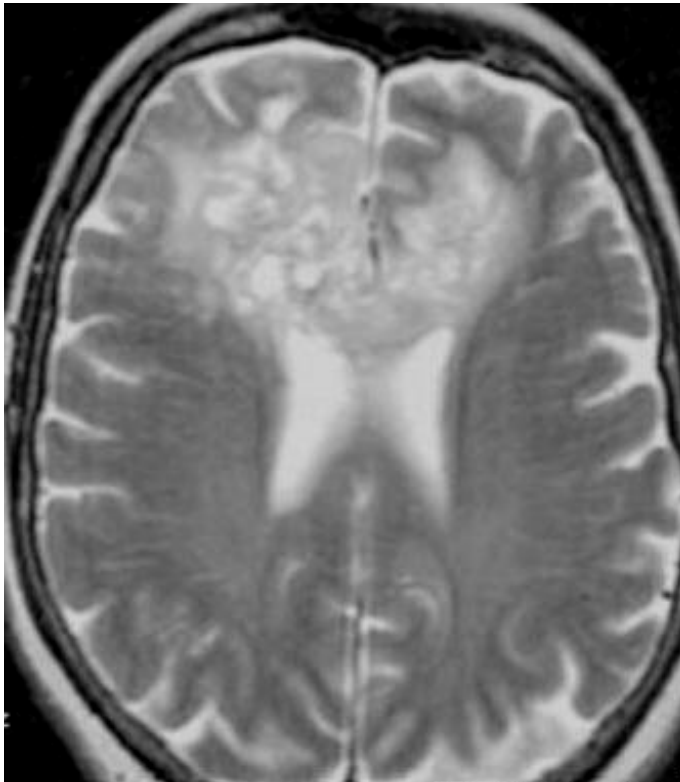


Glioblastoma Multiforme



Imaging

- Best diagnostic clue: Thick, irregularly enhancing rind of neoplastic tissue surrounding necrotic core
- Heterogeneous, hyperintense mass with adjacent tumor infiltration/vasogenic edema
- May also see necrosis, cysts, hemorrhage, fluid/debris levels, flow voids
- Cerebral hemispheres > brainstem > cerebellum

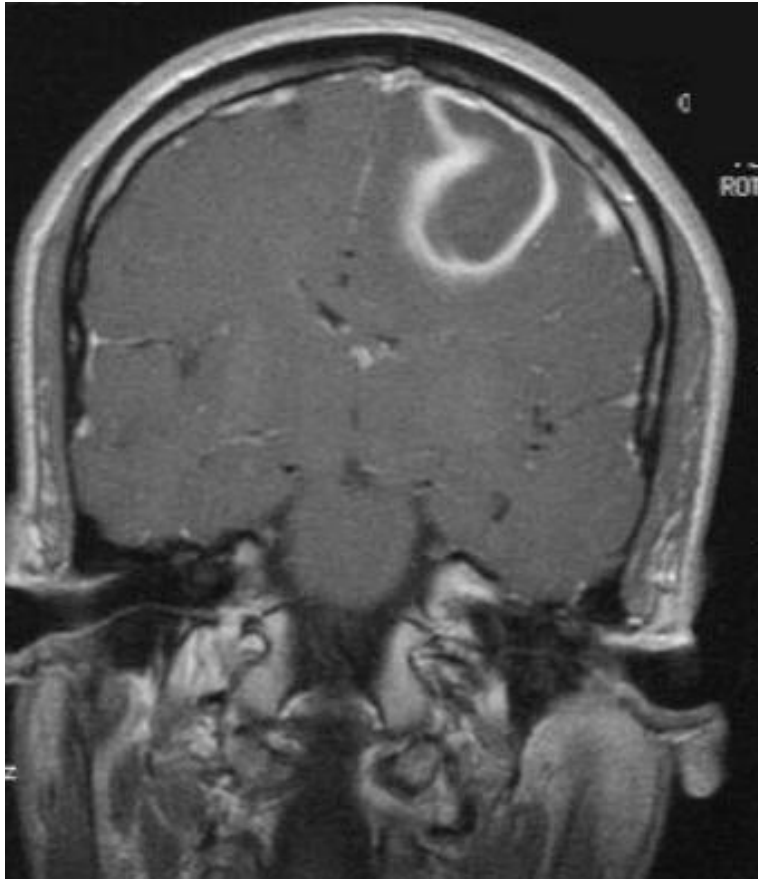
D/D:

- Abscess
- Metastasis
- demyelination
- Subacute ischemia

Clinical Features

- Seizures, focal neurologic deficits common
- may occur at any age
- 12-15% of all intracranial neoplasms

Abscess



Imaging

- Imaging varies with stage of abscess development
- Ring-enhancing lesion: DWI high signal, low ADC
- T2 hypointense rim with surrounding edema

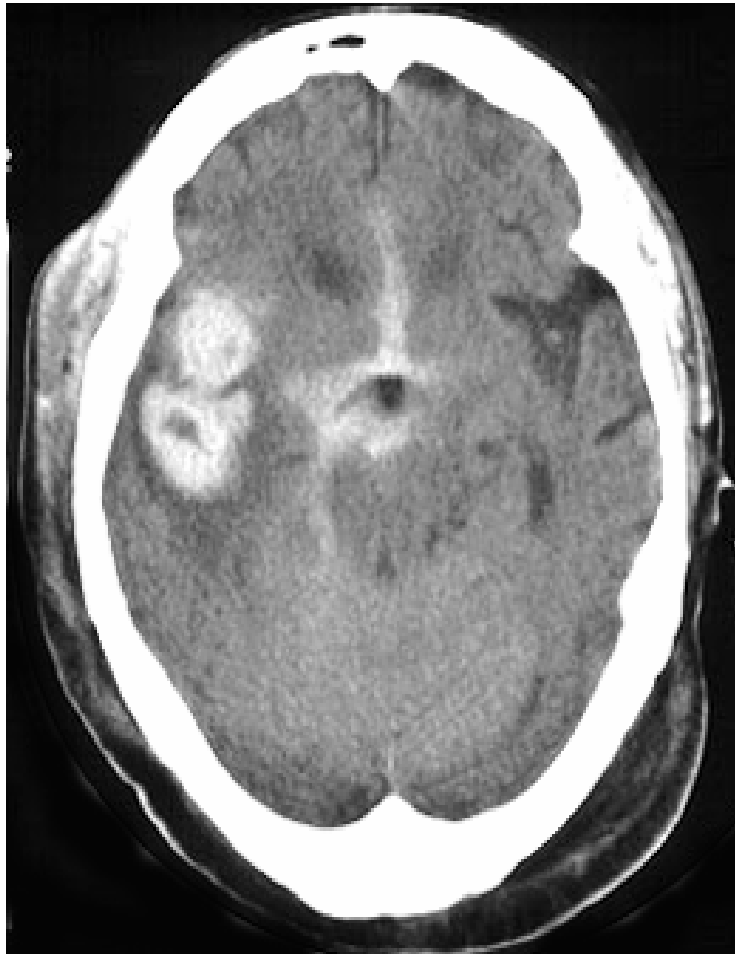
D/D

- Glioblastoma multiforme
- Parenchymal metastases
- Demyelinating disease
- Resolving intracerebral hematoma
- Subacute cerebral infarction

Clinical Features

- Headache is most common presentation; may have seizures, altered mental status, focal deficits
- Potentially fatal but treatable lesion

Subarachnoid Hemorrhage



Imaging

- High density on CT, hyperintensity on FLAIR

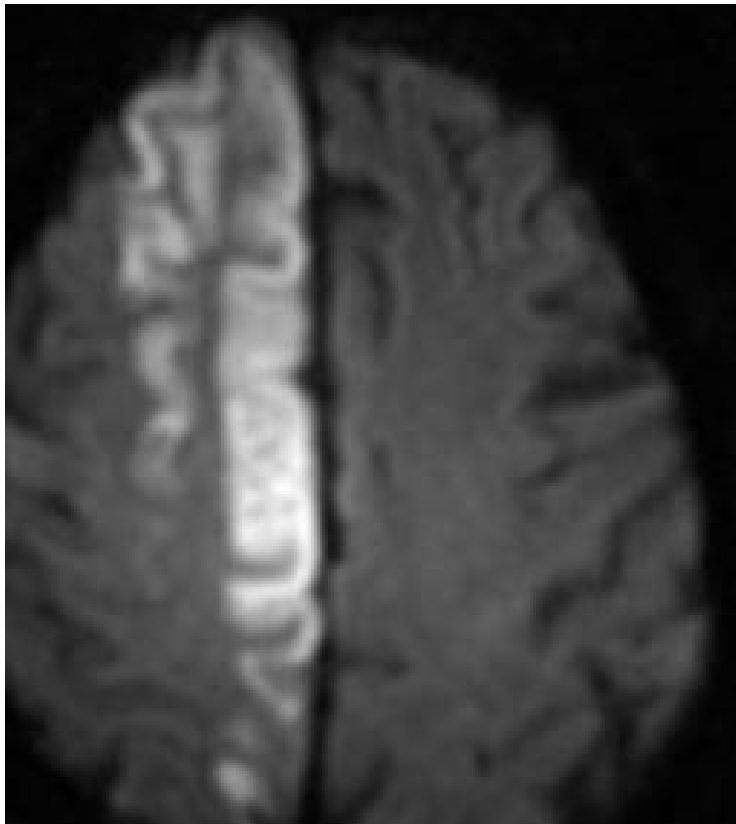
D/D

- Nontraumatic SAH
- Meningitis
- Carcinomatous meningitis
- Pseudosubarachnoid hemorrhage
- Gadolinium administration

Clinical Features

- Headache, emesis, decreased consciousness
- Trauma most common cause
- Presence of tSAH is marker of more severe brain injury
- Poor prognosis if associated with other intracranial injuries
- Vasospasm develops earlier than w/aneurysmal SAH

ACA Cerebral Infarction



Imaging

- Diffusion restriction in anterior 2/3 of medial hemispheres
- Hypodensity/hyperintensity/loss of GM/WM differentiation in ACA territory
- Hypodensity in caudate head, anteromedial putamen/globus pallidus, anterior limb of internal capsule (lenticulostriate arteries)

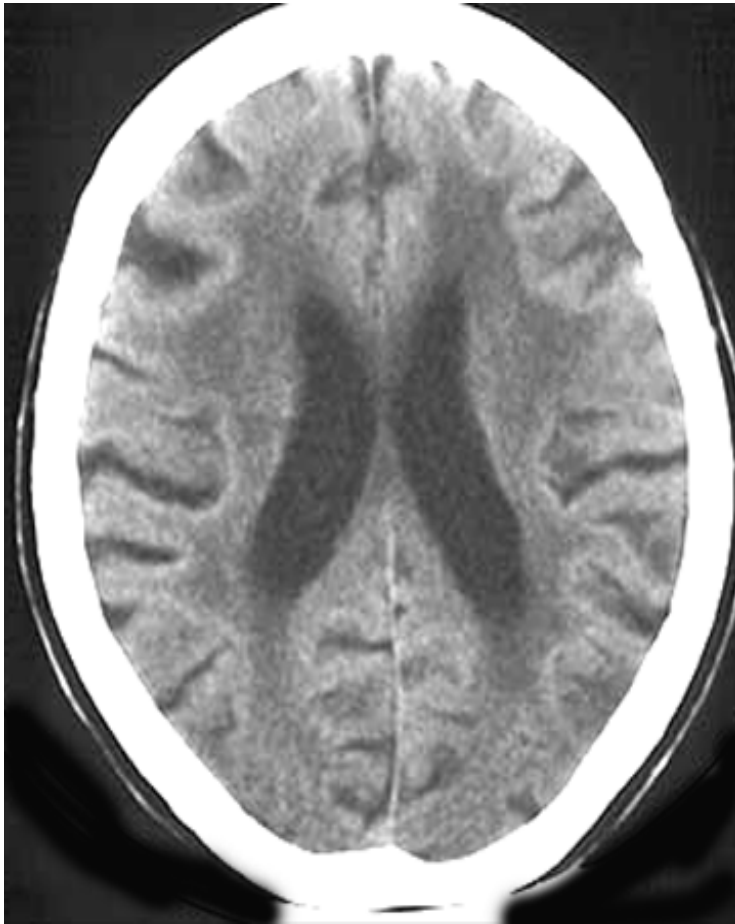
D/D

- Low-grade diffuse astrocytoma
- Cerebral edema
- Herpes encephalitis
- Subdural effusion, empyema

Clinical Features

- Contralateral leg weakness/paraplegia
 - Face, upper extremity spared
- Face, upper extremity spared
- Abulia, motor aphasia, incontinence
- Frontal lobe symptoms, personality changes
- Consider CTA or MRA to evaluate vessels

Normal Aging Brain



Imaging

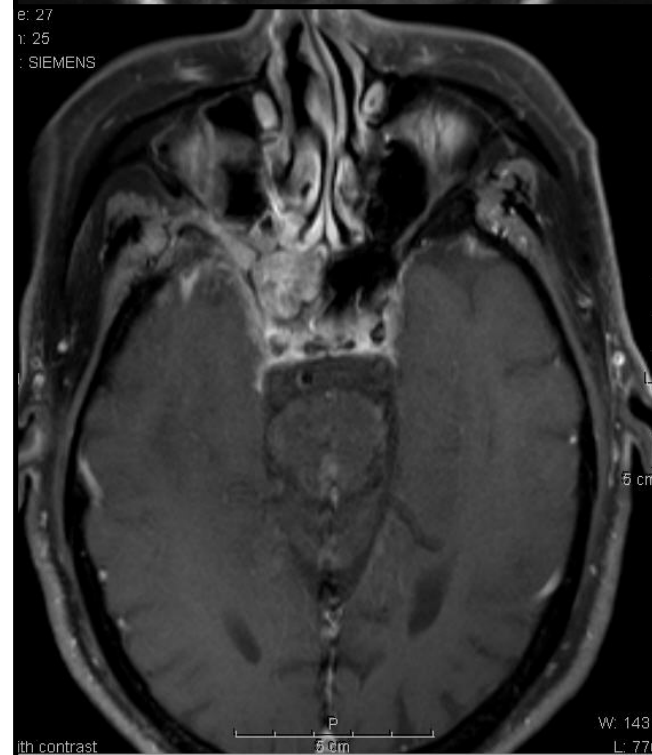
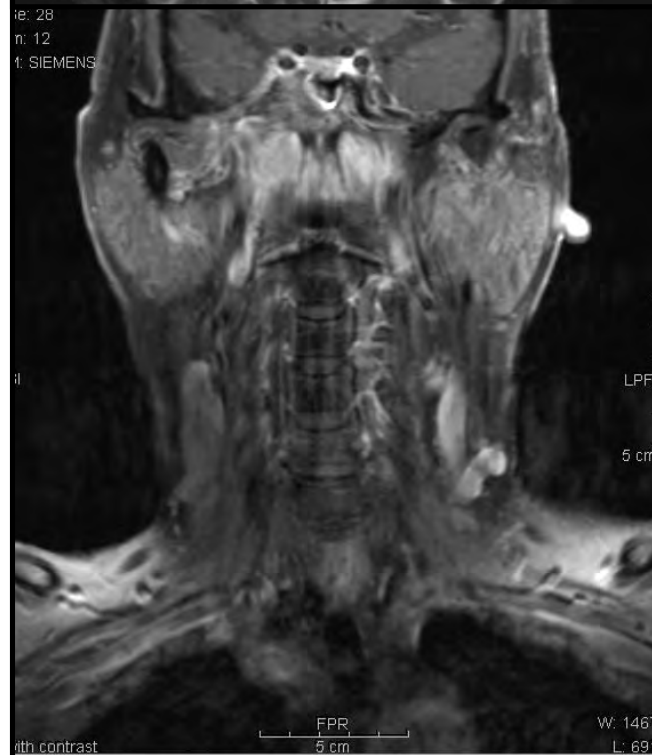
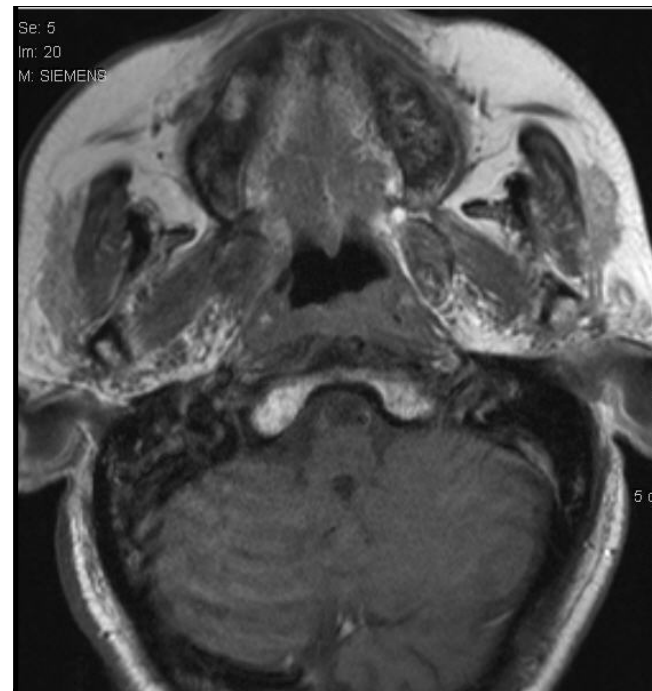
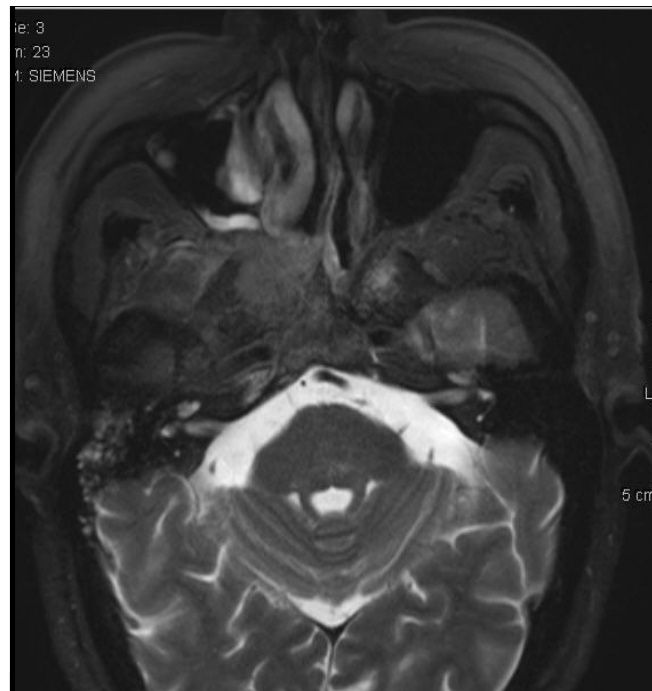
- Broad spectrum of "normal" on imaging in elderly
- "Successfully aging brain"
 - Smooth, thin, periventricular, high signal rim on FLAIR is normal
 - White matter hyperintensities (WMHs) absent/few
- Decreased total brain volume
 - Selective atrophy of white matter (not gray matter) predominates
- D/D
 - Alzheimer disease
 - Mild cognitive impairment
- Sporadic subcortical arteriosclerotic encephalopathy
- Vascular dementia
- Frontotemporal lobar degeneration (Pick disease)

Clinical Features

- WMHs correlate with age, silent stroke, hypertension, female sex

Diagnostic Checklist

- Cannot predict cognitive function from CT/MR
- Imaging only roughly correlates with cognitive function
- Significant overlap with dementias



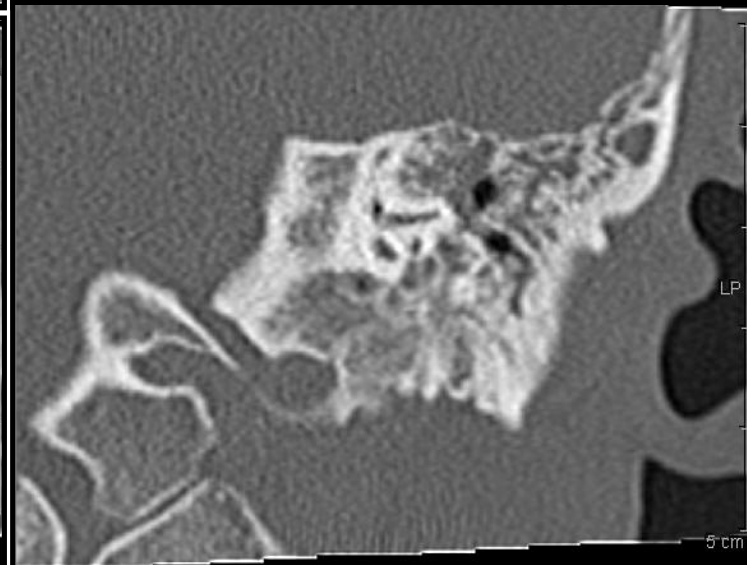
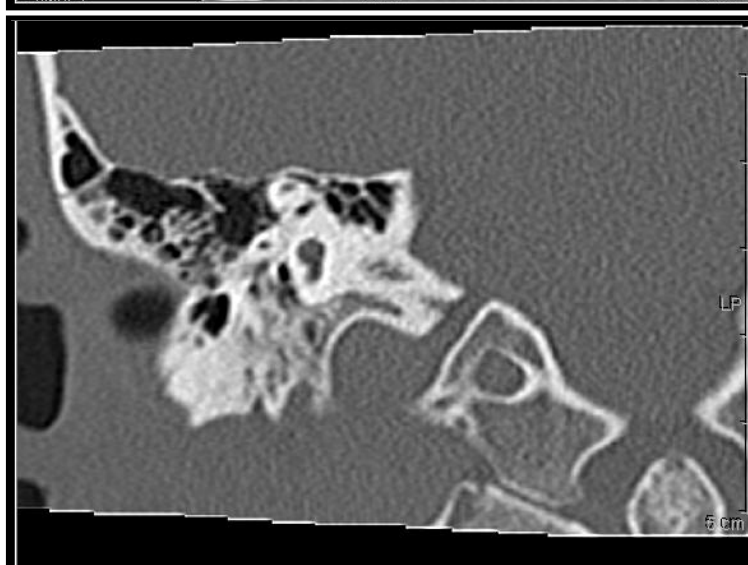
Nasopharyngeal carcinoma with perineural spreading

- *Location:* turbinates (50%) > septum > vestibule > posterior choanae > floor
- *Extension:*
 - (a) lateral + superior: through sinus of Morgagni (= natural defect in superior portion of lateral nasopharyngeal wall) into cartilaginous portion of eustachian tube + levator veli palatini muscle ± masticator and parapharyngeal spaces ± foramen lacerum ± cavernous sinus
 - (b) anterior: posterior nasal cavity + pterygopalatine fossa
 - (c) inferior (1/3): submucosal spread along lateral pharyngeal wall + anterior and posterior tonsillar pillars
- *MRI:* signal intensity similar to that of adjacent mucosa
- Cervical lymphadenopathy is the initial presentation in many patients.



Thyroglossal duct cyst

- The most common congenital neck mass
- Thyroglossal duct = duct along which thyroid gland descends to its final position from foramen cecum at base of tongue (in 3rd week GA) passing anterior to hyoid bone
- *Age*: <10 years in 50%; 2nd peak at 20~30 years; M=F
- *Location*: suprahyoid (15%), at level of hyoid (20%), infrahyoid (65%), midline (75%).
- Midline cyst with occasional septation; infrahyoid cyst is embedded within strap muscle.
- US: anechoic cyst or hypoechoic mass with fine to coarse internal echoes
- CT: smooth well-circumscribed midline cyst with thin wall; hypo- or hyperdensity; peripheral rim enhancement
- MRI: T1-hypointense T2-hyperintense cyst; nonenhancing rim; thick irregular rim + variable signal intensity of fluid if inflamed



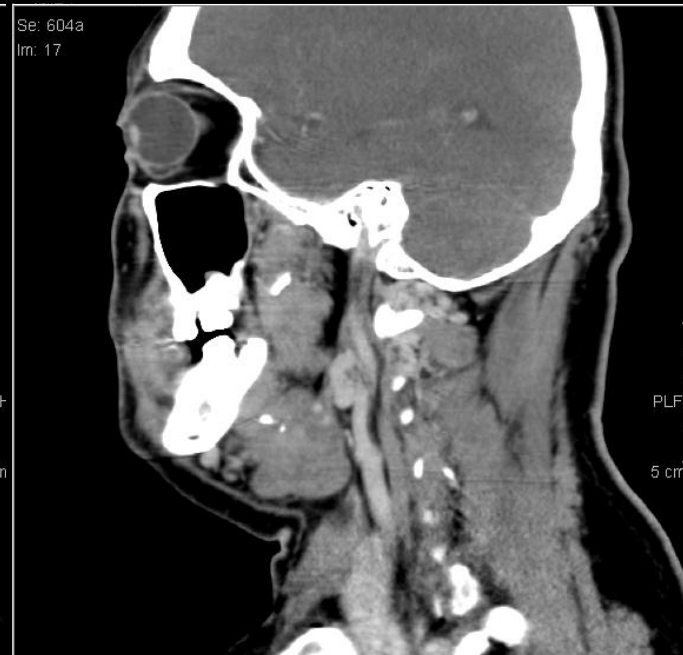
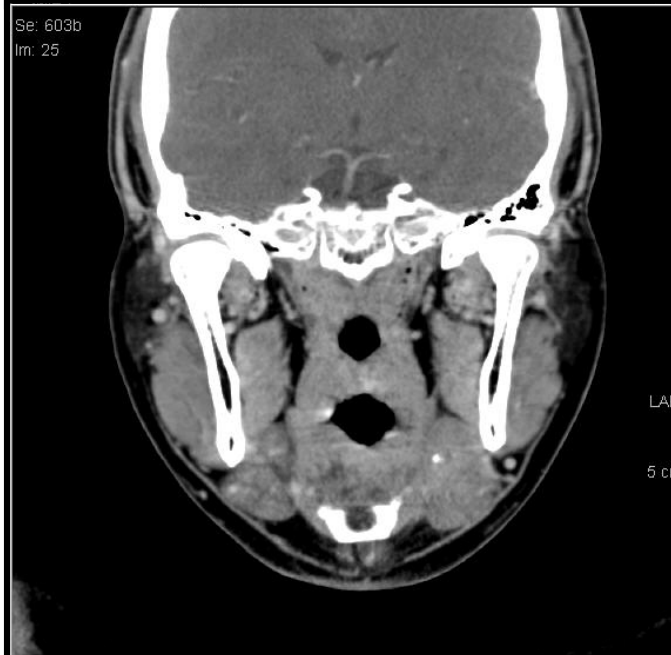
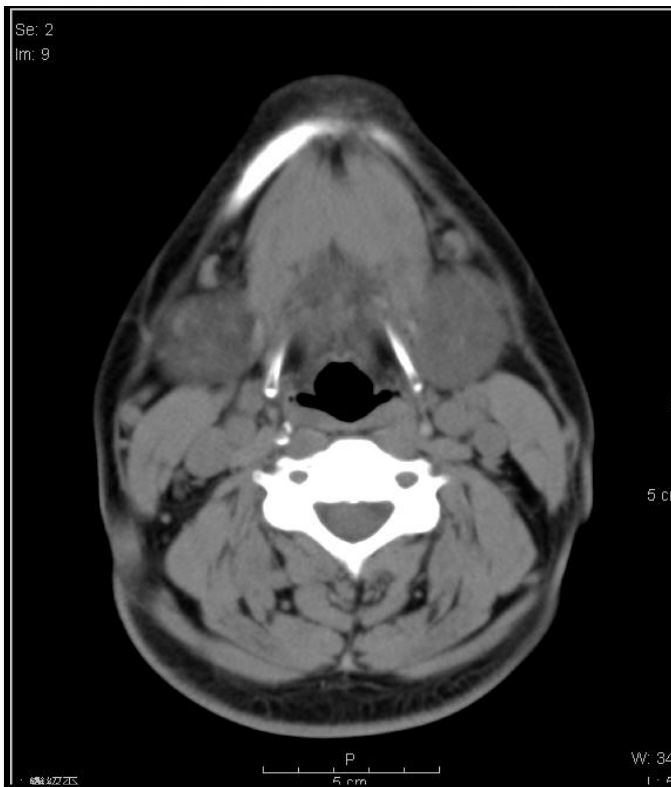
Temporal bone fracture

- Temporal bone fractures classically are described with reference to the long axis of the petrous bone, being classified as either longitudinal (parallel to the axis) or transverse (perpendicular to the axis). Many temporal bone fractures, however, are oblique.
- Longitudinal fractures typically result from trauma to the temporal or parietal region and commonly involve fractures of the temporal squamosa or parietal bone. The line of force runs roughly from lateral to medial. A fracture line may extend through the facial nerve canal, thereby damaging the facial nerve, designated as cranial nerve (CN) VII. Associated injury, such as transection or intraneural hemorrhage, may cause facial nerve paralysis, as can damage from displaced bone fragments. The fracture may also disrupt the ossicular chain, resulting in conductive hearing loss.
- Transverse fractures typically result from trauma to the occiput or cranial-cervical junction, with the line of force running roughly anterior to posterior. A fracture passing through the vestibulocochlear apparatus can cause sensorineural hearing loss and equilibrium disorders. Transverse fractures also commonly injure CN VII, because their path often takes them close to the nerve's labyrinthine segment.
- Oblique (or mixed) fracture patterns, which extend both longitudinally and transversely, are common, and some case series report that these occur more often than do isolated transverse or longitudinal fractures.



Thyroid Ophthalmopathy

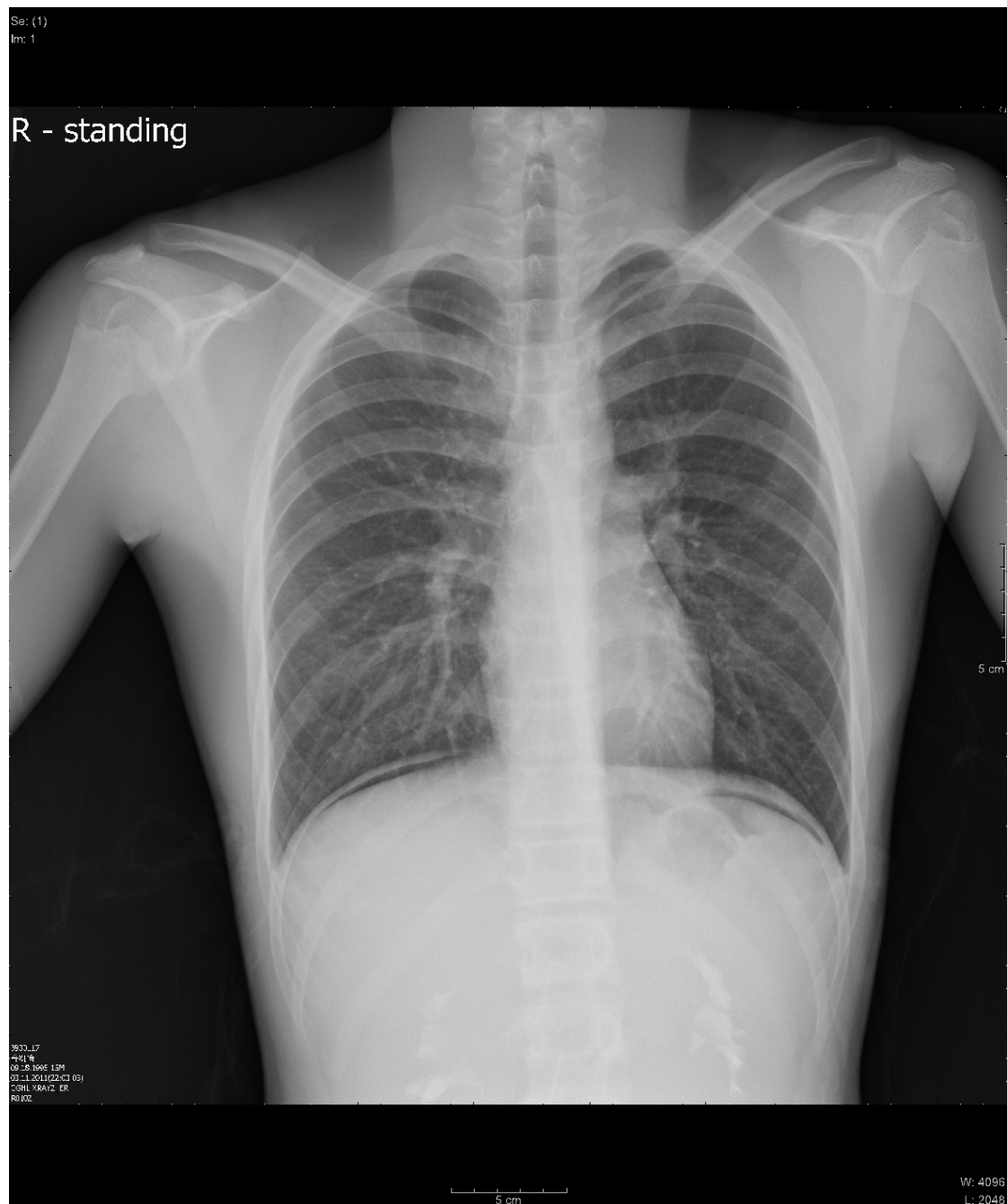
- Most common cause of proptosis in adults
- Typically occurs from 20-50 years old; female predominance 7:1
- Patients are usually hyperthyroid, but may be euthyroid
- Neuroimaging usually reveals thick muscles with tendon sparing
 - Inferior rectus and medial rectus muscles are most commonly involved (I'm SLOW)
 - Usually bilateral, but may be asymmetric
- Laboratory findings: Elevated T3 and T4; Depressed TSH production



Sialolithiasis, Sialoadenitis

- 80-95% occur in submandibular gland or duct
- Stones are most common cause of acute and chronic infection of salivary glands
- Sialolithiasis causes pain and swelling of the involved salivary gland by obstructing the food-related flow of salivary secretions, and cause subsequent infection
- Plain radiography: Opaque stone in course of Wharton's (submandibular) or Stensen's (parotid) ducts
- CT: Stone in duct; Ductal dilatation; swollen gland
- MRI: Inflammation of gland

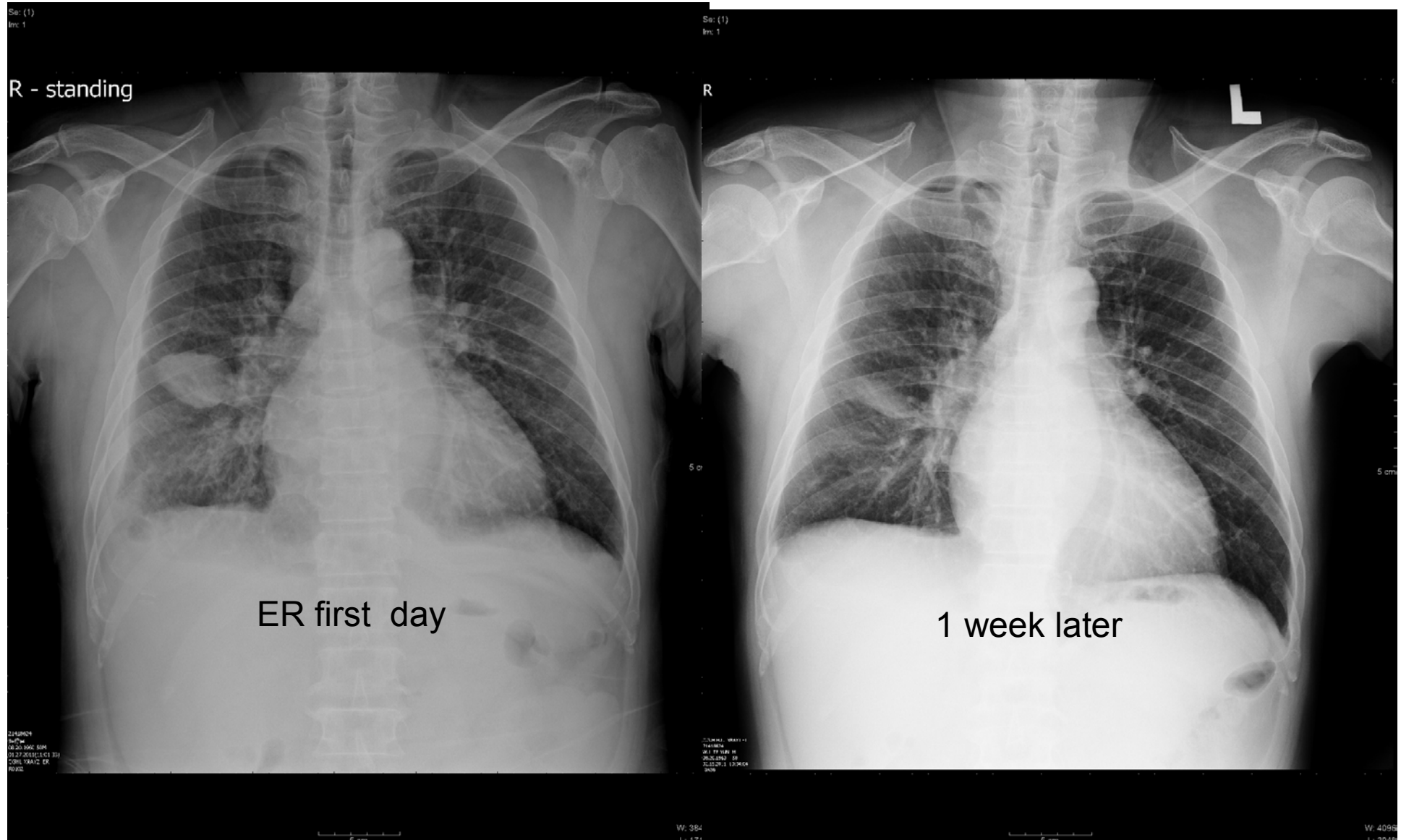
1



Pneumoperitoneum

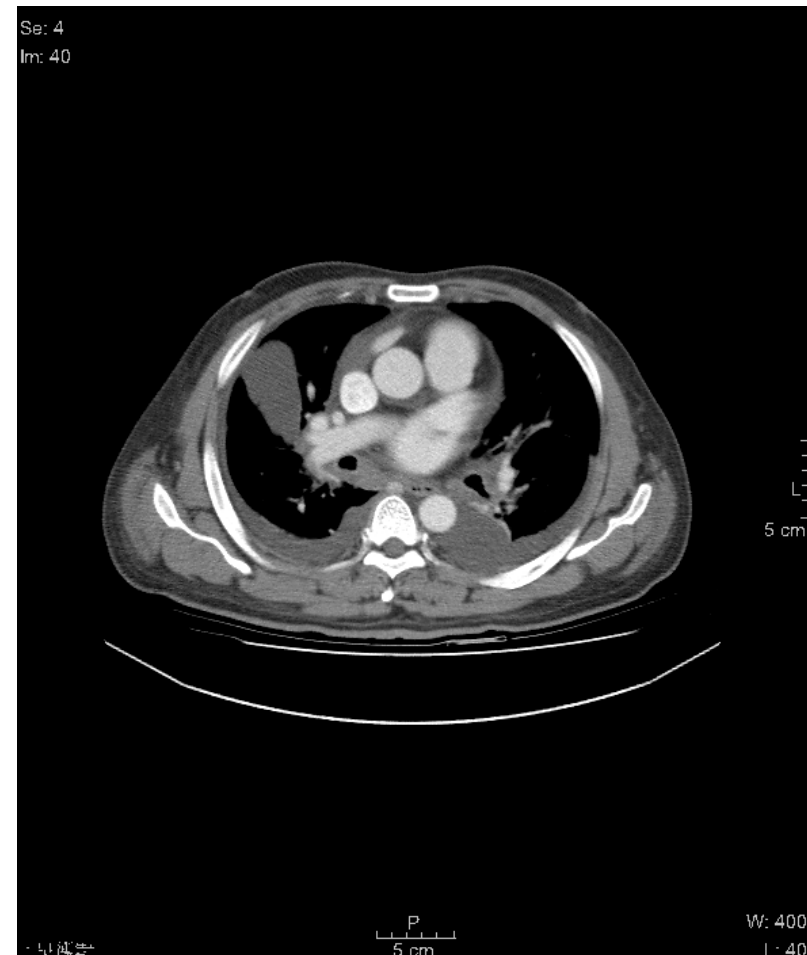
- **CXR**除了看胸部有無病灶外，也要注意橫膈膜以下是否有異常的氣體 (pneumoperitoneum)或是陰影(lower lobe pneumonia)

2

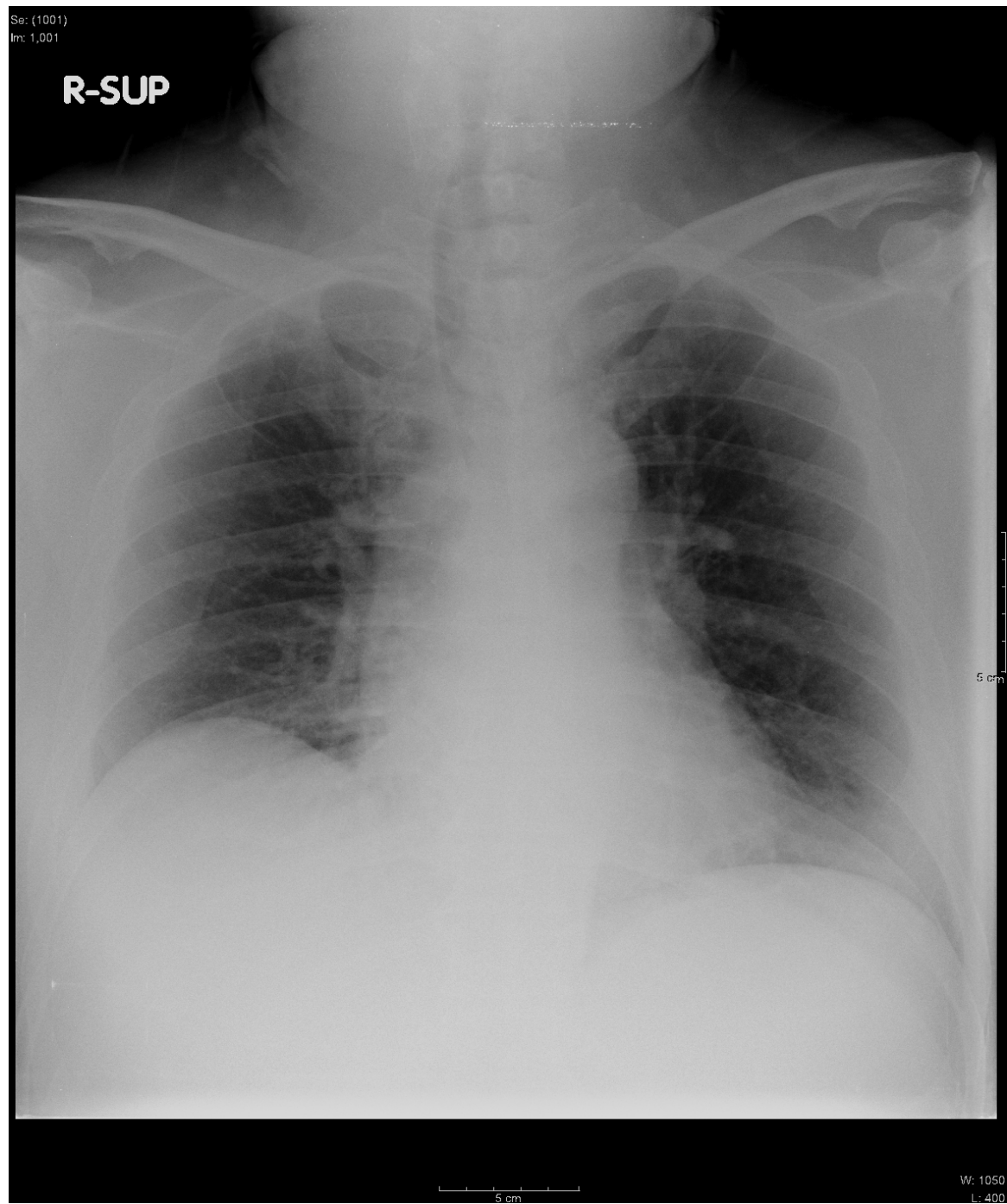


phantom tumor

因爲congestive heart failure造成液體推積在 interlobar spaces of the lung，CXR看起來像是腫瘤，經過治療後，如果congestive heart failure改善，便會很快地消失。
CT看起來像是CYST，不會顯影。

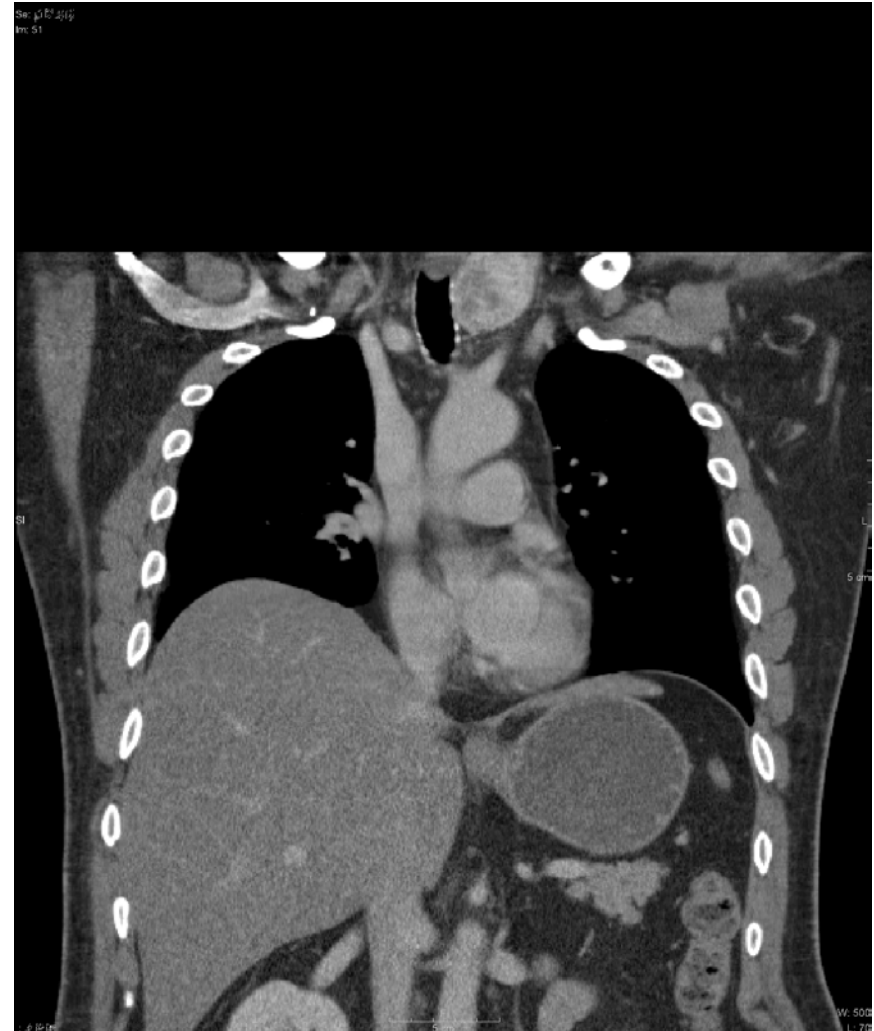


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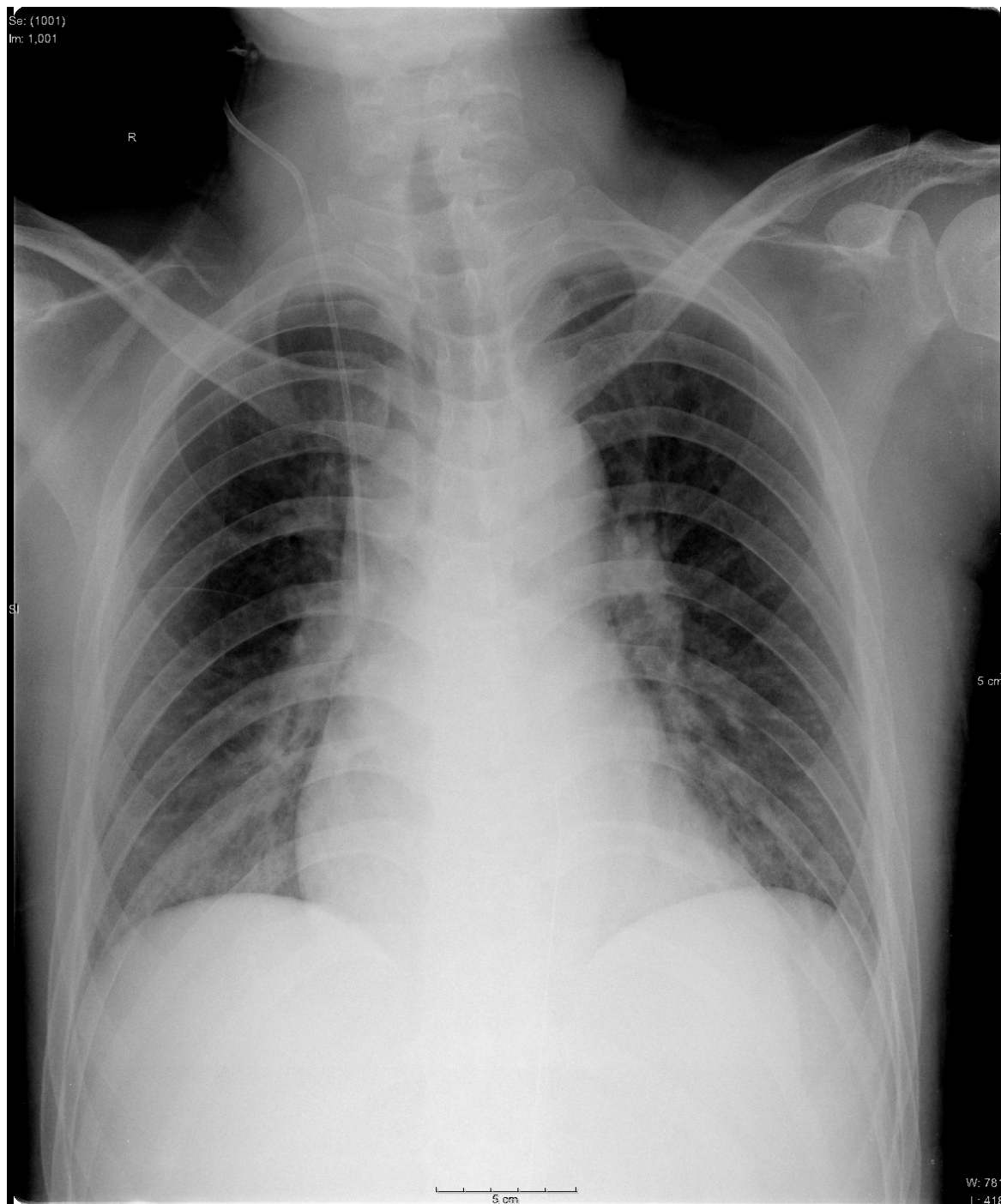


Intrathoracic Goiter

- CXR:
displacement of
the trachea to the
right side.
- CT:moderately
enhancing mass,
continuous with
the lower pole of
left thyroid gland.

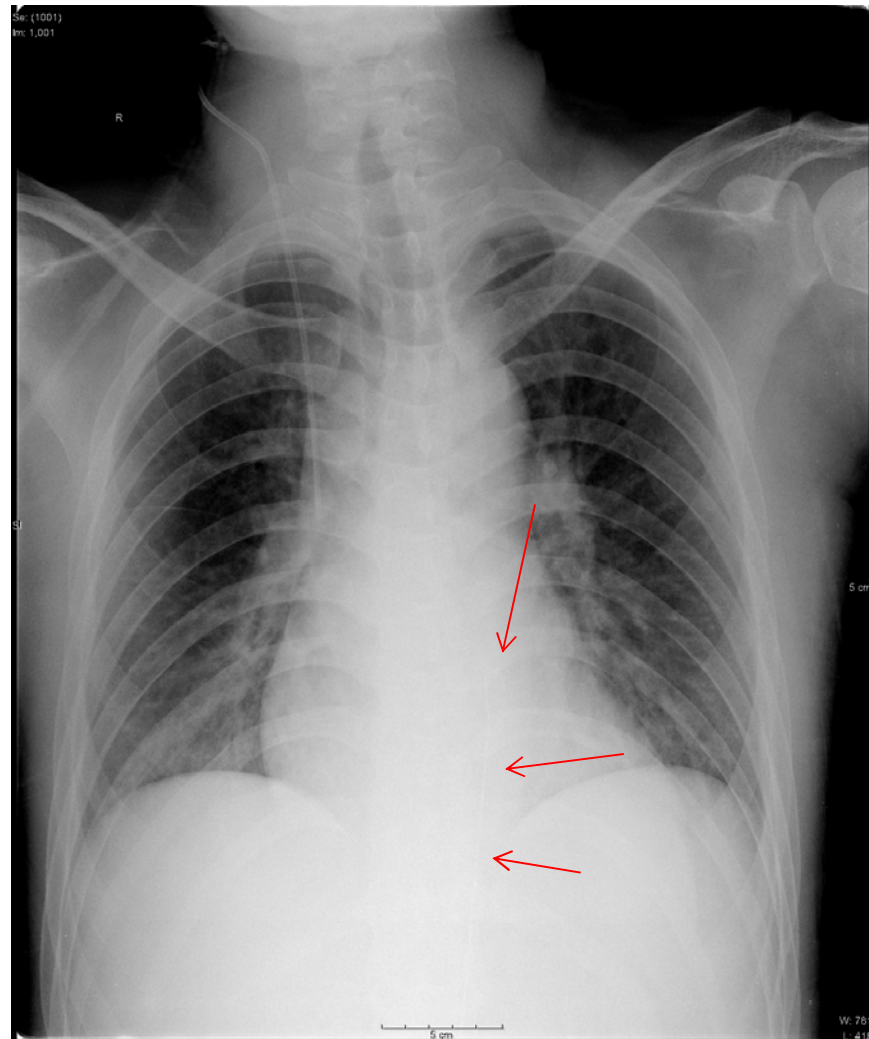


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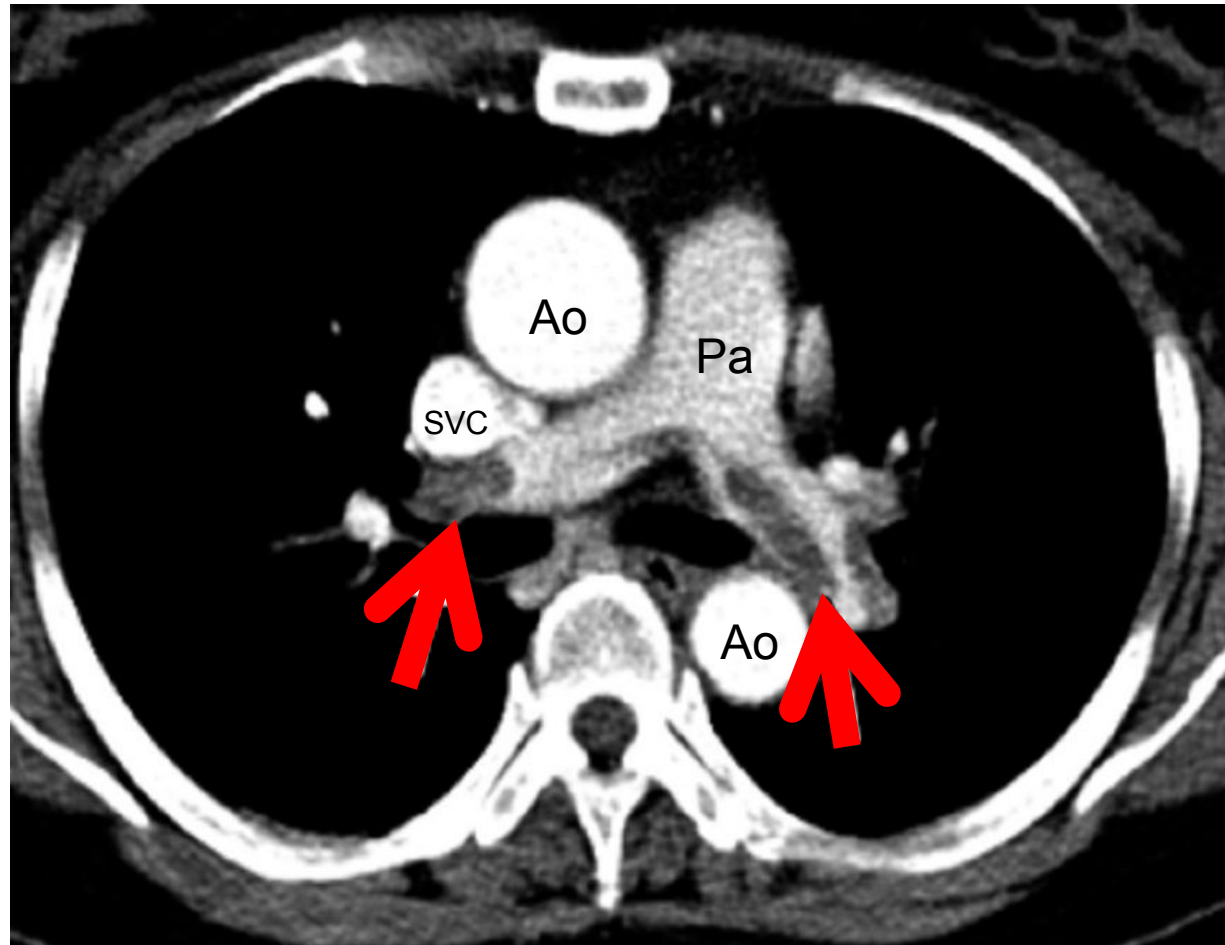


Foreign body (guide-wire)

- 要注意病患身上的導管或是留置物是否正常



5



Ao: aorta, Pa: pulmonary artery

Pulmonary embolism

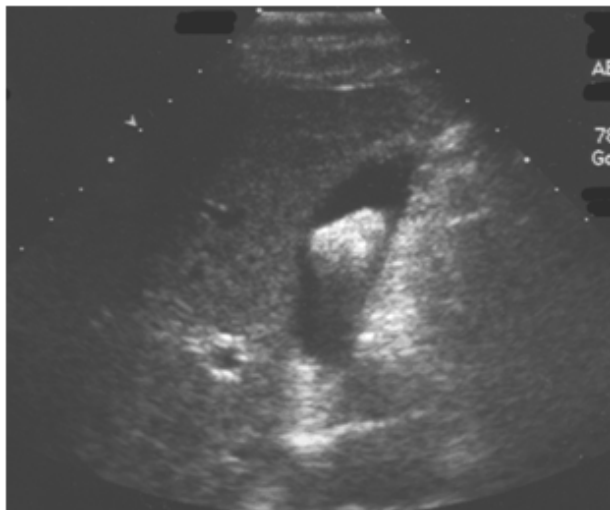
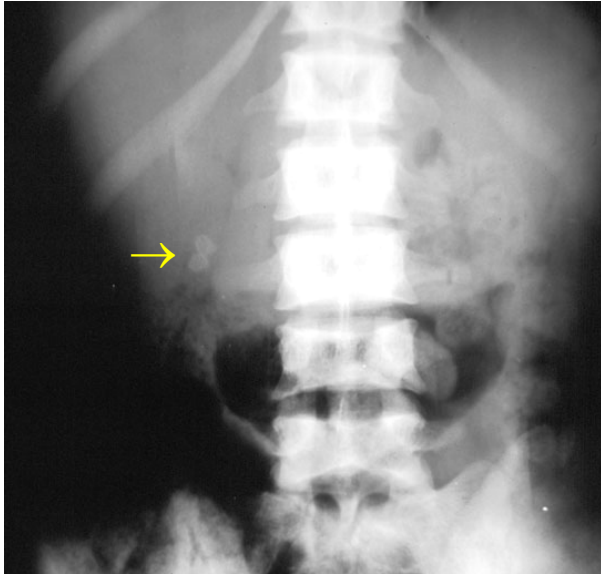
- Chest : filling defects in pulmonary arteries

Chronic Pancreatitis



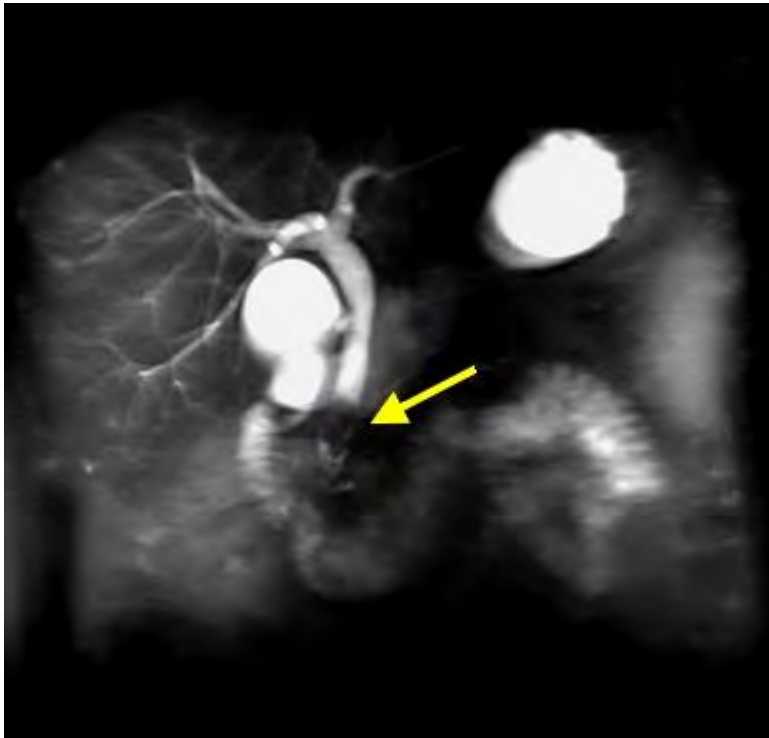
- Spackled calcifications in the upper abdomen with configuration corresponding to pancreas.

Gall stone



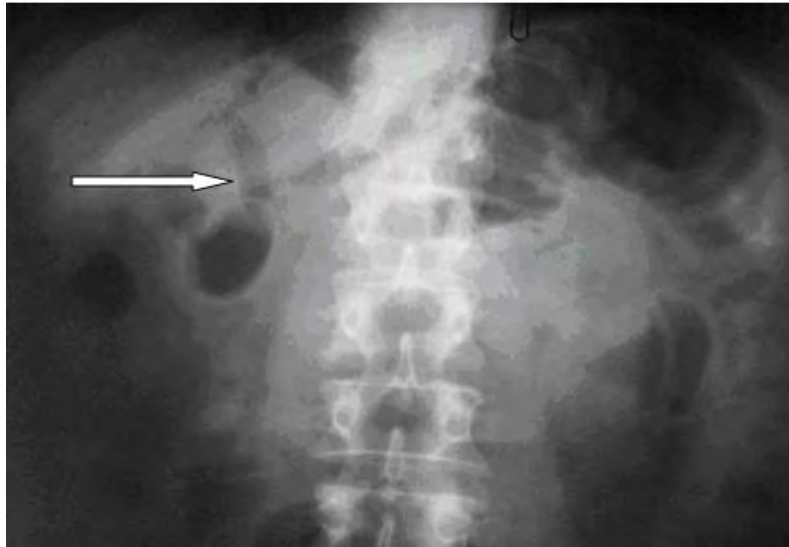
- Calcifications in right upper abdomen.
- Need to D/D gall stone, renal stone, fecal materials and pill capsule.
- Gall stone confirmed with sonography.

CBD stone (MRCP)



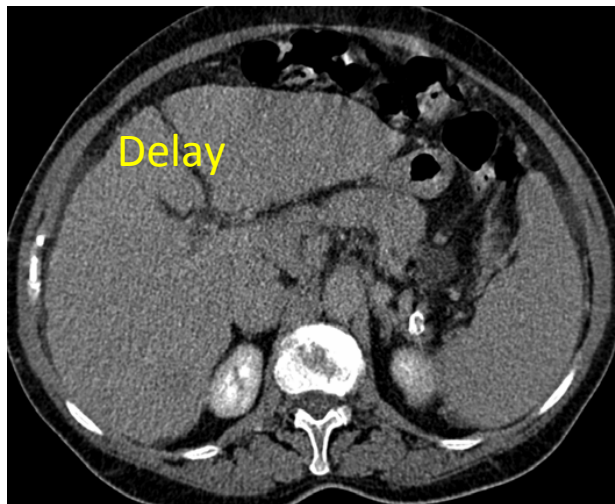
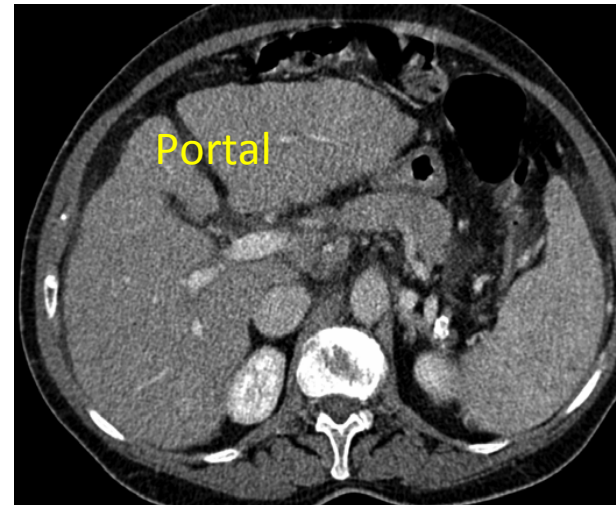
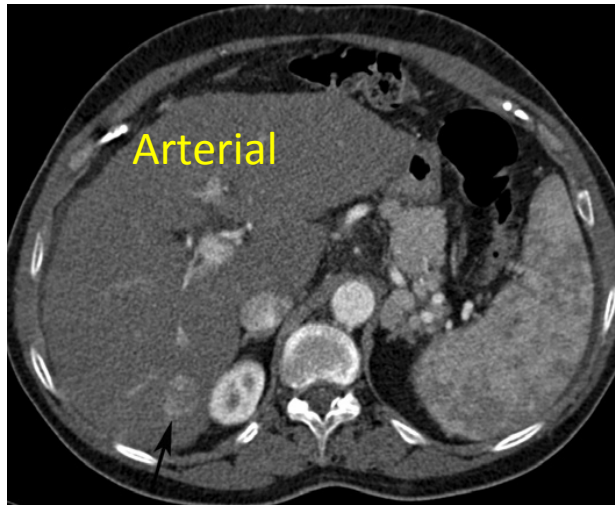
- MRCP
 - CBD stone, sensitivity 100%
 - CBD occlusion, accuracy 94%

Pneumobilia



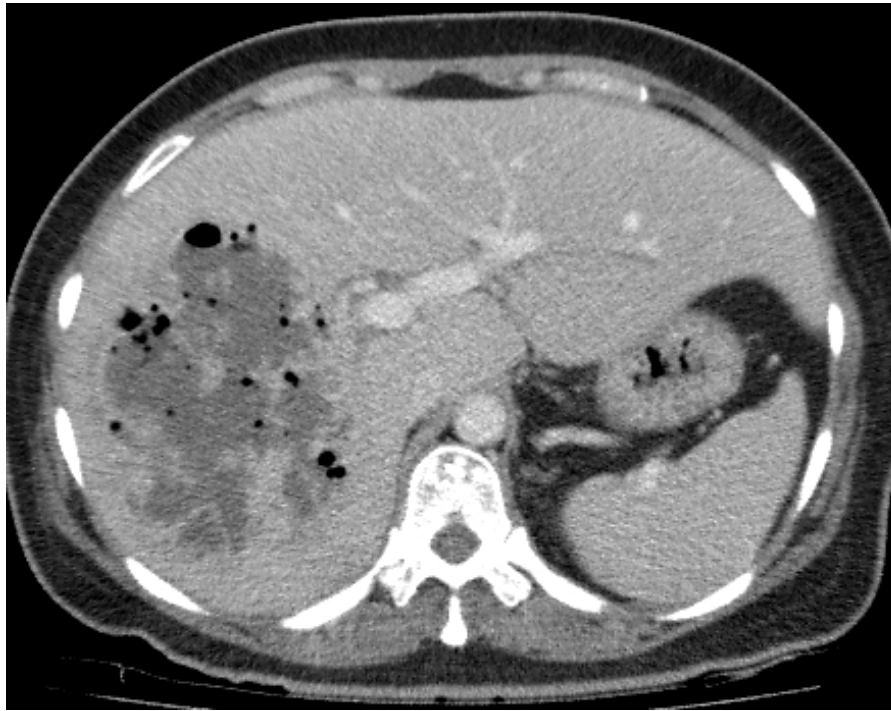
- Air collection in CBD after biliary stone retrieval with endoscope.
- Need to further evaluate the evidence of complication such as pneumoperitoneum to suggest hollow organ perforation.

Hepatocellular carcinoma



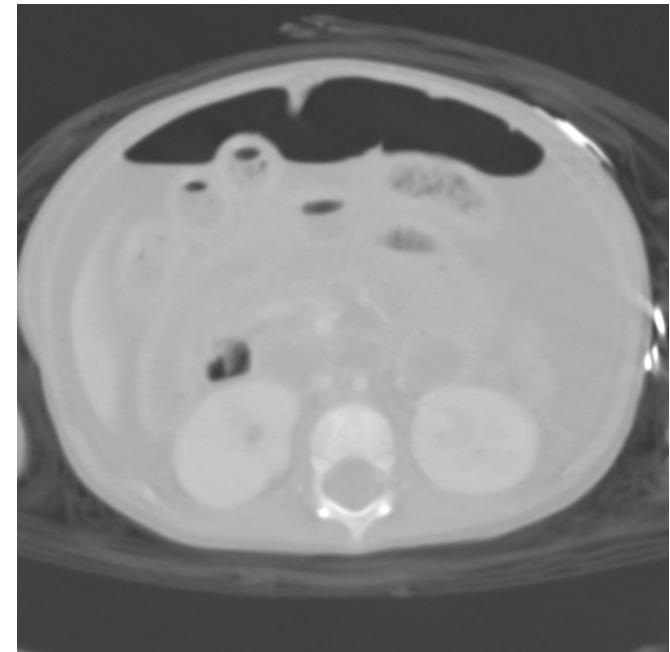
- CT detection sensitivities: 96% approximately
- Arterial enhancement pattern (approximately)
 - Hyperattenuating 53%
 - Mixed 38%
 - Hypoattenuating 9%

Pyogenic liver abscess



- Multilocular or multiseptated lesion, sometimes the margins are irregular
- May show a thin rim or septal enhancement
- May contain air density if it is of a gas-forming bacteria
- Can be treated with percutaneous catheter drainage

No1 : Pneumoperitoneum



- Causes : hollow organ perforation, trauma, recent surgery or laparoscopy, and infection of the peritoneal cavity with gas-producing organisms.
- Postoperative pneumoperitoneum usually resolves in 3 to 4 days.
- Best seen in the standing or sitting position.
- Left lateral decubitus may be used with very ill patients



Signs of pneumoperitoneum

- ▶ Double wall sign
- ▶ Football sign
- ▶ Inverted V sign
- ▶ Hepatic hyperlucency
- ▶ Doge's cap sign
- ▶ Outline of falciform ligament
- ▶ Depiction of diaphragmatic muscle slips

No 2: bowel obstruction



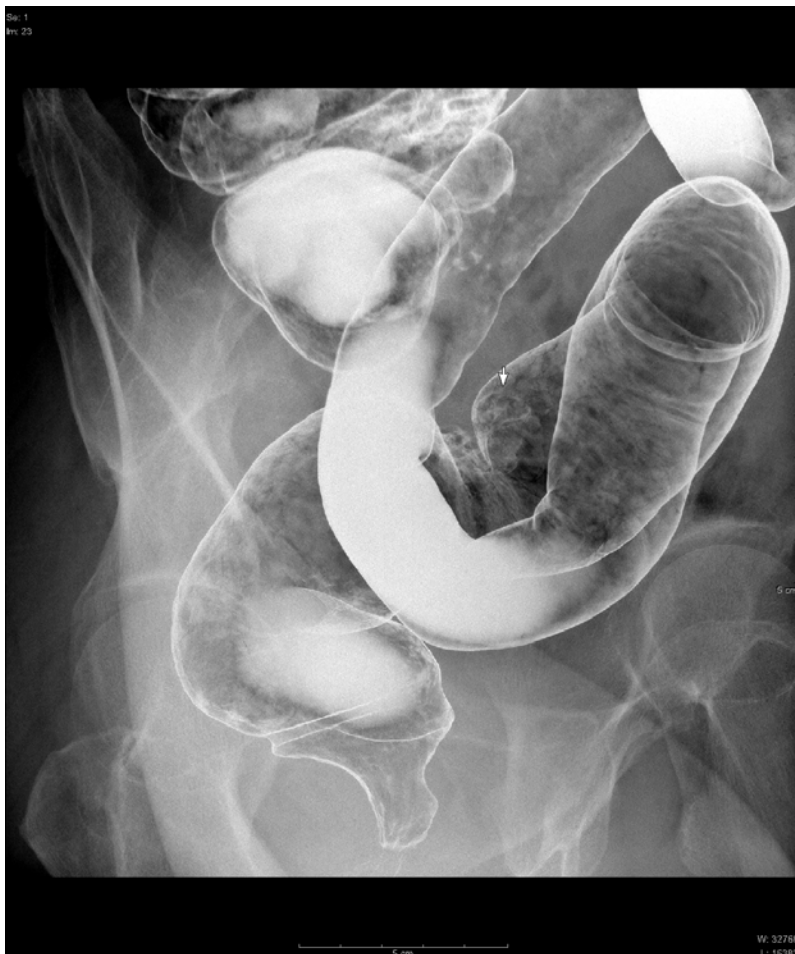
- 80% small bowel obstruction
20% large bowel obstruction
- Radiograph:
 - >3 distended small bowel loops >3 cm with gas-fluid levels
 - Size disparity between obstructed loops and contiguous bowel loops
 - small bowel positioned in center of abdomen
 - Paucity of colon content suggesting high grade obstruction

No 3: colon diverticulitis



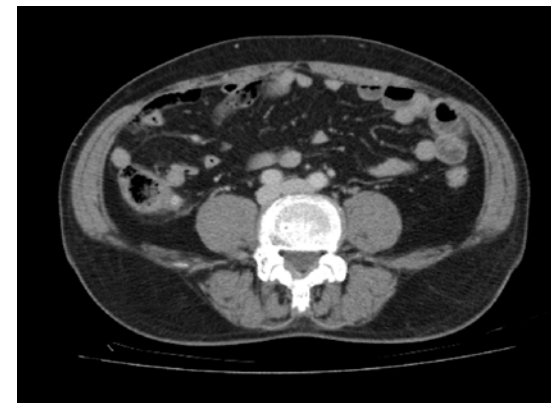
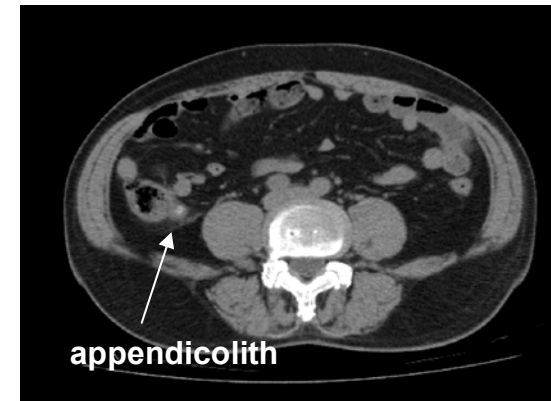
- Definition: inflammation of colon diverticulum
- Pathogenesis: fecal impaction at mouth of diverticulum
- *Location*: sigmoid colon (most)
- CT signs:
 - ✦ Pericolic fat stranding
 - ✦ Saccular outpouchings of colon
 - ✦ Bowel wall thickening:
 - ✦ Circumferential bowel wall thickening of >4 mm (70%)
 - ✦ Hyperemic, engorged vasa recta
 - ✦ Gas or thrombus in porto-mesenteric vessel
 - ✦ Signs of perforation
 - Frank abscess
 - Fluid $\pm$ air of peritonitis (16%)
 - ✦ Complication
 - Tract/Fistular formation

No 4: colon tumor



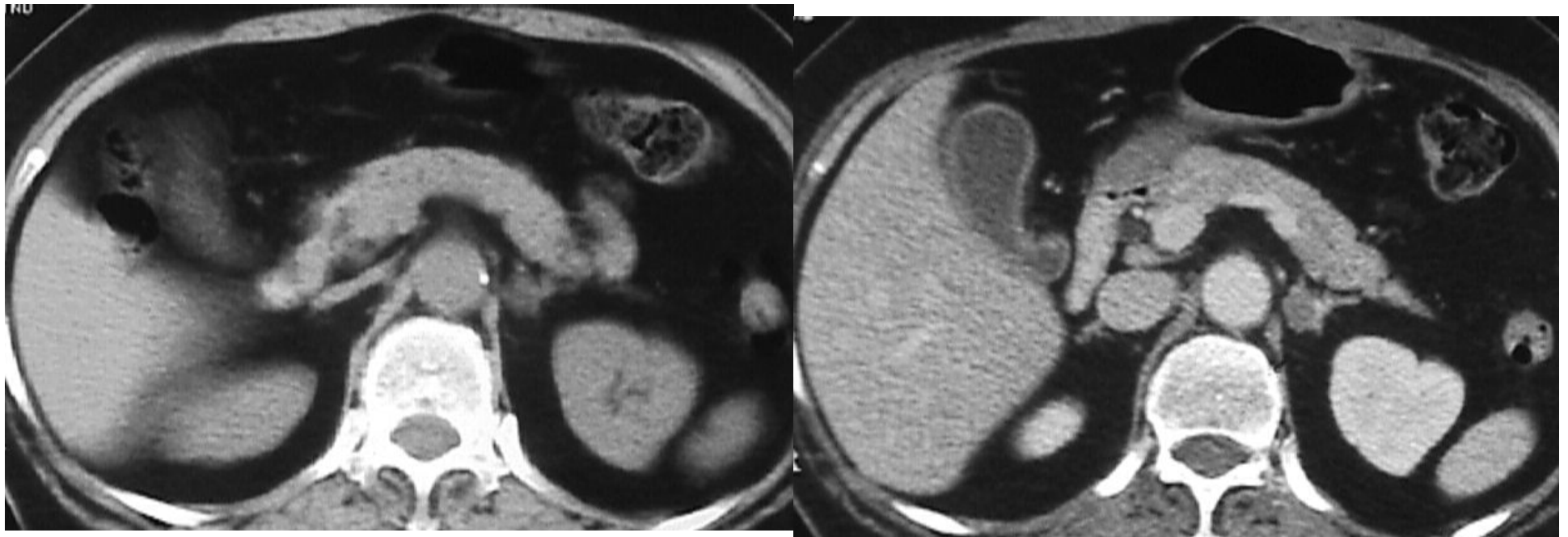
- Risk factor:
 - malignancy in 5% of tubular adenomas
 - malignancy in 30-40% of villous adenomas
- Location:
sigmoid>rectum>ascending>Transverse>RS
- Imaging findings.
 - Barium:
 - Protruding lesion with broad base
 - Short and thick polyp stalk
 - Irregular or lobulated head of polyp
 - CT
 - Short segment luminal wall thickening
 - Polypoid ->semi-annular->annular
 - Increased pericolic fat stranding

No 5: Acute appendicitis



- *Etiology:*
 - by lymphoid hyperplasia (60%), fecolith (33%), foreign bodies (4%), stricture, tumor, parasite; Crohn disease
- CT presentation:
 - ✓ Distended lumen >7 mm in diameter without/with appendicolith
 - ✓ Circumferential wall thickening
 - ✓ Prominent mural stratification
 - ✓ Periappendicular linear streaky densities
 - ✓ Adjacent reactive mesenteric lymphadenopathy
 - ✓ May induce terminal ileal wall thickening
 - ✓ Circumferential/focal cecal apical thickening
 - ✓ Funnel of contrast medium in cecum symmetrically centering about occluded orifice of appendix
 - ✓ Tip appendicitis = abnormal tip of appendix + normal proximal appendix free peritoneal fluid

F, 45 Y/O



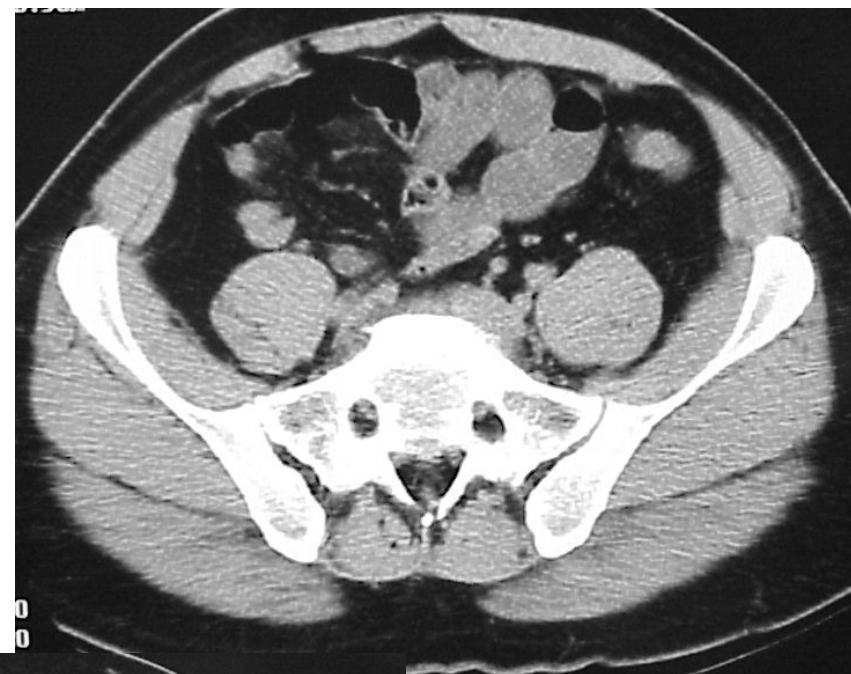
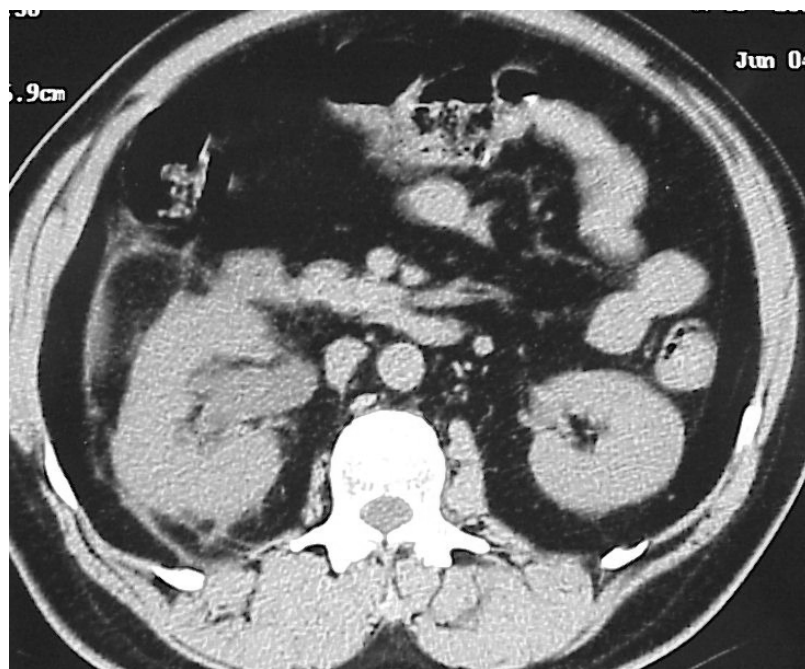
ADRENAL ADENOMA

- Could be an incidental findings on images when it is not functioning
- Usually appear as a low density nodule of adrenal limb on unenhanced CT
- After contrast enhancement, it usually has mild degree of homogenous enhancement.
- Its size are typically smaller than 4 cm.



PUTTY KIDNEY

- A characteristic imaging finding of renal TB
- Calcifications of the renal parenchyma with visible lobes distribution of the whole kidney
- In TB autonephrectomy state
- Could be differentiated from renal staghorn stones by the differences of locations and patterns of calcifications



URETERAL CALCULI

- Typically present with acute flank pain
- Nearly all are high density on unenhanced CT
- Could be radiolucent (thus undetectable) on plain radiographs of the kidney, ureter and bladder
- Usually with indirect signs (hydronephrosis, hydroureter, perinephric or periureteric stranding/fluid, nephromegaly, decreased parenchymal density)

Se: 重要影像
Im: 27

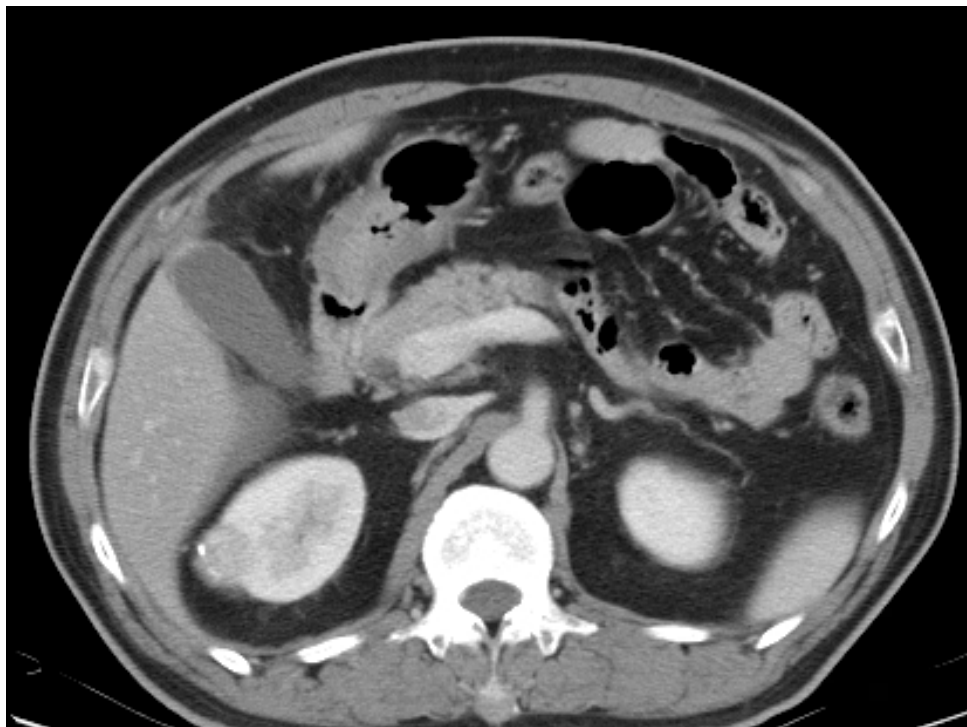


Se: 重要影像
Im: 24



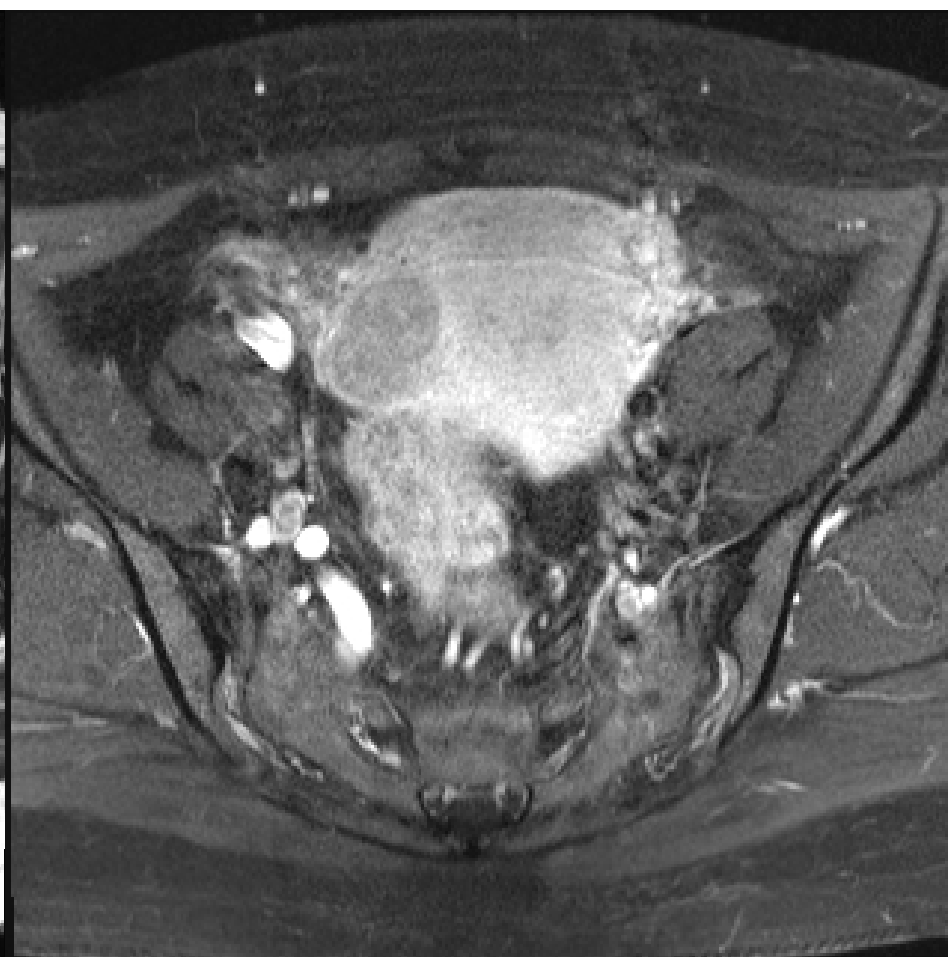
RENAL ANGIOMYOLIPOMAS

- Sporadic cases or associated with tuberous sclerosis complex
- Diagnosed by intra-tumoral fat of a renal parenchymal tumor on CT
- Spontaneous hemorrhage or hemorrhage after subtle trauma
- Transcatheter arterial embolization (TAE) could be used to stop tumor bleedings



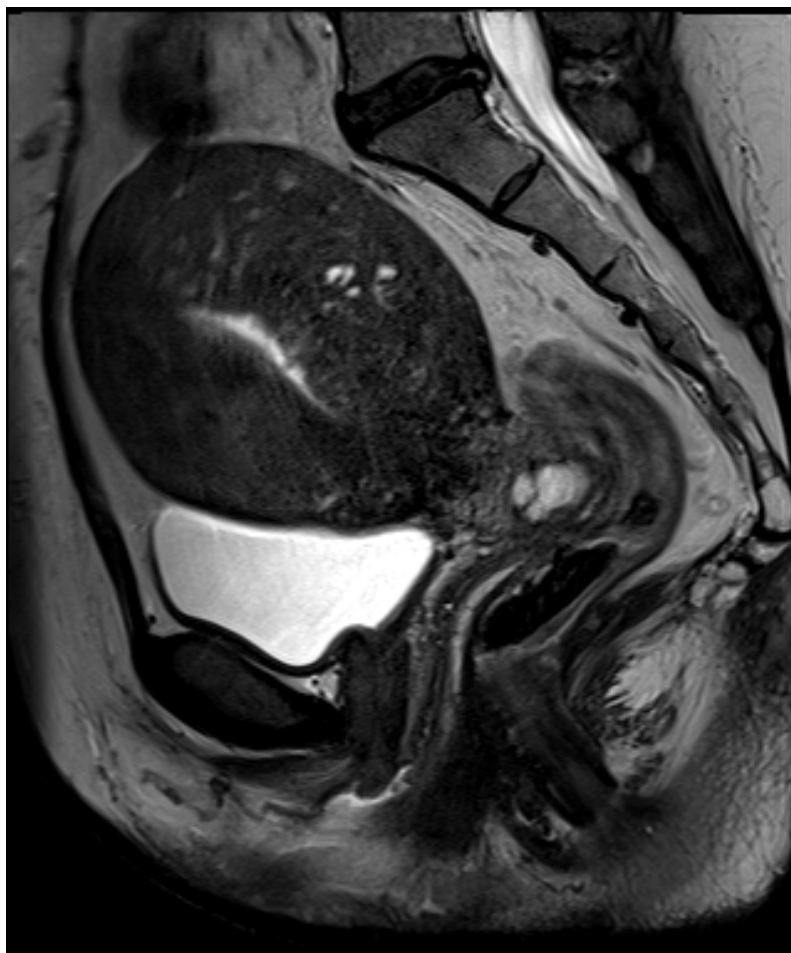
RENAL CELL CARCINOMAS

- The most common malignant tumor of the renal parenchyma
- Usually no fat in the tumor
- May have intratumoral calcifications, hemorrhage or necrosis
- Could be solid or cystic or mixed (solid and cystic)
- RCC is typically hypervascular; but RCC could be hypovascular
- Could have renal vein/IVC thrombosis of advanced stages



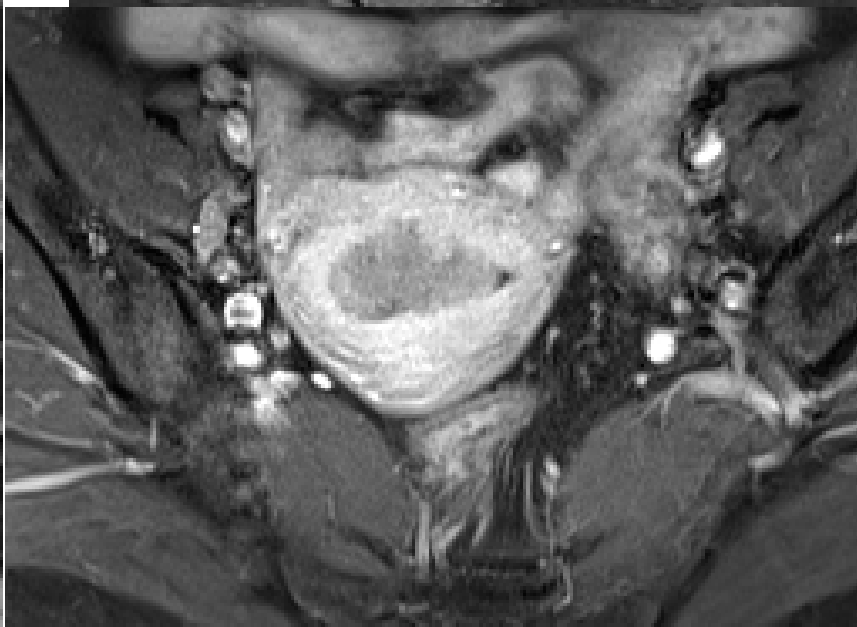
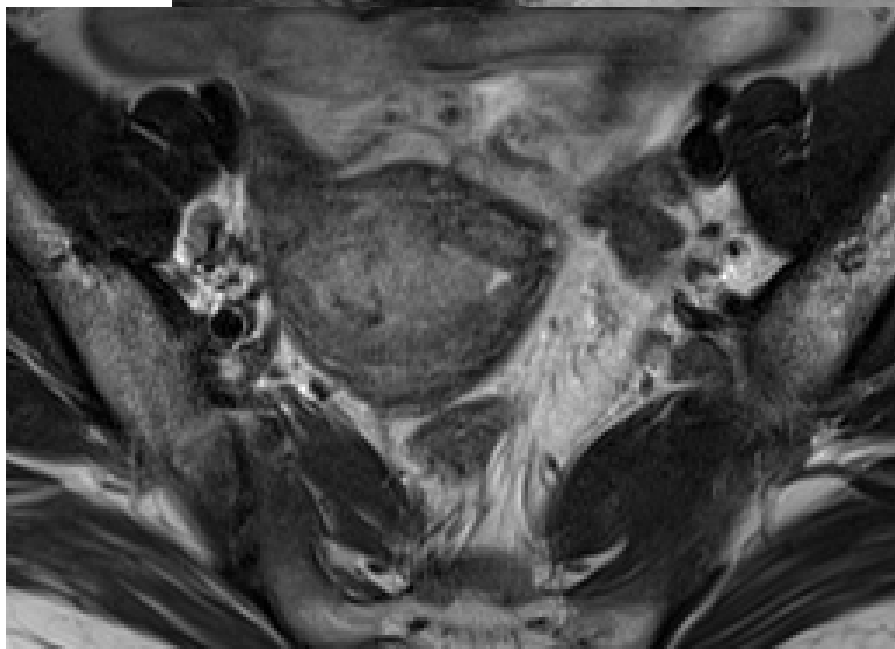
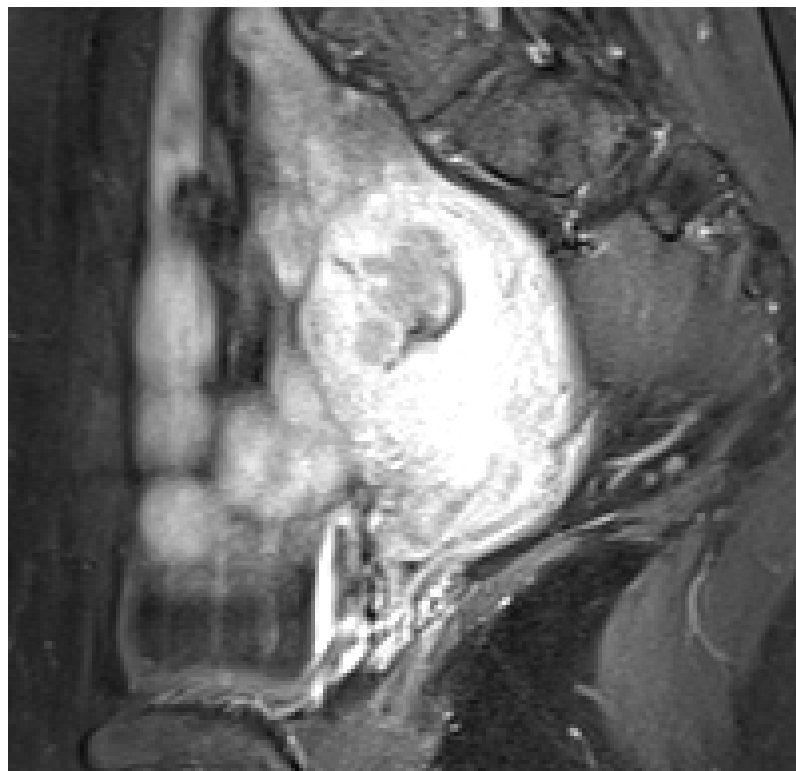
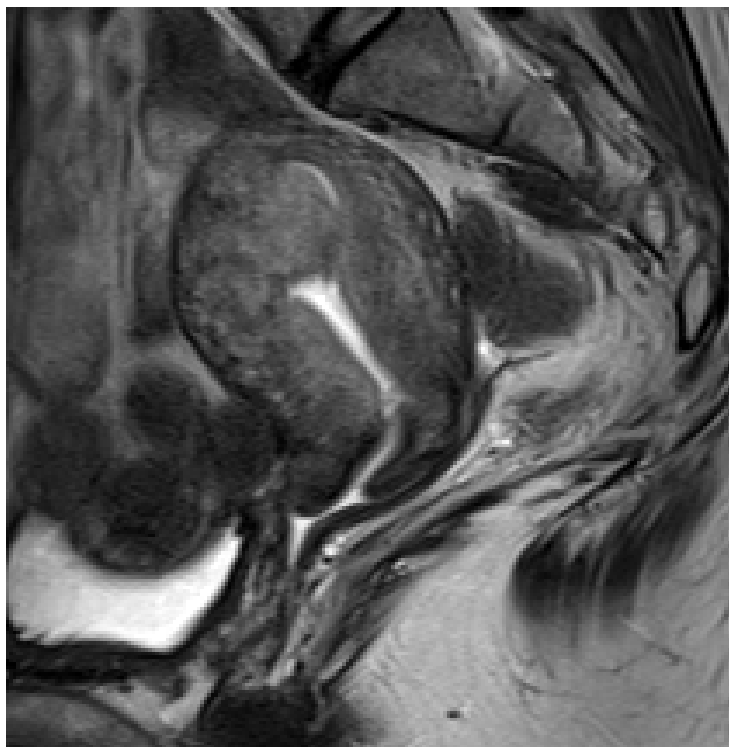
Uterine fibroids

- Image features:
 - usually indistinguishable from healthy myometrium on CT unless they are calcified or necrotic.
 - sharply marginated areas of low-to-intermediate signal intensity on T1- and T2-weighted MRI scans
 - cystic degeneration, calcification, fatty degeneration, sarcomatous degeneration or complicated with necrosis or hemorrhage
- DDx: uterine sarcoma



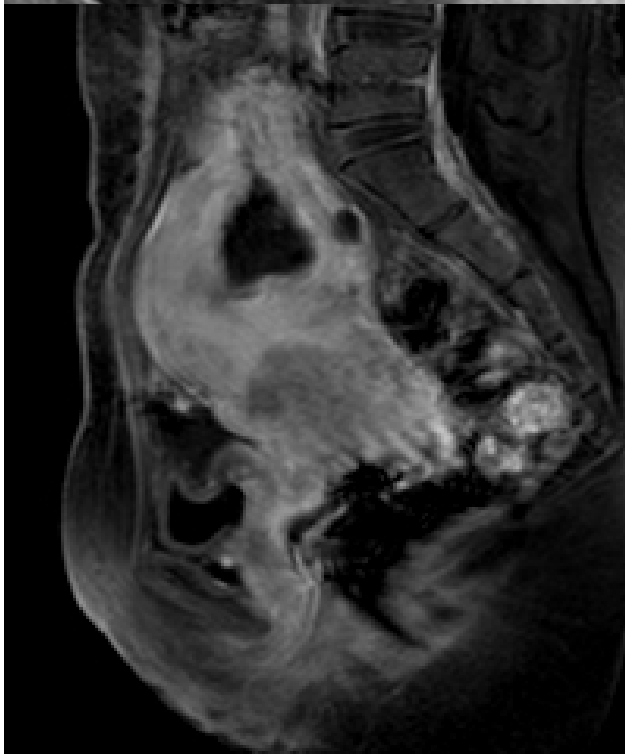
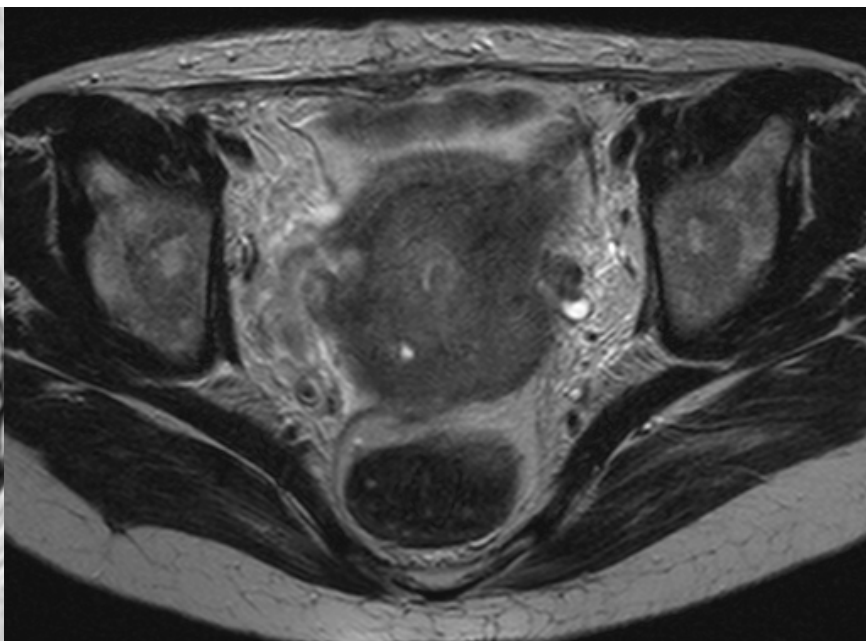
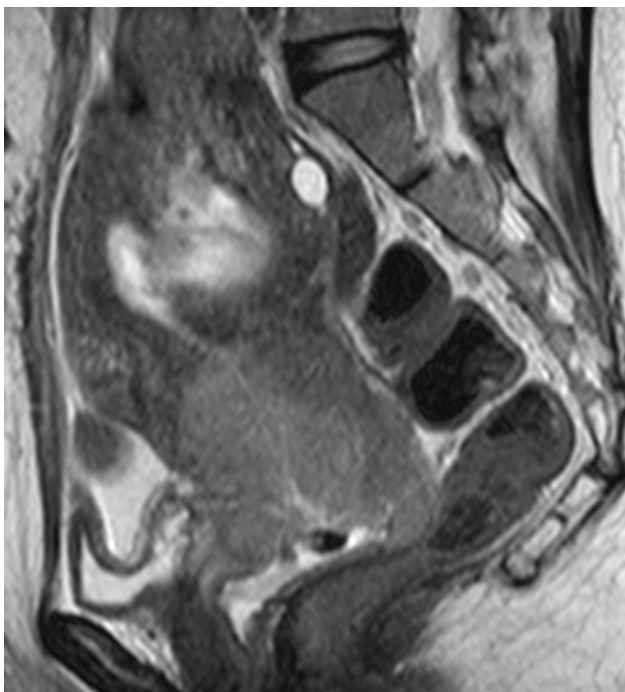
Adenomyosis

- Image features:
 - focal or diffuse thickening of the junctional zone of the myometrium with scattered foci of high signal in involved areas
 - poor definition and ill-defined margination differentiate adenomyosis from leiomyomas
- DDx: leiomyoma, endometrial cancer.



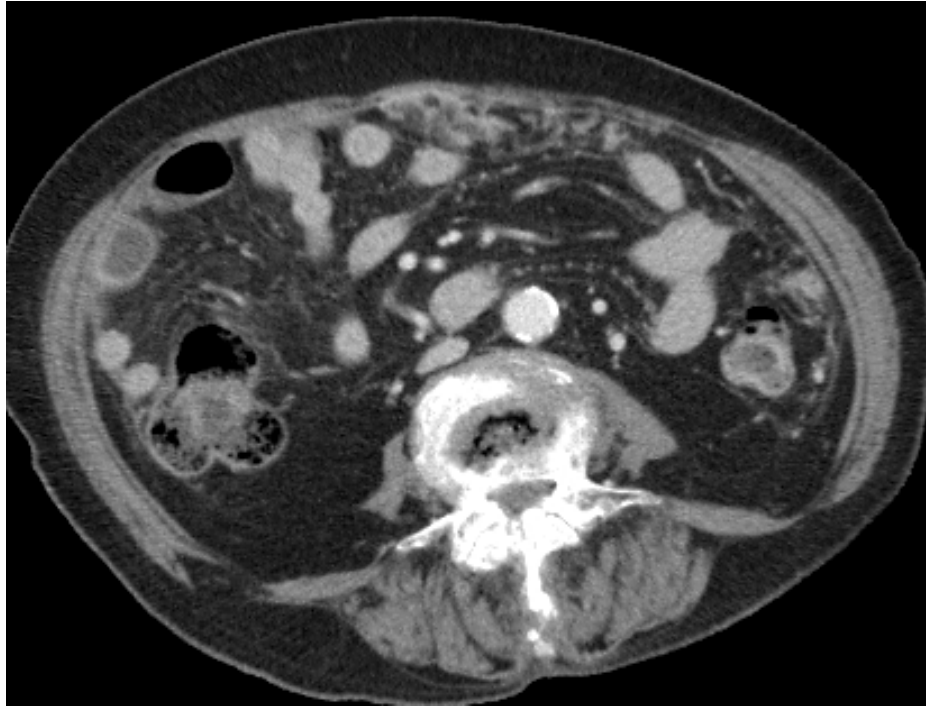
Endometrial cancer

- Image features
 - Asymmetric endometrial thickening, lobulated soft tissue, infiltrative or irregular tumor islands along endometrium.
 - T2W hyperintensity, may invade through junctional zone, deep into myometrium, inferior extension to cervical canal or stroma, LN or ovarian metastases.
 - Contrast enhanced T1W images provide better delineation of tumor extension.
- DDx: endometrial polyps, hyperplasia, submucosal myoma, endometrial stromal sarcoma



Cervical cancer

- Image features:
 - cervical mass of intermediate signal intensity at T2W imaging
 - may be more readily identified by their early enhancement after dynamic injection
 - invasion of cervical stroma, uterine corpus, parametrium, vagina, sidewall and adjacent organs
 - regional nodal metastasis
- DDx: endometrial cancer, cervical myoma



Ovarian cancer

- Image features
 - size greater than 4cm
 - Irregular or large solid components
 - Thick (>3mm) septations
 - Evidence of peritoneal, lymphatic or hematogenous spread, or local invasion
- DDx: Krukenberg's tumor

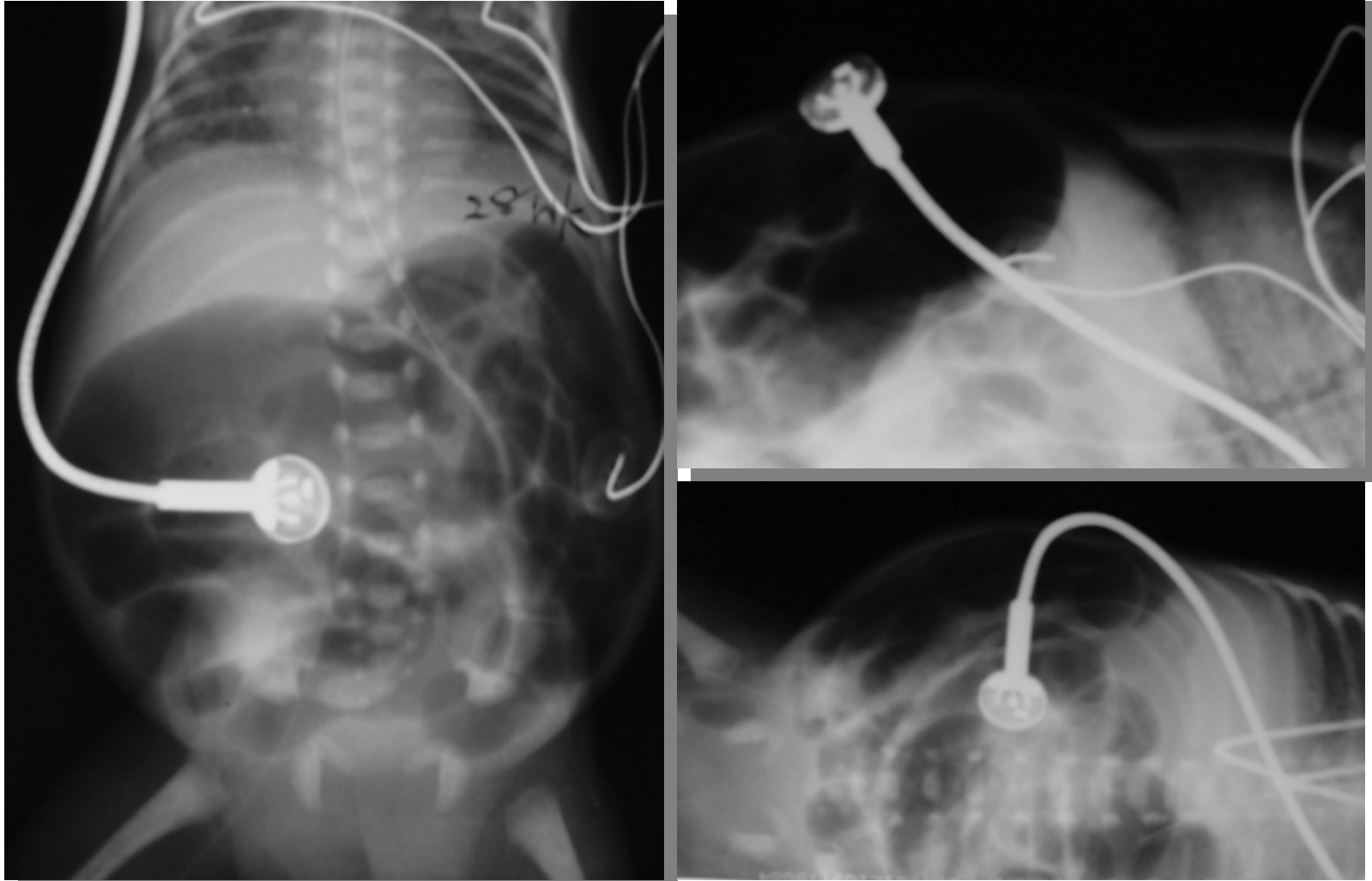
Pneumonia



Pneumonia

- Typically, lung opacity $\pm$ air bronchogram, may progress to lobar pneumonia
- Not associated with volume loss
- Round pneumonia, round opacity with well defined borders in a child less than 8 years
- Streptococcal pneumonia infection, most common
- F/U CXR to document resolution following therapy
- Differential diagnosis
atelectasis, aspiration pneumonia, bronchogenic cyst, neuroblastoma

Pneumoperitoneum: supine cross-table & decubitus views

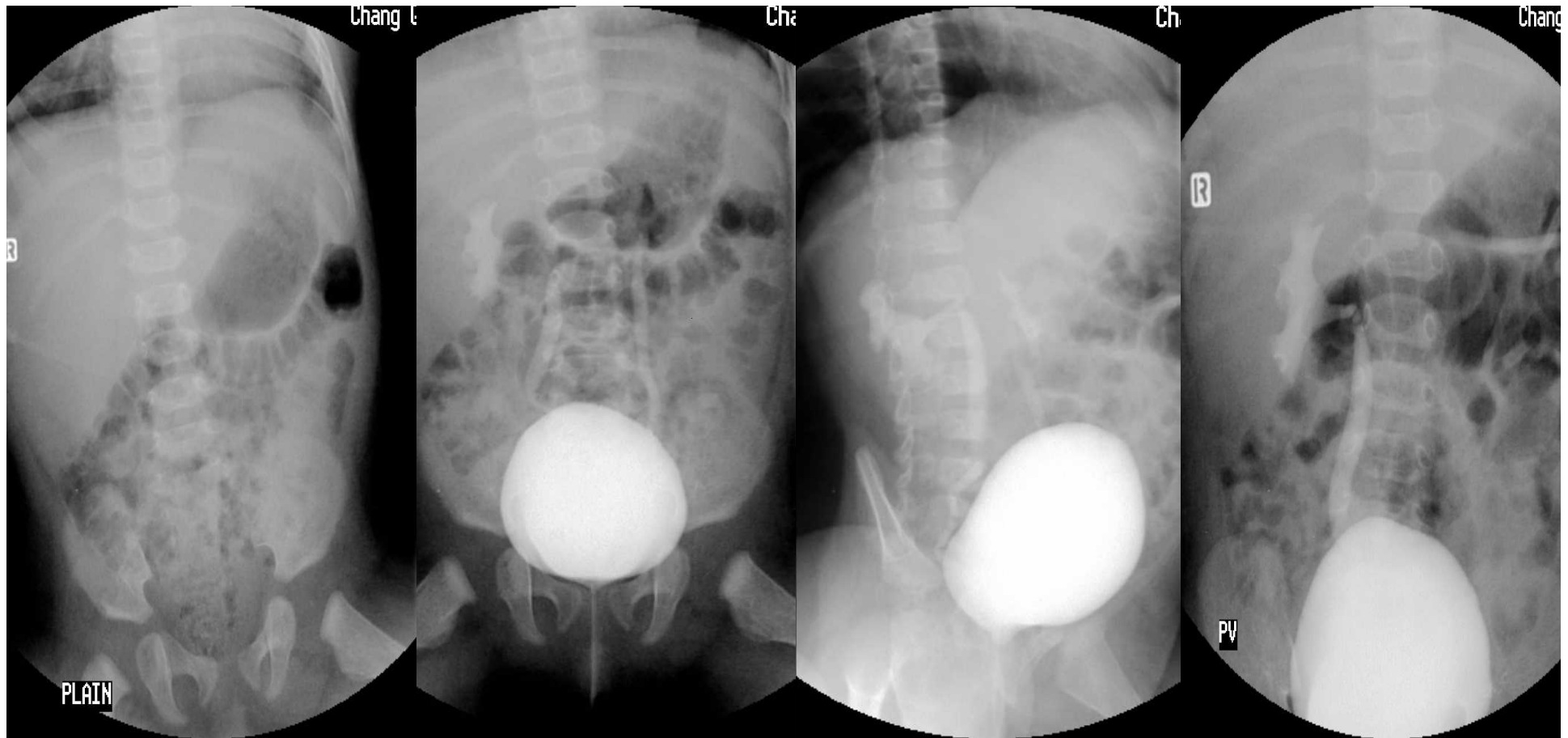


Necrotizing enterocolitis (NEC) with perforation

Pneumoperitoneum

- Left lateral decubitus and cross table lateral views are most sensitive radiographic views; CT is the most sensitive modality.
- Football sign, falciform ligament sign, air under diaphragm, triangular lucency, liver lucent sign, double wall sign
- Differential diagnosis
postoperative, NEC, bowel perforation (traumatic bowel injury, iatrogenic, infection, distal bowel obstruction, perforated peptic ulcer, spontaneous gastric perforation, dissection from pneumothorax or pneumomediastinum, rare in ruptured appendicitis)

4 M/O female infant has UTI

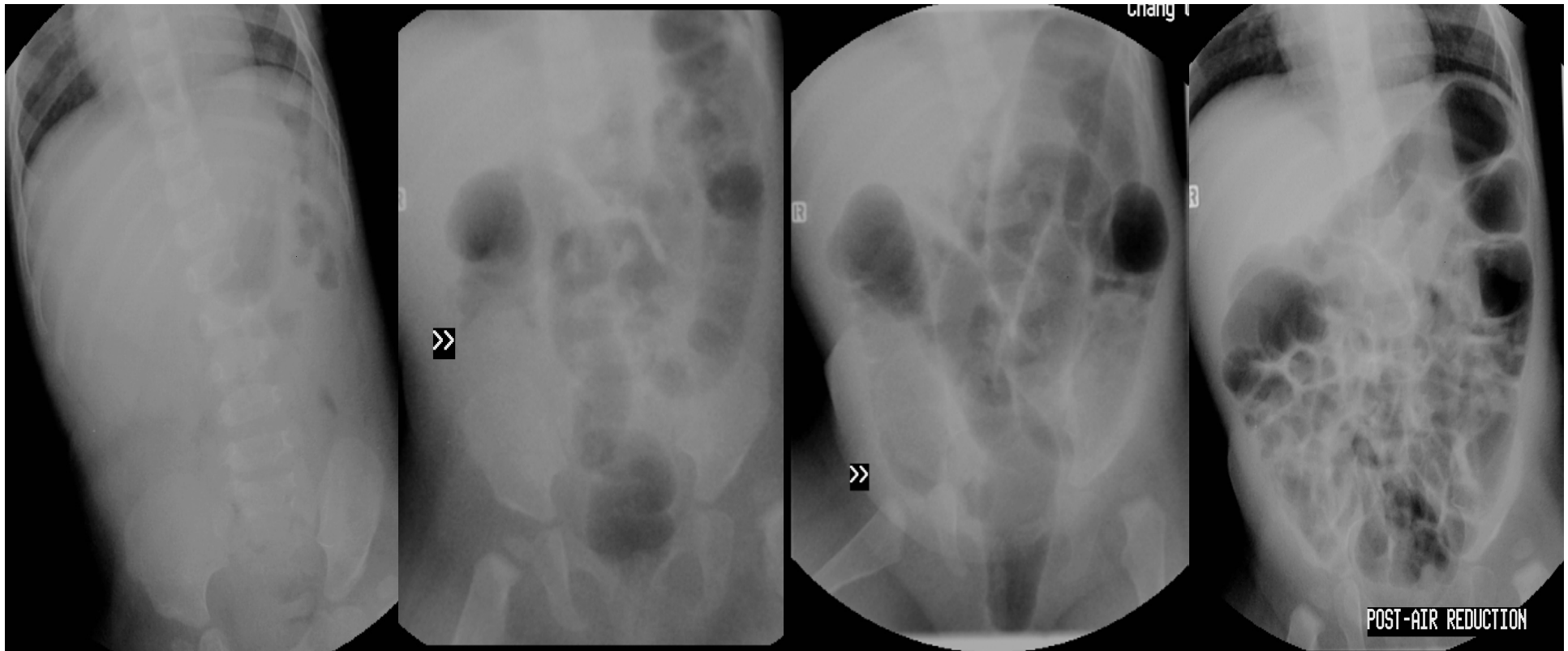


VCUG : bilateral VUR, right grade III, left grade II

VCUG

- VCUG should be performed after a first UTI in boys and girls and generally after the bladder infection is treated.
- VUR occurs either primarily or secondary.
- Primary reflux is due to immaturity or abnormality of the VU junction, which allows urine to ascend into the ureter during bladder filling or voiding.

A 8M/O female infant has abd pain

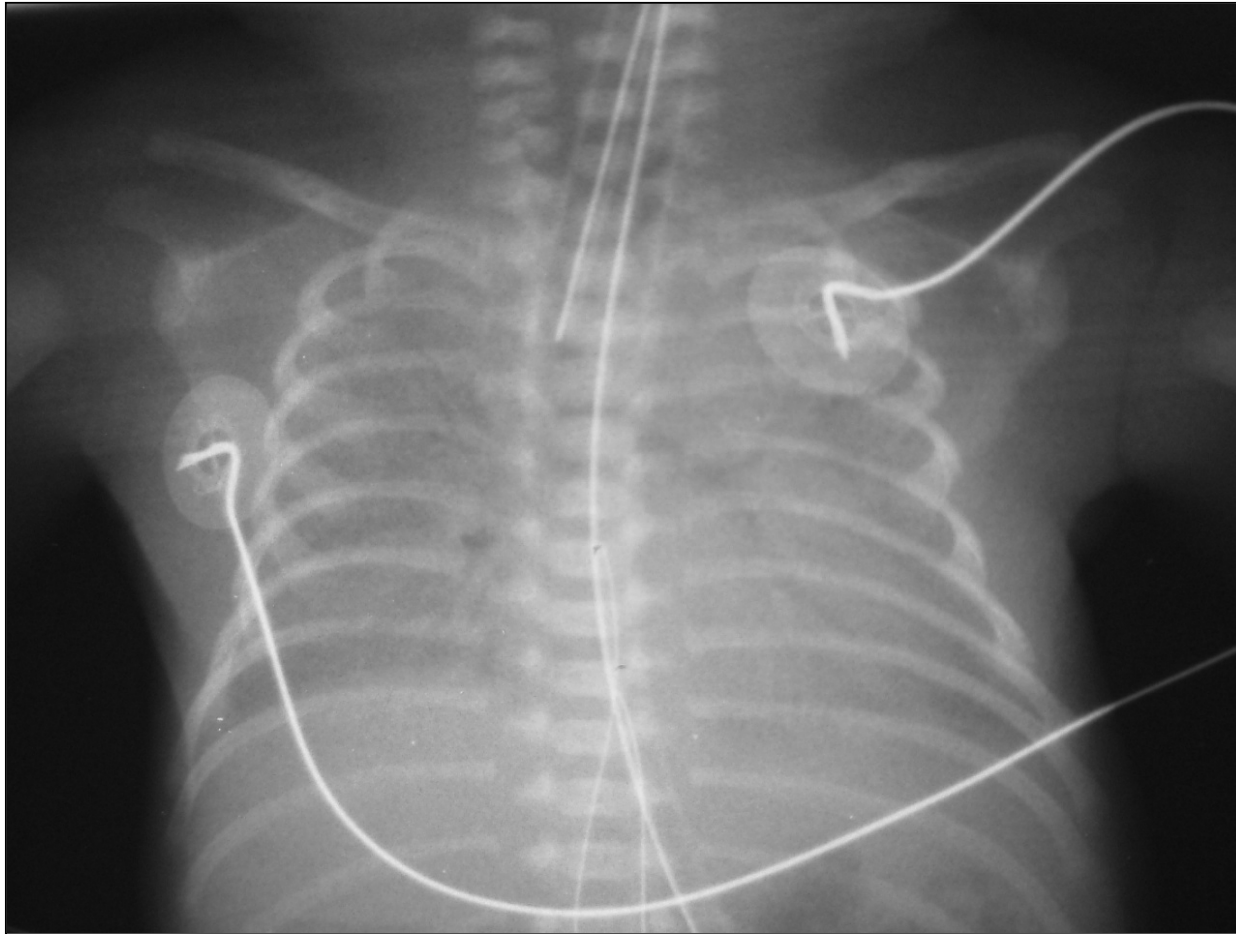


Intussusception with successful air reduction

Intussusception

- Intussusception is a condition in which a proximal portion of the bowel (intussusceptum) telescopes into the adjacent distal bowel (intussusciens).
- In most cases is idiopathic and ileocolic type.
- Treated by air enema with fluoroscopic guidance.
- If a successful air reduction with air contrast must reflux into multiple loops of small bowel.

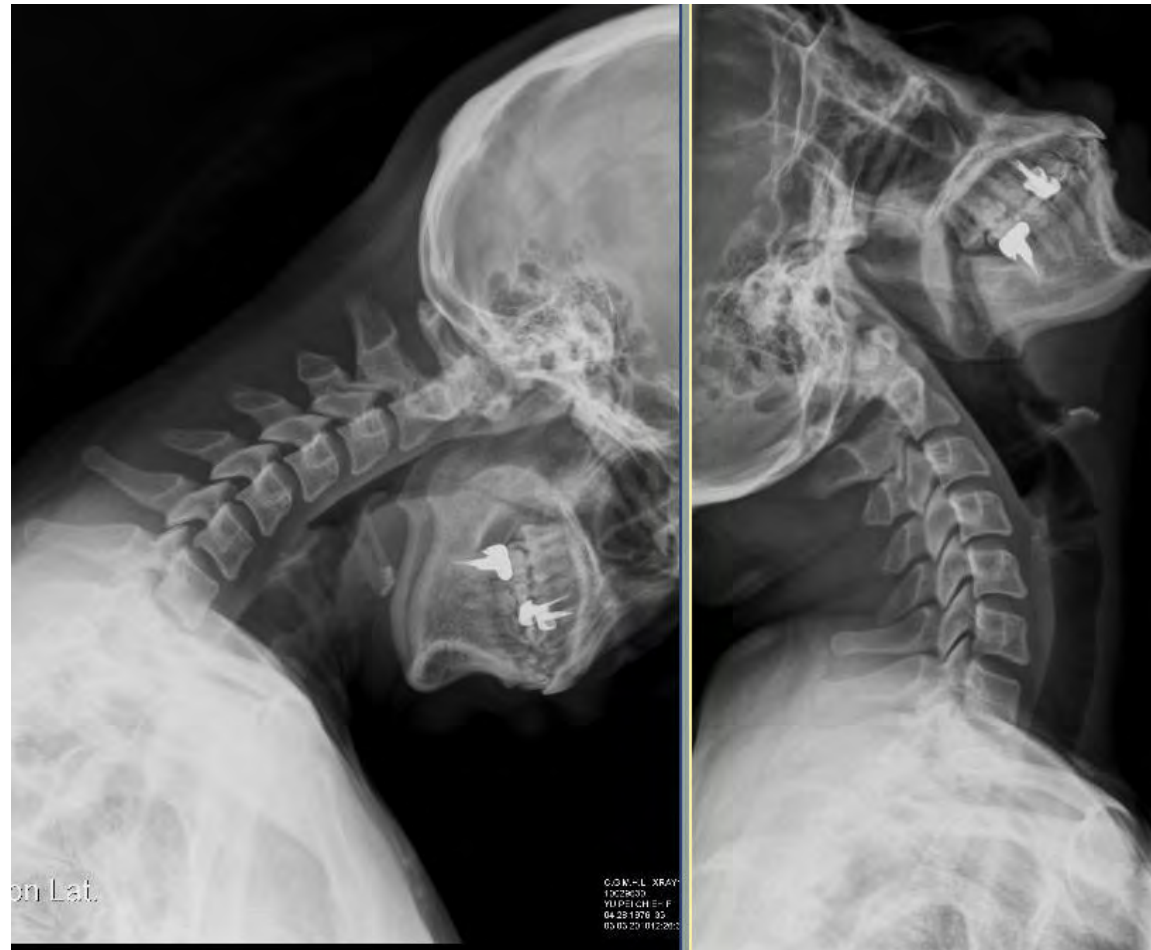
Premature baby with RDS:



Respiratory distress syndrome (RDS)

- RDS is a syndrome of premature infants, usually born at less than 36 weeks of gestation, that occurs as a result of surfactant deficiency from underdeveloped type II pneumocytes.
- The resulting radiographic appearance is a diffuse, symmetric ground-glass appearance to the lung parenchyma with low lung volumes.

Case 1



Case 1:C1-2 subluxation



Case 2



Case 2: Spondylolisthesis



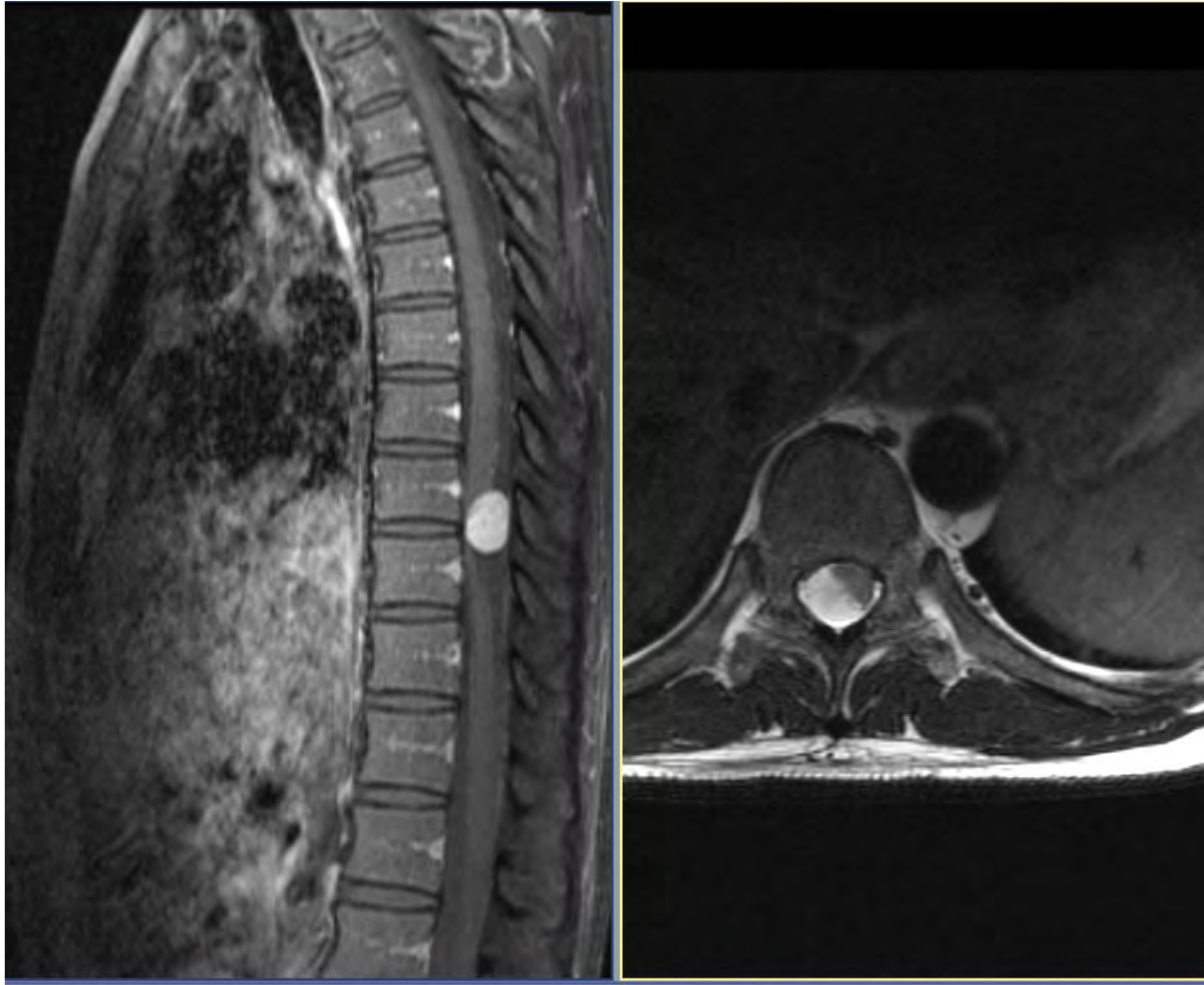
Case 3



Case 3

- Multiple osteoporotic compression fracture, T8, T10, T12 & L1.
- Vacuum phenomena within discs
- Osteonecrosis of T10 body
- Spondylolisthesis of L4 on L5, S/P posterior laminectomy, transpedicular screws fixation and posterolateral fusion.

Case 4



Case 4

- Dx: T-spine meningioma
- Intradural extramedullary location
- No widening of neuroforamen

Case 5



Case 5

- Dx: Infectious spondylitis, L3 to L5.
- Osteomyelitis of L3, L4 and L5 bodies.
- Discitis
- Paraspinal soft tissue swelling
- Epidural abscesses formation