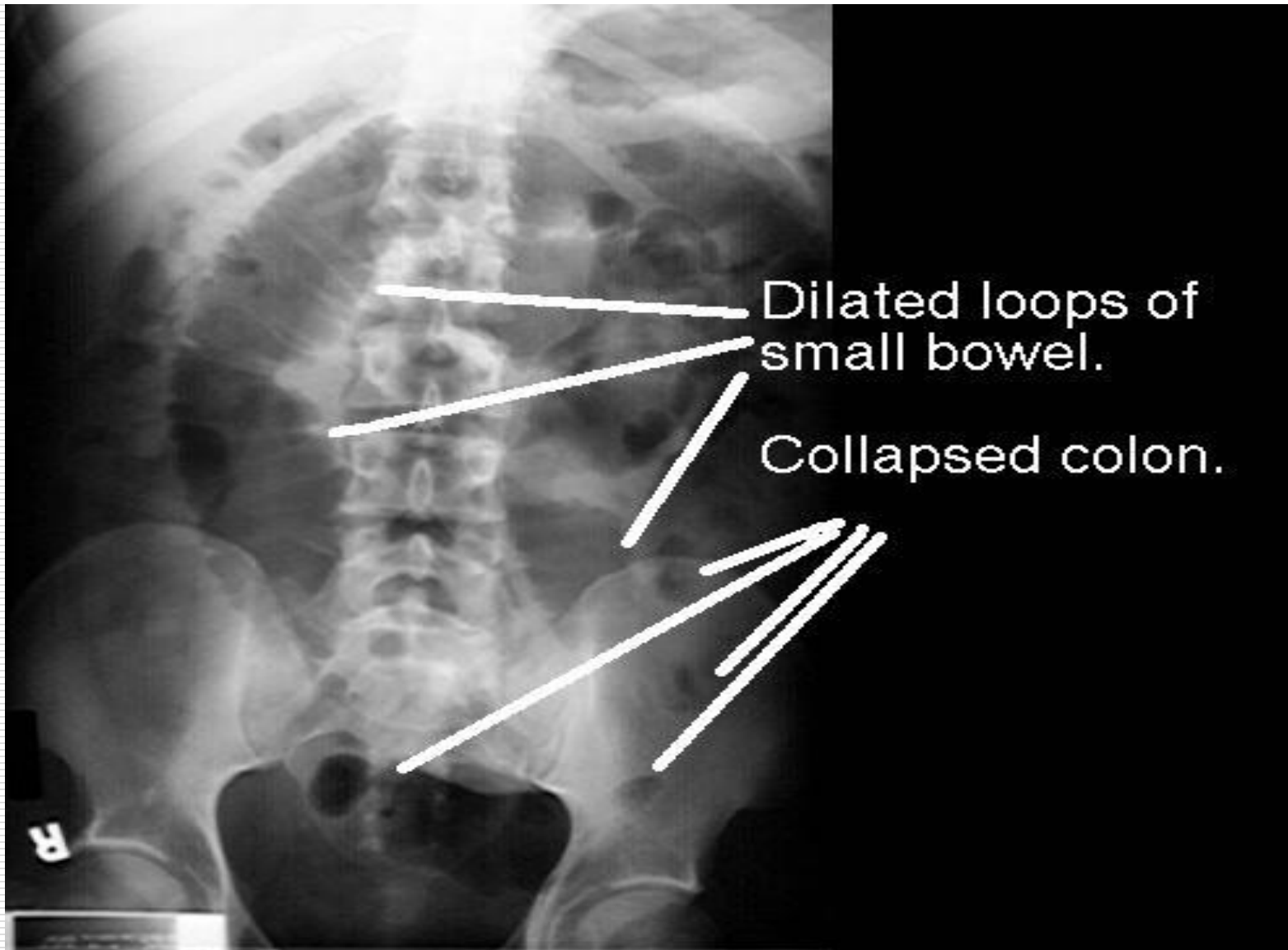
Abdominal radiograph.

CT scan

When?

Crampy abdominal pain – nausea & vomiting – abdominal tenderness.

Small bowel obstruction



Small bowel obstruction



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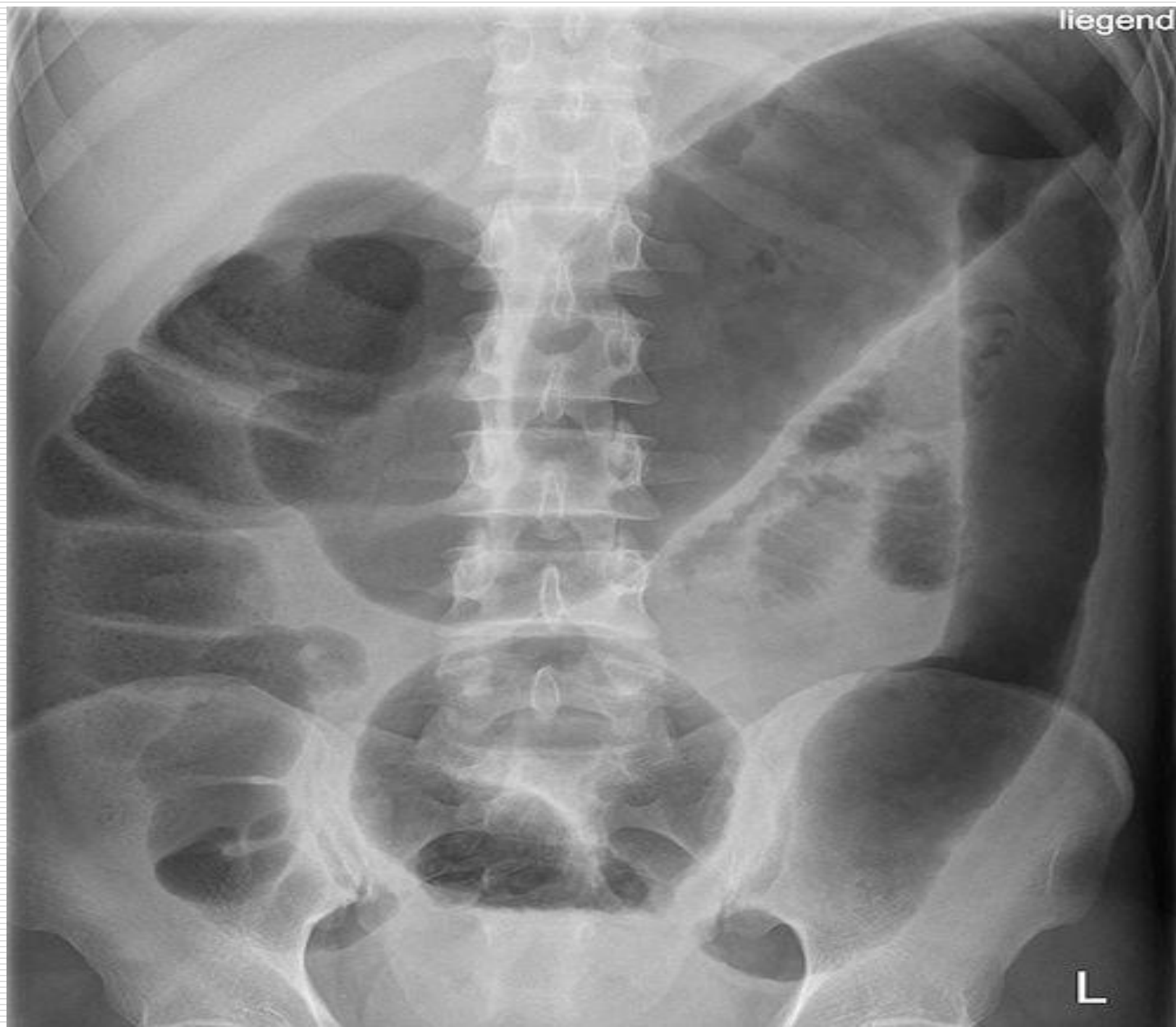
Emergency Radiology



Large bowel obstruction.ca colon



liegend



Emergency Radiology

Abdominal Emergencies:

Gut Perforation (e.g. Perforated DU)

What to order?

Abdominal radiograph (Erect).

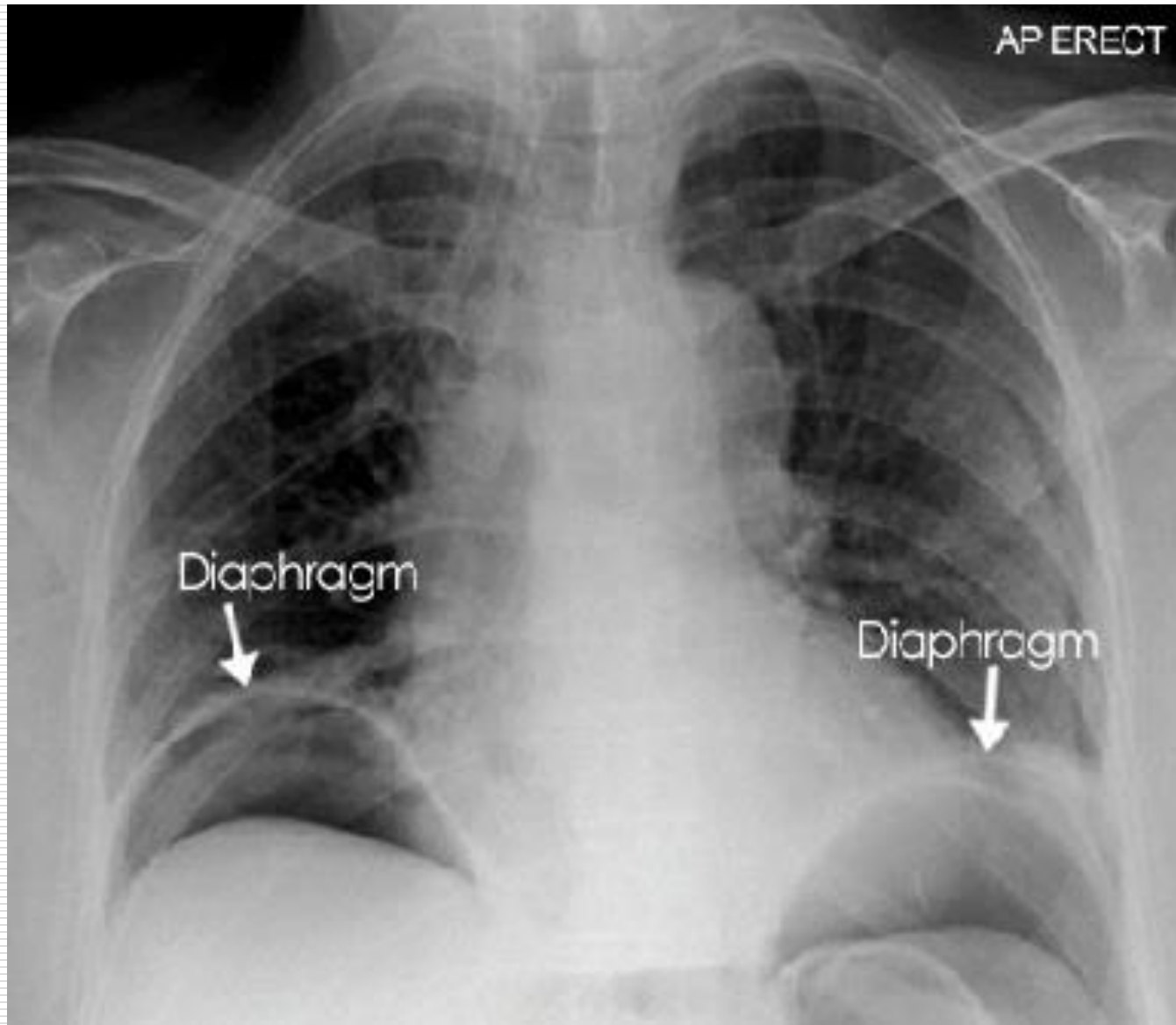
US

CT scan

When?

History of peptic ulceration – signs of peritonitis

Air under diaphragm



pneumoperitoneum



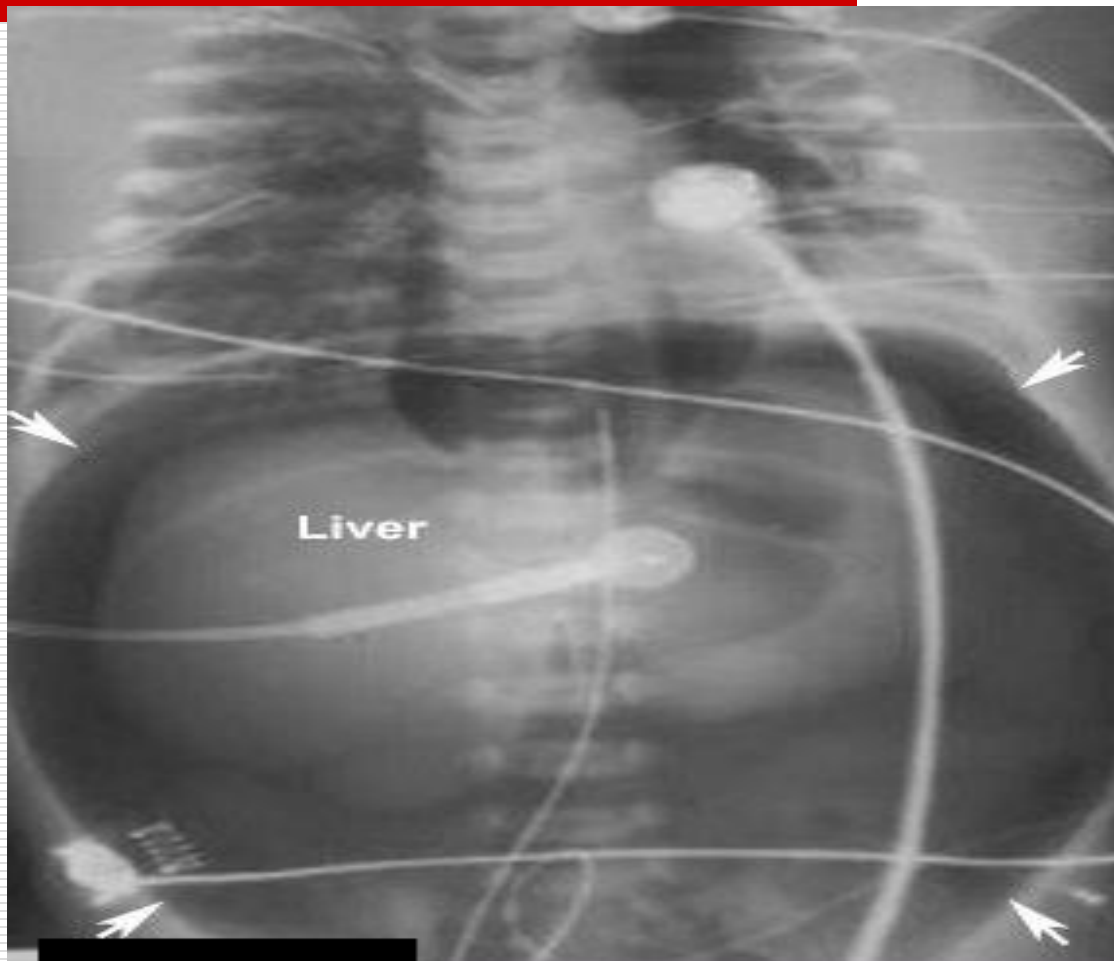
Emergency Radiology



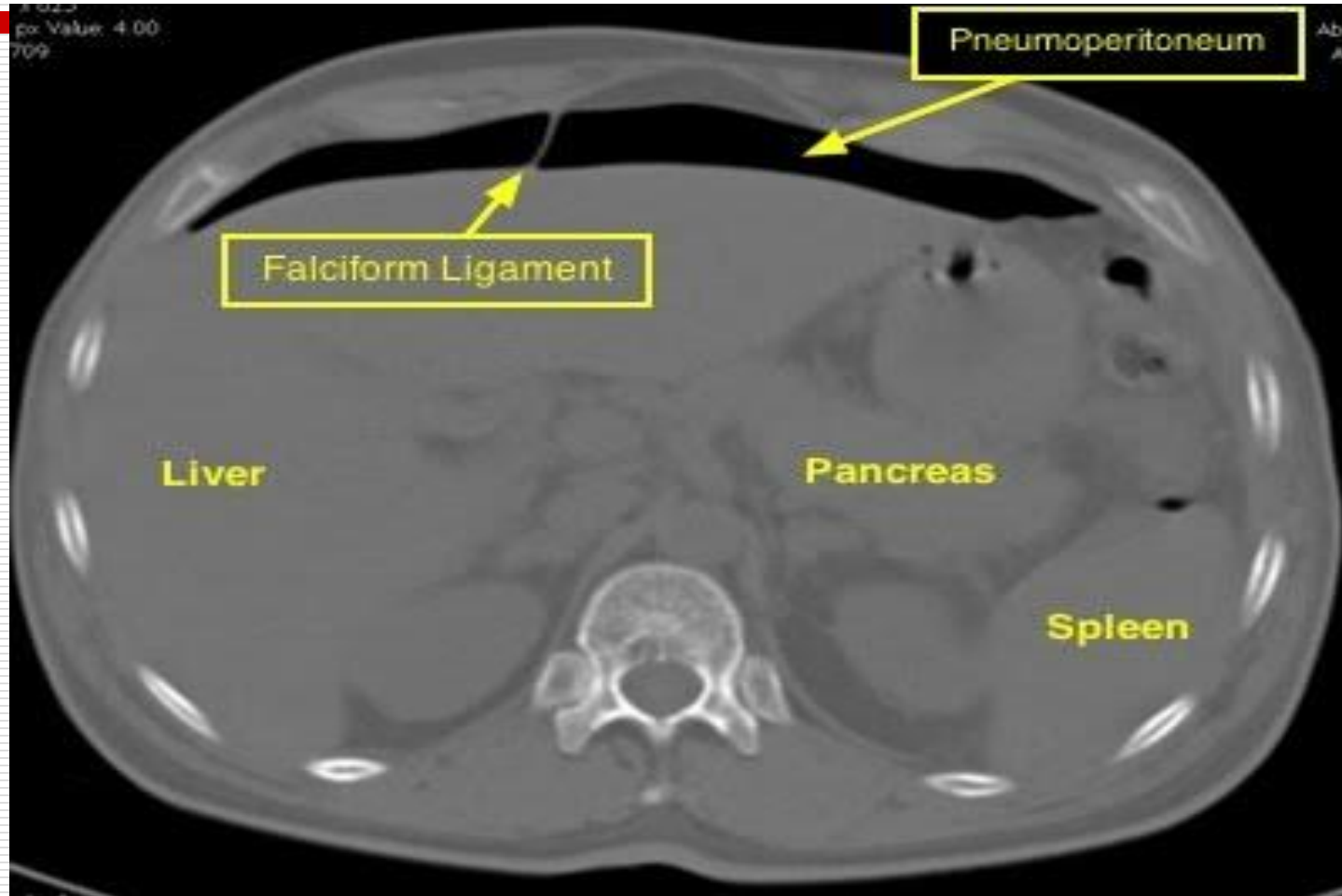
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Emergency Radiology



This axial CT scan of the abdomen demonstrates a large volume of free intraperitoneal air (pneumoperitoneum), which appears as a dark, crescentic area along the anterior abdominal wall. The falciform ligament is visible as a thin, dark line extending from the anterior abdominal wall to the liver. The liver, pancreas, and spleen are also labeled. The vertebral body is visible in the center of the image.



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Abdominal Emergencies:

Jaundice

What to order?

Ultrasound

CT scan

PTHC

ERCP

When?

Yellowish discoloration of the skin – dark urine –
pale stools

CBD stones ,IHBD

□ ERCP



Emergency Radiology

□ MRCP STONE



Emergency Radiology

□ PANCRATITIS



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Abdominal Emergencies:

Appendicitis

What to order?

Abdominal radiograph.

Ultrasound

CT scan

When?

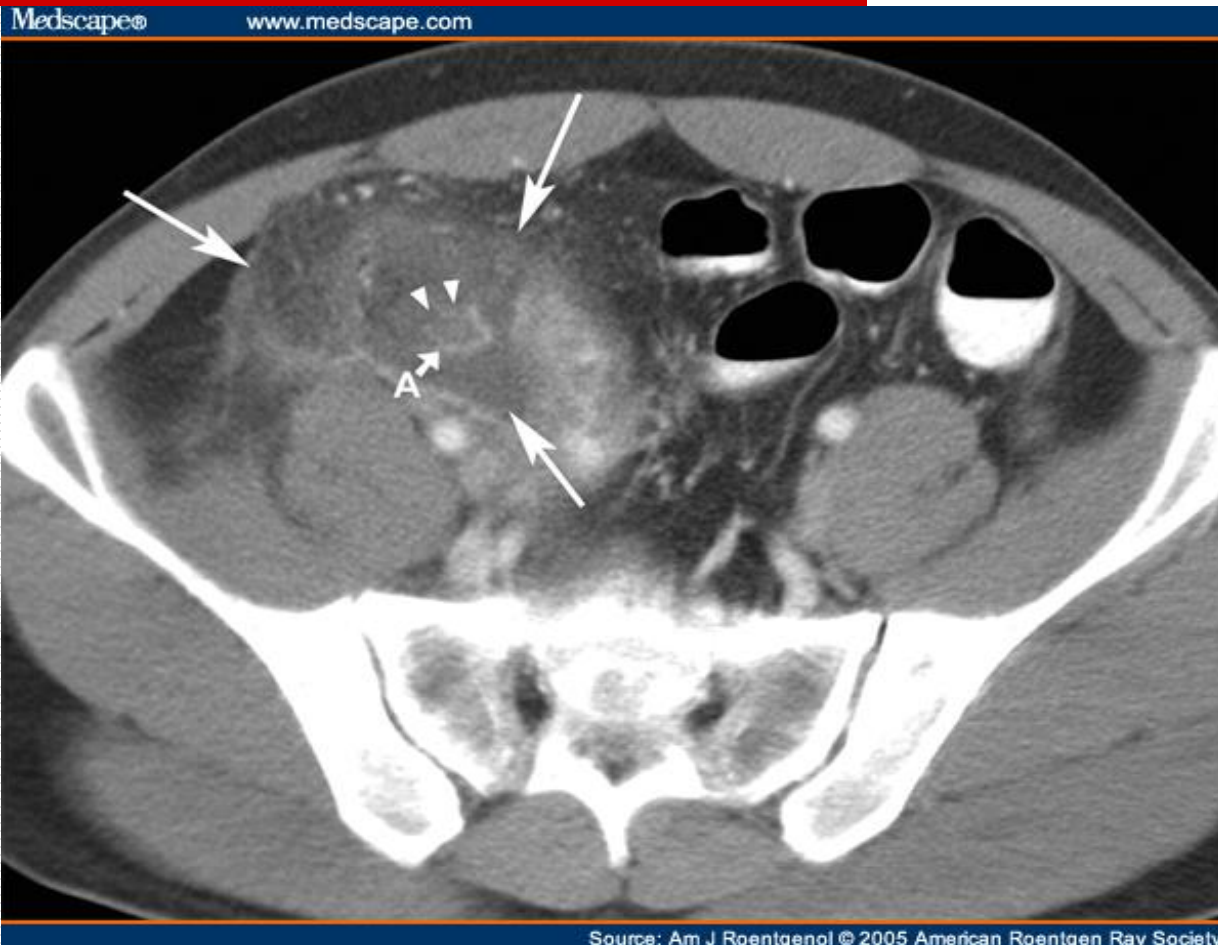
Sudden onset of RIQ pain – rebound tenderness.

APPENDICITIS ,Appendicolith



Figure 1. Plain radiographic image of the abdomen revealing an appendicolith (arrow) in the right lower quadrant.

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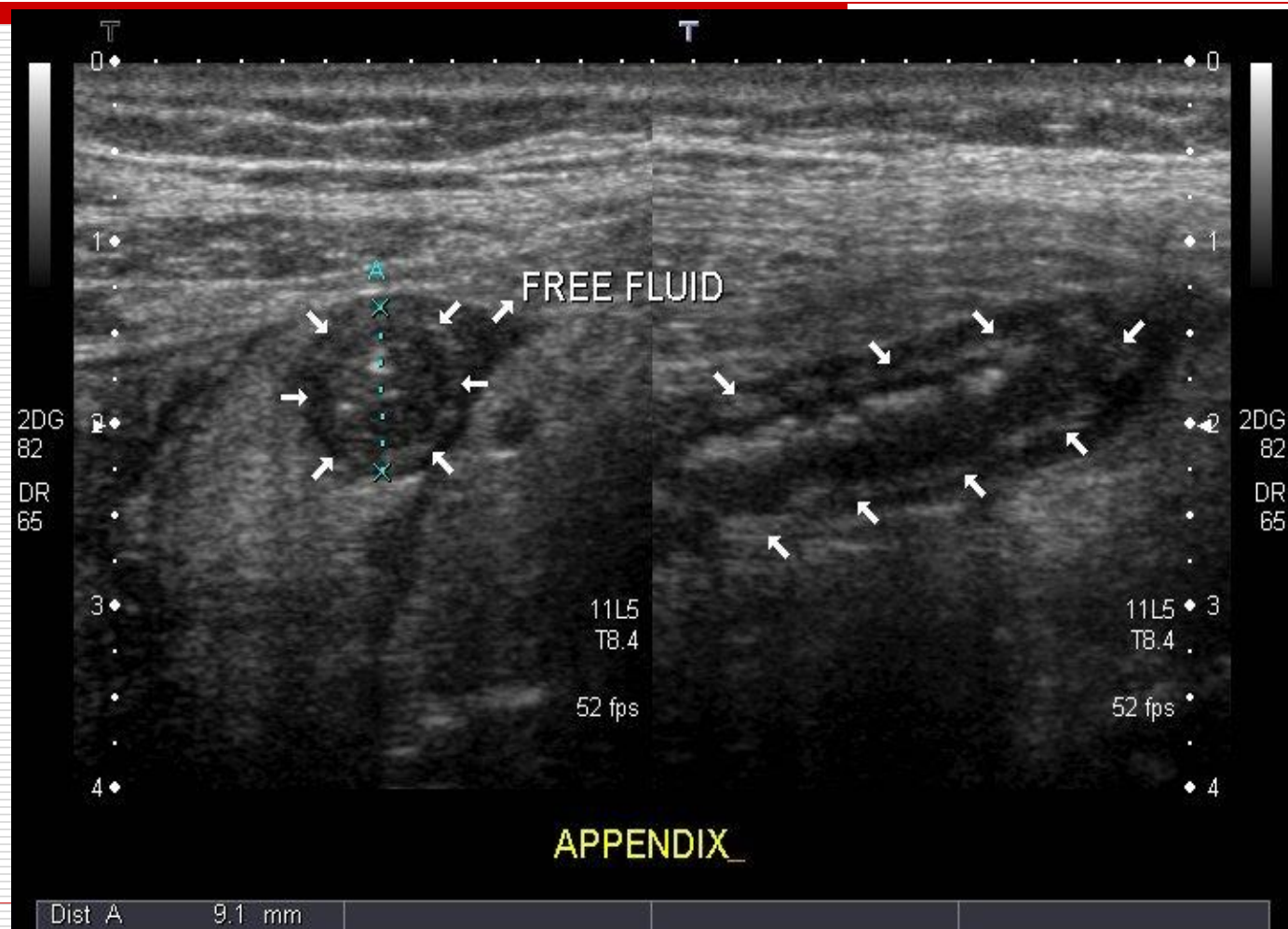
Emergency Radiology



Emergency Radiology



Emergency Radiology



appendicitis



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Emergency Radiology

Abdominal Emergencies:

Cholecystitis

What to order?

Ultrasound (Gold standard)

When?

Sudden onset of epigastric pain – rebound tenderness

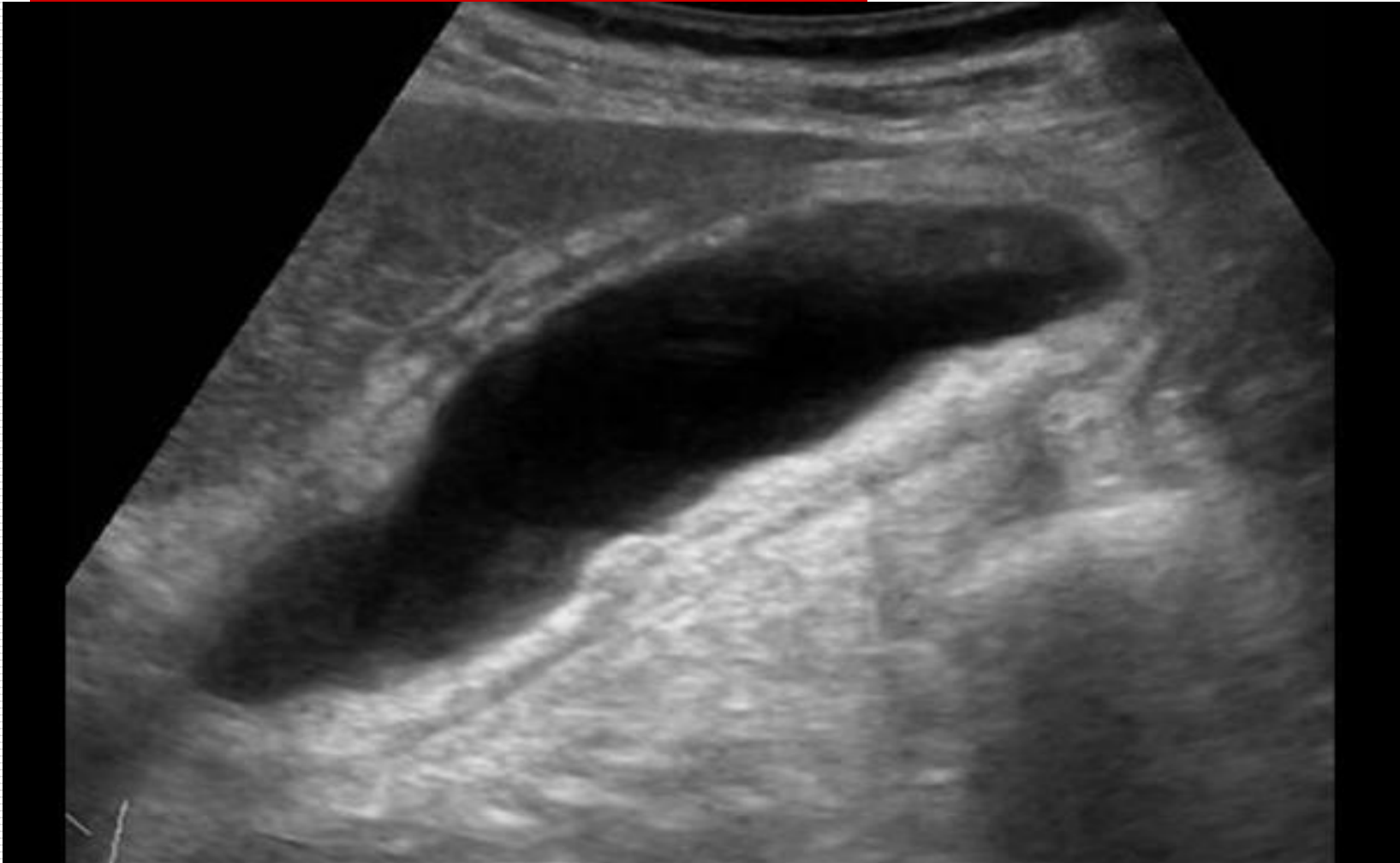
Calculus cholecystitis



Cholecystitis



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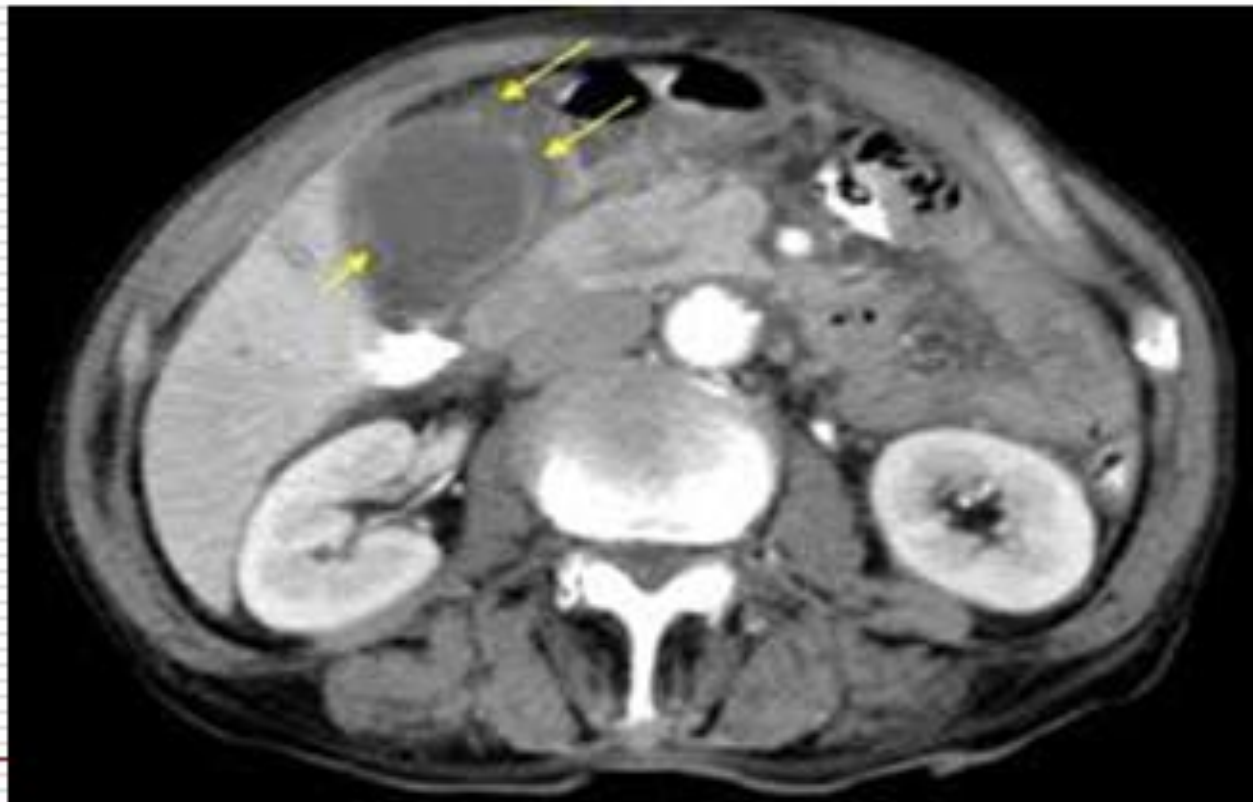


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Emergency Radiology

□ CHOLYCYSTITIS



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Genitourinary Emergencies:

- UT stones
 - Hematuria
 - Urinary tract trauma.
 - Urethral Injuries, stones (male)
 - Scrotal injuries, swellings, testicular torsion, epididymitis (male)
-

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Genitourinary Emergencies:

Ureteric Stones (Renal Colic):

What to order?

- Plain X-ray of the urinary tract (PUT)
- Ultrasound
- Intravenous Urography (IVU)
- CT of the abdomen

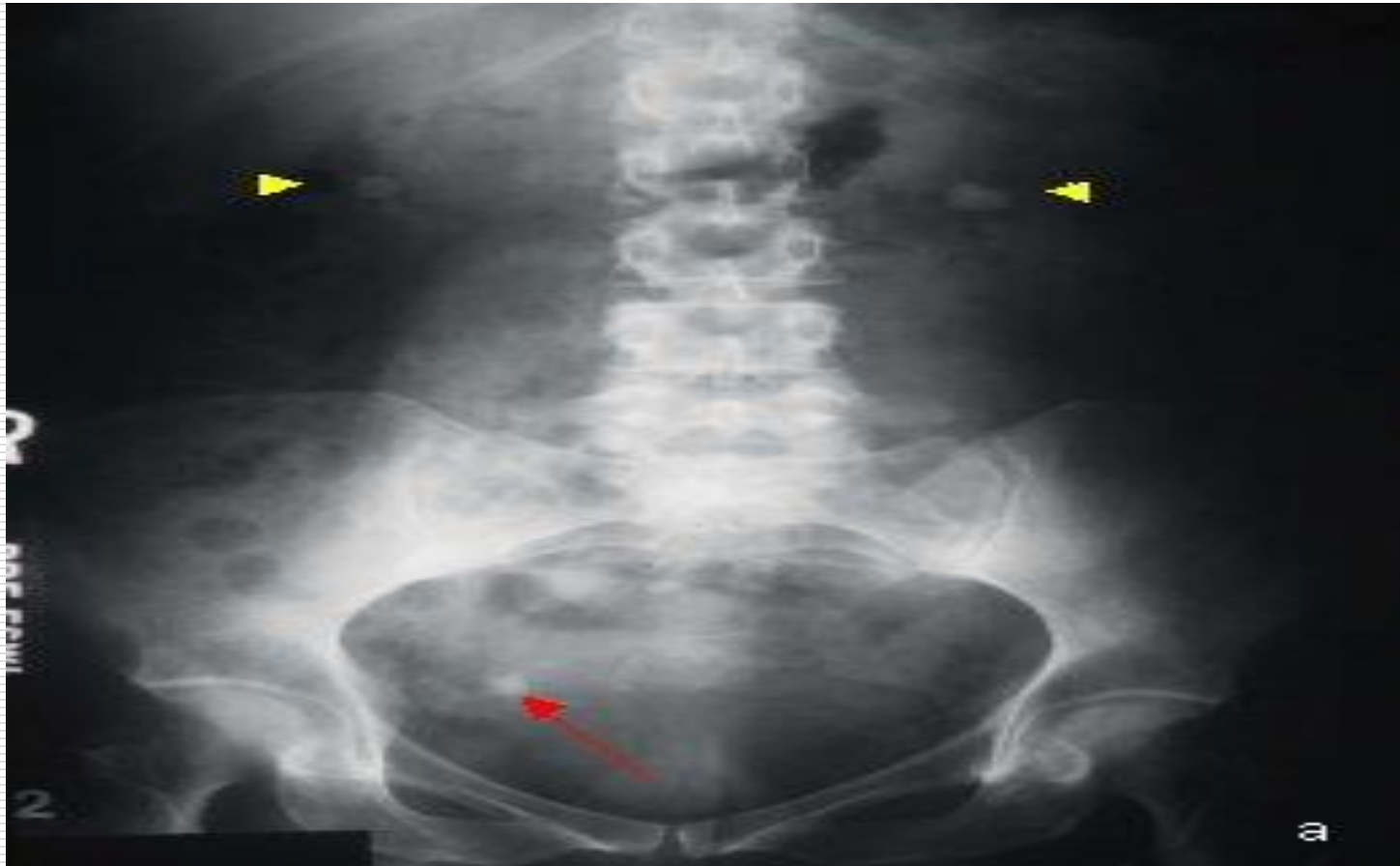
When?

Sudden onset of loin pain radiating to the groin.

Ureteric stone



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Ureteric stone



Ureteric stone



Lt ureteric stone







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Genitourinary Emergencies:

Hematuria (Painful-Painless):

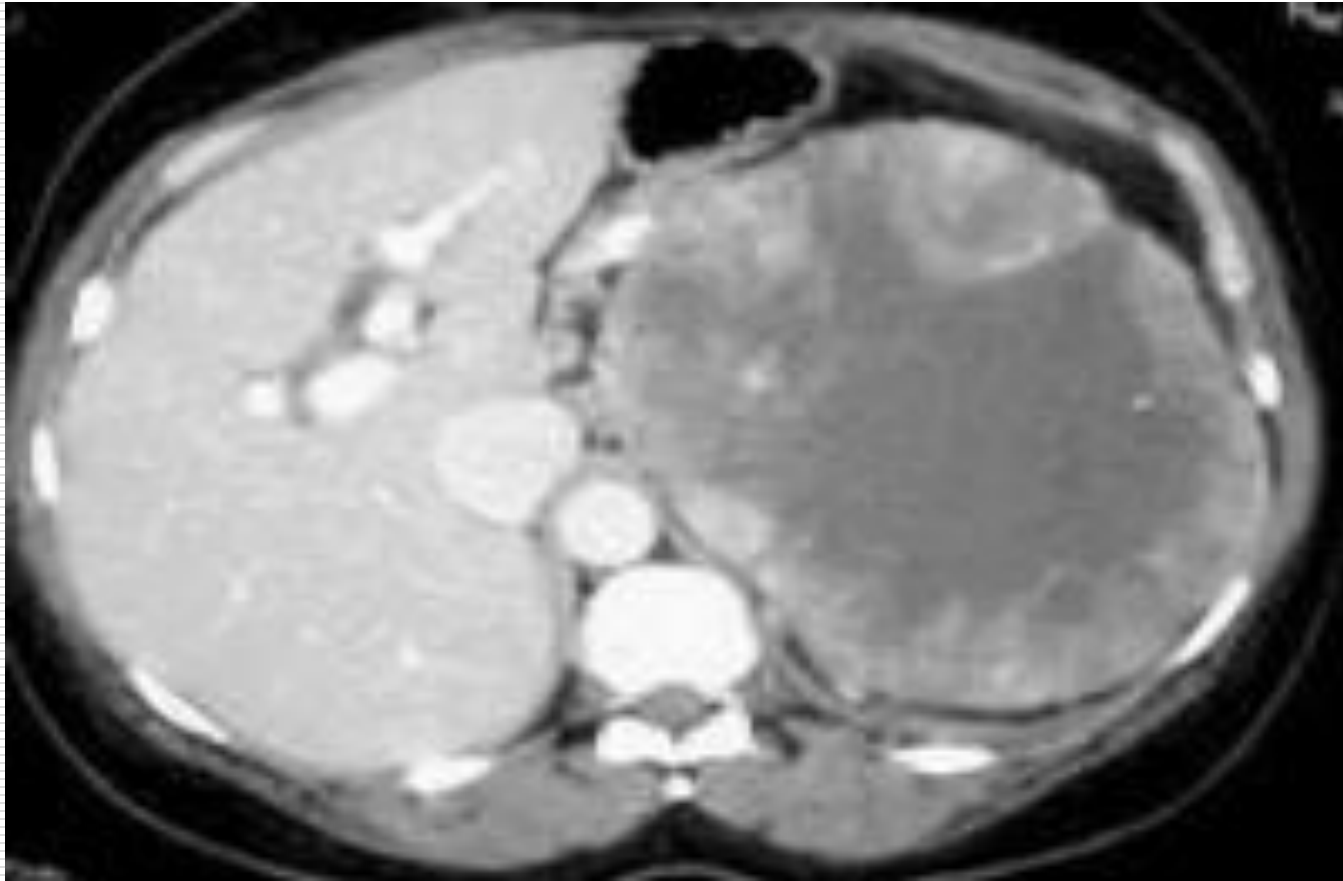
What to order?

- Plain X-ray of the urinary tract (PUT).
- Ultrasound.
- Intravenous Urography (IVU).
- CT of the abdomen.
- Cystogram.

When?

Passage of blood or blood clots with urination (either painful or painless).

Renal cell carcinoma



RCC



CA BLADDER



Ca bladder

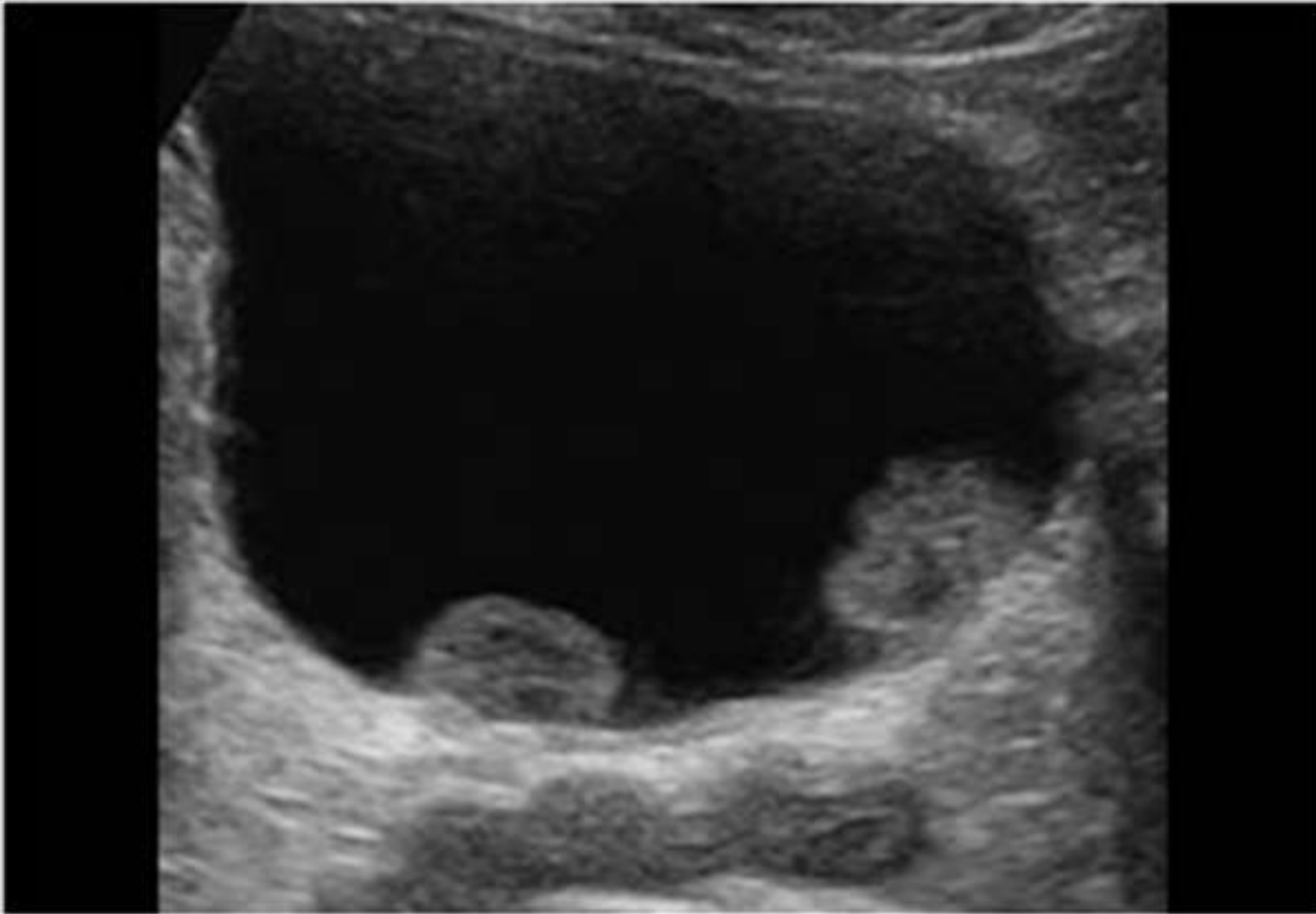




Clot urinary bladder versus ca?



Ca bladder ?clot?



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Genitourinary Emergencies:

Urinary tract trauma (Renal Bladder male urethra):

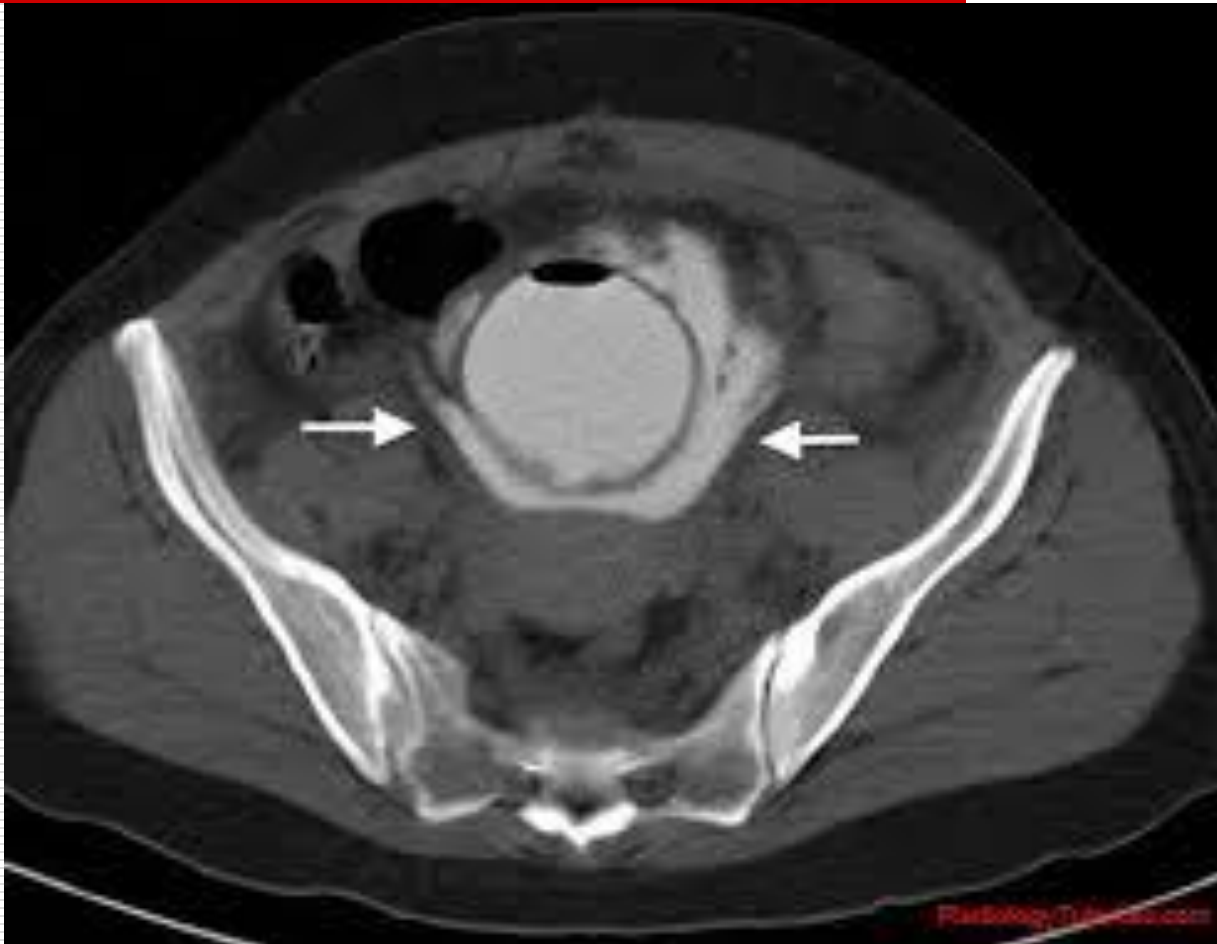
What to order?

- Plain X-ray of the urinary tract (PUT)
- Ultrasound
- Intravenous Urography (IVU)
- CT of the abdomen
- Ascending urethrocystography

When?

History of blunt trauma to the abdomen – Falling astride.

Urinary bladder injury



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Urethral injury



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Genitourinary Emergencies:

Scrotal emergencies:

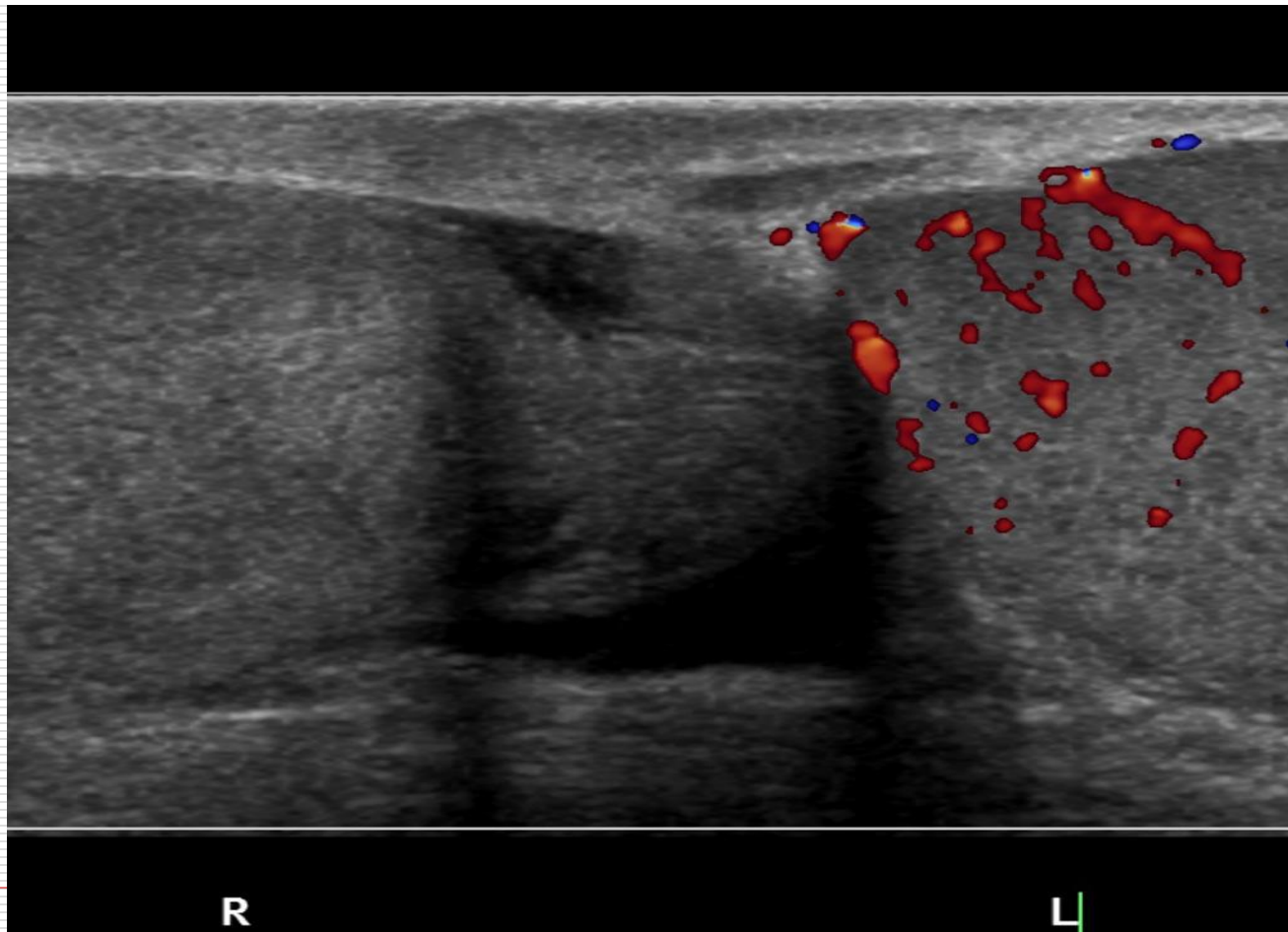
What to order?

- Ultrasound with color Doppler.

When?

Acute scrotal pain – trauma to testis.

Testicular torsion

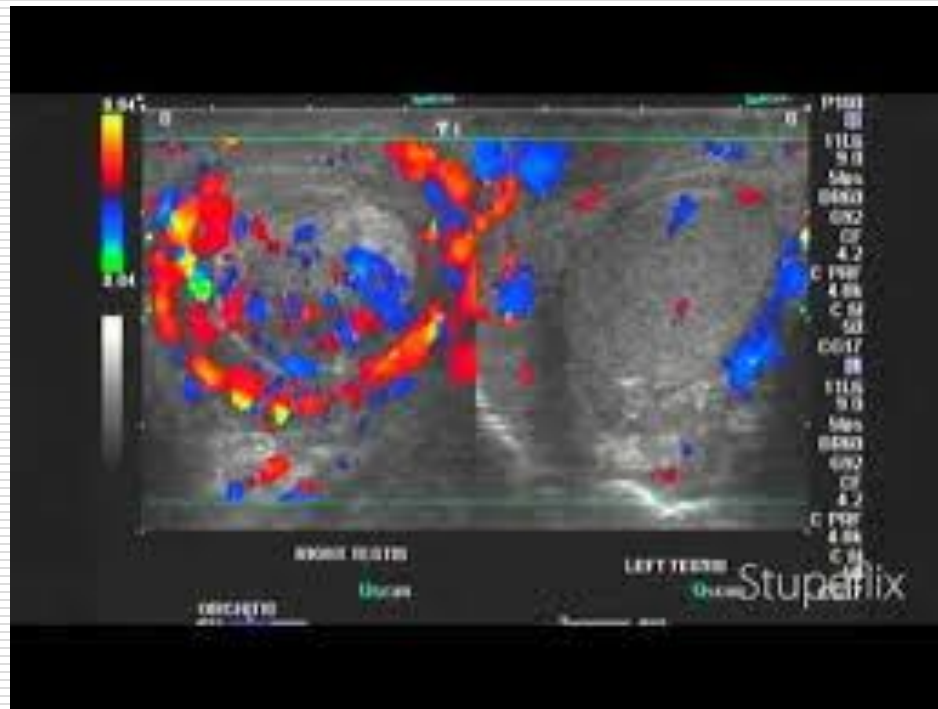


Emergency Radiology

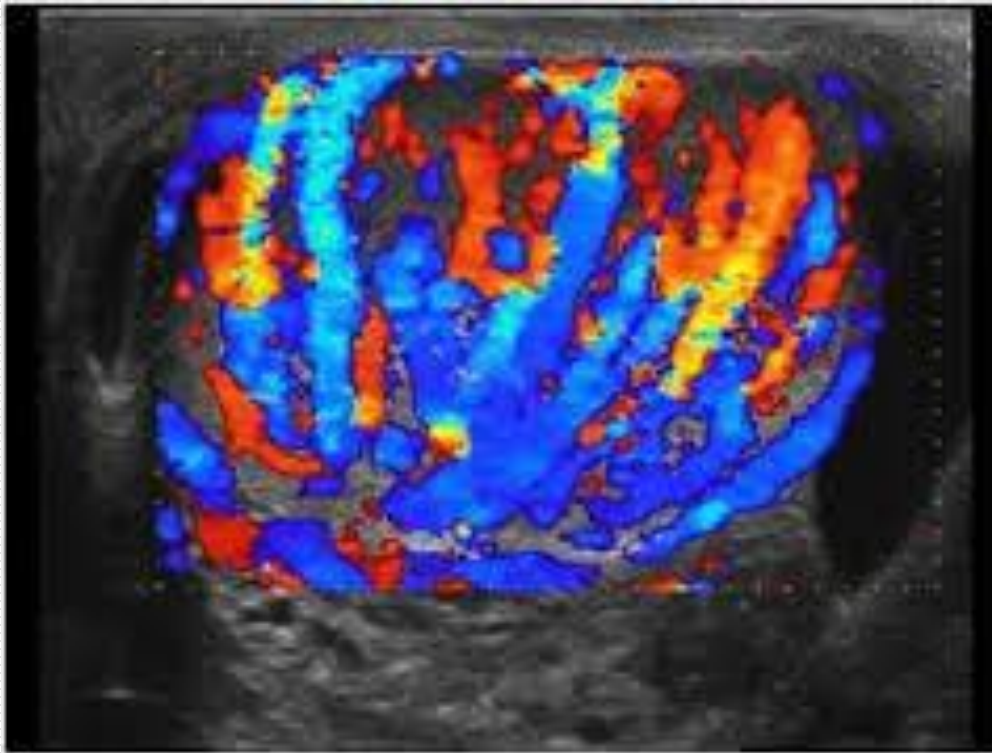
☐ Testicular torsion



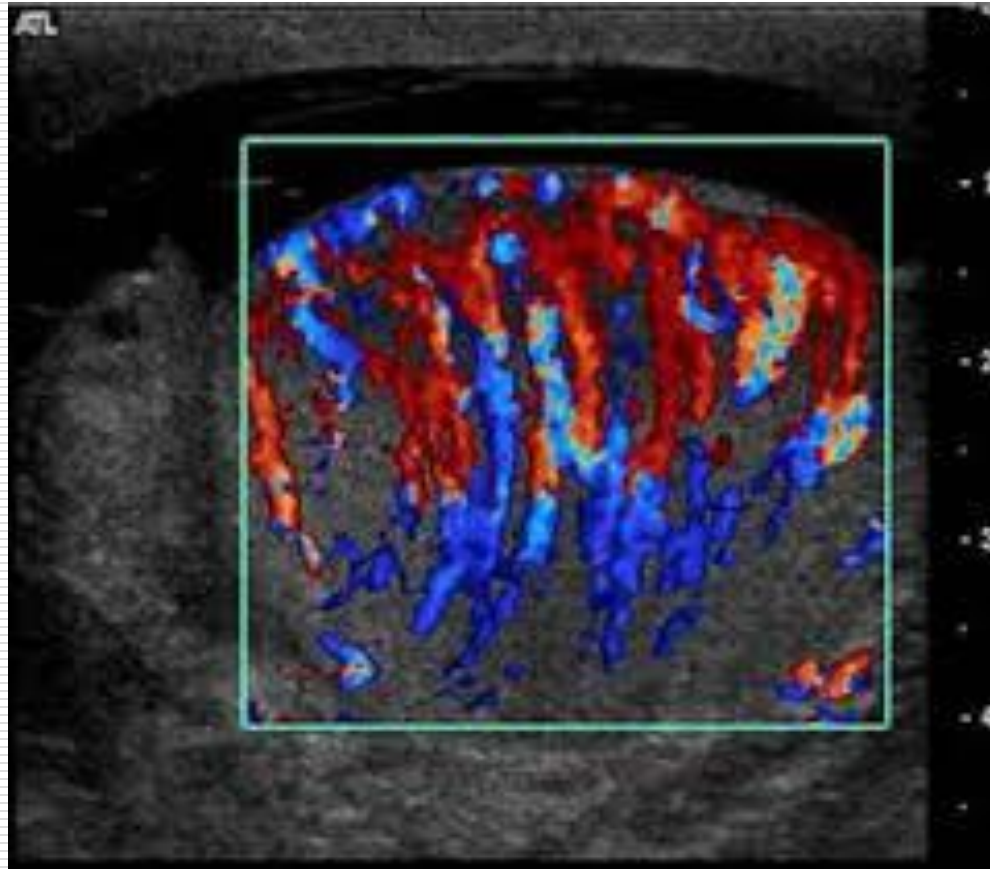
Emergency Radiology



Emergency Radiology

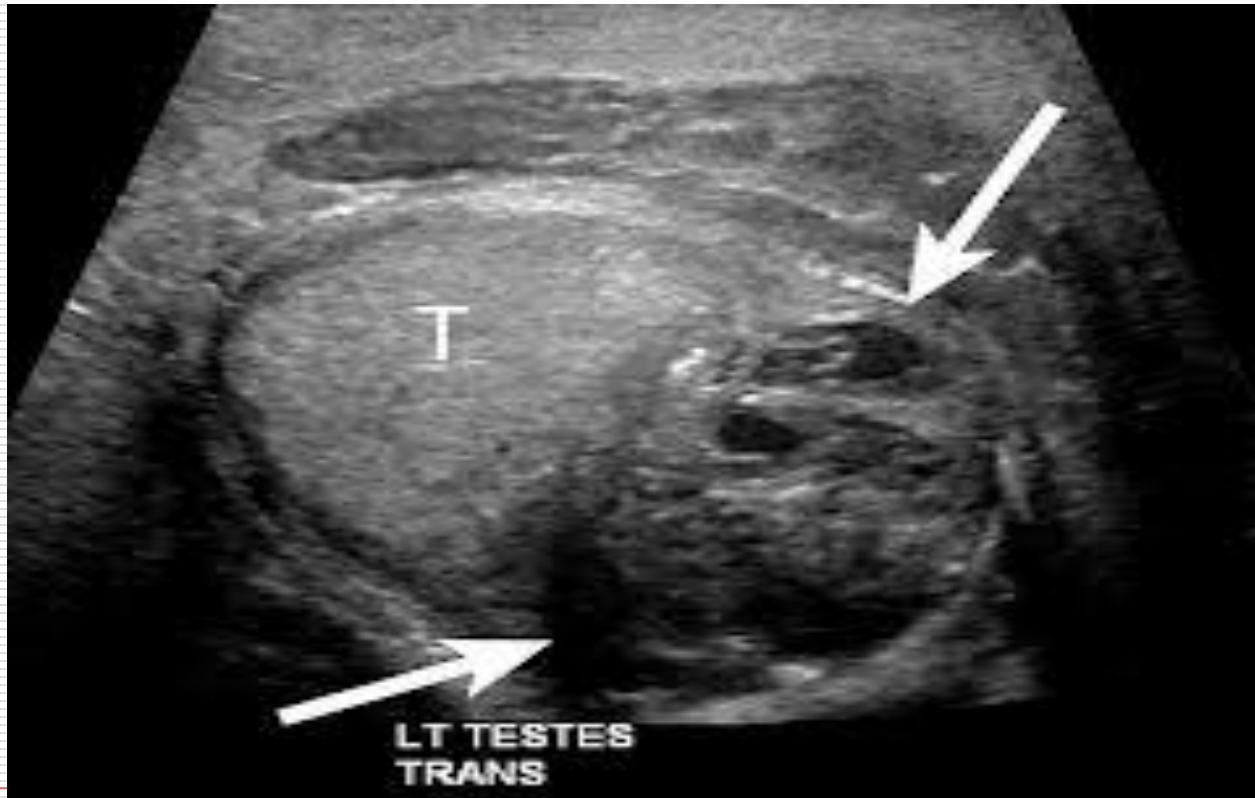


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Emergency Radiology

□ Epididymitis



Emergency Radiology

Gynecological & Obstetric Emergencies:

- Ovarian Torsion
 - PID
 - Abortion
 - Ectopic pregnancy
 - Placenta Previa
-

Emergency Radiology

Gynecological & Obstetric Emergencies:

What to order?

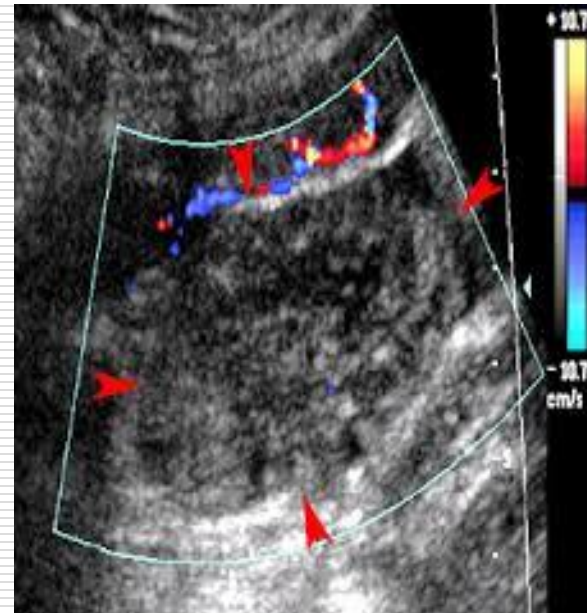
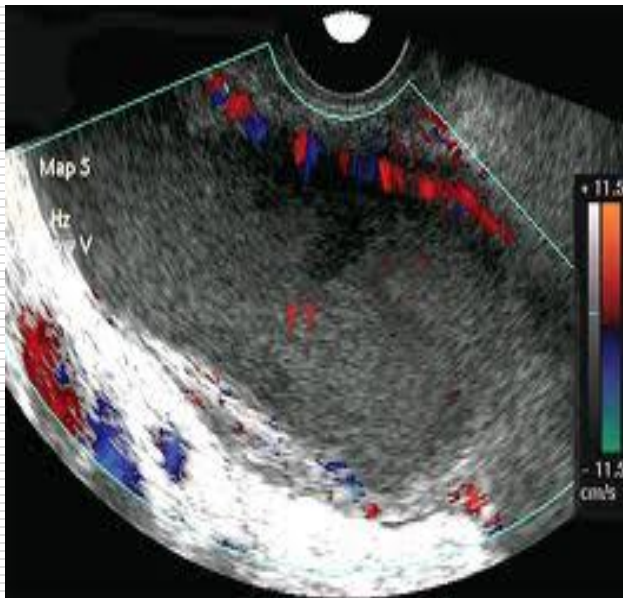
Ultrasound (Color Doppler)

When?

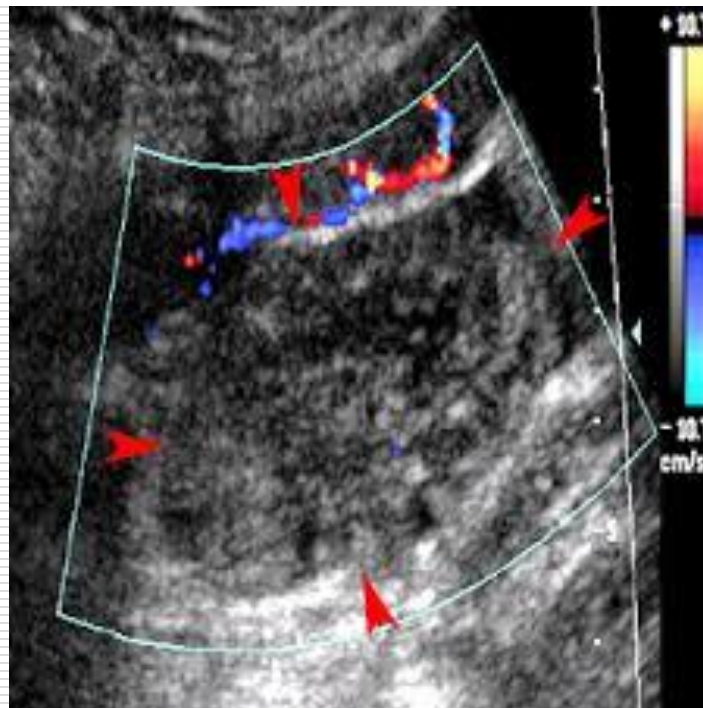
Lower abdominal pain – fever – vaginal discharge

Emergency Radiology

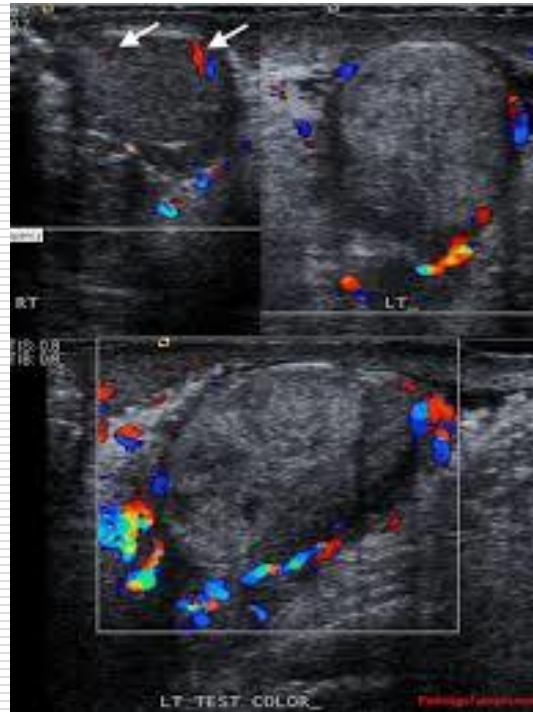
□ Ovarian torsion



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Obstetric Emergencies:

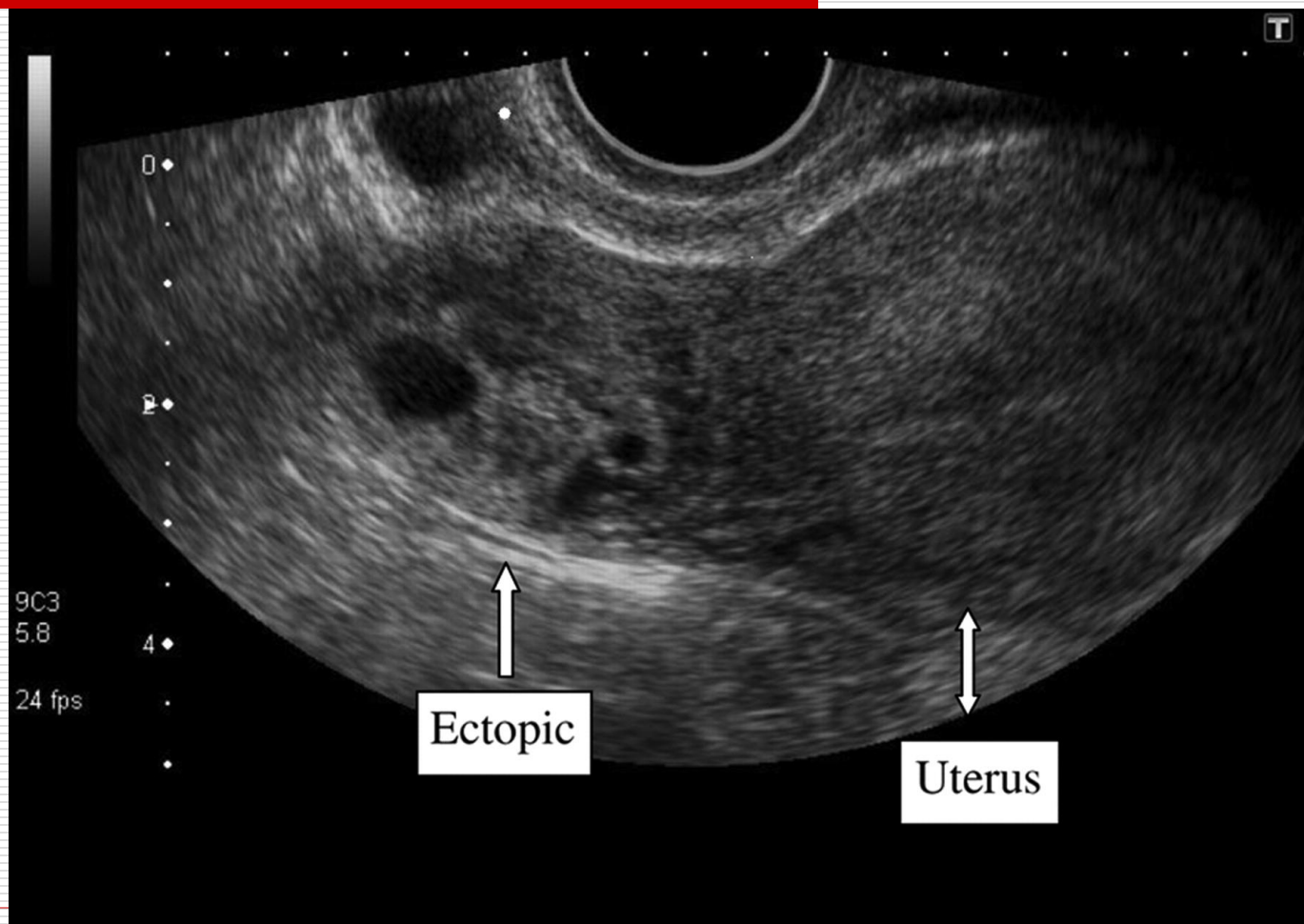
What to order?

Ultrasound (Color Doppler)

When?

Bleeding in early / late pregnancy

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☐ Blighted ovum



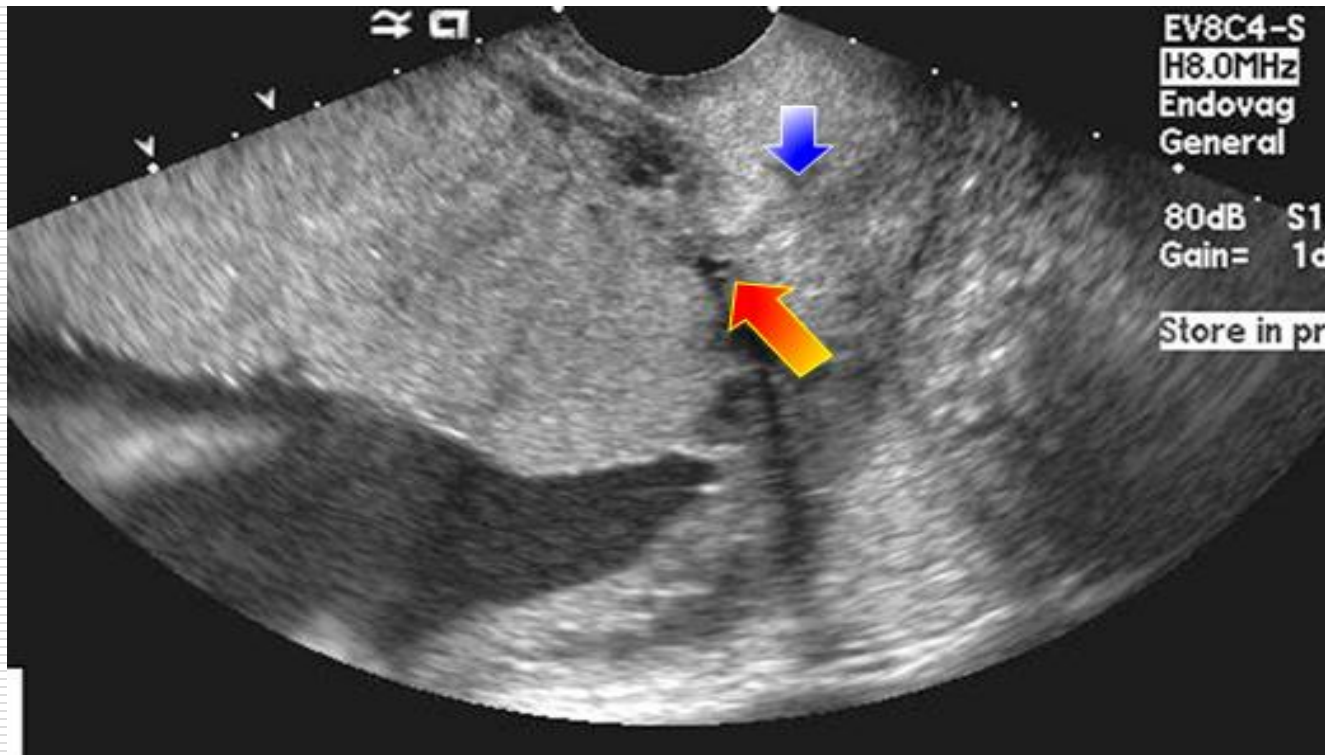
Emergency Radiology

❑ Blighted ovum

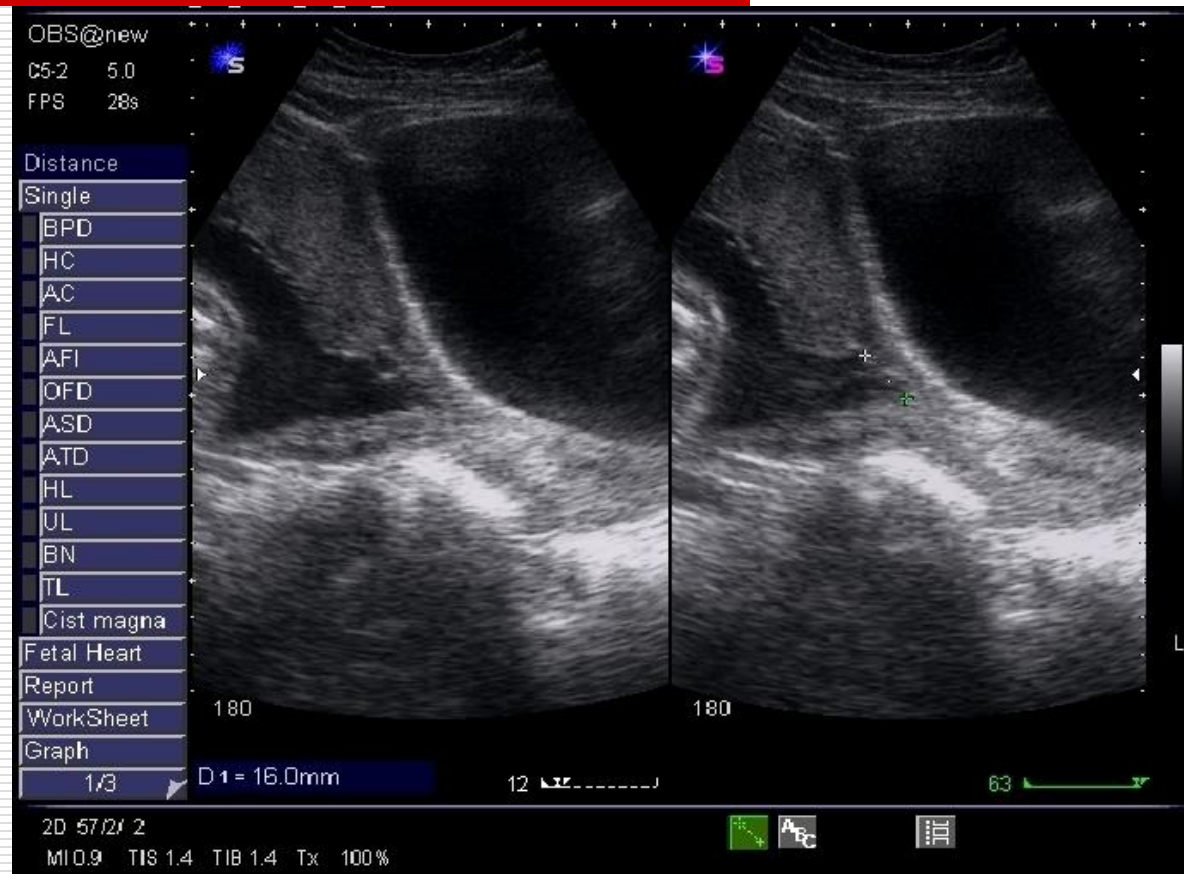


Emergency Radiology

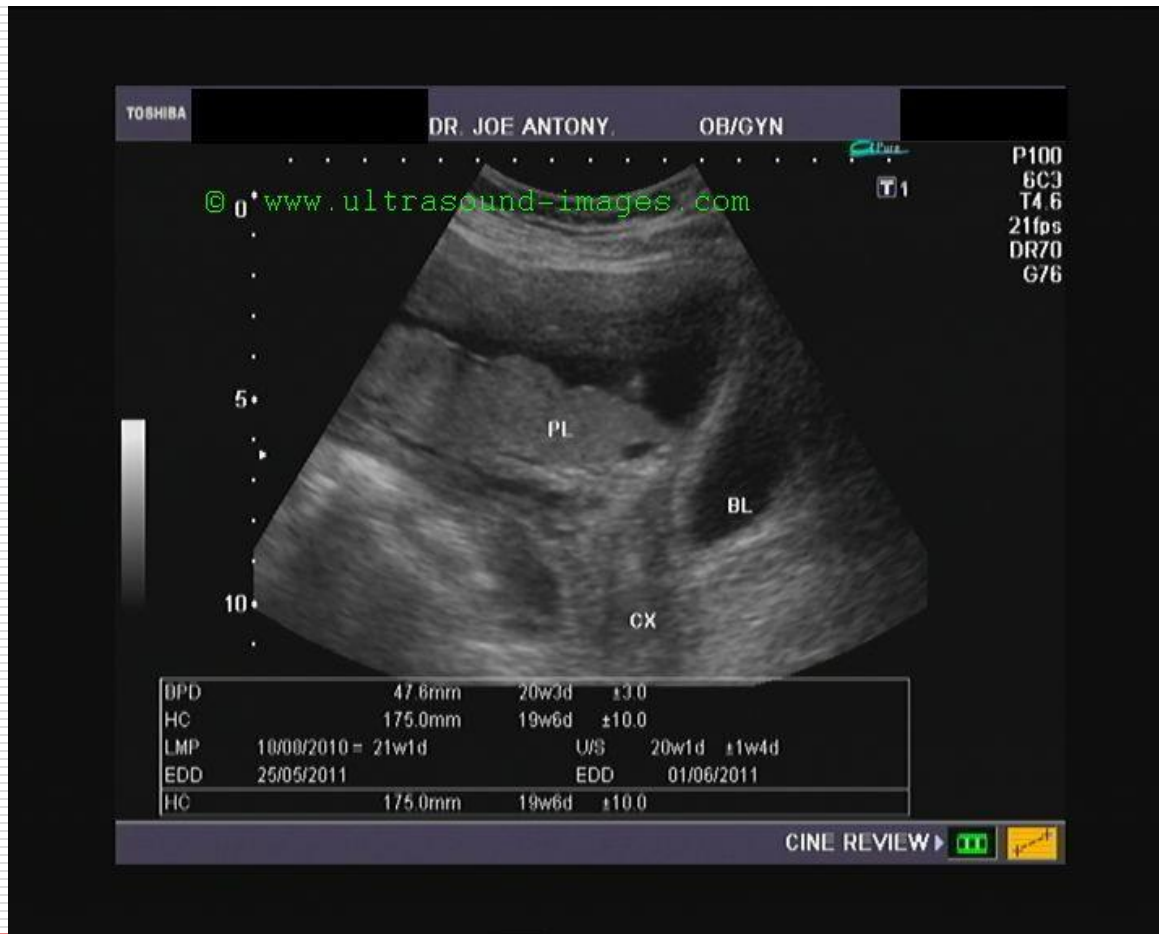
☐ Placenta previa



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Musculoskeletal Emergencies:

- Upper & lower extremities Fractures & dislocations
 - Pelvic Fractures.
 - Joint injuries
 - Ligaments and tendons injuries.
-

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Musculoskeletal Emergencies:

What to order?

- Plain X-ray.
- CT scan.
- MRI

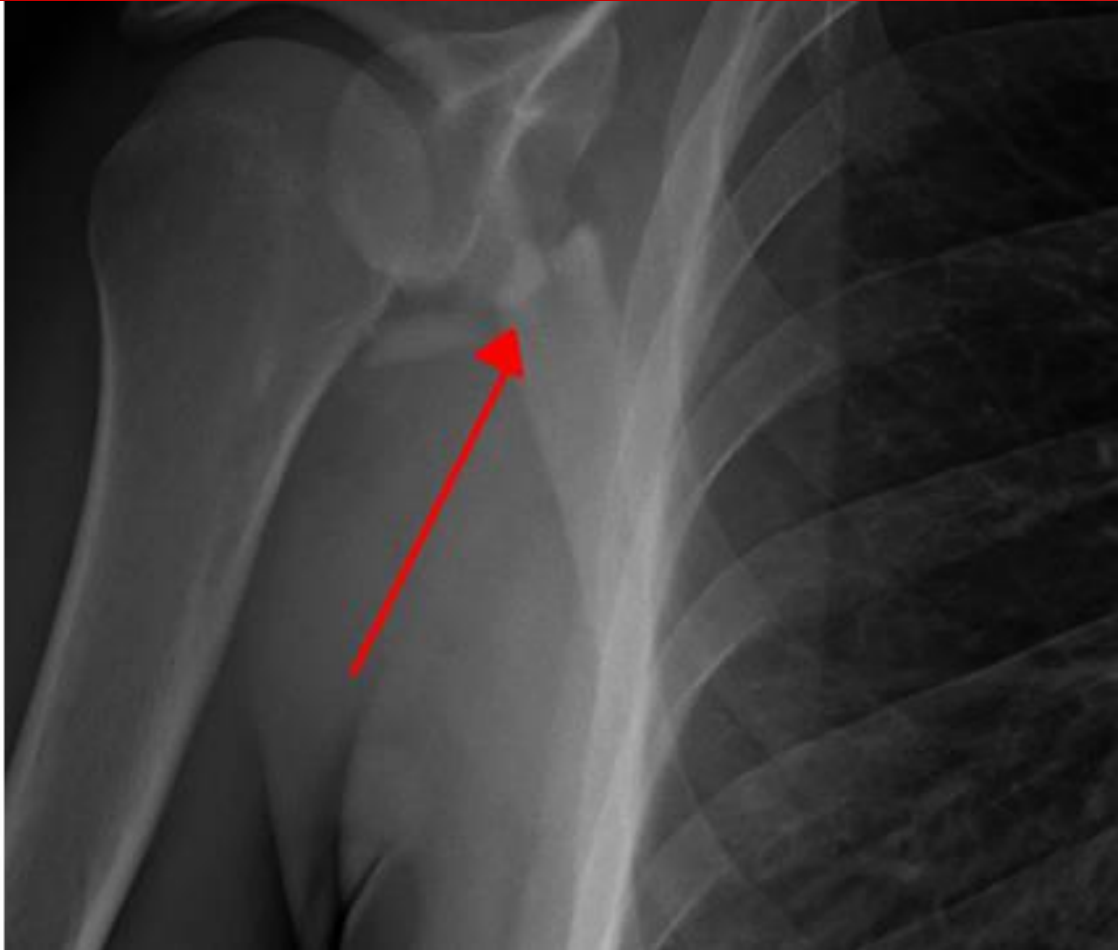
When?

History of trauma.

Fracture left humerus



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Coles fracture



Scaphoid fracture



Pelvis fracture



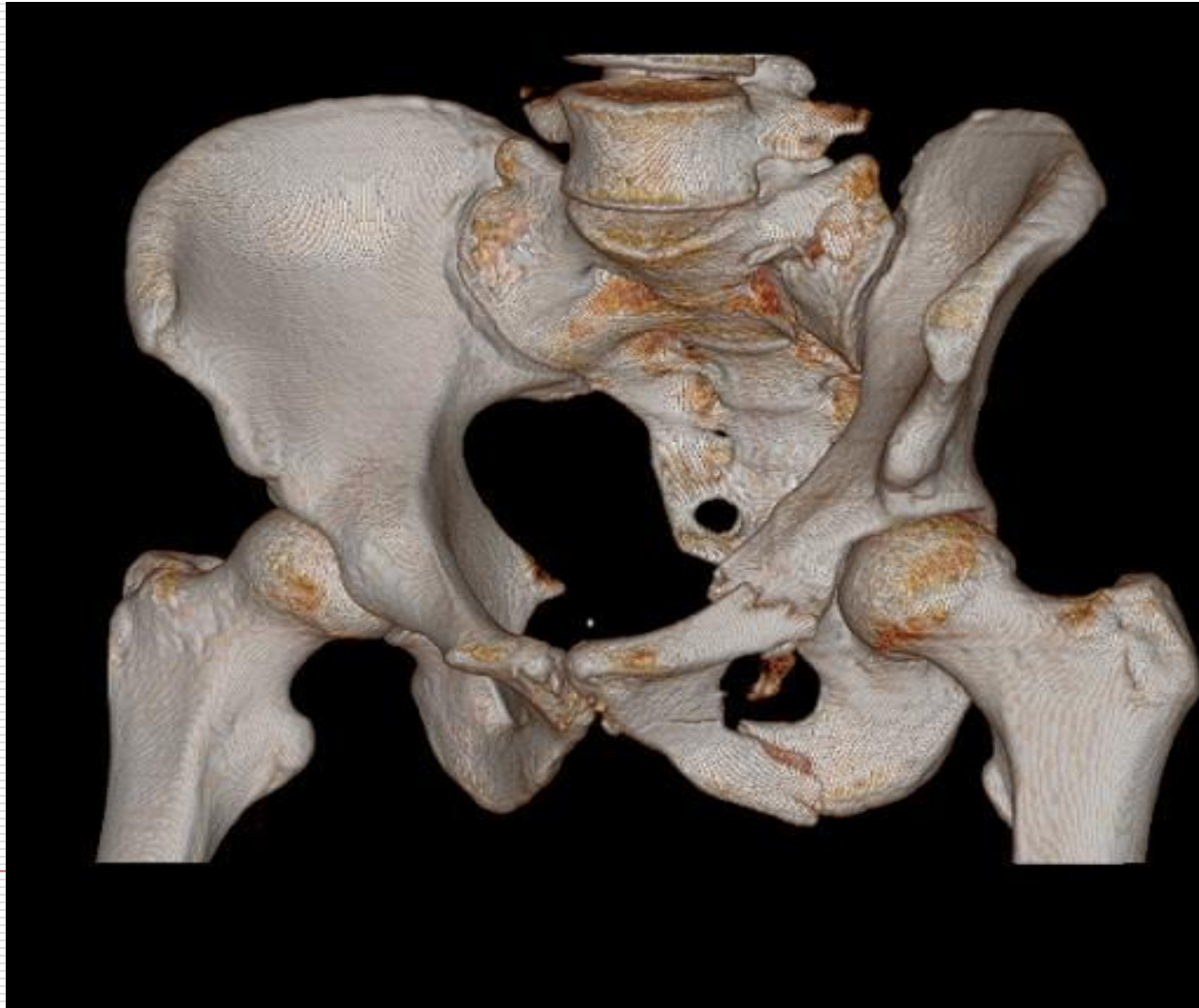
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Shoulder dislocation

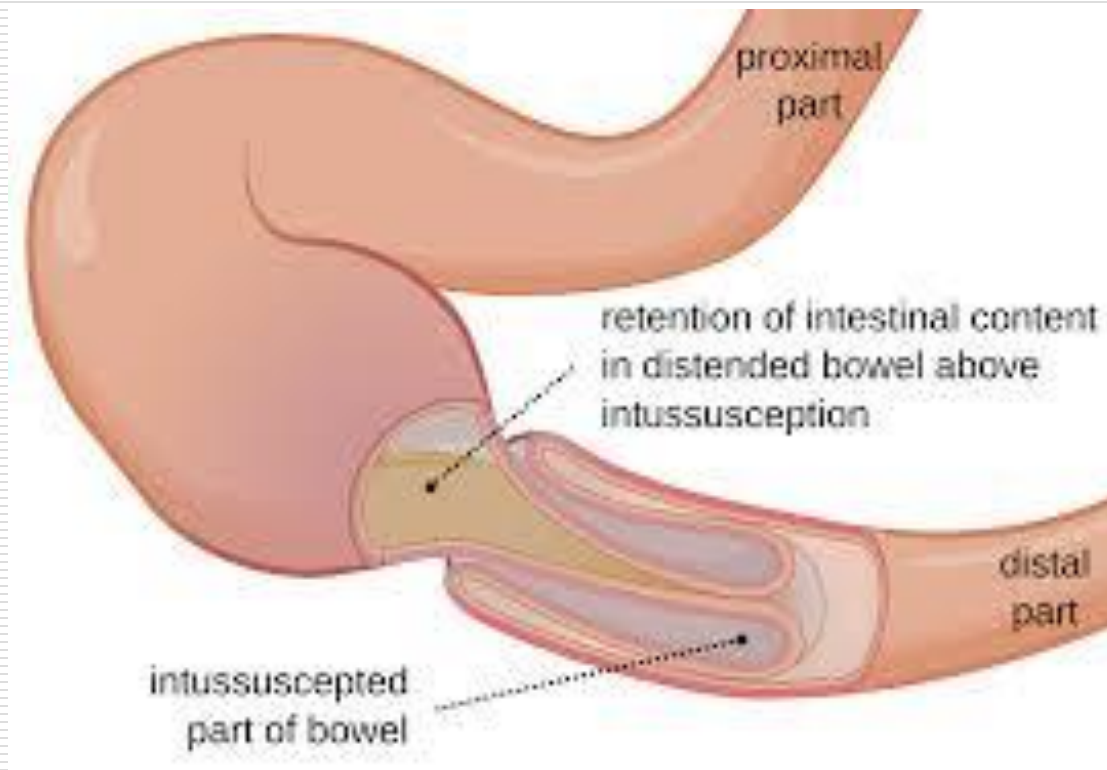


Emergency Radiology

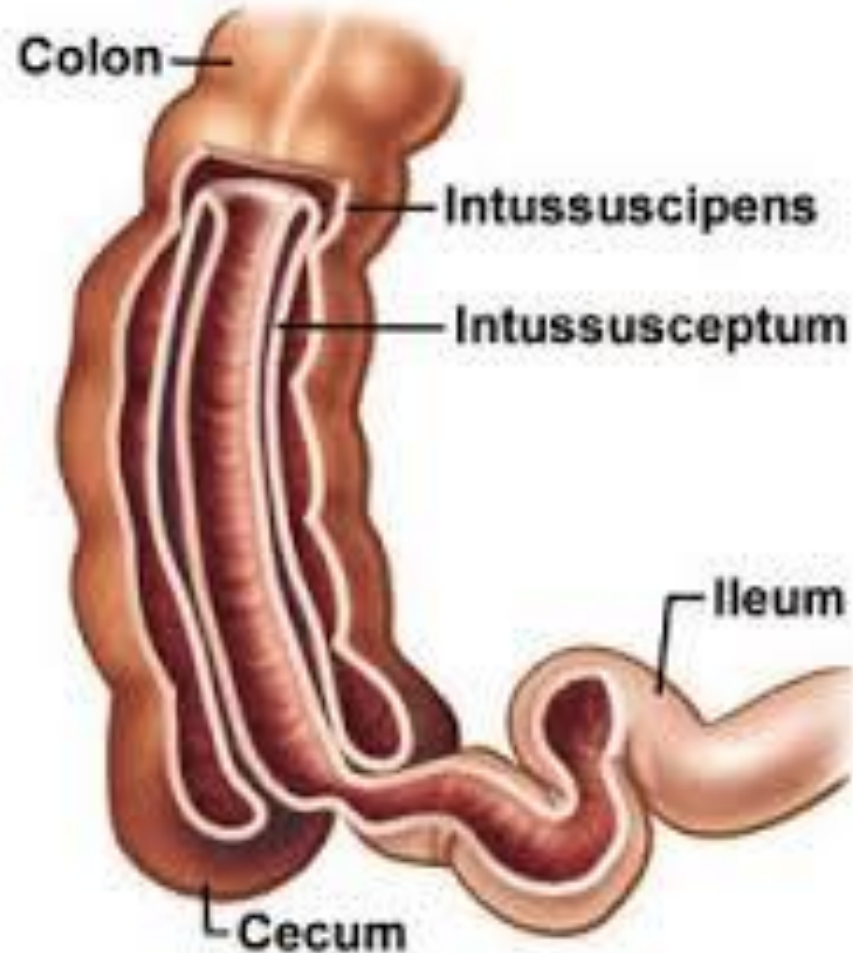
Pediatric Emergencies:

- Neonatal emergencies (intestinal obstruction, Intussusception.)
 - Foreign body aspiration.
 - Bone injuries.
-

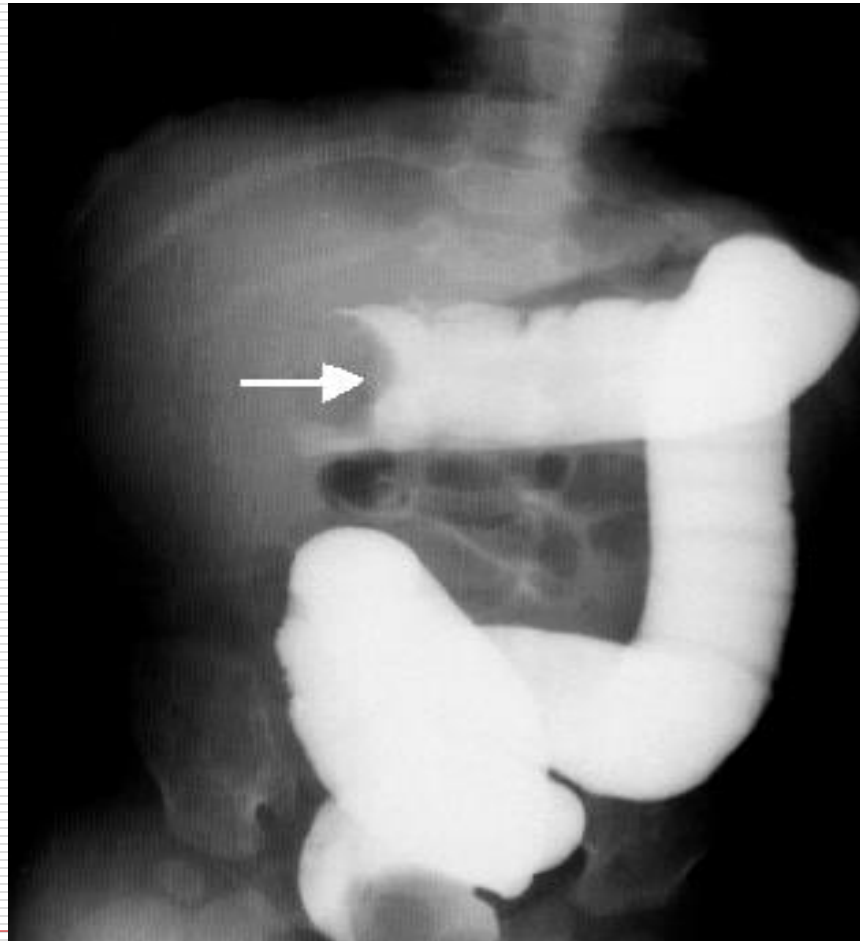
intusseption



Emergency Radiology



Emergency Radiology



Emergency Radiology



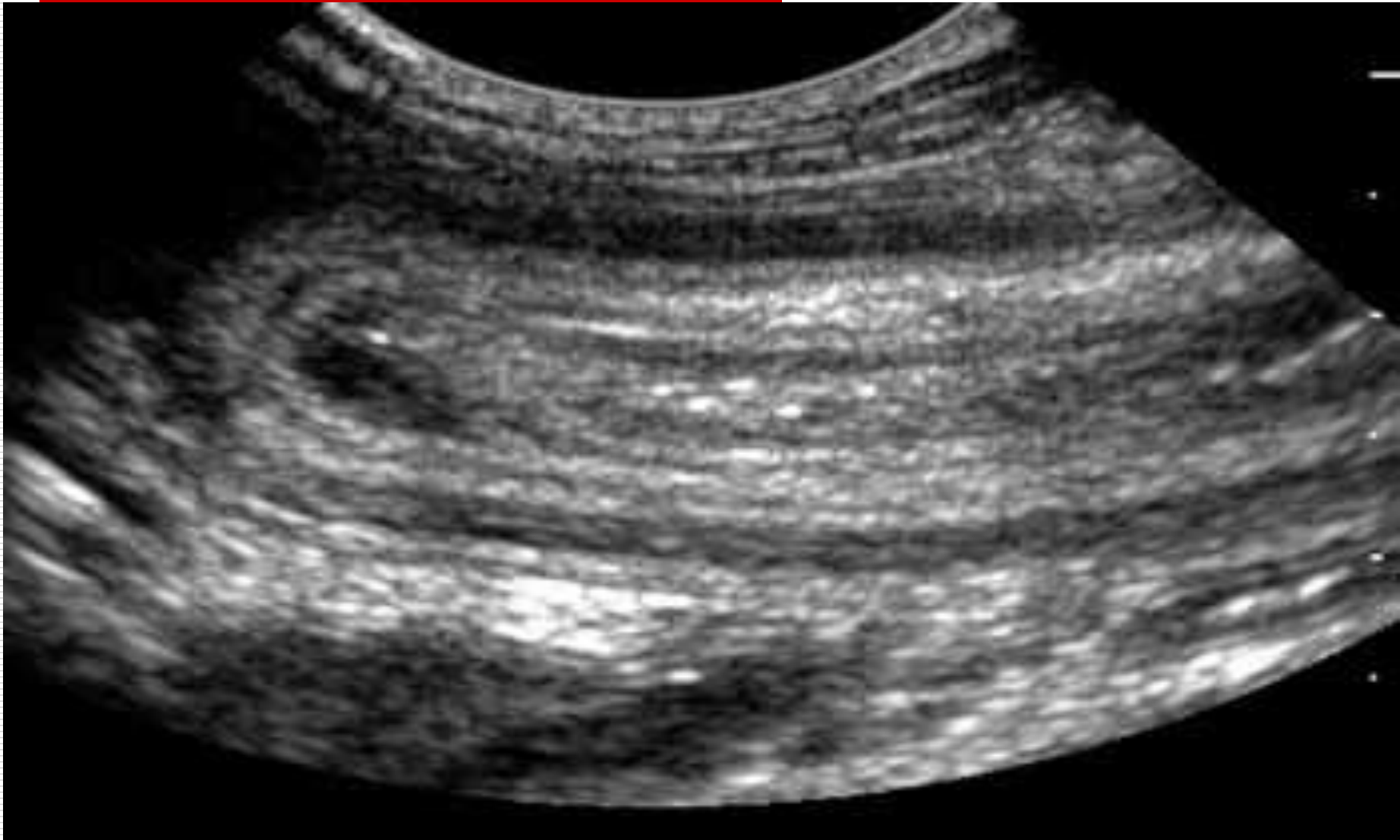
Intussusception on ultrasound: 'target sign'



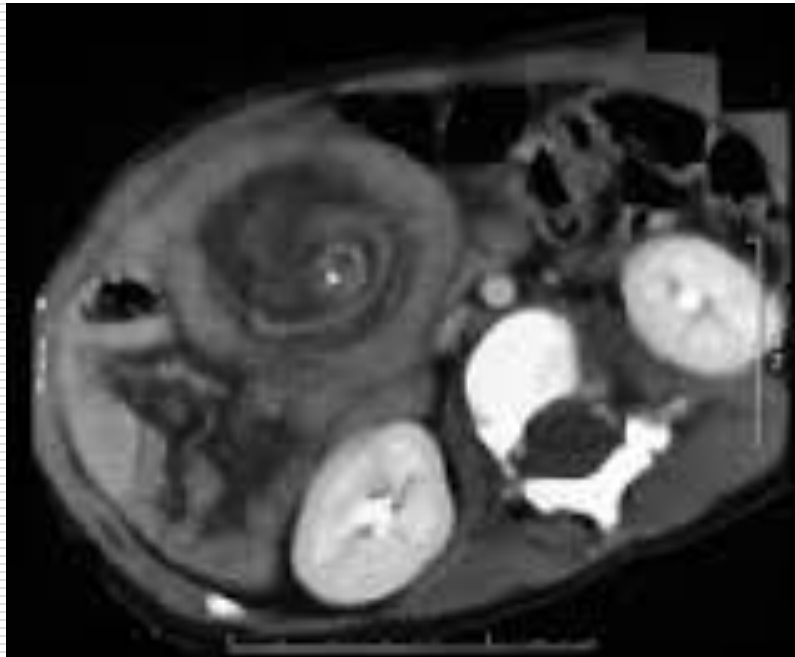
vetnext.com

#VETERINARYECCSMALLTALK

Intusseption us



Emergency Radiology



UNFORTUNATELY most of doctors
don't write proper history.

Please provide us with proper history to
get proper diagnosis.

In important cases, please don't
hesitate to come to radiology
department and discuss the case with
the radiologist.

According to ACR regulation assessment of renal function by doing creatinine level before administration of CM is crucial, however many center depend on GFR.

Still there is conflict about the **save** creatinine level.

CIN :

Unfortunately CM has toxic effect on the kidney.

With the use of new CM adverse effect become less but still we face significant morbidity.

According to ACR regulation CM should be use consciously in patient with impaired renal function.

In case of allergy like asthmatic patient, the patient should be prepared with prednisolone tab.

Unfortunately there is no effective way to prevent severe allergic reaction (anaphylactic shock) but fortunately this severe reaction is very rare nowadays especially with the new generation of CM.

THE END

Dr .Raad Abdulrahman
hameed FIBMR –TUCOM

Emergency radiology

بسم الله الرحمن الرحيم

