

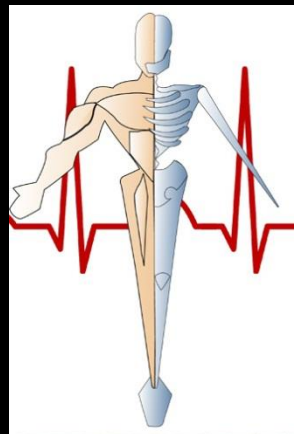
Three Phase CEUs Presents:

*Fundamentals of Radiographic  
Pathology ©*

‘Mastery Test’

by

John Fleming, M.Ed., RT(R)(MR)(CT)



Please scroll down to proceed.

# Forward:

The premise behind the creation of this tutorial is to provide imaging professionals with access to high quality yet affordable continuing education.

Our courses qualify as Category A (technical) points for the following: all ARRT recognized imaging modalities, ARRT-CQR, FDOH-Bureau of Radiation Control, NMTCB, and RCIS.

**According to the ARRT, a current license as a general radiographer with the FDOH is required to qualify to complete this course.**  
*This rule does not apply to either the NMTCB or RCIS credentials.*

**Please scroll down to proceed.**

# Payment Methods:

1. Venmo: @John-Fleming-Three-Phase-CEUs (press to copy & paste)
2. Cash App: \$ThreePhaseCEUs (press to copy & paste)
3. Zelle: (727) 744-7946
4. Apple Pay: (727) 744-7946
5. PayPal: (727) 744-7946
6. Check: please make your check payable to, “Three Phase CEUs” and return it along with your answer sheet to the address below.

Three Phase CEUs  
c/o John Fleming  
80 Bay Woods Drive  
Safety Harbor, FL 34695

Text John Fleming at (727) 744-7946 for our current prices.

Please scroll down to proceed.

# Question #1:

Which of the following terms refers to a condition that is marked by an abnormal disturbance in the function and or structure of the human body as the result of some type of injury or trauma?

- a. disease
- b. pathology
- c. pathogenesis
- d. etiology

# Question #1: Review

- Simply put, pathology is the study of disease.
- **Disease** is a term that literally refers to a lack of “ease.”
- It is a condition that is marked by an abnormal disturbance in the function and or structure of the human body as the result of some type of injury or trauma.

# Question #2:

Which of the following is not an example of an inflammatory reaction?

- a. abscess
- b. ulcer
- c. cellulitis
- d. ischemia

# Question #2: Review

- Three Types of Inflammatory Reactions:

## Abscess

- This type of inflammatory reaction causes the injurious agent to become a walled-off ball of pus.

## Ulcers

- This is another type of inflammatory reaction that is the result of a healing wound that is located on the skin or a mucous membrane

## Cellulitis

- This is an acute bacterial infection of the skin and is a third example of an inflammatory reaction.
- It can be found anywhere in the body, but it is more often seen in areas where the skin can be damaged and thus allow a portal of entry for bacteria.

# Question #3:

Which of the following is not a cardinal sign of inflammation?

- a. pain
- b. redness
- c. cyanosis
- d. heat

# Question #3: Review

- Inflammation refers to the body's ability to wall-off and sequester an injurious agent.
- The ultimate goal of this process is the safe removal of said injurious agents.
- Hyperemia is the process of dilating capillaries to allow fluids and leucocytes to infiltrate the infected area.
- The leucocytes will act to remove cellular debris through a process known as phagocytosis.
- The cardinal signs of inflammation include heat (results from hyperemia), redness, pain, and often a decrease in function.

# Question #4:

The inability of an organ or structure to form properly is called:

- a. aplasia.
- b. atrophy.
- c. hypertrophy.
- d. ischemia.

# Question #4: Review

- Aplasia is the inability of an organ or structure to form properly.
- The defective development of an organ can result in the partial or complete loss of an organ.

# Question #5:

An abnormal proliferation of foreign cells that forms a mass of tissue within an organ or structure is called:

- a. edema.
- b. transudate.
- c. cachexia.
- d. neoplasm.

# Question #5: Review

- A neoplasm is the abnormal proliferation of foreign cells that form a mass of tissue within an organ or structure.
- A neoplasm will compete for nutrients from the cells that normally comprise the host organ and it is often referred to as a mass or tumor.
- Oncology is the study of neoplasms.
- A benign neoplasm is one that is self-limited and will not spread or seed to distant sites within the host organism.
- A malignant neoplasm (cancer), on the other hand, does possess the ability to spread to distant sites in the body.

This type of tumor will seed by employing either the lymphatic system (primary method) or by using the circulatory system (hematogenous spread).

# Question #6:

Cancer of the blood and blood forming tissues is known as:

- a. lymphoma.
- b. leukemia.
- c. adenocarcinoma.
- d. sarcoma.

# Question #6: Review

- Four major cancer categories are as follows:
  1. Carcinoma/Adenocarcinoma
    - This type of cancer will arise from epithelial cells or tissues such as the breast, colon, or pancreas.
  2. Sarcoma
    - Relatively rare but highly malignant.
    - This is cancer of soft tissue or connective tissue such as bone, cartilage, muscle, and fat.
  3. Leukemia
    - This is cancer of the blood and blood forming tissues.
  4. Lymphoma
    - This type of cancer originates in lymphatic tissues and affects the production of lymphocytes (white blood cells).

# Question #7:

The most likely cause of the infection (arrows) located on this lateral of the foot would be:

- a. virus.
- b. parasite.
- c. bacteria.
- d. none of the above



# Question #7: Review

The arrows on this image are pointing to an area where the excrement of a **bacterial infection** has resulted in the formation of air within the tissue of this patient's foot. This is an indication of cellulitis.



# Question #8:

All of the following would be an example of a sign (as opposed to a symptom) except:

- a. skin rash.
- b. edema.
- c. headache.
- d. cyanosis.

# Question #8: Review

- The study of the origin and development of a disease.
- Pathogenesis will lead to observable changes that are known as manifestations.

## Sign

- This is a manifestation that is observable by the health care worker.
- Examples would be edema, cyanosis, or a skin rash.

## Symptom

- This pertains to the patient's perception of what is wrong and is subjective.
- An example would be a headache.

# Question #9:

The understanding that there may be no real underlying cause for a disease is referred to as:

- a. idiopathic.
- b. etiology.
- c. syndrome.
- d. pathology.

# Question #9: Review

- Idiopathic

This refers to the fact that there may be no real cause for the disease.

Examples would be hypertension and a spontaneous pneumothorax.

# Question #10:

Atrophy refers to a decrease in size of cells within an organ or structure. Which of the following would **not** be an underlying cause of atrophy?

- a. nerve damage
- b. increase in physical activity
- c. poor nourishment
- d. poor circulation

# Question #10: Review

- Atrophy is the decrease in size of the cells within an organ or structure.
- The following is a list of some of the common causes of atrophy:
  - Lack of Physical Activity
  - Poor Nourishment
  - Nerve Damage
  - Poor Circulation

# Question #11:

The most likely cause of the deformity found on this radiograph would be:

- a. osteomyelitis.
- b. osteopetrosis.
- c. Osgood-Schlatter disease.
- d. osteogenesis imperfecta.



# Question #11: Review

- Osteogenesis Imperfecta is a relatively rare congenital bone disorder that is characterized by bones that easily break.

This condition is sometimes referred to as “brittle bone” disease.

- People with this OI are born with insufficient amounts of a protein called type I collagen which plays an important role in bone formation.

This collagen deficiency will result in osteopenia which is a decrease in the number of osteocytes.

The net result is the formation of fragile or severely deformed bones.

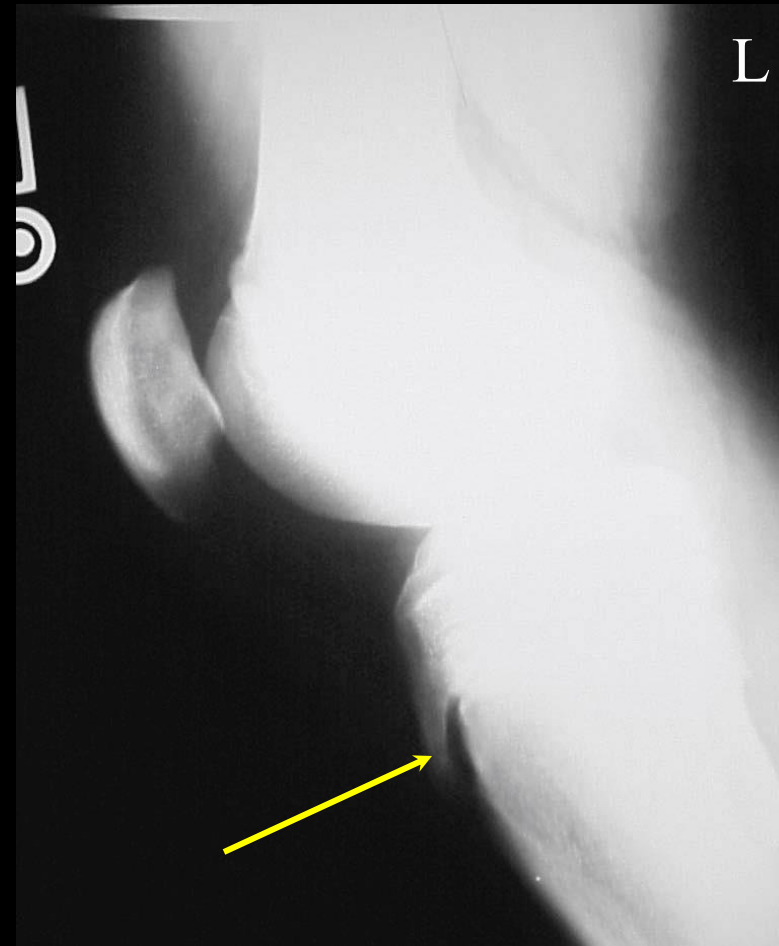
- In severe cases, multiple fractures can form while the fetus is in the womb.

As a result, many infants are stillborn or die shortly after birth.

# Question #12:

The most likely cause of the deformity found on this radiograph would be:

- a. Osgood-Schlatter disease.
- b. Paget's Disease.
- c. osteopoikilosis.
- d. avascular necrosis.



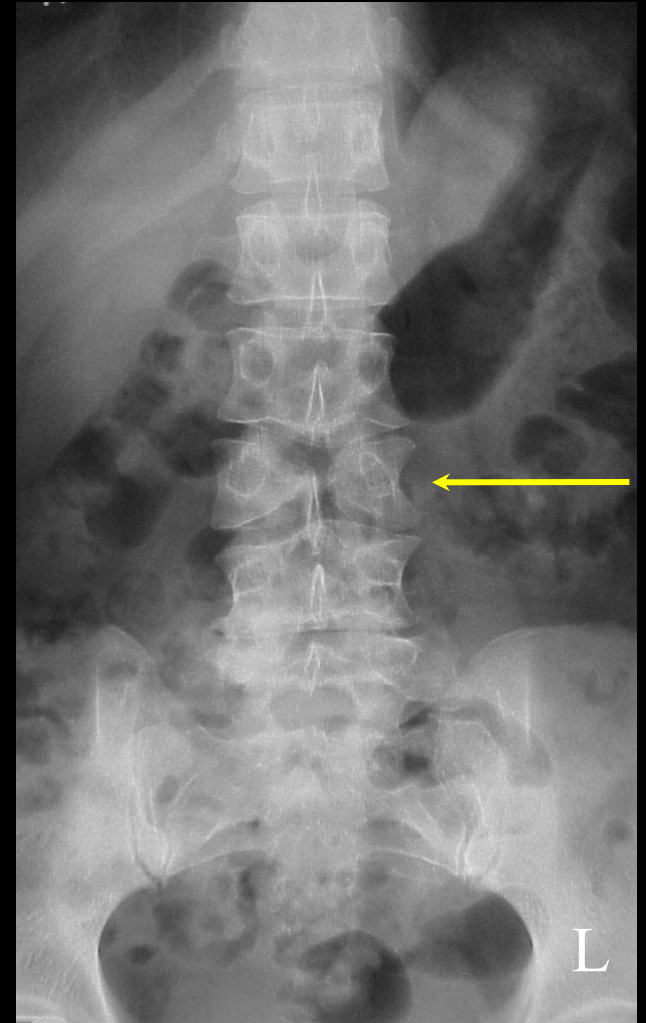
# Question #12: Review

- Osgood-Schlatter disease is one of the most common causes of knee pain in young athletes.
- This disease mainly affects boys ages 10 to 16.
- It is a condition where the tibial tuberosity becomes inflamed following exercise.
- Treatment primarily consists of rest.

# Question #13:

The most likely cause of the deformity found on this radiograph would be:

- a. spina bifida.
- b. butterfly vertebra.
- c. spondylosis.
- d. spondylolisthesis.



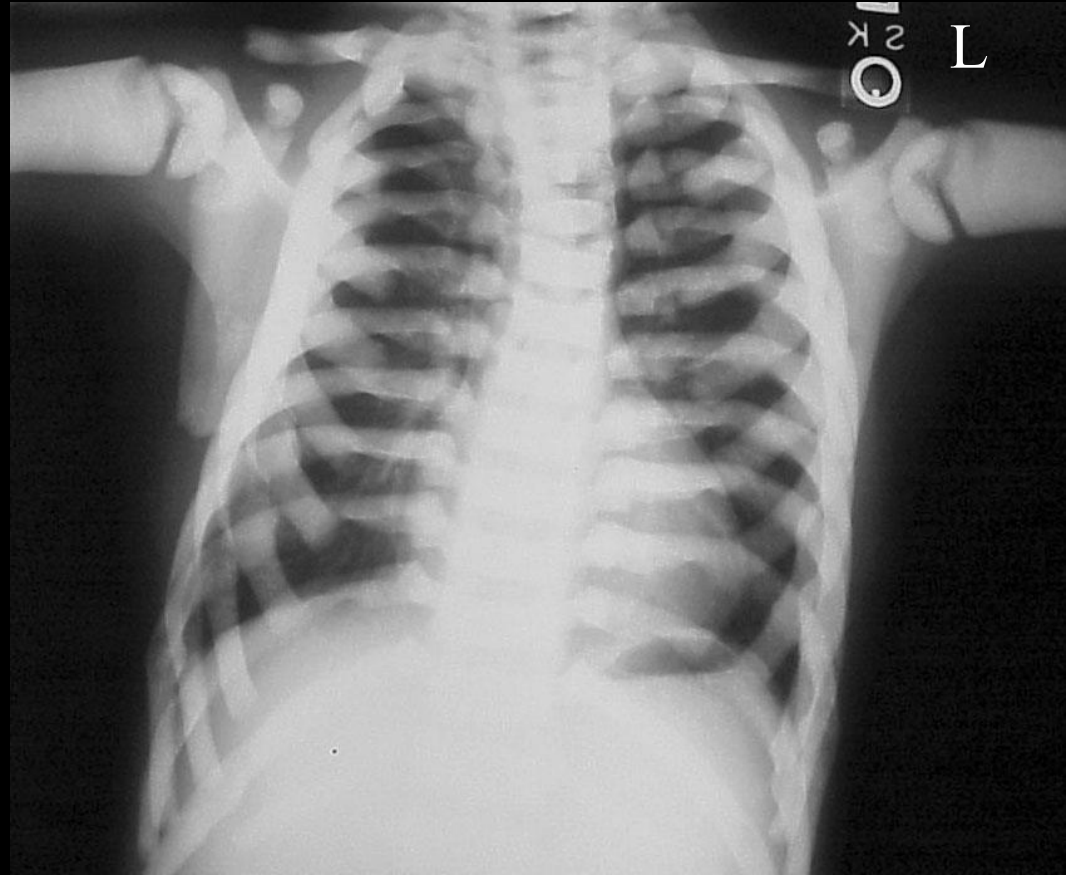
# Question #13: Review

- A butterfly vertebra is a congenital defect of a vertebra that produces the radiographic appearance of a butterfly on an AP projection.
- Most are of no significance, but they do have the potential for causing instability or altering the shape of the spinal canal.

# Question #14:

The most likely cause of the condition found on this radiograph would be:

- a. osteopetrosis.
- b. osteoporosis.
- c. osteomalacia.
- d. ankylosing spondylitis.



# Question #14: Review

- Osteopetrosis is a condition that results from a disorder of endochondral ossification and is the opposite of osteoporosis.
- Patients with this very rare condition possess bones that are very hard and dense.
  - As a result, osteopetrosis is sometimes referred to as “marble bone” disease.
  - Oddly enough, their bones tend to be more brittle than normal.
- It can be fatal at birth or asymptomatic into adulthood.
- There is currently no definitive treatment for osteopetrosis.

# Question #15:

Which of the following is the most likely cause of the type of arthritis that is depicted on this radiographic image of the lumbar spine?

- a. rheumatoid arthritis
- b. osteoarthritis
- c. ankylosing spondylitis
- d. gout



# Question #15: Review

- Ankylosing Spondylitis is a chronic, degenerative arthritis that usually begins in the sacroiliac (SI) joints and spreads to the spine.
- It is characterized by osteoporosis and fusion of the SI joints and vertebral bodies.
- Due to its very distinctive radiographic appearance, it is commonly referred to as “bamboo spine” disease.
- Treatment includes steroids to reduce the inflammation and analgesics (aspirin) for pain.

# Question #16:

The most likely cause for the multiple, round, radiopaque densities found on this radiograph would be:

- a. Paget's disease.
- b. enchondroma.
- c. osteochondroma.
- d. osteopoikilosis.



# Question #16: Review

- Osteopoikilosis is an osteosclerotic bone dysplasia that is literally translated as “spotted bones.”
- It produces many small radiopaque densities that are sometimes referred to as bone islands.
- It has an unknown etiology and is usually asymptomatic.

# Question #17:

The ivory vertebra demonstrated on this radiograph is an example of an osteoblastic bone tumor.

- a. true
- b. false



# Question #17: Review

- There are two general categories of bone tumors:
  1. Osteolytic
    - They result in a decrease in bone density and have a lucent radiographic appearance.
  2. Osteoblastic
    - They result in an increase in bone density and have an opaque radiographic appearance.

# Question #18:

Which of the following is the most likely cause of the benign projection of bone that is depicted on this image of the knee?

- a. enchondroma
- b. osteochondroma
- c. osteosarcoma
- d. fibrosarcoma



# Question #18: Review

- An osteochondroma or exostosis consists of a benign projection of bone that has a cartilaginous cap.
- They are generally found in the metaphysis of long bones, the ribs, and the pelvis.
- Osteochondromas often produce a mushroom or cauliflower radiographic appearance and are sometimes referred to as a bone spur.

# Question #19:

Which of the following is the most common type of primary malignant bone tumor?

- a. chondrosarcoma
- b. fibrosarcoma
- c. multiple myeloma
- d. enchondroma

# Question #19: Review

- **Multiple Myeloma is the most common type of primary, malignant bone tumor.**
- It is characterized by an increase in plasma cells within RBC producing bones.
  - Plasma cells are immune system cells that are found in the bone marrow and produce antibodies.
- The cardinal signs of multiple myeloma are as follows:
  - Possess “multicentric” or “punched-out” osteolytic lesions.
  - Bence-Jones proteins are found in the urine.
  - Possess marked osteoporosis with compression fractures of the vertebral bodies.

# Question #20:

Which of the following is the most likely cause of this benign bone lesion (arrow) that is commonly found in young adults?

- a. fibrosarcoma
- b. osteosarcoma
- c. osteochondroma
- d. enchondroma



# Question #20: Review

- An enchondroma is a cartilaginous, benign bone lesion that is found in bone marrow.
- It is most commonly found in young adults.
- Enchondromas are most often located in the bones of the hands, feet, and ribs.
- They present with a radiolucent, “cystic” appearance with calcium deposits.

# Question #21:

Which of the following diseases refers to a destruction of bone mass that makes patients more susceptible to fracture formation?

- a. osteomalacia
- b. osteoporosis
- c. osteopetrosis
- d. osteopoikilosis

# Question #21: Review

- Osteoporosis is characterized by a reduction in bone mass that makes patients with this condition susceptible to fracture formation.

The underlying mechanism in all cases is an imbalance between the body's normal process of bone destruction followed by bone growth.

- There are many factors involved in the pathogenesis of osteoporosis.

The primary causes are aging and postmenopausal hormone changes.

Other causes include steroid use, osteogenesis imperfecta, multiple myeloma, and inactivity.

# Question #22:

Which of the following diseases refers to a bacterial infection that causes bone destruction and abscess formation?

- a. gout
- b. osteomyelitis
- c. osteomalacia
- d. Paget's disease

# Question #22: Review

- Osteomyelitis is a condition that is the result of a bacterial bone infection that causes bone destruction and abscess formation.
  - One characteristic is the formation of a Brodie's abscess. It is typically found in the tibia and is an indication of osteomyelitis.
- Another characteristic of osteomyelitis is a sequestrum formation.
  - This is an avascular "island" of bone that forms within an abscess. It is commonly referred to as a bone-in-bone formation.
- Osteomyelitis can be acute or chronic.
- It is usually treated with prolonged antibiotic therapy.

# Question #23:

Which of the following refers to a type of pneumonia that occurs as the result of the patient inhaling a foreign material into their lungs?

- a. alveolar pneumonia
- b. bronchopneumonia
- c. aspiration pneumonia
- d. interstitial pneumonia

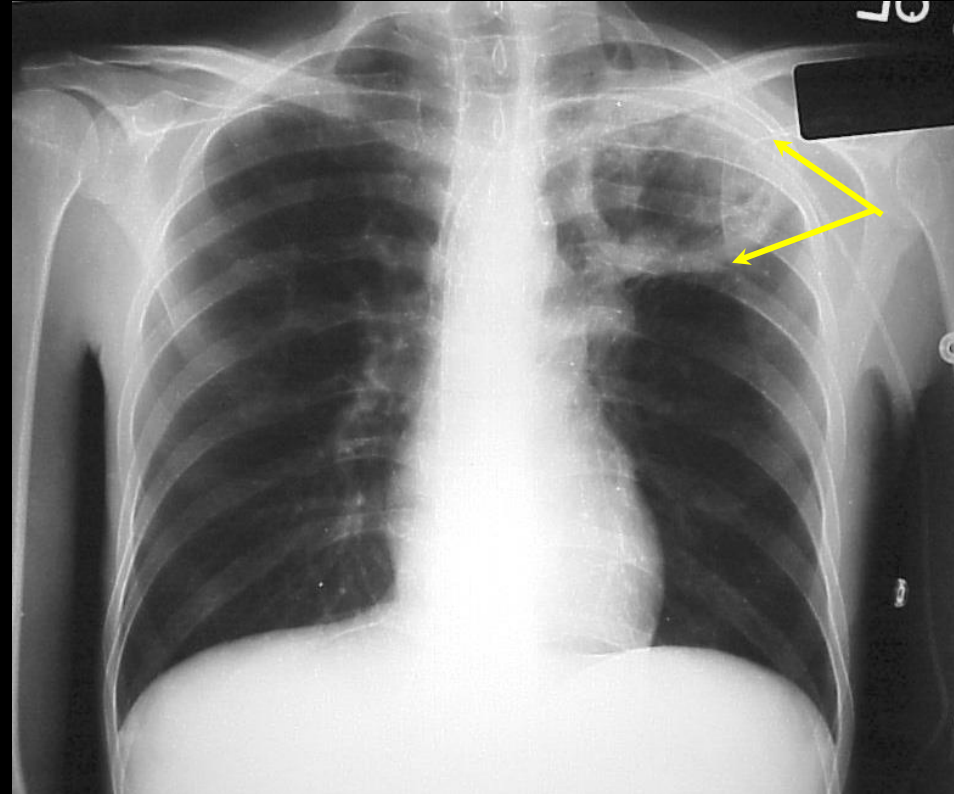
# Question #23: Review

- Aspiration Pneumonia occurs as the result of the patient inhaling a foreign material into their bronchial tree.
- It is often caused by a swallowing dysfunction.

# Question #24:

The most likely etiology for this large walled-off area of lung tissue (arrows) would be which of the following?

- a. bronchogenic carcinoma
- b. lung abscess
- c. bronchopneumonia
- d. histoplasmosis



# Question #24: Review

- A lung abscess is a walled-off, necrotic area of lung tissue containing pus.
- It is usually a complication of alcoholism, but it can also be caused by bacterial pneumonia.
- The use of antibiotics is the primary course of treatment but in some instances, a needle aspiration may be indicated.

# Question #25:

Exposure to mycobacteria is responsible for which of the following diseases?

- a. histoplasmosis
- b. tuberculosis
- c. bronchiectasis
- d. emphysema

# Question #25: Review

- Tuberculosis (TB) is caused by inhaling mycobacteria.
- It is spread primarily by air droplets but may be spread by inhaling dried mycobacteria as well.
- Diagnosis

A TB skin test (Mantoux/PPD) is the method of choice to determine exposure.

Small, red bumps will appear within 72 hours after the injection if the patient has been exposed to TB.

Future TB skin tests are no longer necessary as the patient will always test positive.

A positive test result will be confirmed with a sputum test (AFB) and the presence of the active disease can be ruled out with a chest radiograph.

# Question #26:

Inhaling soil and or bat/bird droppings that have been infected with a fungus is responsible for which of the following diseases?

- a. histoplasmosis
- b. bronchiectasis
- c. pneumoconiosis
- d. bronchogenic carcinoma

# Question #26: Review

- Histoplasmosis is a condition that occurs as the result of inhaling soil and/or bat/bird droppings that have been infected with a fungus called *Histoplasma capsulatum*.
- It has a similar radiographic appearance to TB.
- Most cases of histoplasmosis are self limiting but in some extreme cases, anti-fungal medications may be indicated.

# Question #27:

Which of the following diseases is an umbrella term that is used to describe both chronic bronchitis and emphysema?

- a. chronic obstructive pulmonary disease
- b. pneumoconiosis
- c. atelectasis
- d. bronchiectasis

# Question #27: Review

- Chronic obstructive pulmonary disease (COPD) is a term used to describe two lung diseases, chronic bronchitis and emphysema.

These two diseases tend to coexist.

They also both pertain to an obstruction of the normal flow of air within the lungs.

As a result, physicians collectively refer to them as COPD.

- Smoking is the primary risk factor for COPD.

Up to 90% of COPD related deaths are related to smoking.

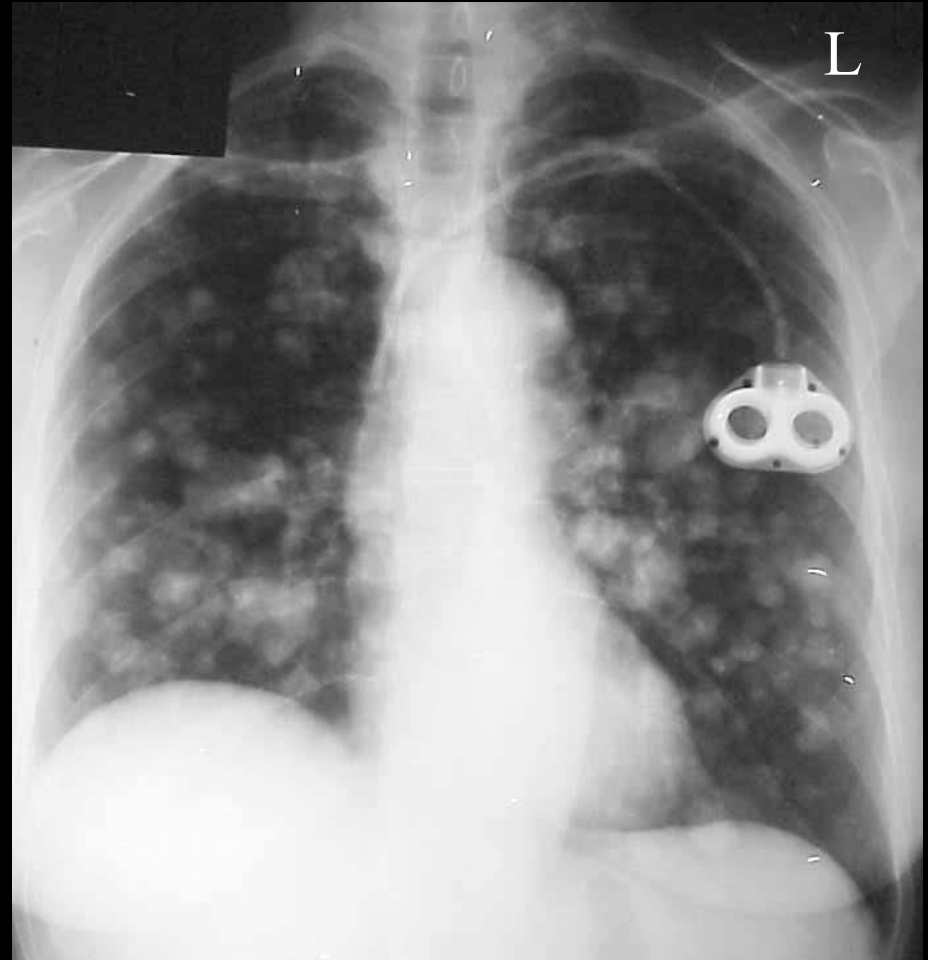
- Emphysema is a type of COPD that is characterized by a chronic destruction of bronchi and alveoli.

Smoking is the primary risk factor for emphysema, but it can also be caused by pollution or an inherited lack of an enzyme called alpha-1-antitrypsin.

# Question #28:

The multiple “cotton ball” appearance of the radiopaque densities found in this patient’s lung is the result of which of the following conditions?

- a. histoplasmosis
- b. tuberculosis
- c. primary lung cancer
- d. pulmonary metastasis



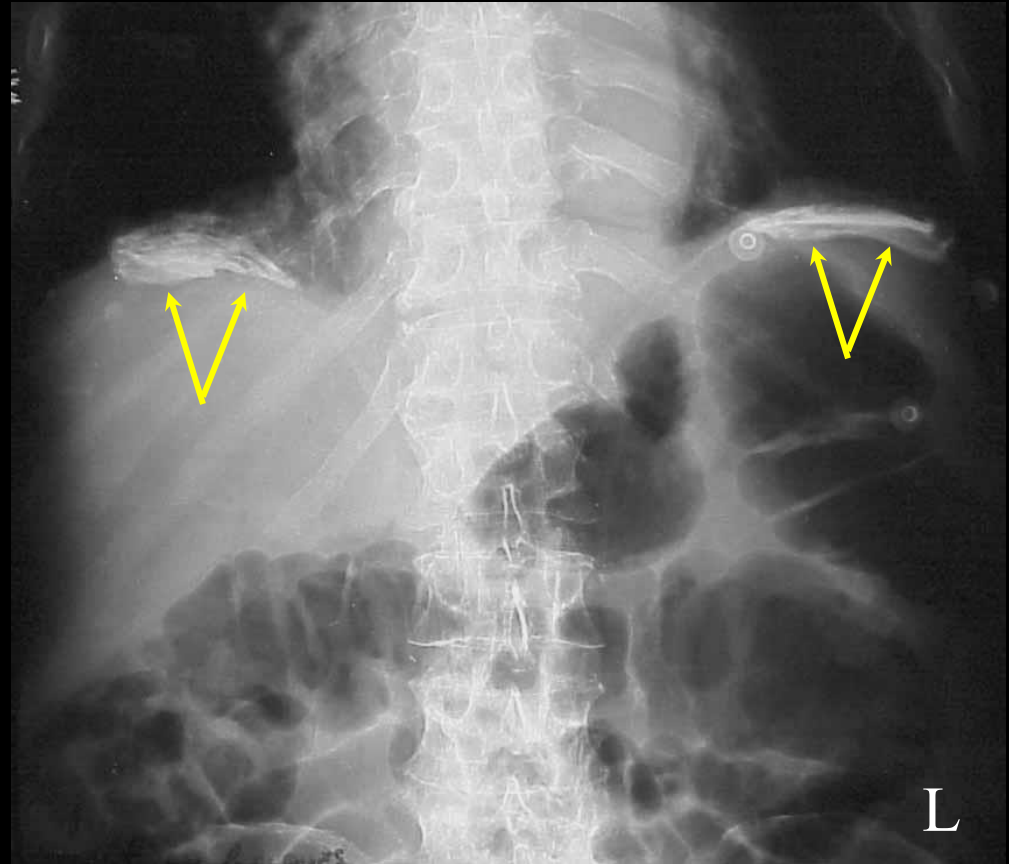
# Question #28: Review

- Pulmonary Metastasis (secondary lung cancer) is much more common than primary lung cancer.
- It primarily occurs via the lymphatic system or the circulatory system.
- It is common from the following types of primary cancer:
  - Breast Cancer
  - Colon Cancer
  - Prostate Cancer
- Treatment for pulmonary metastasis varies according to the type of primary cancer that is involved.

# Question #29:

This radiograph possesses pleural plaques (arrows) that are a classic example of which of the following types of pneumoconiosis?

- a. silicosis
- b. asbestosis
- c. black lung disease
- d. none of the above



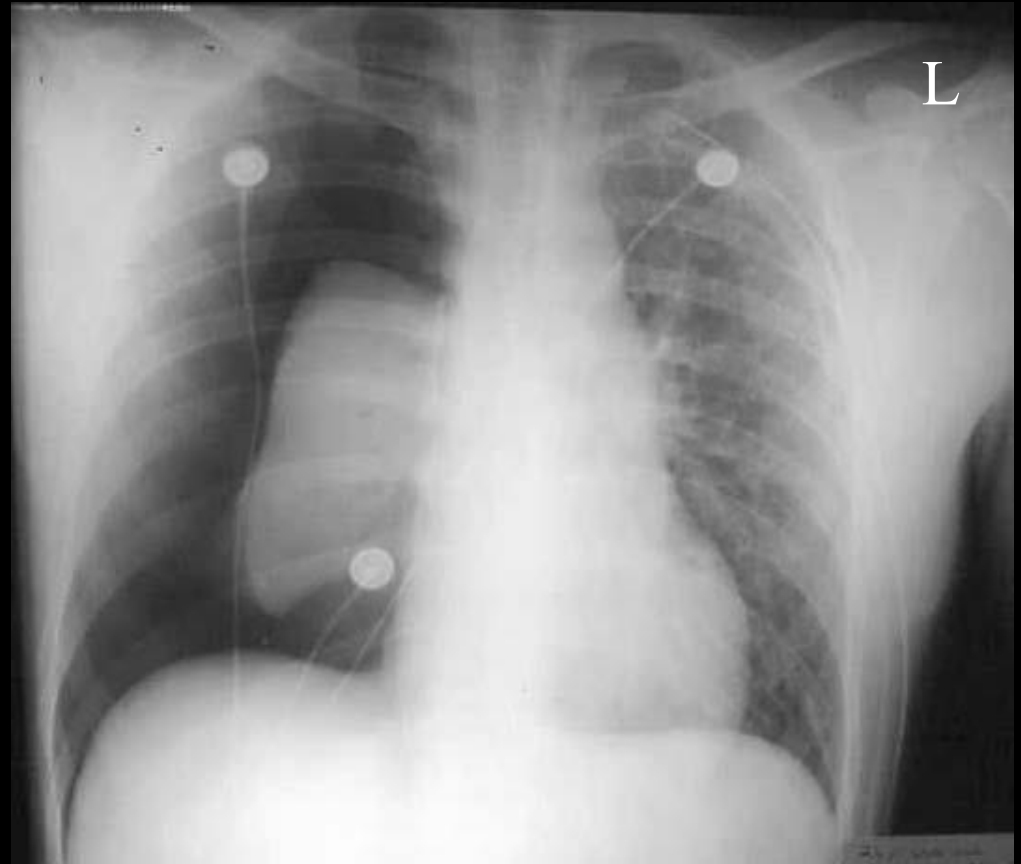
# Question #29: Review

- Pneumoconiosis is an occupational disease where dust or particulate matter is inhaled.
- This causes the formation of pulmonary fibrosis.
- Types:
  - Silicosis is caused by inhaling silicon dioxide (sand).
  - Asbestosis occurs as the result of inhaling asbestos dust.
    - Patients who present with this disease possess very distinct radiopaque pleural plaques.
  - Black lung disease is caused by inhaling coal dust.

# Question #30:

The most likely condition depicted on this chest radiograph is a:

- a. pleural effusion.
- b. bronchogenic carcinoma.
- c. atelectasis.
- d. pneumothorax.



# Question #30: Review

- A pneumothorax is a condition occurs when air is introduced into the pleural space.

The net result of this phenomena is a collapsed lung.

- Common causes of a pneumothorax include the following:

Trauma

- May be the result of a penetrating chest wound.

Ruptured Bulla from Emphysema

Spontaneous

- Most commonly found in tall, thin, young males.

Iatrogenic

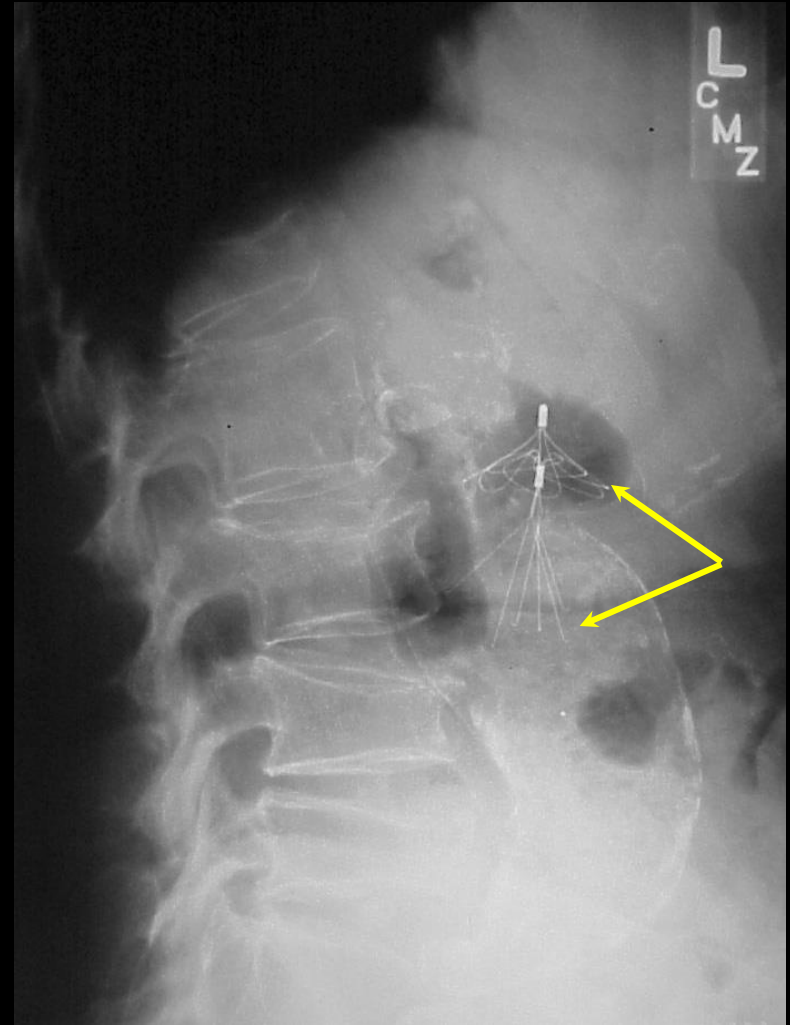
- May be caused during a thoracentesis or chest tube insertion.

- Treatment for a pneumothorax often includes the insertion of a chest tube.

# Question #31:

The filter depicted on this radiograph (arrows) is used to help prevent clots that break off from the legs from creating a pulmonary embolus within the lungs.

- a. true
- b. false



# Question #31: Review

- Pulmonary emboli are often caused by blood clots that break off from veins in the legs.

These clots form emboli that can obstruct the lumen of the pulmonary arteries.

Many times, this will resolve on its own but large obstructions can infarct the lung and lead to death.

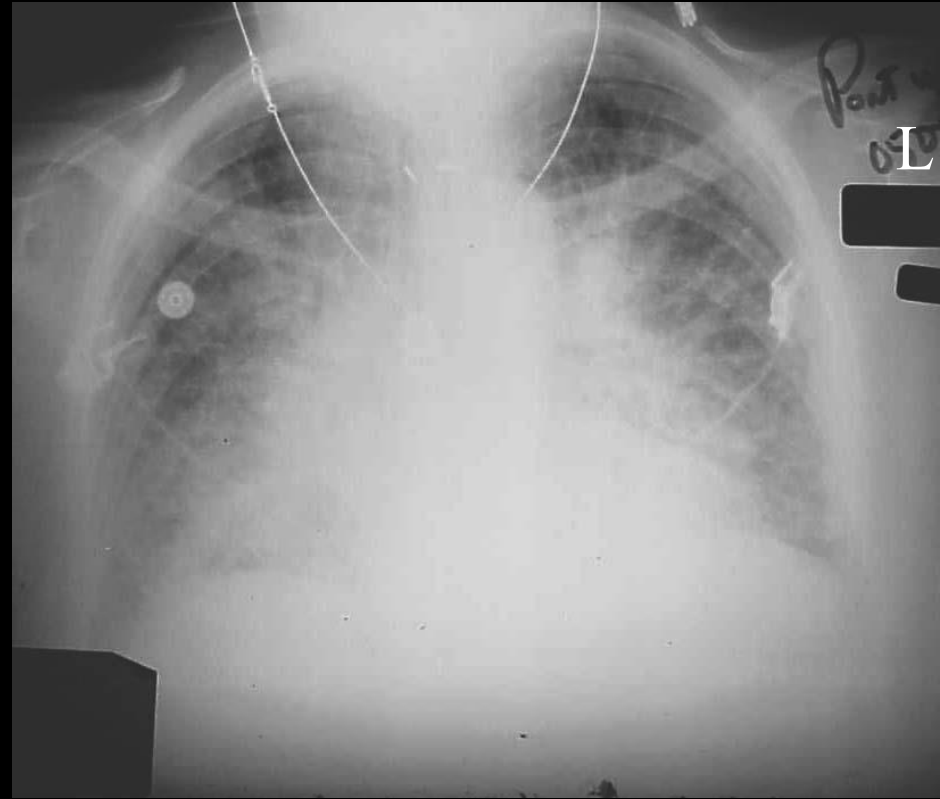
An inferior vena cava filter is a small, umbrella-shaped metal device placed in the inferior vena cava (a large vein in the abdomen) to prevent blood clots from traveling to the lungs and causing a pulmonary embolism (PE).

- A PE is most often seen in elderly, bedridden patients, and in postoperative patients.
- A chest X-ray may demonstrate an area of consolidation that is commonly referred to as “Hampton’s Hump.”

# Question #32:

This patient has congestive heart failure which is leading to which of the following conditions that is depicted on this chest radiograph?

- a. bronchiectasis
- b. pulmonary edema
- c. atelectasis
- d. pleural effusion



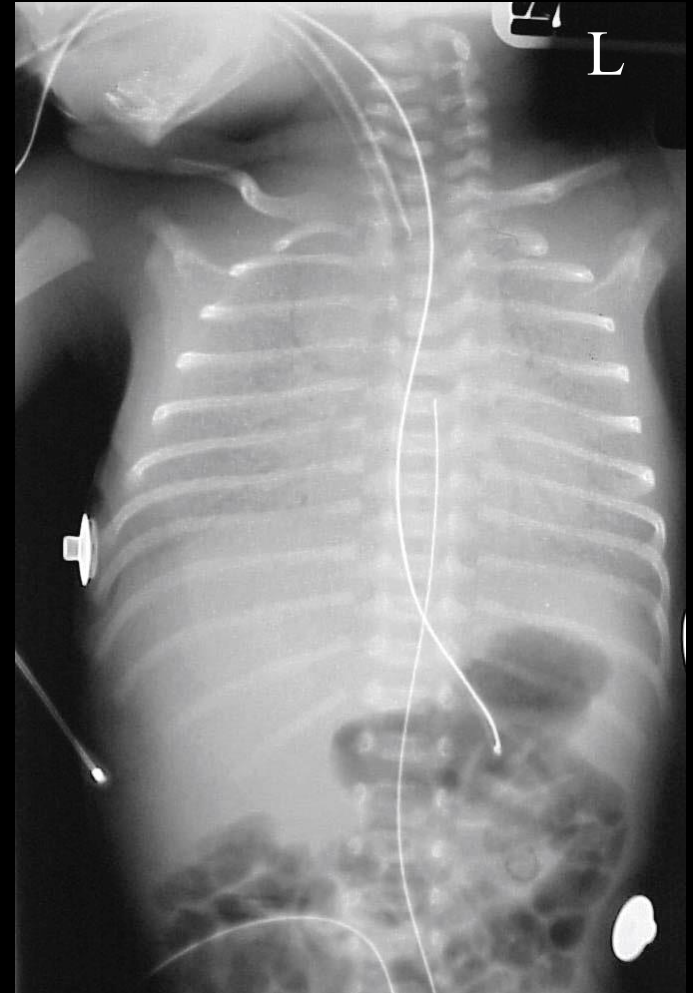
# Question #32: Review

- Pulmonary edema occurs when air within the lungs is replaced with fluid.
- It leads to a decrease in gas exchange and may cause respiratory failure.
- It often occurs secondary to congestive heart failure (CHF) or renal failure.
- Treatment includes the administration of oxygen and diuretics.  
Removing the underlying cause of the pulmonary edema is the most important consideration for treatment.

# Question #33:

The “ground glass” radiographic appearance of this newborn’s chest is a classic example of which of the following conditions?

- a. respiratory distress syndrome
- b. Tetralogy of Fallot
- c. Wilm’s tumor
- d. none of the above



# Question #33: Review

- Respiratory distress syndrome (RDS) was formerly referred to as hyaline membrane disease.
- It is characterized by a lack of surfactant in premature infants.
  - This causes the alveoli to poorly aerate resulting in hypoxia.
- RDS has a very distinctive “ground glass” radiographic appearance on a chest x-ray.

# Question #34:

Which of the following types of tuberculosis is depicted on the radiograph below?

- a. primary TB
- b. secondary TB
- c. miliary TB
- d. multi-drug-resistant TB



# Question #34: Review

- For Miliary or Hematogenous TB, mycobacteria can enter the circulatory system by eroding the pulmonary vein.
- If this occurs, it can seed in such organs as the liver and spleen through the systemic circulation.
- Since it is now bloodborne, the bacteria may enter the blood flow to the lung and produce innumerable fine densities uniformly distributed in both lungs.
  - This presents as a bird seed or “millet” type of radiographic appearance and hence the name, miliary TB.
- This is a serious condition and if left untreated, it is almost always fatal.

# Question #35:

The artifacts demonstrated on the radiograph below are the result of an antiquated treatment for which of the following diseases?

- a. histoplasmosis
- b. tuberculosis
- c. pneumoconiosis
- d. bronchiectasis



# Question #35: Review

- Prior to the discovery of isoniazid, early methods to treat patients with tuberculosis relied heavily upon rest and isolation in sanatoriums.
- A common treatment was to collapse the lung in order to allow it to “rest.”

This technique had absolutely no value in fighting this disease.

One method employed to “rest” the lung was to surgically insert ping pong balls into the pleural space of the upper lung field in order to compress the lung.

- This technique was referred to as plumbage.

# Question #36:

Which of the following terms refers to a weakening of an arterial wall that results in a bulge or balloon-like appearance?

- a. thrombus
- b. embolus
- c. aneurysm
- d. ischemia

# Question #36: Review

- An aneurysm is a weakening of an arterial wall that results in a bulge or balloon-like appearance.

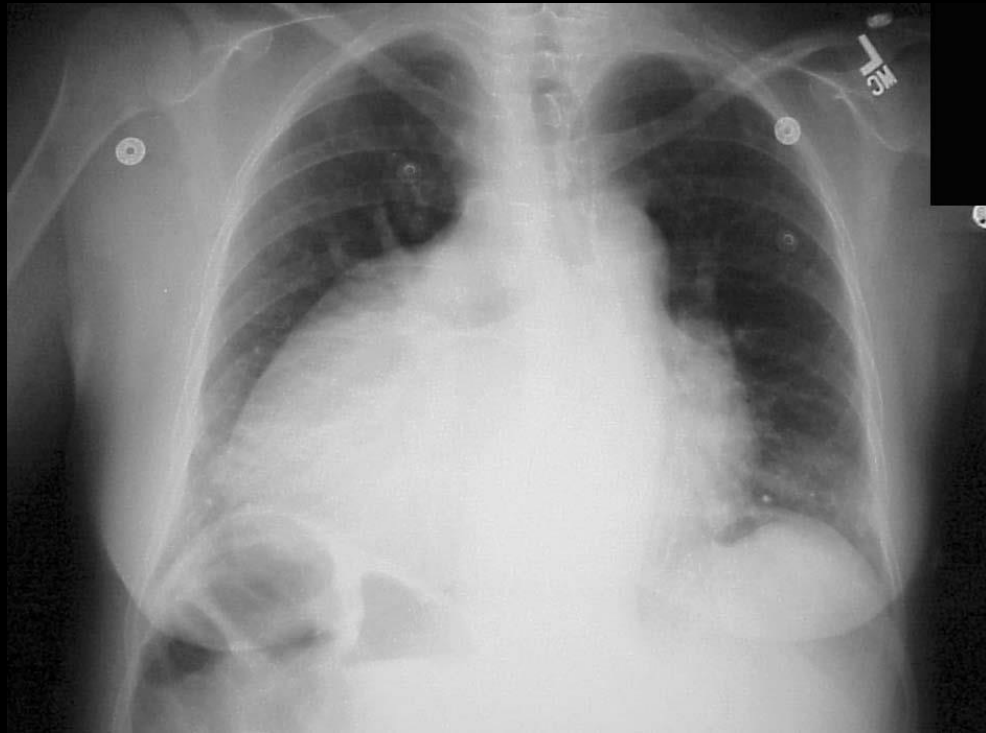
A rupture of this bulge is potentially fatal.

They are most commonly associated with cerebral arteries and the abdominal aorta.

# Question #37:

The congenital defect depicted on this chest radiograph is best described by which of the following?

- a. dextrocardia
- b. CHF
- c. pulmonary edema
- d. pleural effusion



# Question #37: Review

- Situs inversus is a very rare congenital condition where all of the organs in the body are transposed to the opposite side.  
It has an unknown etiology.
- Dextrocardia is also a congenital defect where the heart is transposed to the opposite side of the body within the thorax.  
Dextrocardia can occur independently of situs inversus and is somewhat more common.

# Question #38:

The unusual condition depicted on this radiograph is best described by which of the following diseases?

- a. diabetes
- b. cellulitis
- c. pitting edema
- d. elephantiasis



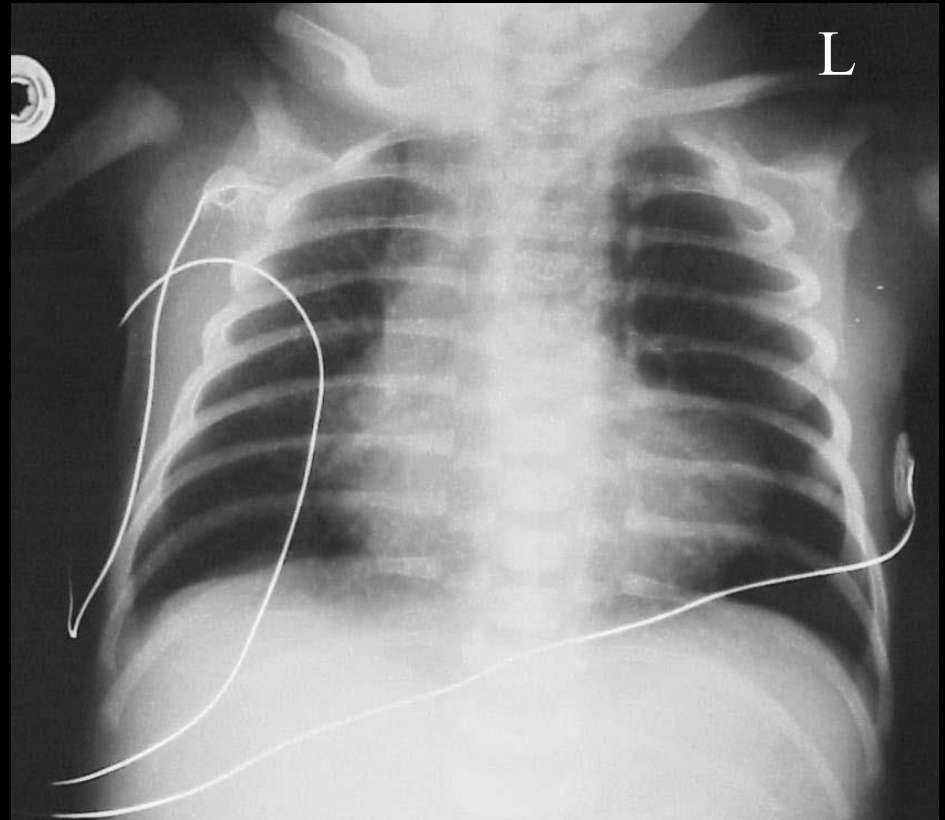
# Question #38: Review

- Elephantiasis is a thickening of the skin and underlying tissue of the legs and genitalia in the form of a hydrocele.
- It is usually caused by a parasitic roundworms that block the lymphatic system.
  - It can, however, also be caused by a persistent contact with volcanic ash.
- Treatment includes rigorous scrubbing of the affected area combined with drug treatment to kill the worms.

# Question #39:

The boot-shaped heart of the newborn is a characteristic of which of the following diseases?

- a. Wilm's tumor
- b. Tetralogy of Fallot
- c. infant respiratory distress syndrome
- d. none of the above



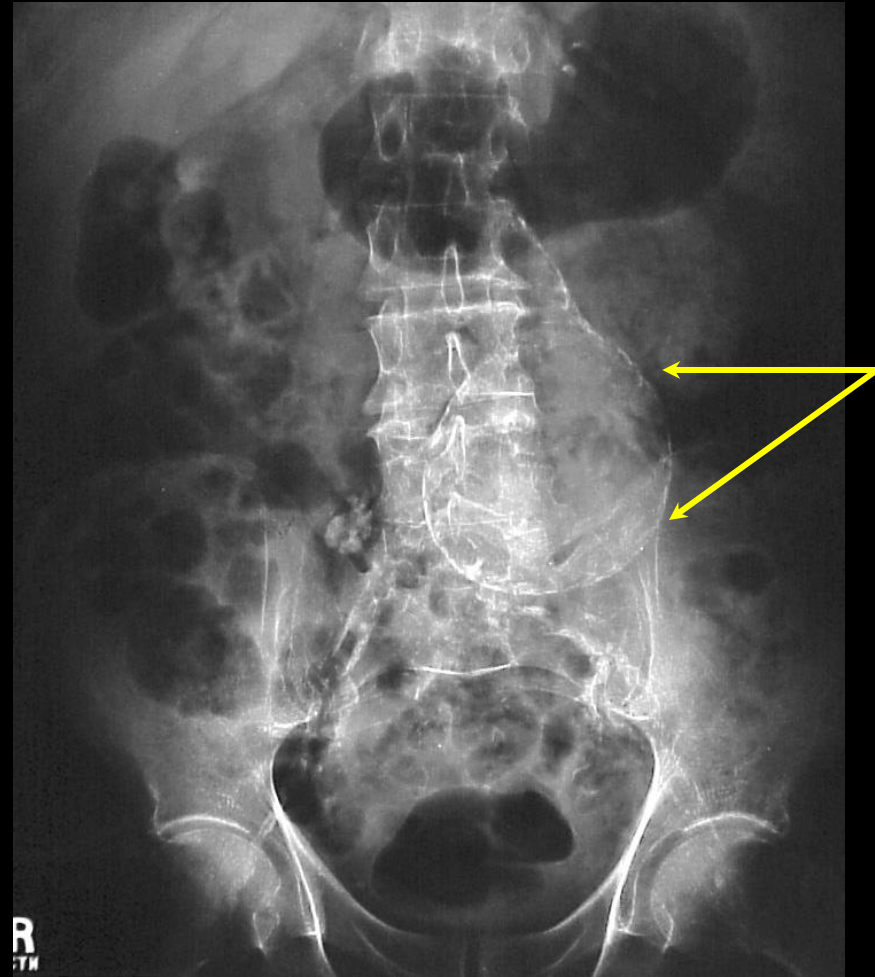
# Question #39: Review

- Tetralogy of Fallot is a very rare congenital heart defect that presents at birth with a “boot-shaped” heart.
- As the name indicates, it consists of the following four defects:
  1. Pulmonary Stenosis
    - The narrowing of the pulmonary valve restricts the flow of blood into the pulmonary arteries.
  2. Right Ventricular Hypertrophy
    - The right ventricle has to work harder to pump blood and enlarges due to the pulmonary stenosis.
  3. Ventricular Septal Defect
    - This is a hole that is located between the ventricles.
  4. An Overriding Aorta
    - A defective aorta causes deoxygenated blood to flow directly into the aorta and bypass the lungs.

# Question #40:

Which of the following best describes the calcification (arrows) that is depicted on this radiograph?

- a. calcified spleen
- b. aortic abdominal aneurysm
- c. dermoid
- d. porcelain gallbladder



# Question #40: Review

- Aortic abdominal aneurysms often form with minimal symptoms and are easily diagnosed with an ultrasound.

The average age for diagnosis is between 65 to 70.

The risk of rupture begins at 5 cm and they can swell to over 15 cm in diameter.

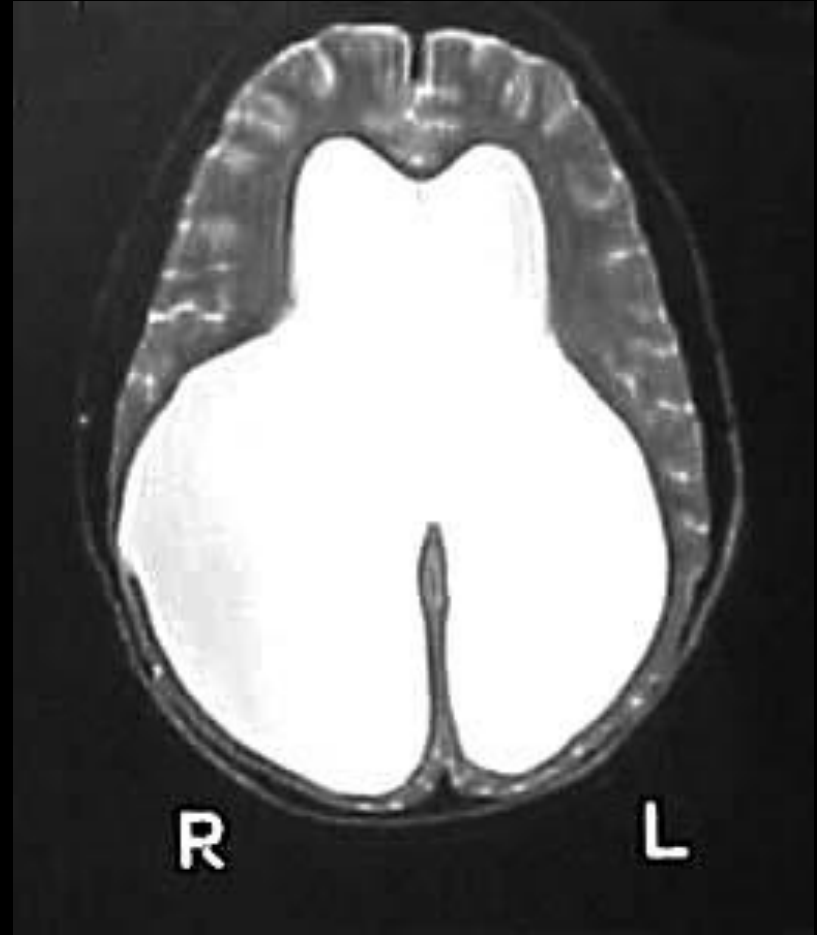
Inserting an endovascular stent through the femoral artery or surgically replacing the aneurysm with a graft or synthetic patch tube are two common means of treatment.

A non-surgical approach for aneurysms less than 5 cm would be to lower cholesterol levels, reduce hypertension, and smoking cessation.

# Question #41:

Which of the following terms would be used to best describe the condition depicted on this MR image of the brain?

- a. intraventricular hemorrhage
- b. meningioma
- c. intracerebral hemorrhage
- d. hydrocephalus



# Question #41: Review

- People with hydrocephalus have an excess of cerebral spinal fluid (CSF) within the ventricles of their brain.
- This results in increased intracranial pressure, enlarged heads in infants, and possible brain damage.
- Two Common Types of Hydrocephalus:
  - Noncommunicating
    - This is caused by the presence of an obstruction such as a tumor.
  - Communicating
    - This occurs when the CSF cannot be absorbed properly
- A shunt inserted between the ventricles and the heart or abdomen is a common method to relieve the pressure.

# Question #42:

Subarachnoid bleeding is a type of intracranial hemorrhage.

- a. true
- b. false

# Question #42: Review

## Cerebrovascular Accident Flowchart:

1. Stroke
2. Transient Ischemic Attack (TIA)
3. **Intracranial Hemorrhage**
  - a. Intracerebral (Parenchymal) Bleeding
  - b. Subarachnoid Bleeding**
  - c. Extracerebral Bleeding
    - (1) Subdural Hematoma
    - (2) Epidural Hematoma

# Question #43:

Which of the following refers to a benign neoplasm that is attached to the VIII cranial nerve housed within the temporal bone?

- a. meningioma
- b. acoustic neuroma
- c. astrocytoma
- d. none of the above

# Question #43: Review

- An acoustic neuroma is a benign tumor that is commonly associated with the VIII cranial (acoustic) nerve housed within the temporal bone.
- Symptoms include hearing loss, tinnitus (ringing in the ears), vertigo, and ataxia (loss of balance).
- Small tumors may not require treatment, but surgery and chemotherapy are options for larger tumors.

# Question #44:

Which of the following terms would be used to best describe the condition (arrow) depicted on this radiograph of the lumbar spine?

- a. spondylosis
- b. spondylolisthesis
- c. spinal stenosis
- d. spina bifida occulta



# Question #44: Review

- Spina Bifida Occulta is usually a mild occurrence that rarely results in the protrusion of the meninges or spinal cord.
- It is often a serendipitous discovery on routine radiographic images of the lumbar spine.

# Question #45:

Which of the following diseases is characterized by a herniation of the cerebellar tonsils through the foramen magnum?

- a. astrocytoma
- b. Arnold Chiari Malformation
- c. meningioma
- d. spinal stenosis

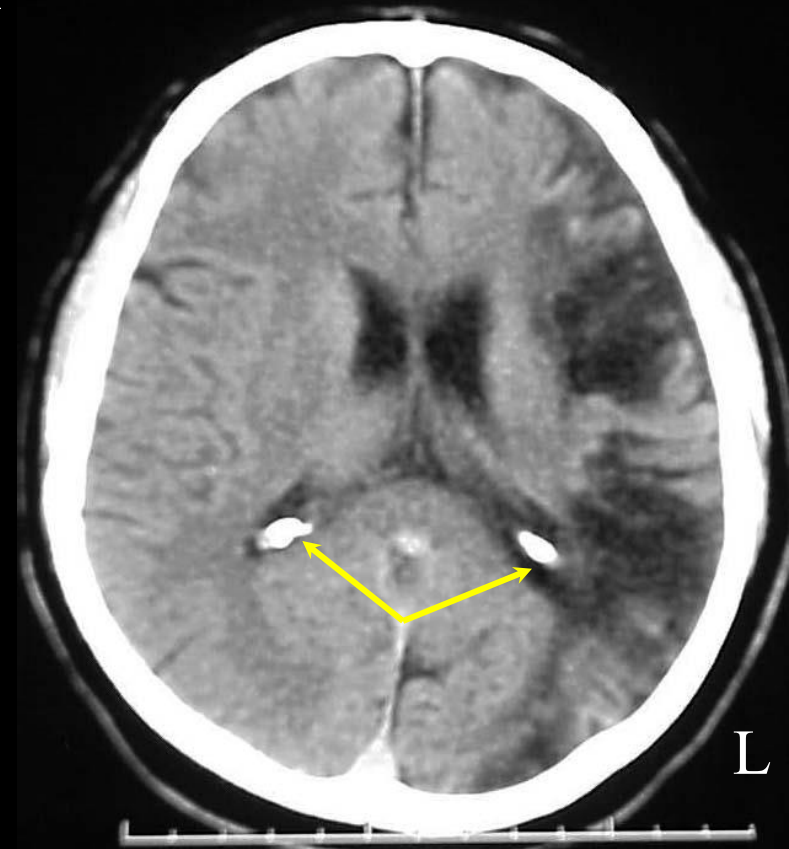
# Question #45: Review

- Children born with spina bifida and hydrocephalus often have **Arnold Chiari Malformation**.
- **This congenital defect allows the cerebellar tonsils to herniate through the foramen magnum and into the spinal canal.**
- This can block the flow of CSF and cause the brain stem and cerebellum to become stretched and compressed.
- This condition will require surgical correction.
- Arnold Chiari Malformation will often cause the formation of syrinx within the spinal cord which is a fluid filled cavity which may also obstruct the flow of CSF.
- MR is the imaging modality of choice for this condition.

# Question #46:

Which of the following is the most likely structure that has become calcified (arrows) on this CT scan of the brain?

- a. choroid plexus
- b. pineal gland
- c. pituitary gland
- d. none of the above



# Question #46: Review

- The **choroid plexus** is an area found within the ventricles of the brain that is responsible for producing cerebral spinal fluid (CSF).
- On occasion, a portion of **the choroid plexus may become calcified, and this usually has no clinical significance.**

# Question #47:

Which of the following terms refers to the congenital absence of a kidney?

- a. atrophy
- b. hypoplasia
- c. hypertrophy
- d. atresia

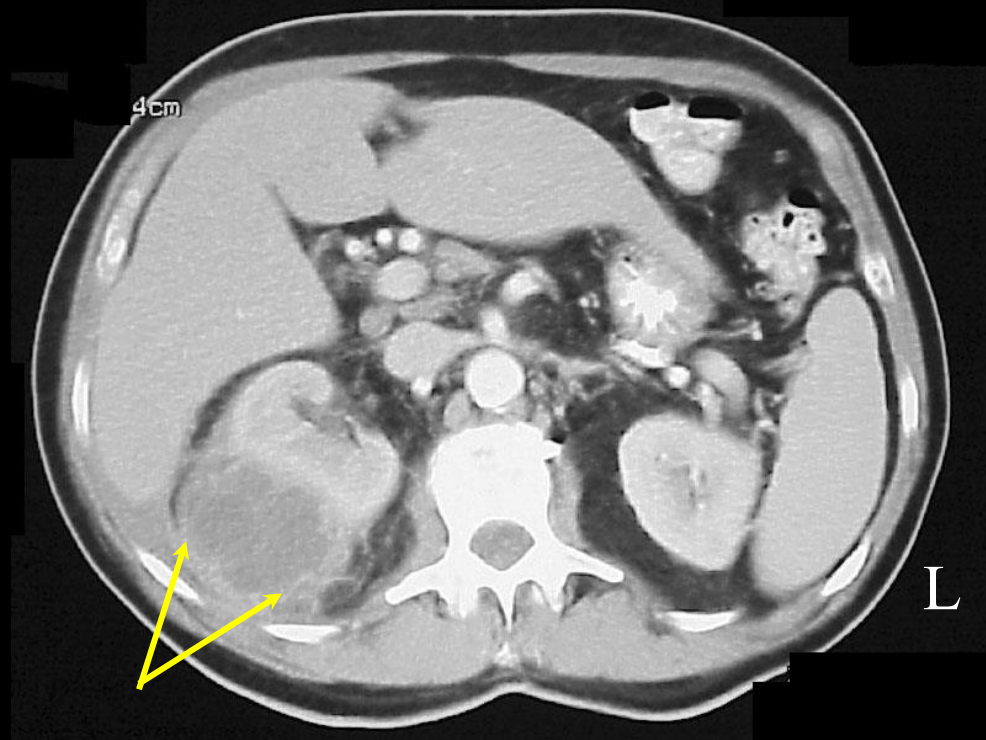
# Question #47: Review

- A congenital defect where an organ is not formed is called atresia.
- In this particular instance, **kidney atresia would be the congenital absence of a kidney.**
- These patients often have other congenital defects as well and there is no treatment.

# Question #48:

A bacterial infection is the etiology for the deformity (arrows) that is found on this kidney. With that being the case, which of the following terms would be used to describe this condition?

- a. renal abscess
- b. renal cyst
- c. renal cell carcinoma
- d. polycystic kidney disease



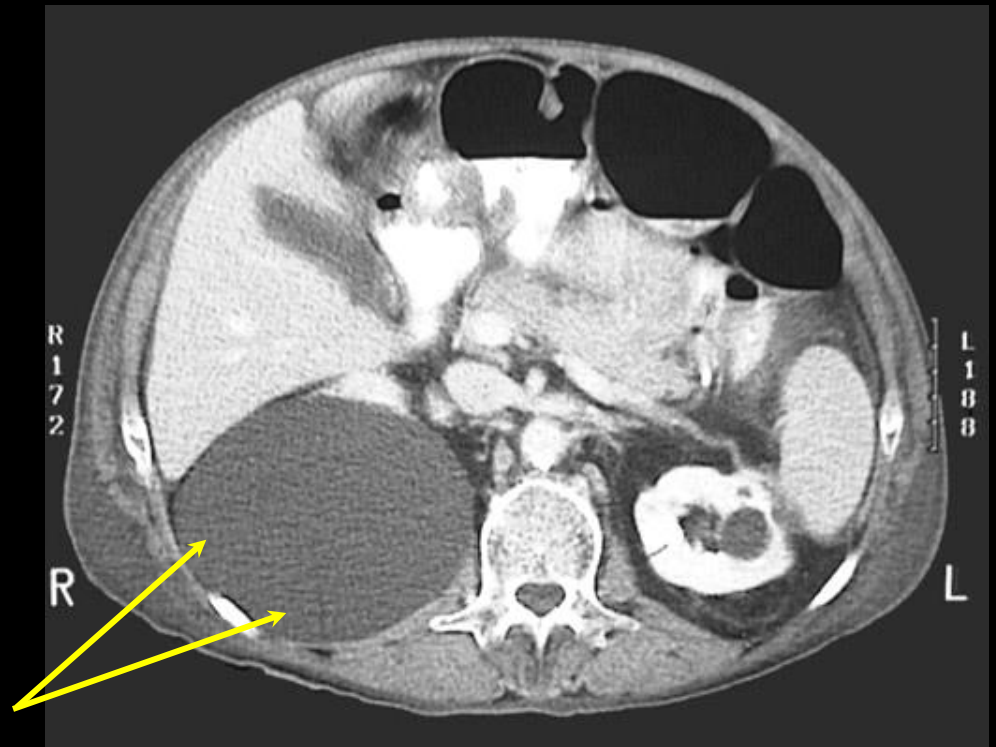
# Question #48: Review

- A bacterial infection is usually the etiology for the formation of a renal abscess.
- The origin may be from sepsis (blood infections) or from bacteria that has worked their way up from the bladder.
- Treatment includes antibiotic therapy, and in some instances, the aspiration of fluid from within the abscess.

# Question #49:

This image depicts the most common unifocal mass found on the kidneys (arrows). Which of the following terms would be used to describe this condition?

- a. polycystic kidney disease
- b. renal cyst
- c. renal abscess
- d. renal cell carcinoma



# Question #49: Review

- Renal Cysts:

A cyst is a fluid filled, non-vascular sac that can form anywhere in the body.

When a renal cyst forms, it will attach to the outside of the kidney.

**A renal cyst is the most common unifocal mass found on a kidney.**

They are found in greater than 50% of the population that is 50 years or older.

Ultrasound is the imaging modality of choice for their diagnosis.

Most kidney cysts resolve on their own and are no cause for concern.

# Question #50:

Which of the following terms refers to a congenital disease of the kidneys that produces multiple cysts which cause the kidney to lose function?

- a. renal abscess
- b. renal cell carcinoma
- c. horseshoe kidney
- d. polycystic kidney disease

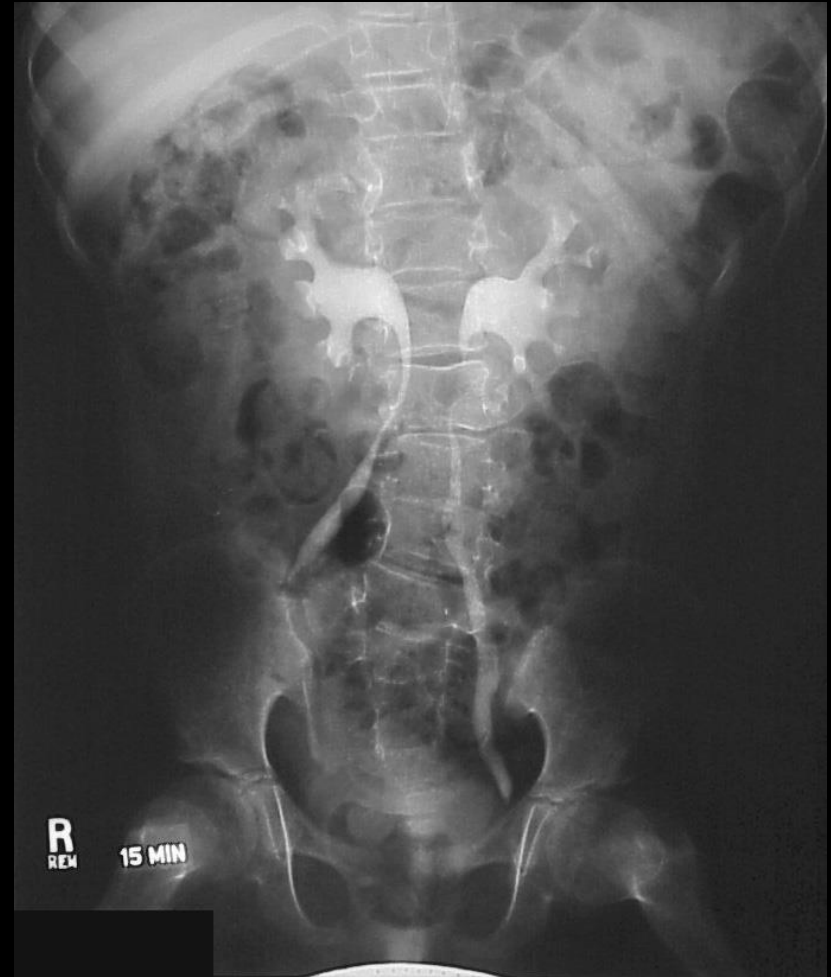
# Question #50: Review

- Polycystic Kidney Disease (PKD) is a hereditary disease that is characterized by the presence of multiple cysts within the kidneys.
- Unlike renal cysts, polycystic kidneys lose function.
  - As the cysts expand, they put pressure on the nephrons which will ultimately cause an obstruction and a decrease in urine production.
- PKD can also affect the liver and pancreas.
- This disease can be diagnosed with an IVP, CT scan, and ultrasound which is the modality of choice.
- Treatment in advanced stages of PKD includes dialysis and kidney transplants.

# Question #51:

Which of the following conditions is the most likely etiology for the unusual tilt that the kidneys possess on this IVP radiograph?

- a. renal cell carcinoma
- b. hydronephrosis
- c. horseshoe kidneys
- d. ectopic kidneys



# Question #51: Review

- Horseshoe Kidneys is a congenital disease where the lower poles of both kidneys fuse causing both collecting systems to sit at an angle.

This odd angle has a propensity to produce stagnant urine that can eventually become infected.

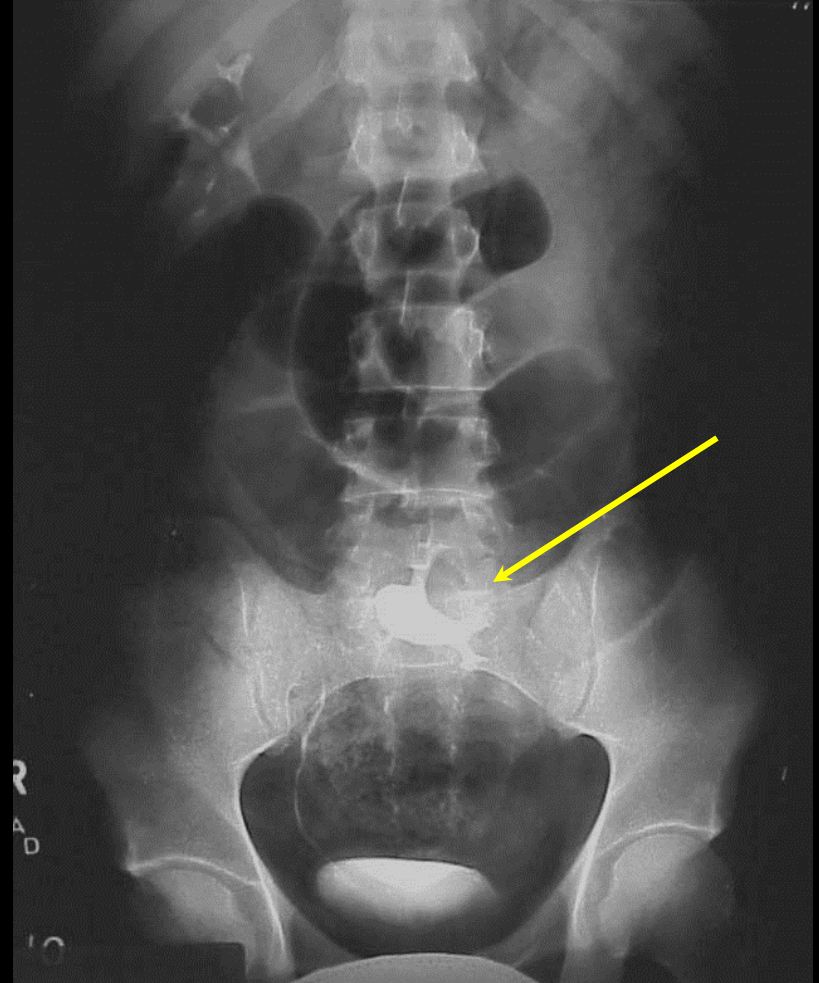
If no infection is present, their presence will produce no discernable signs and symptoms.

- There is no cure for this condition other than treating the symptoms.

# Question #52:

The arrow on this radiograph is pointing to a kidney that is located within the boundaries of the pelvis. This condition would be best described as an ectopic kidney.

- a. true
- b. false



# Question #52: Review

- An ectopic kidney is a congenital defect where the kidney is located in an abnormal position within the body.
  - They can be located within the boundary of the pelvis or even within the thorax.
- In most cases, this will have no effect on urine production, but they may cause infections and kidney stones in some individuals.
- A common course of action is to just treat the symptoms that may be caused as a result of an ectopic kidney.

# Question #53:

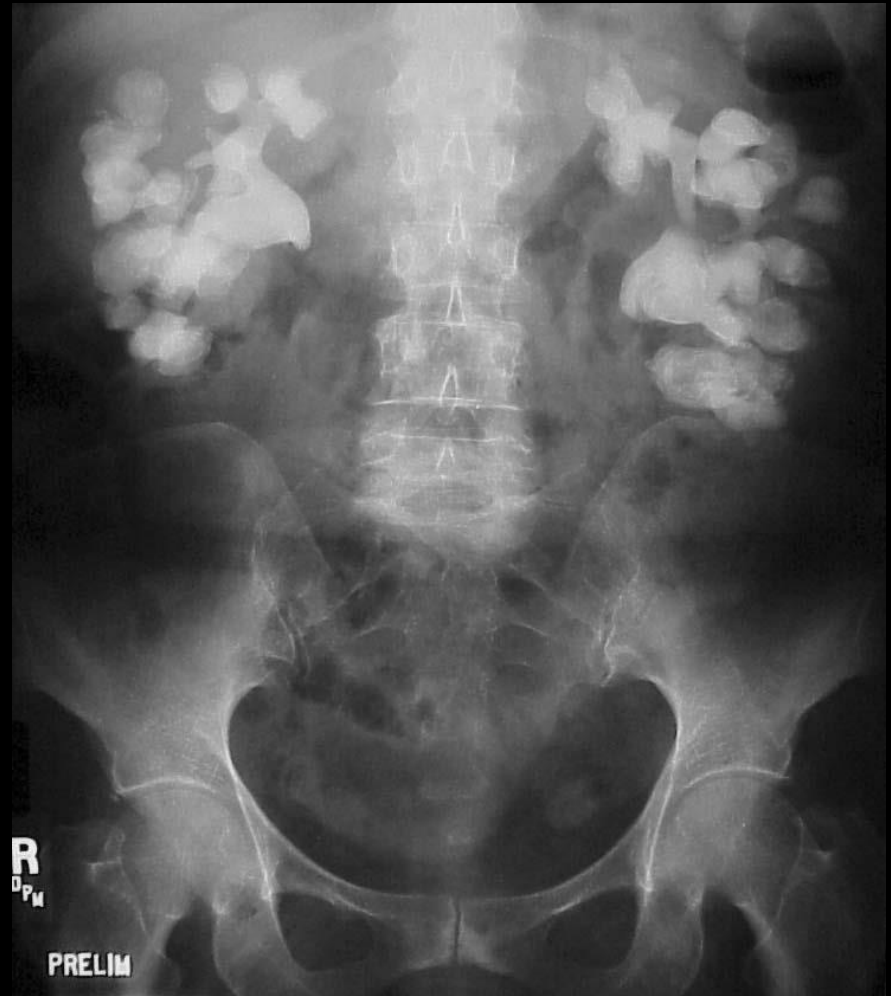
The condition depicted on the radiograph below would be best described as staghorn calculus.

- a. true
- b. false



# Question #53: Review

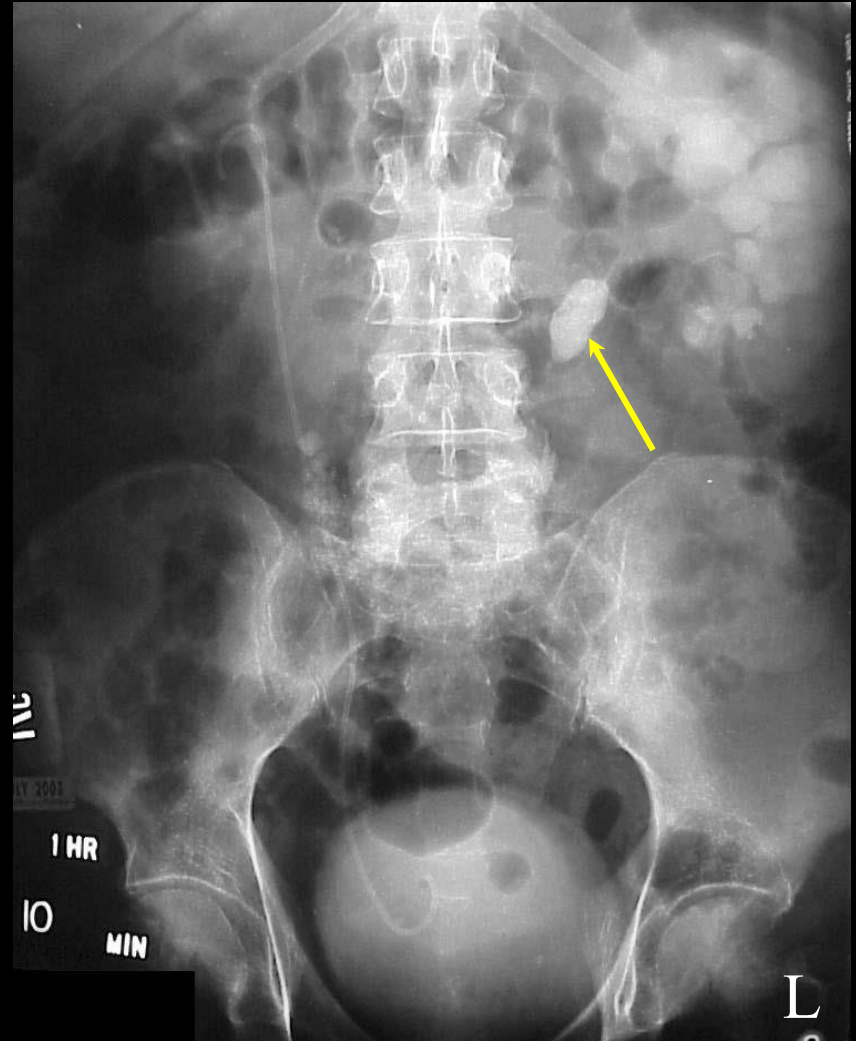
This scout image demonstrates the formation of bilateral **staghorn calculi** with the collecting systems of both kidneys.



# Question #54:

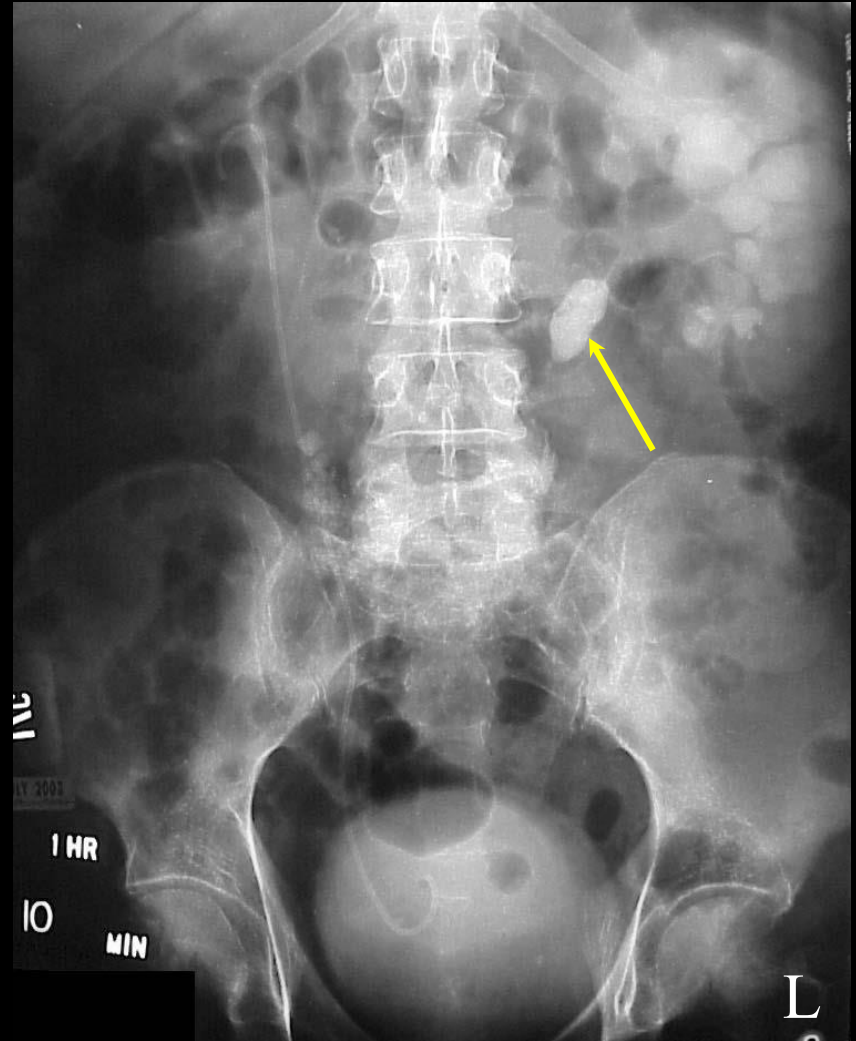
The kidney stone identified with the arrow to the right is located in the:

- a. ureterovesical junction.
- b. pelvic brim.
- c. ureteropelvic junction.
- d. none of the above



# Question #54: Review

This patient is a prolific kidney stone producer. The arrow is pointing to an example of how a large stone can exit the renal pelvis and block the proximal ureter at the ureteropelvic junction. Note the stent in the right kidney.



# Question #55:

Vesicoureteral reflux is characterized by an abnormal flow of urine from the urinary bladder back into the ureters.

- a. true
- b. false

# Question #55: Review

- Vesicoureteral reflux is characterized by an abnormal flow of urine from the bladder back into the ureter.
- This can be caused as a result of a hereditary condition, a bladder infection, or from bladder dysfunction.
- Symptoms include the following:
  - Cystitis
  - Nephritis
  - Polyuria
  - Dysuria
  - Pyuria
  - Hematuria
  - Hydroureter/Hydronephrosis

# Question #56:

What is the most common abdominal neoplasm of infancy and early childhood?

- a. polycystic kidney disease
- b. renal cell carcinoma
- c. Wilm's tumor
- d. Crohn's disease

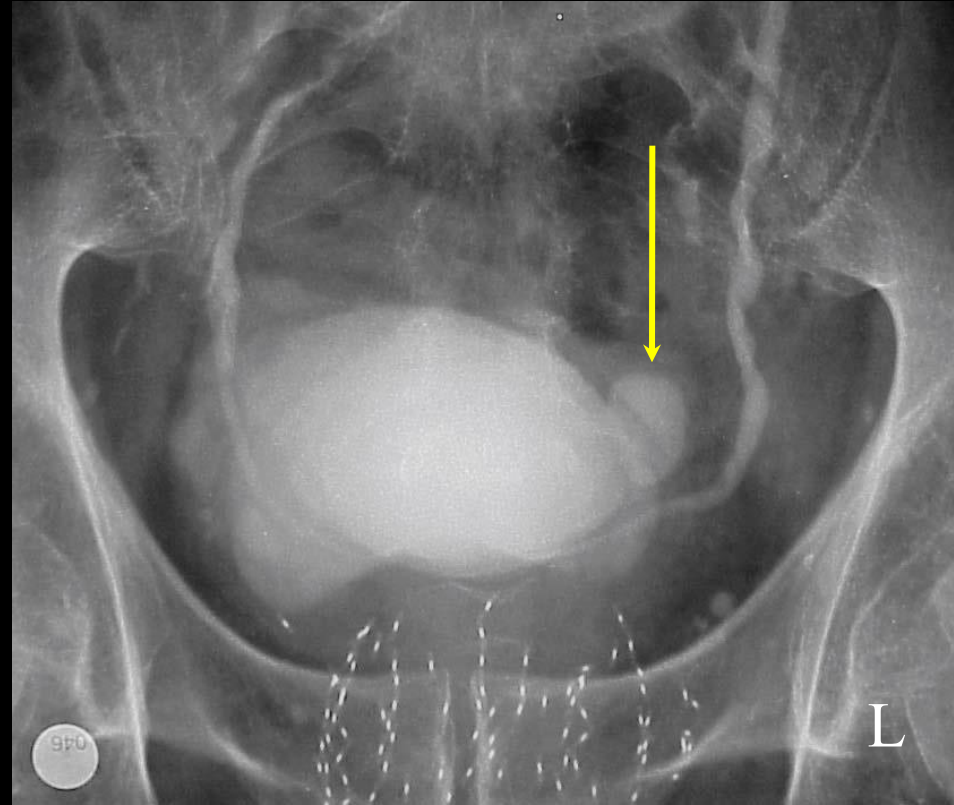
# Question #56: Review

- Wilm's Tumor is also referred to as a nephroblastoma.
- It is the most common abdominal neoplasm of infancy and early childhood with an average onset of three years old.
- Wilm's tumor produces a large, palpable abdominal mass
- It has a propensity to metastasize to the lungs, liver, and skeletal system.
- Early detection and treatment results in a nearly 90% five-year survival rate.

# Question #57:

The arrow on this image of the urinary bladder is most likely pointing to which of the following?

- a. bladder polyp
- b. transitional cell carcinoma
- c. bladder diverticula
- d. dermoid



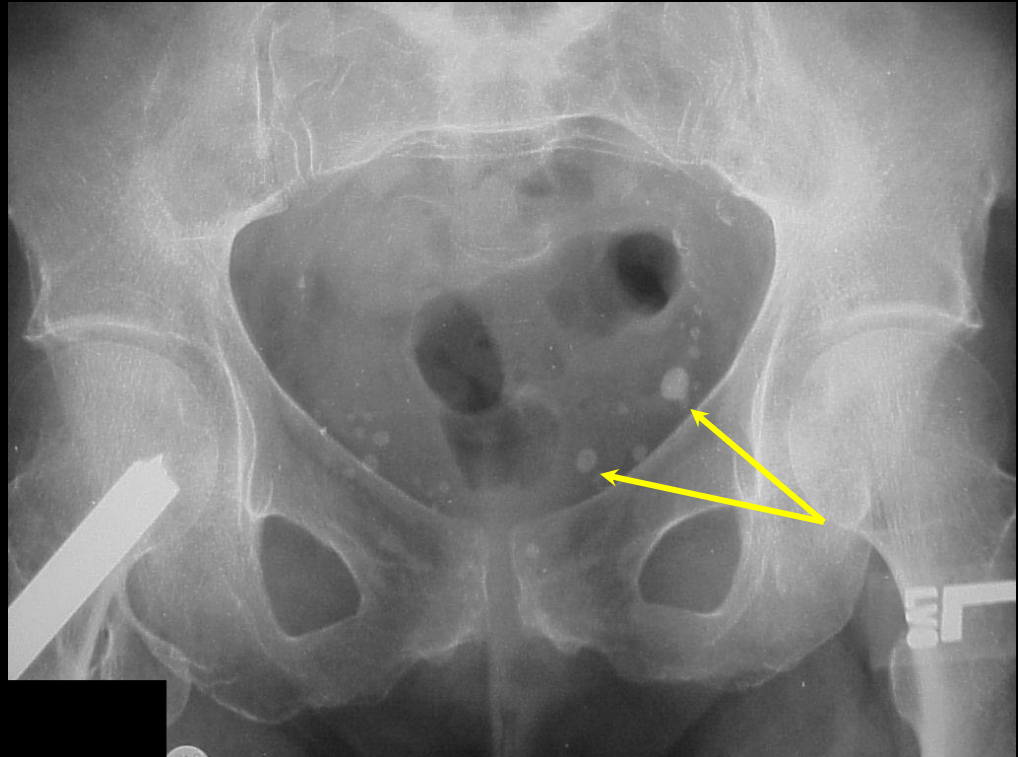
# Question #57: Review

- Bladder diverticula can be hereditary, caused by an enlarged prostate, or the result of a chronic bladder infection.
- They may also be the source of future infections or may, in some instances, trap kidney stones.
- Other than antibiotics to combat infection, there is no treatment for bladder diverticula.

# Question #58:

The small round radiopaque densities that the arrows on this radiograph are pointing to are most likely which of the following?

- a. dermoid
- b. phleboliths
- c. bladder stones
- d. none of the above



# Question #58: Review

- A phlebolith is nothing more than small, usually round, calcified valve within a vein that surround the urinary bladder.
- They are sometimes mistaken for kidney or bladder stones and have no clinical importance.

# Question #59:

Renal cell carcinoma is the most common malignant tumor of the kidneys.

- a. true
- b. false

# Question #59: Review

- Renal cell carcinoma is the most common malignancy of the kidneys.
- Unlike with renal cysts, there is vascular perfusion which originate at the renal tubules.
- Renal cell carcinoma has a propensity to metastasize to the lungs, brain, liver and bone.
- Common symptoms include flank pain, hematuria, and an abdominal mass.

Unfortunately, these symptoms often do not present until the cancer is in an advanced stage.

As a result, renal cell carcinoma has a very high mortality rate.

- Treatment usually consists of nephrectomy.

# Question #60:

The most likely etiology for the pathology depicted within the bladder on the radiograph below is which of the following?

- a. bladder calculus
- b. bacterial infection
- c. transitional cell carcinoma
- d. bladder diverticula



# Question #60: Review

- Transitional Cell Carcinoma (TCC) makes up 90% of all urinary bladder cancers.
- It is a metastatic cancer that is mostly seen in men after the age of 50.
- TCC is clearly related to some industrial chemicals and to smoking.
- The primary symptom is painless hematuria.
- An IVP will demonstrate a filling defect in the area of the trigone but a cystoscopy is the method of choice for diagnosis.
- Treatment includes surgery, radiation therapy, and chemotherapy.

# Question #61:

A fistula is an abnormal passageway between two structures that do not normally connect.

- a. true
- b. false

# Question #61: Review

- A fistula is an abnormal passageway between two structures that do not normally connect.
- A fistula can form between two adjacent structures or between an organ and the surface of the body.
- A colovaginal fistula is a case where a passageway has been created between the vagina and the rectum.

This provides an alternate path for both feces and flatulence to exit the body.

This condition will often lead to recurrent infections of the urinary system and the vagina.

This condition can be caused by trauma, vaginal surgery, or colon cancer.

# Question #62:

The most likely etiology for the artifact located within the pelvis on this radiograph is which of the following?

- a. dermoid
- b. bladder calculus
- c. bladder diverticula
- d. none of the above



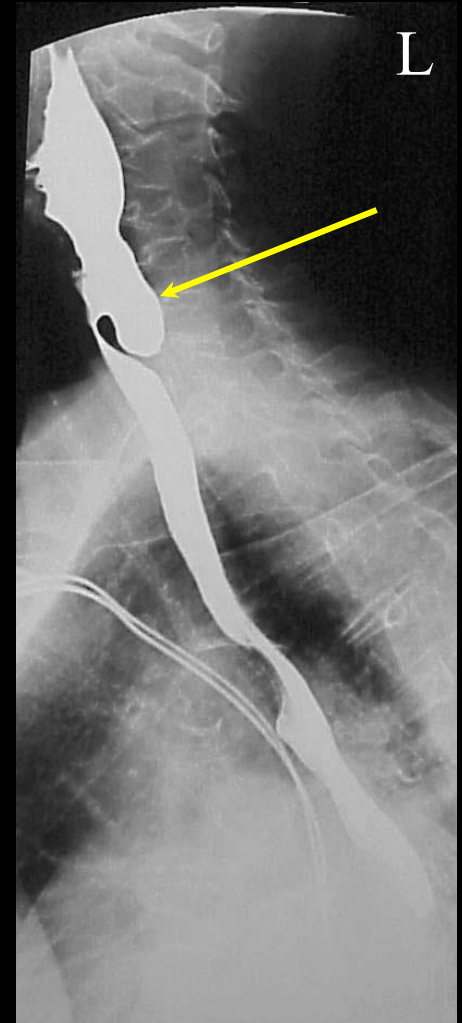
# Question #62: Review

- A dermoid is a type of teratoma (benign cyst) that contains developmentally mature skin that can take the following forms:
  - Hair, Teeth, Nails
  - Cartilage
  - Thyroid Tissue
  - Sebaceous Secretions (oil)
- A dermoid can account for up to 25% of all ovarian tumors but can occur in other areas of the body as well.
  - In some instances, surgical removal may be indicated.

# Question #63:

The most likely condition depicted on this radiograph of the esophagus (arrow) would be which of the following?

- a. polyp
- b. traction diverticula
- c. Zenker's diverticula
- d. epiphrenic diverticula



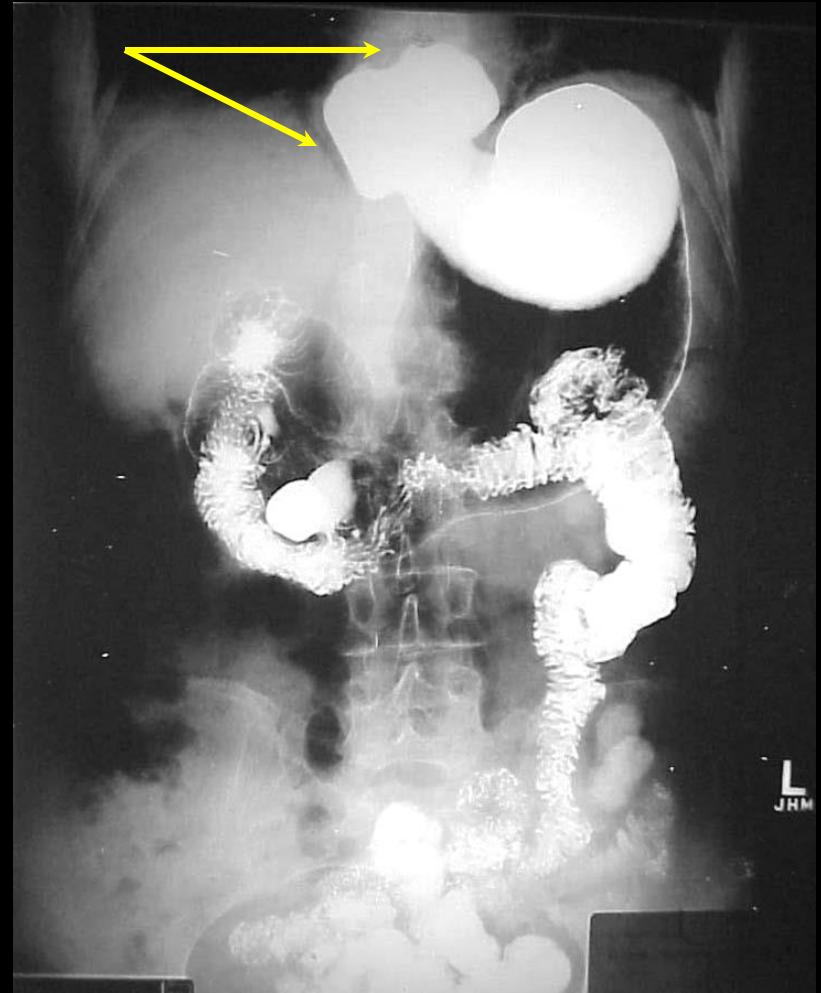
# Question #63: Review

- A diverticulum is an outpouching that occurs due to a weakening in the lining of, in this instance, the digestive system.  
This is not to be confused with a neoplasm which is a new growth that usually develops in towards the lumen of the digestive system.  
Diverticulum are often diagnosed with barium studies of the digestive system.
- **Zenker's Diverticulum arise from the posterior wall of the upper esophagus in the area of the pharynx.**  
Although often asymptomatic, they can cause dysphagia (difficulty in swallowing) and halitosis (bad breath).

# Question #64:

The most likely condition depicted on this UGI radiograph (arrows) would be which of the following?

- a. epiphrenic diverticula
- b. candida
- c. hiatal hernia
- d. gastric ulcer



# Question #64: Review

- A hiatal hernia occurs when a portion of the stomach herniates into the thorax through the esophageal opening in the diaphragm.

This is known as a sliding hiatal hernia, and it is the most common type of hiatal hernia encountered.

- This is one of the most common findings on an UGI series.
- It can affect up to 50% of the population as some point in their lives.
- A hiatal hernia is usually asymptomatic, but the patient may experience a fullness in their chest or regurgitation.

This acid reflux may lead to inflammation and ulceration of the esophagus.

Chronic herniation of the stomach may be associated with gastroesophageal reflux disease (GERD).

- Treatment includes a bland diet, antacids, and medications to reduce reflux.

# Question #65:

Which of the following disorders of the intestines involves the “telescoping” of one bowel loop inside another loop?

- a. adhesion
- b. intussusception
- c. volvulus
- d. hernia

# Question #65: Review

- Intussusception occurs when a section of bowel is constricted by peristalsis causing it to prolapse or telescope into itself.
- This condition is primarily confined to infants aged 2 to 36 months and occurs more frequently in boys than girls at a ratio of 3:1.
- Intussusception is the cause of approximately 1% of all adult bowel obstructions and commonly affects the ileocecal valve.
- It is commonly corrected with a barium enema.

# Question #66:

The main abnormality on this BE radiograph (arrows) would be which of the following?

- a. sessile polyps
- b. Crohn's disease
- c. diverticulosis
- d. pedunculated polyps



# Question #66: Review

- Diverticulosis can occur along the entire length of the GI tract.
- In the large intestine, they are commonly found in the area of the sigmoid colon.
- Diverticulum often have no signs or symptoms and are often a serendipitous discover on a barium study or colonoscopy.

# Question #67:

A volvulus is a type of mechanical bowel obstruction that is defined as a loop of twisted bowel.

- a. true
- b. false

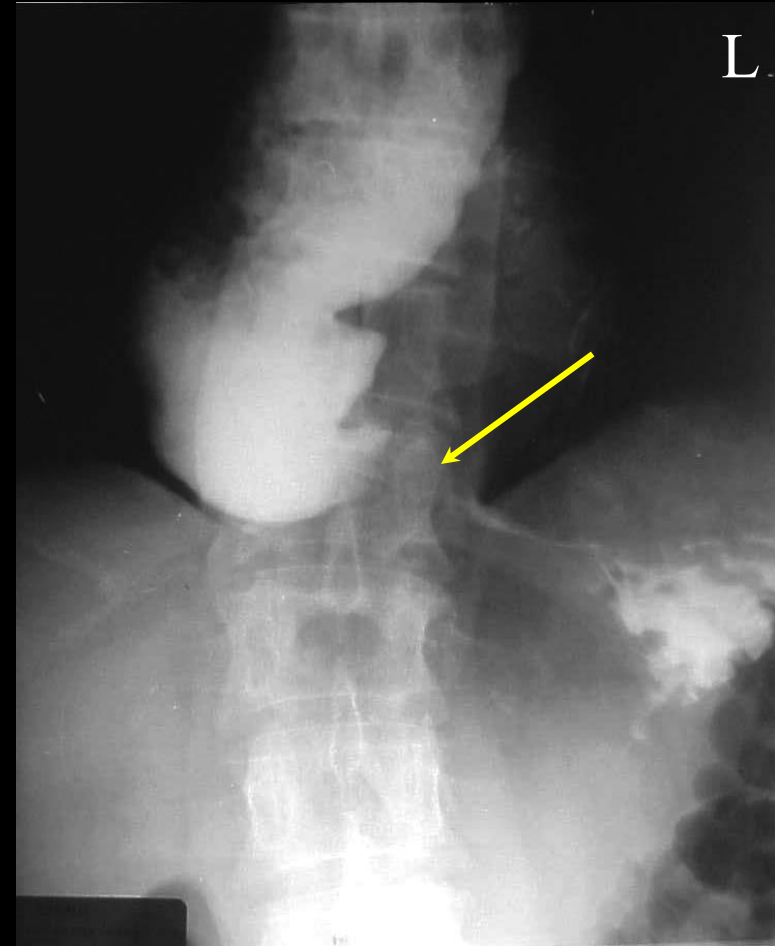
# Question #67: Review

- A volvulus is a loop of intestine that has twisted around itself causing either a partial or complete obstruction.
- They may resolve on their own, but some will require surgical intervention to prevent a loss of blood supply to the affected area and relieve the obstruction.

# Question #68:

The lower esophageal sphincter (LES) has failed to relax on this radiograph (arrow) resulting in an esophageal motility disorder. Which of the following would best describe this condition?

- a. candida
- b. gastroesophageal reflux disease
- c. esophageal varices
- d. achalasia



# Question #68: Review

- Achalasia is an esophageal motility disorder that occurs due to the inability of the lower esophageal sphincter (LES) to relax.

As a result, the esophagus fills with ingested food and fluids.

- This is the exact opposite of acid reflux.
- Treatment includes a bland diet, medication to relax the LES, surgery, and an upright position to reduce regurgitation.

# Question #69:

Which of the following is one of the most common findings on an UGI series?

- a. achalasia
- b. hiatal hernia
- c. adynamic ileus
- d. candida

# Question #69: Review

- A hiatal hernia occurs when a portion of the stomach herniates into the thorax through the esophageal opening in the diaphragm.

This is known as a sliding hiatal hernia, and it is the most common type of hiatal hernia encountered.

- This is one of the most common findings on an UGI series.
- It can affect up to 50% of the population as some point in their lives.
- A hiatal hernia is usually asymptomatic, but the patient may experience a fullness in their chest or regurgitation.

This acid reflux may lead to inflammation and ulceration of the esophagus.

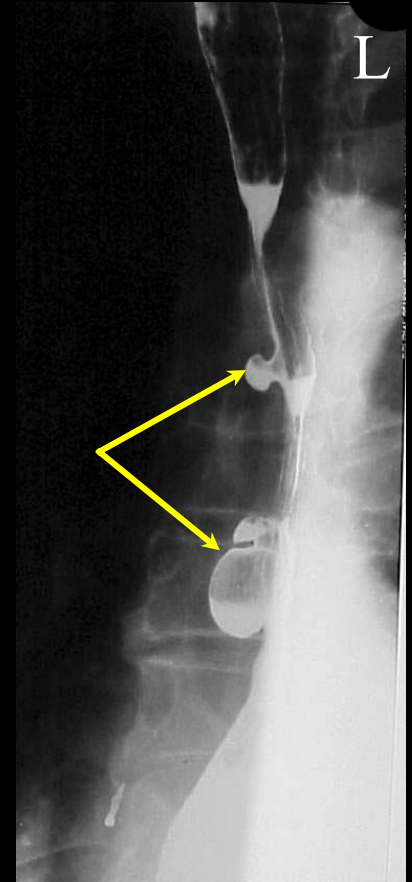
Chronic herniation of the stomach may be associated with gastroesophageal reflux disease (GERD).

- Treatment includes a bland diet, antacids, and medications to reduce reflux.

# Question #70:

The most likely condition depicted on this radiograph of the esophagus (arrows) would be which of the following?

- a. Zenker's diverticula
- b. epiphrenic diverticula
- c. traction diverticula
- d. polyp



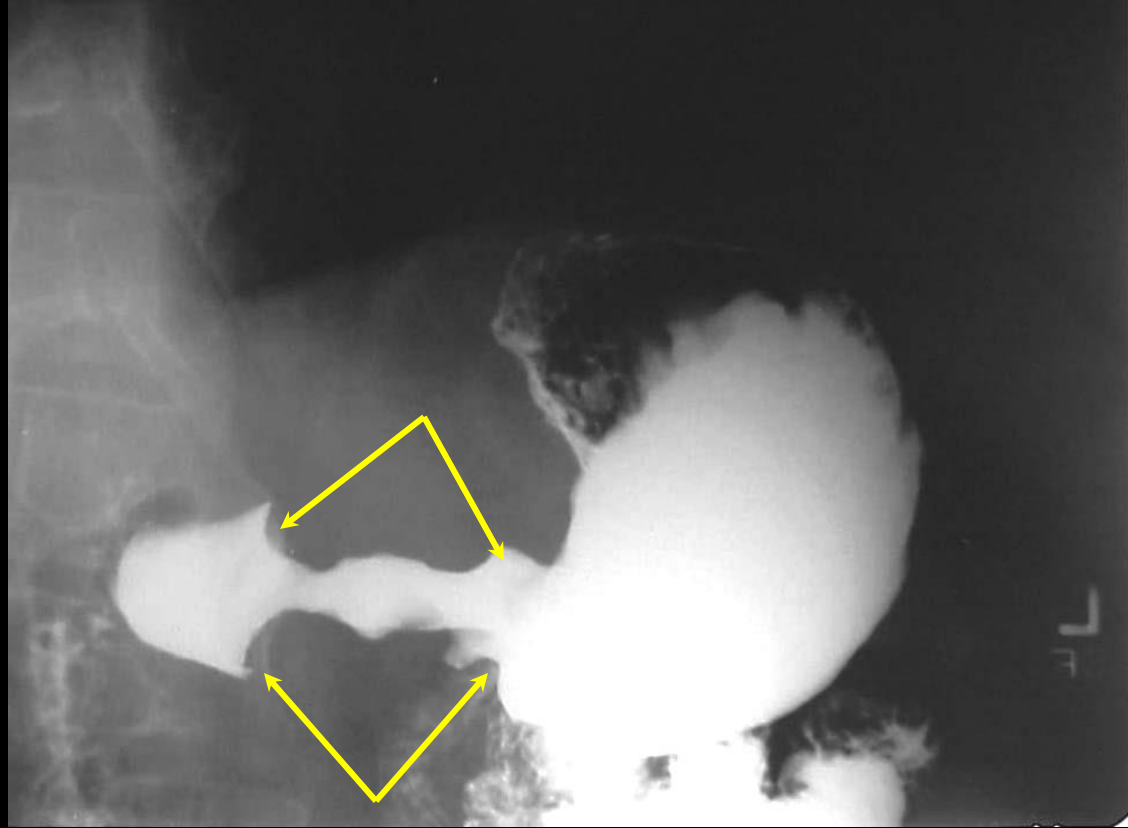
# Question #70: Review

- A Traction Diverticulum forms in the mid esophagus area.
- Traction diverticulum may form due to scarring from pulmonary tuberculosis or an inflammatory process within the mediastinum.

# Question #71:

The main abnormality depicted on the radiograph below (arrows) is a sessile polyp?

- a. true
- b. false



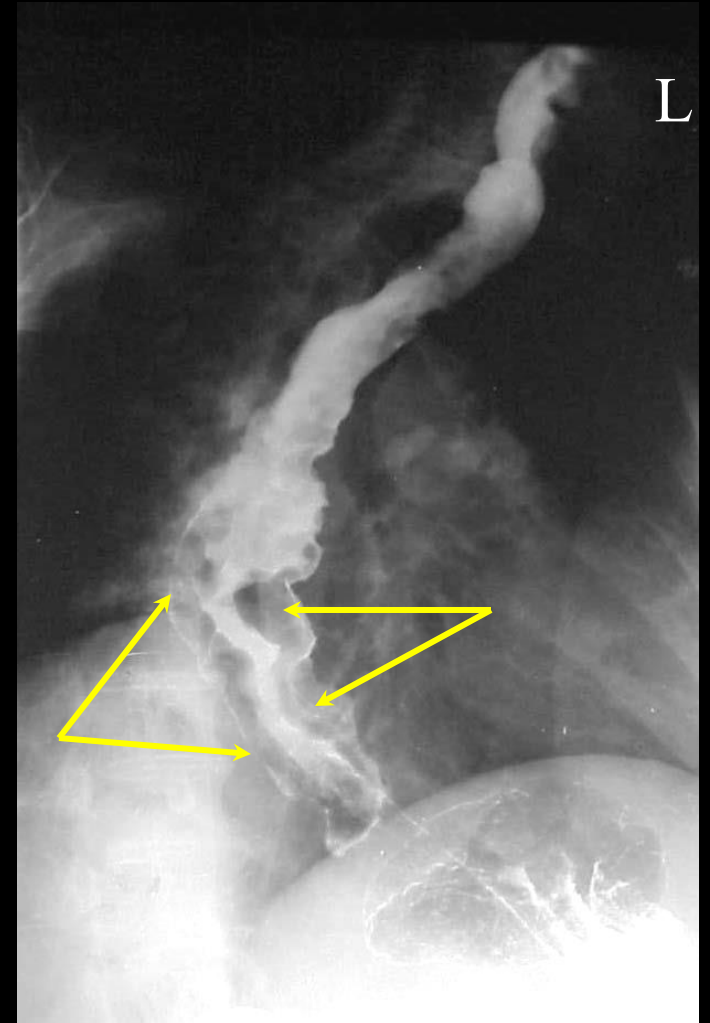
# Question #71: Review

- Gastric Carcinoma is generally asymptomatic in the early stages and has generally metastasized to other areas of the body by the time it has been diagnosed.
- As a result, it has a poor prognosis.
- UGI studies present thick, irregular, and rigid (linitis plastica) folds.
- Treatment includes gastrectomy, chemotherapy, and radiation therapy.

# Question #72:

The arrows on this radiograph of the esophagus are pointing to esophageal varices. Damage to which of the following organs is the likely etiology for this condition?

- a. liver
- b. kidneys
- c. pancreas
- d. adrenal glands



# Question #72: Review

- Esophageal Varices are dilated, tortuous veins of the esophagus which may rupture.
- They are commonly a result of portal hypertension and/or liver cirrhosis.

Esophageal varices are often a complication of alcoholism.

# Question #73:

The bowel pattern demonstrated on this radiograph is the result in the disruption of the normal peristaltic action of the intestines. Which of the following is the most likely etiology for this condition?

- a. adhesion
- b. adynamic ileus
- c. constipation
- d. intussusception



# Question #73: Review

- An Adynamic or Paralytic Ileus is a type of bowel obstruction is caused by a reduction in the normal peristaltic action of the intestines.
- This loss of peristalsis will cause the lumen of both the small and large intestines to fill with air and fluid.
- Therefore, the radiographic appearance of air in both the small and large intestines is an indication of this condition.
- Some common causes of an adynamic ileus are as follows:
  - Anesthesia/Some Medications
  - Abdominal Surgery
  - Illness

# Question #74:

The most likely etiology for the condition depicted on this radiograph would be which of the following?

- a. bowel adhesion
- b. Crohn's disease
- c. adenocarcinoma
- d. inguinal hernia



# Question #74: Review

- A Hernia is a type of obstruction is caused by a weakening of the abdominal wall that allows a portion of the small and/or large intestine to protrude through it.
- A *reducible hernia* can be pushed back into the abdominal cavity while an *incarcerated hernia* cannot and could therefore lead to a bowel obstruction.
- A common hernia in men is called an inguinal hernia.

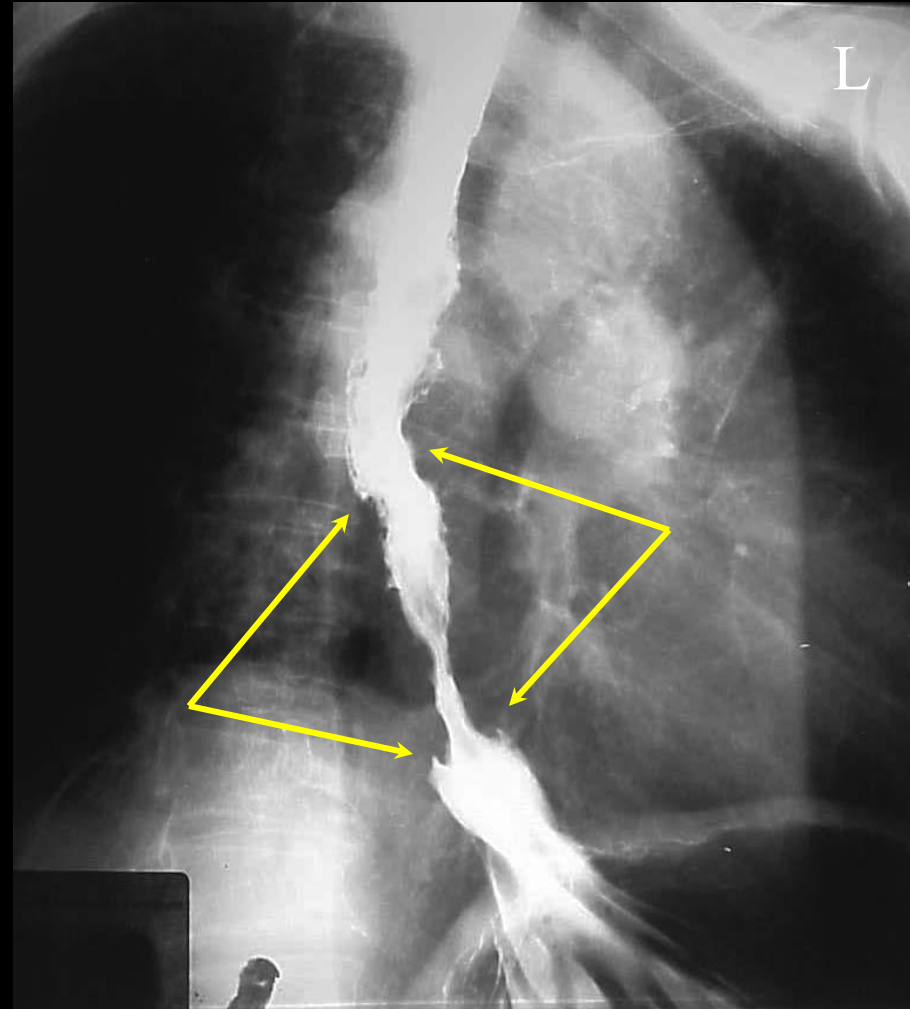
This condition occurs when the inguinal ring is compromised thus allowing a portion of the bowel to rupture through the abdominal wall.

In some instances, the bowel will descend into the scrotum.

# Question #75:

Which of the following is the most likely etiology for the condition depicted (arrows) on this radiograph of the esophagus?

- a. esophagus cancer
- b. candida
- c. esophageal varices
- d. gastroesophageal reflux



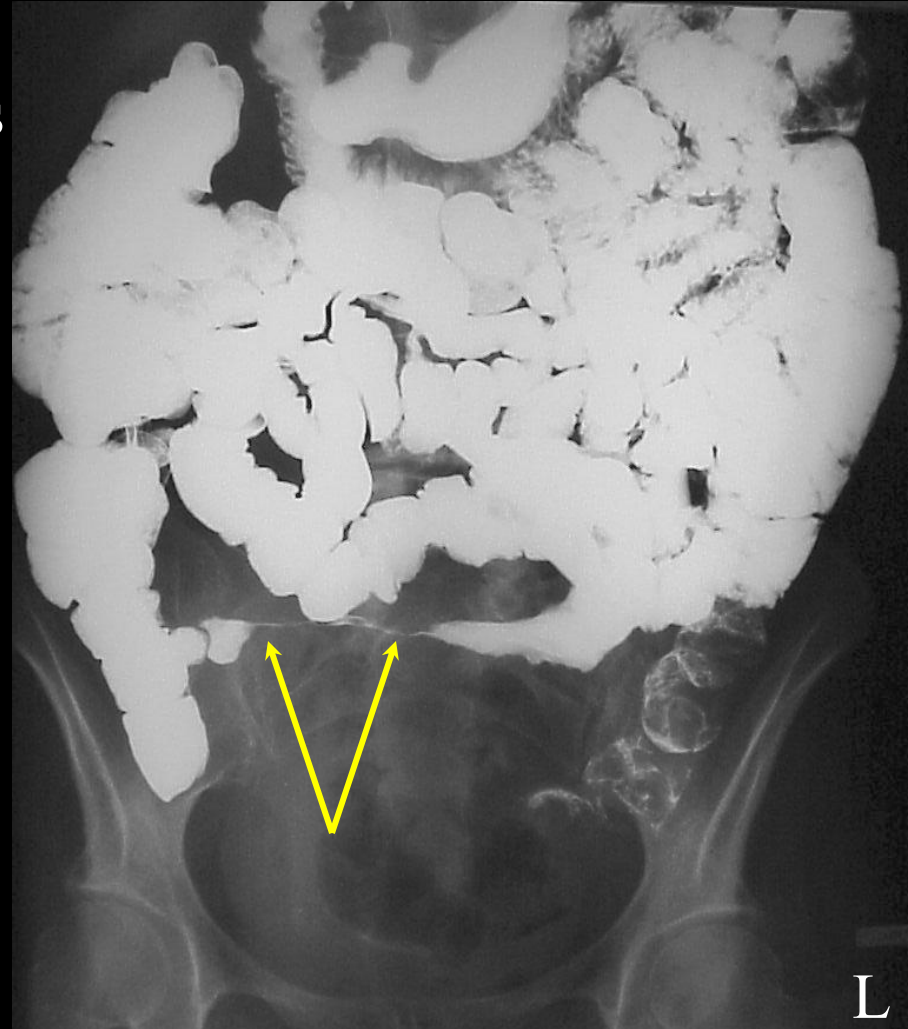
# Question #75: Review

- Esophagus Cancer represents 2% of all cancers and there is a high incidence in smokers and alcoholics.
- The prognosis for this cancer is very poor as it has a 5-year survival rate of 25%.
- It presents with a very “ratty” radiographic appearance on a barium swallow.
- Treatment includes the following
  - Chemotherapy
  - Radiation Therapy
  - Esophagogastrectomy (gastric pull-up)
    - The affected portion of the esophagus is removed, and the stomach is pulled up into the thorax.

# Question #76:

The arrows on this radiograph are pointing to a condition referred to as the “string sign.” This is a characteristic of which of the following diseases?

- a. Wilm’s tumor
- b. adenocarcinoma
- c. Crohn’s disease
- d. candida



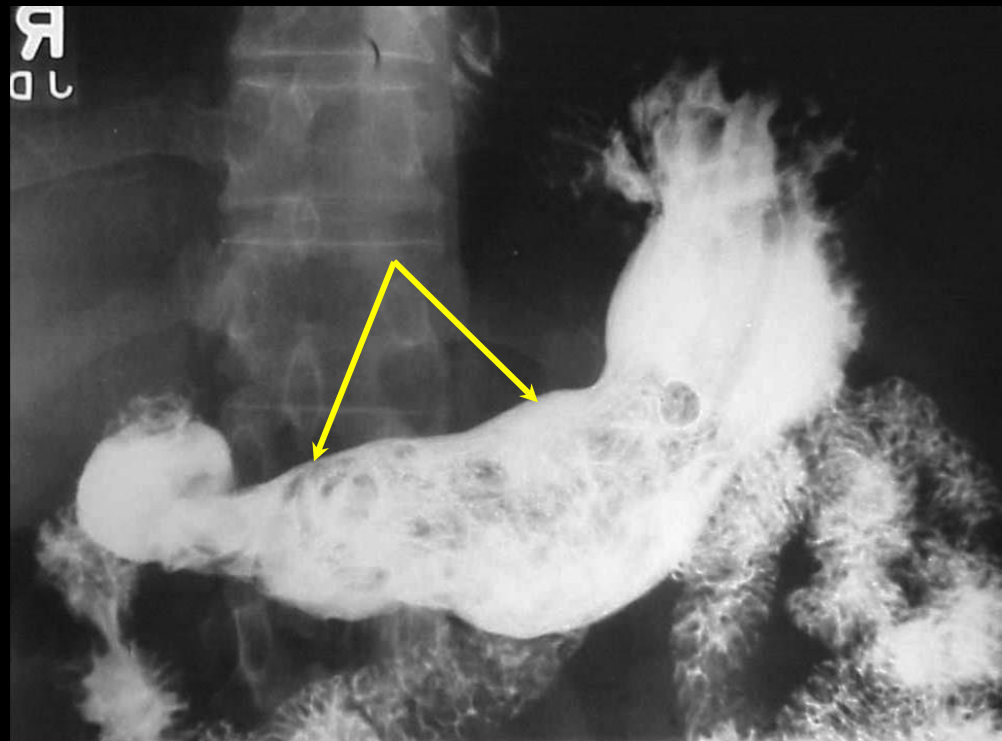
# Question #76: Review

- Crohn's Disease or Regional Enteritis is characterized by a chronic inflammation of the bowel and has an unknown etiology.
- This is an example of a disease that may be the cause of a mechanical bowel obstruction.
- It is characterized by abdominal cramping, diarrhea, constipation, weight loss or gain, and vomiting.
- Fistulas may form in response to the chronic inflammation that characterizes this disease.
- There is no known cure for Crohn's disease.

# Question #77:

The hard mass of entangled material found within the stomach (arrows) on the radiograph below is referred to as a bezoar.

- a. true
- b. false



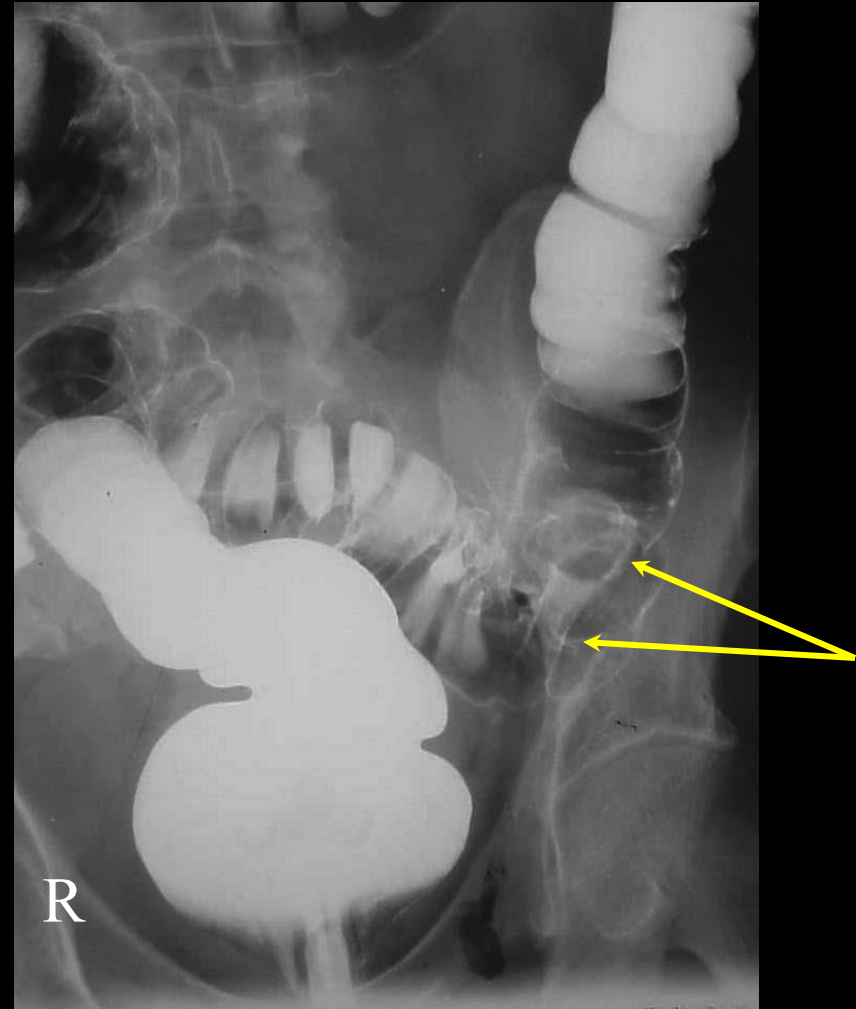
# Question #77:

- A Bezoar is a hard mass of entangled material found within the stomach or intestines that cannot be digested.
- They are often made of hair and food fibers.

# Question #78:

Which of the following is the most likely etiology for the condition depicted (arrows) on this radiograph of the large intestine?

- a. diverticulosis
- b. polyp
- c. Crohn's disease
- d. diverticulitis



# Question #78: Review

- A neoplasm that grows into the lumen of the colon is called a polyp.
- A pedunculated polyp possess a stalk while a sessile (barnacle) polyp is attached directly to the bowel wall.
- Most polyps are benign, but an adenomatous polyp may transform into a malignancy and must be removed.

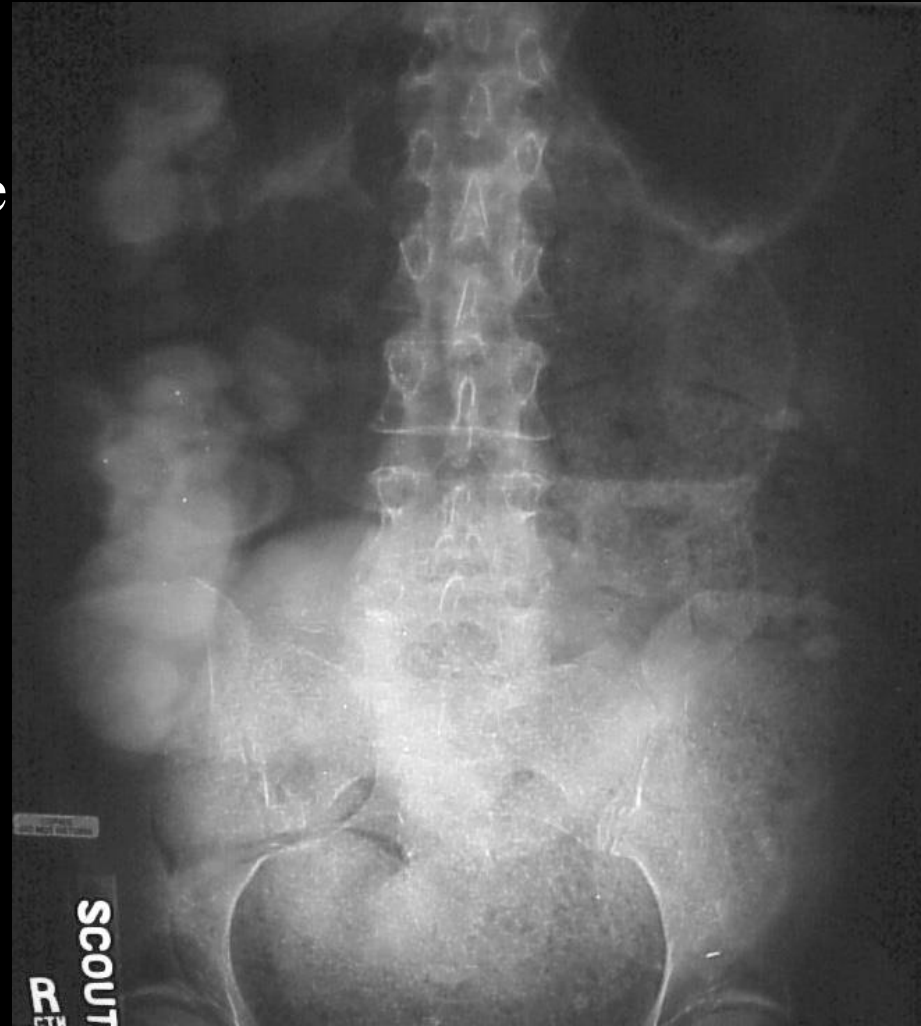
This is sometimes referred to as simply an adenoma.

- Colon polyps are generally asymptomatic, but some may cause rectal bleeding, pain, diarrhea, and/or constipation.

# Question #79:

Which of the following is the most likely etiology for the grainy appearance on this radiograph of the abdomen?

- a. ascites
- b. constipation
- c. GI bleed
- d. paralytic ileus



# Question #79: Review

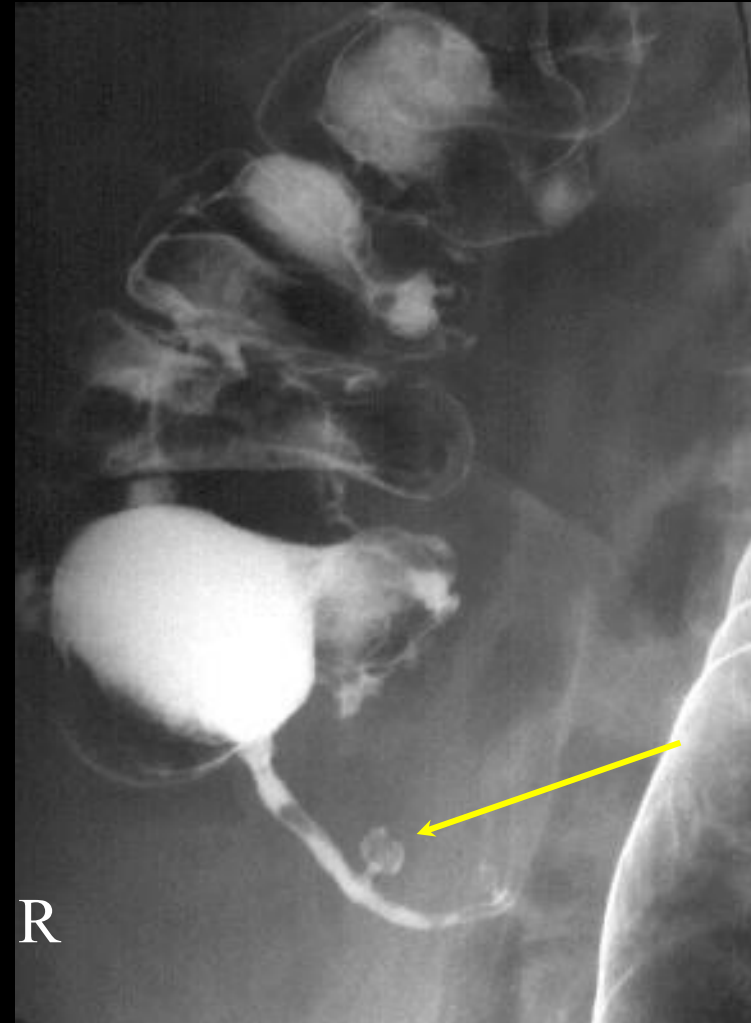
- Treatment for Constipation usually consists of an increased intake of fluid and dietary fibers and the use of laxatives.

In some instances, the impaction will require the use of enemas and/or manual removal.

# Question #80:

Which of the following is the most likely etiology for the structure identified by the arrow on this BE radiograph?

- a. diverticula
- b. adenocarcinoma
- c. polyp
- d. appendicolith



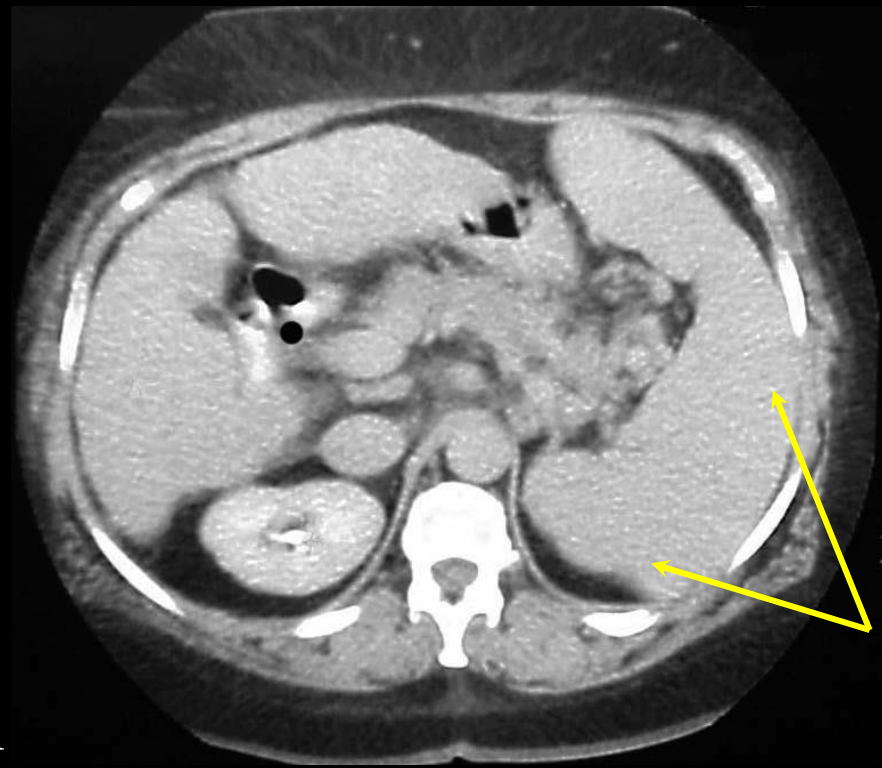
# Question #80: Review

- Diverticula can form anywhere along the alimentary canal. In this instance, the lining of the appendix has weakened resulting in the formation of a small diverticula.

# Question #81:

Which of the following would be the most likely condition for what the arrows on this CT image of the abdomen are pointing to?

- a. hepatomegaly
- b. kidney hyperplasia
- c. splenomegaly
- d. none of the above



R

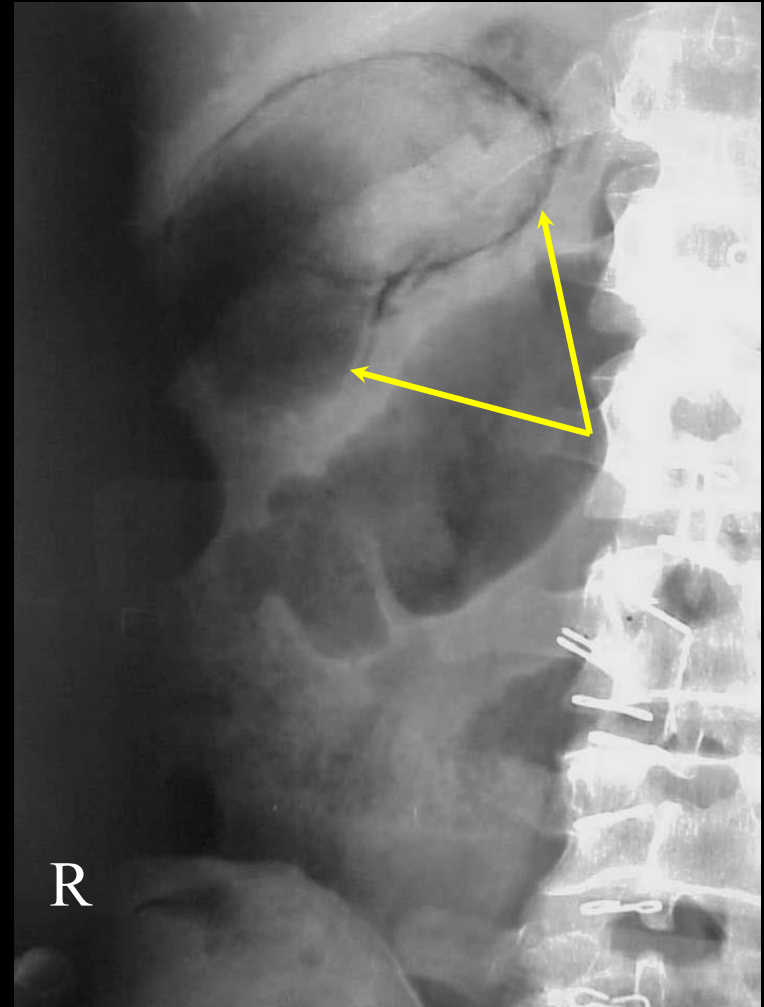
# Question #81: Review

- Splenomegaly simply refers to an enlargement of the spleen.
- It is usually associated with any disease that involves the destruction of large quantities of defective red blood cells.
  - It is also linked to leukemia, lymphoma, and portal hypertension.
- Treatment for this condition usually includes a splenectomy.

# Question #82:

The main abnormality on this radiograph (arrows) is an emphysematous gallbladder. This condition is caused by a bacterial infection.

- a. true
- b. false



# Question #82: Review

- Emphysematous Cholecystitis is characterized by the presence of bacteria within the gallbladder.

In this instance, bacteria has managed to work their way from the small intestine, through the biliary tree, and finally into the gallbladder.

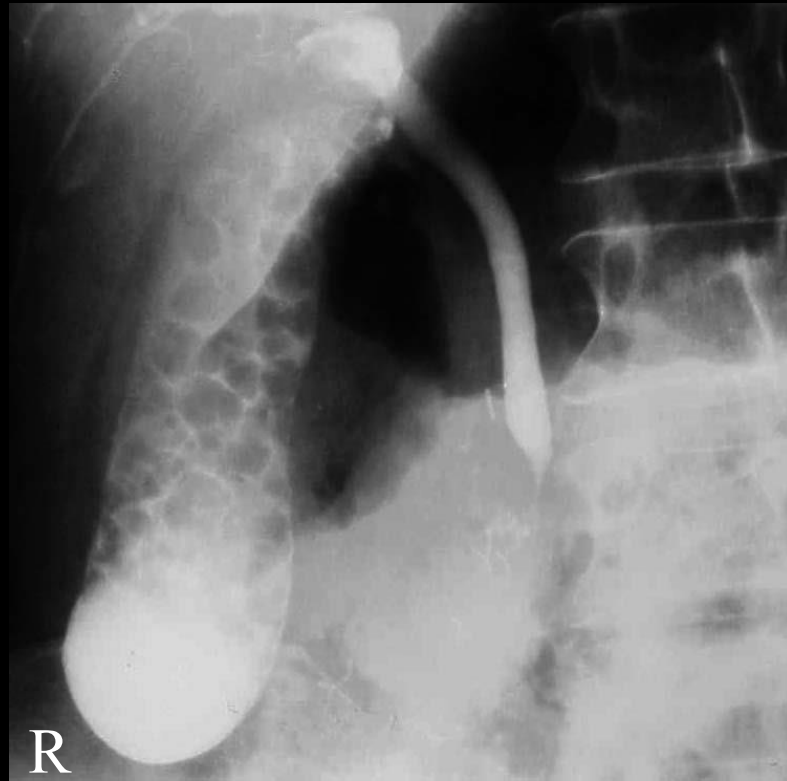
Bacteria produce gas as an excrement and as a result, the gallbladder will produce a distinct air-fluid level on an upright abdomen radiograph.

- Treatment involves cholecystectomy and broad-spectrum antibiotic coverage.

# Question #83:

The main abnormality depicted on the radiograph below would be consistent with radiopaque choleliths.

- a. true
- b. false



# Question #83: Review

- Cholelithiasis is the condition of having gallstones.
- This only becomes a problem if the stones cause an inflammation of the gallbladder which is called cholecystitis.

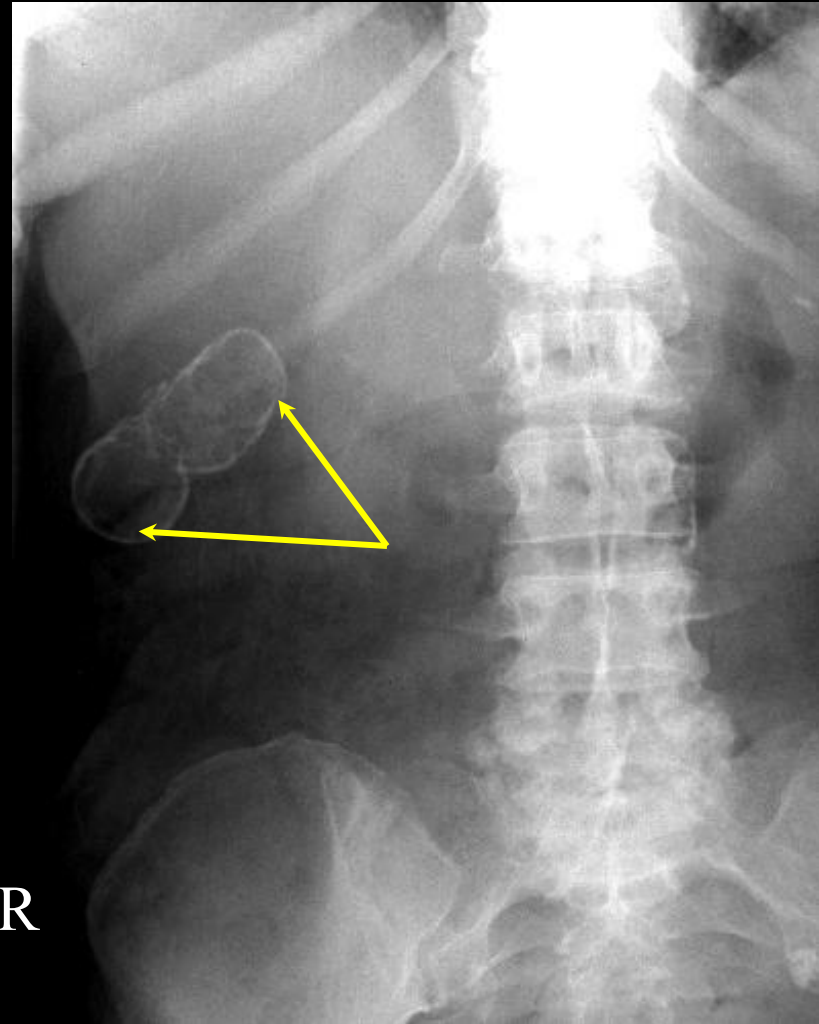
This is often secondary to cystic duct obstruction.

- Nuclear medicine and ultrasound are the imaging modalities of choice in the diagnosis of cholelithiasis although 15% of gallstones appear radiopaque on a KUB.

# Question #84:

Which of the following is the most likely condition for the structure identified by the arrows on this abdominal radiograph?

- a. dermoid
- b. calcified renal cyst
- c. porcelain gallbladder
- d. calcified splenic cyst



# Question #84: Review

- Calcification of the gallbladder is commonly referred to as a porcelain gallbladder.

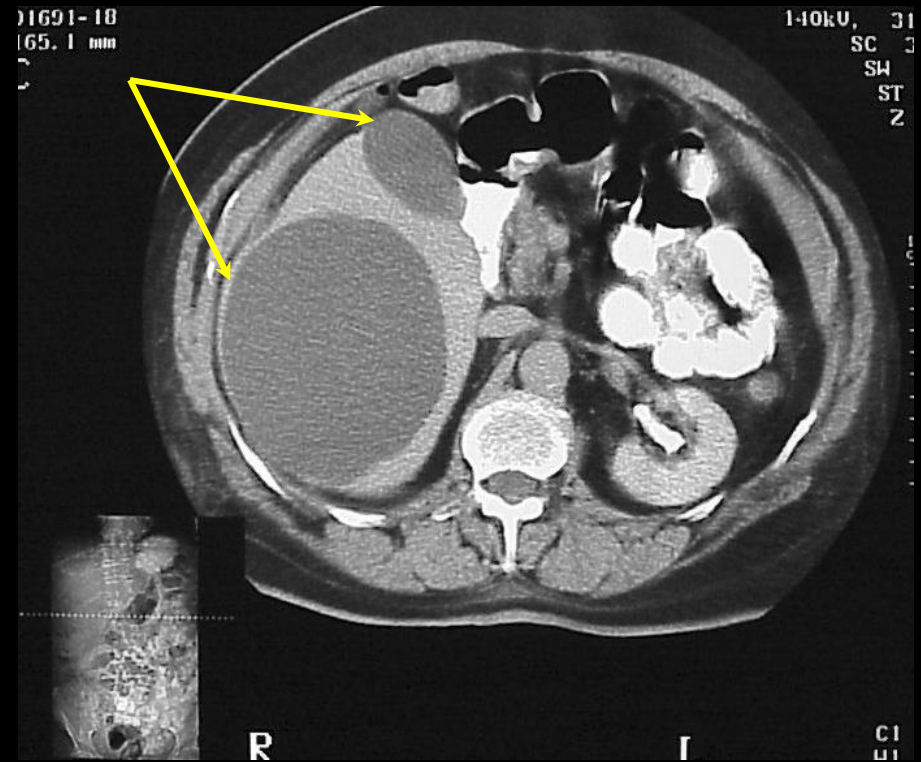
The walls of the gallbladder can calcify and form a hard, bluish color that resembles porcelain.

- It may be associated with gallbladder cancer which is very rare, or it may be brought on by excessive gallstone production.
- Treatment includes cholecystectomy.

# Question #85:

Which of the following would be the most likely condition for what the arrows on this CT image of the abdomen are pointing to?

- a. hepatic cysts
- b. hepatic hemangioma
- c. hepatocellular carcinoma
- d. none of the above



# Question #85: Review

- A hepatic cyst is a benign, thin-walled sac that may be either empty or full of fluid.
- They may be located within the liver or on its external surface.
- Hepatic cysts generally have no symptoms and are usually incidental findings on ultrasounds, CT scans and/or MRI scans of the abdomen.
- No treatment is usually required.

# Question #86:

Which of the following is the most likely type of the fracture identified by the arrows on this oblique foot radiograph?

- a. Jones fracture
- b. Comminuted fracture
- c. avulsion fracture
- d. torus fracture



# Question #86: Review

- An avulsion fracture occurs when there is trauma to where a ligament or tendon attaches to a bone.
- This type of fracture occurs when the tear causes a piece of bone to be pulled off.
- An avulsion fracture can be seen anywhere in the body, but a common site is at the base of the 5th metatarsal.
- Most avulsion fractures are treated as a soft tissue injury and do not require surgical repair.

# Question #87:

Which of the following is the most likely type of the fracture identified by the arrows on this cone down of an oblique hand?

- a. boxer's fracture
- b. Monteggia fracture
- c. Salter-Harris fracture
- d. Jones fracture



# Question #87: Review

- A Boxer's Fracture occurs at the head of the 4th or 5th metacarpal of the hand.
- It almost always occurs as the result of striking a firm object with a closed fist.
- Most boxer's fractures can heal with a cast, but some severe cases may require surgical repair.

# Question #88:

Which of the following is the most likely type of the fracture identified by the arrow on this patient's distal radius?

- a. Pott's fracture
- b. torus fracture
- c. Colles' fracture
- d. compression fracture



# Question #88: Review

- A Colles' Fracture is most often caused when an individual falls backwards onto a hard surface and braces themselves with an open hand.
- It consists of a fracture of the distal radius with posterior and lateral displacement of the distal fragment.
- It can most often be treated with a closed reduction and a cast.
- Some severe fractures may require the surgical insertion of an internal fixation device.

# Question #89:

Which of the following bones is **not** involved in a tripod fracture?

- a. sphenoid bone
- b. malar or zygomatic
- c. temporal bone
- d. maxillary bone

# Question #89: Review

- The malar or zygomatic bone articulates with the frontal bone, temporal bone, and the maxillary bone.
- Trauma directly to the malar bone may cause a fracture at each of these articulations.
  - This would be known as a tripod fracture.
- Treatment of this type of fracture usually requires a surgical reduction of the fracture sites.

# Question #90:

Which of the following bones has a retrograde blood supply that if damaged due to trauma could lead to a condition called avascular necrosis?

- a. 5th metatarsal
- b. scaphoid
- c. cuboid
- d. hamate

# Question #90: Review

- The scaphoid is the most commonly fractured carpal bone, and it can be difficult to heal due to its unpredictability.
- **The scaphoid has an unusual retrograde blood supply.**

The arterial blood vessels that supply it enter at the distal portion of the bone.

As a result, healing can be slow and result in a delayed union or not at all (non-union).

- Electrical stimulation may be used for delayed union.
- In the case of non-union, surgery may be indicated.

In some instances, the blood supply may be damaged and lead to a condition called avascular necrosis.

- This will eventually lead to degenerative arthritis.

# Question #91:

Which of the following fractures occurs when there are multiple bone fragments?

- a. comminuted
- b. spiral
- c. greenstick
- d. Pott's

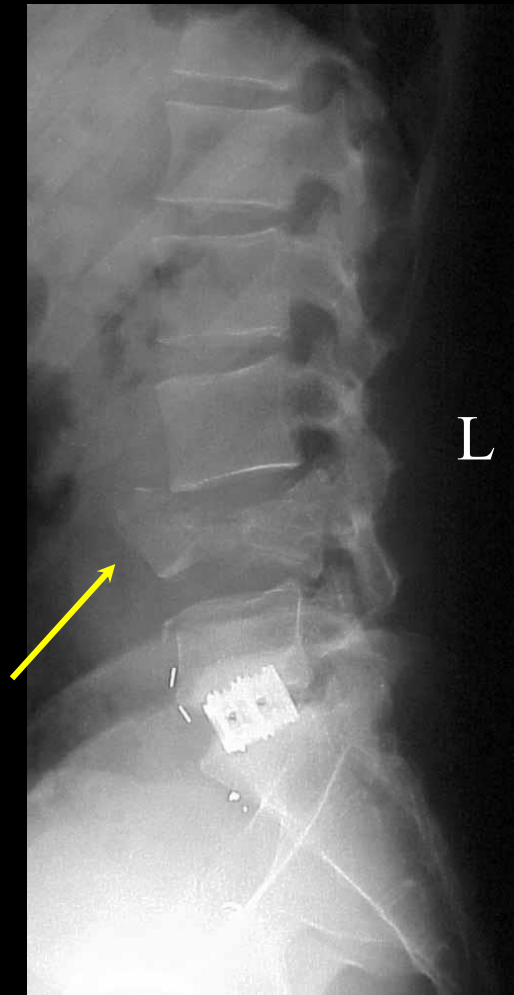
# Question #91: Review

- A Comminuted Fracture occurs when there are multiple bone fragments.
- This often occurs as the result of some type of crushing injury or as the result of gun shot wound.

# Question #92:

Which of the following is the most likely type of the fracture identified by the arrow on this patient's lumbar spine?

- a. Jones fracture
- b. Salter-Harris Type II
- c. torus
- d. compression fracture



# Question #92: Review

- A Compression Fracture occurs when a vertebral body is crushed and collapses down upon itself.
- It can be the result of trauma, cancer, or osteoporosis.
- Treatment may include the any of the following depending on the severity of the fracture and its potential impact on the spinal cord:
  - A back brace to stabilize the fracture while it heals.
  - The surgical insertion of internal fixation devices.
  - A vertebroplasty may be performed.
    - This requires the injection of cement into the vertebral body by an interventional radiologist as a means to prevent further collapse of the vertebral body.

# Question #93:

A positive fat pad sign is an indication of a fracture for which of the following?

- a. elbow
- b. wrist
- c. ankle
- d. hip

# Question #93: Review



The image on the left is normal elbow while the **elbow on the right demonstrates a positive fat pad sign as the result to trauma to the distal humerus.**

# Question #94:

Which of the following is a type of fracture that is commonly associated with children?

- a. Jones fracture
- b. Pott's fracture
- c. Colles' fracture
- d. greenstick fracture

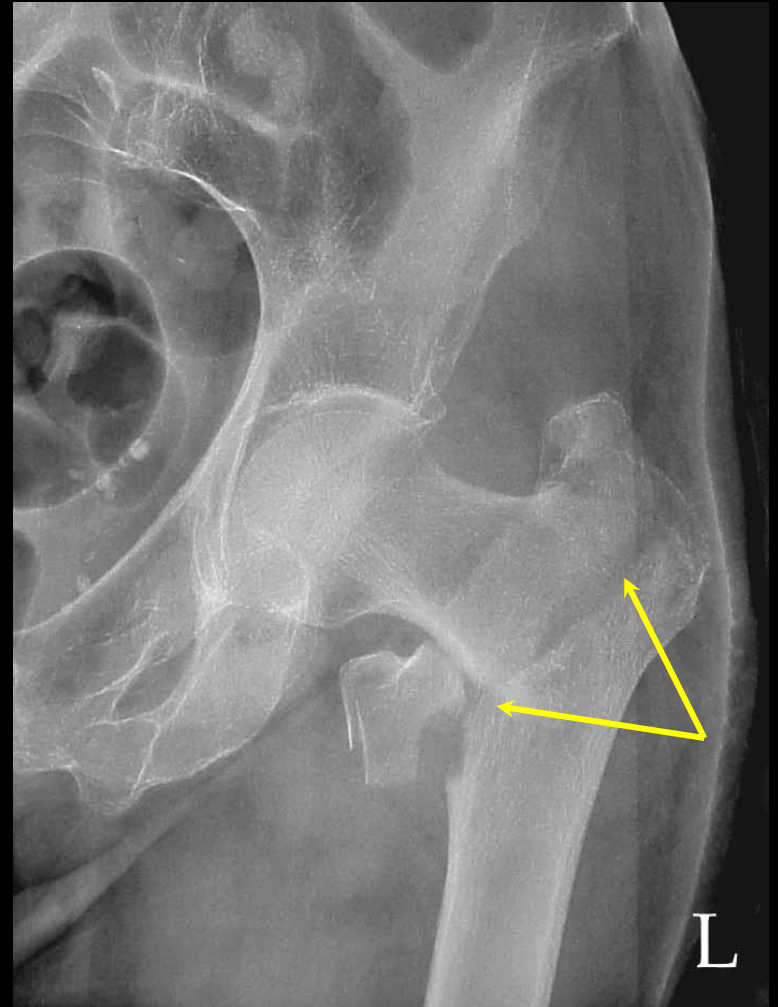
# Question #94: Review

- A greenstick fracture is a type of partial fracture that is commonly associated with children.
- The analogy is between the pliable nature of their bones and the inability to cleanly break a green twig.
- These fractures are usually easily repaired and most often can be corrected with a closed reduction.
- Greenstick fractures are sometimes associated with rickets.

# Question #95:

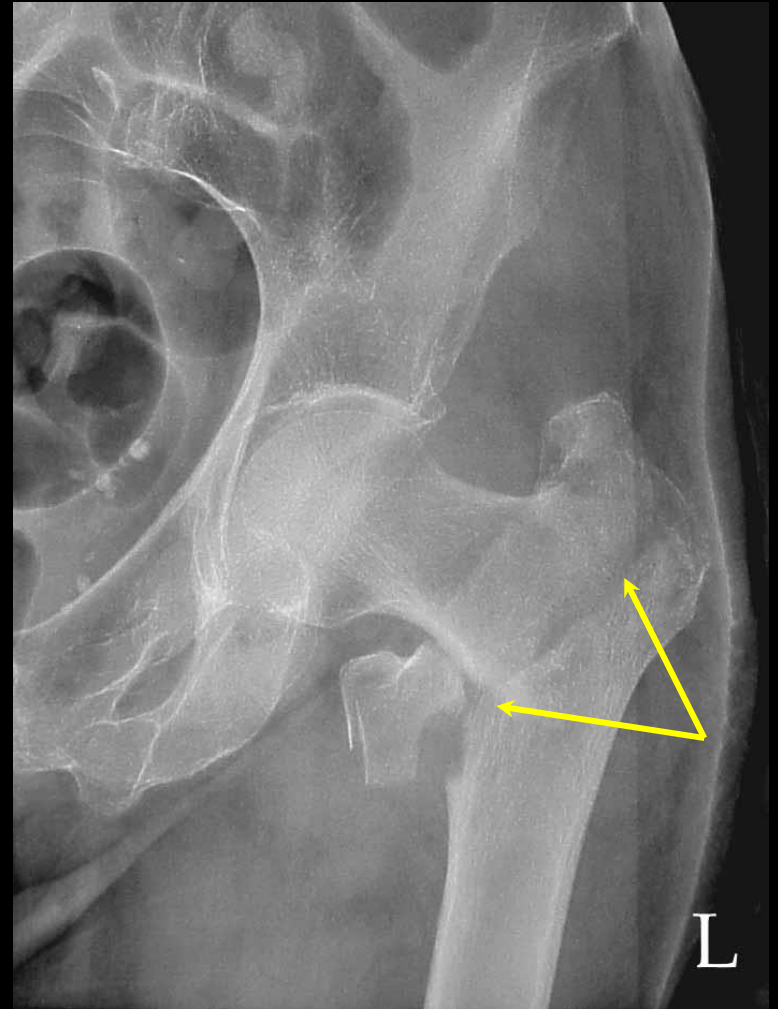
Which of the following is the most likely type of fracture identified by the arrows on this patient's hip?

- a. intertrochanteric fracture
- b. subtrochanteric
- c. femoral head
- d. femoral neck



# Question #95: Review

This hip fracture occurred through the intertrochanteric crest (arrows). These fractures usually do not damage the blood supply to the hip like femoral neck fractures do and can therefore be reduced with a metal plate and screws as opposed to the more invasive total hip replacement usually required for neck fractures.



# Question #96:

What is the name of the fracture that occurs on the shaft of the 5th metatarsal?

- a. Monteggia fracture
- b. Salter-Harris fracture
- c. Jones fracture
- d. Pott's fracture

# Question #96: Review

- A Jones Fracture occurs on the shaft of the 5th metatarsal.
- It should not be confused with an avulsion fracture which often occurs at the base of the 5th metatarsal.
- Most often a Jones fracture occurs without significant injury or impact.
- It is more difficult to heal than an avulsion fracture but usually only requires the wearing of a walking boot or cast for 4 to 8 weeks.
- However, in some instances, it may require the surgical insertion of a screw or bone graft in order to stimulate a healing response.

# Question #97:

What is the name given to a fracture of the proximal third of the ulna combined with a dislocation of the radial head within the elbow joint?

- a. torus fracture
- b. Monteggia fracture
- c. Salter-Harris fracture
- d. blow-out fracture

# Question #97: Review

- A Monteggia Fracture is usually the result of a fall on an outstretched arm.
- It involves a fracture of the proximal third of the ulna combined with a dislocation of the radial head within the elbow joint.
- These are very unstable injuries that usually require surgical repair.
  - The ulna will require an internal fixation device and once this will usually reduce the radial head dislocation.

# Question #98:

What is the name given to a fracture where the bone has pierced the skin?

- a. Salter-Harris fracture
- b. spiral fracture
- c. compression fracture
- d. compound fracture

# Question #98: Review

- An Open or Compound Fracture occurs when the bone manages to pierce the skin.
- These fracture almost always require the surgical insertion of internal fixation devices.

# Question #99:

What is the name given to a fracture of the distal forearm in children that is sometimes referred to as a “buckle” fracture?

- a. spiral fracture
- b. torus fracture
- c. Salter-Harris fracture
- d. greenstick fracture

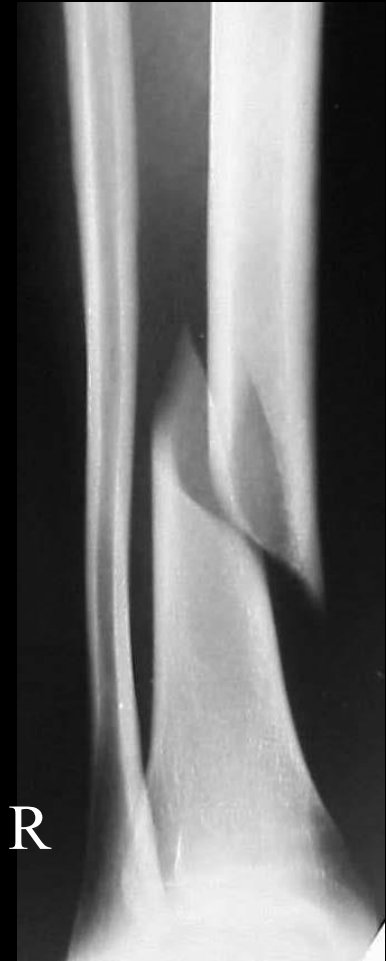
# Question #99: Review

- Torus comes from the Latin word tori which refers to a swelling or protuberance.
- The impact from a fall on an outstretched hand is usually the cause of a Torus Fracture.
- It commonly occurs in the distal forearm of young children, and it is sometimes referred to as a “buckle” fracture.
- It is characterized by a small buckle or protuberance on one side of the bone but not on the other.
- Treatment usually consists of a short cast for three weeks in order to prevent any further injury.

# Question #100:

Which of the following types of fractures is demonstrated on this patient's tibia?

- a. transverse
- b. incomplete
- c. spiral
- d. none of the above



# Question #100: Review

- A Spiral Fracture occurs when the bone has been twisted apart.
- It will have a similar appearance to a spiral staircase.
- This fracture is sometimes referred to as a torsion fracture.
- Spiral fractures in babies and children can be a warning sign of abuse.

---

# Congratulations, you have just completed the Mastery Test!!

Now, just snap a picture of your completed answer sheet and text it to John Fleming at (727) 744-7946. If you score a 75% or higher, your certificate of completion will be emailed back to you within one week of us receiving your completed answer sheet and payment. *You will be allowed no more than three attempts to achieve a passing score on the mastery test.*

I hope that you have enjoyed this format for earning your continuing education and thanks for your support.

---

# Contact Information:

---

Mailing Address: Three Phase CEUs  
c/o John Fleming  
80 Bay Woods Drive  
Safety Harbor, FL 34695

Cell Phone: (727) 744-7946 (please send a text)

Website: <http://www.ceuarmy.com/>

Email: [threephaseceus@tampabay.rr.com](mailto:threephaseceus@tampabay.rr.com)

---

# About the Author:

---

John Fleming graduated from the St. Petersburg College (SPC) Radiography Program in Pinellas Park, Florida in December of 1985. He has been employed by SPC since May of 1987 and is currently the Radiography Program Director.

John completed a Master of Education Degree from the University of South Florida in December of 1998, and he has passed the American Registry of Radiologic Technology's Computed Tomography and Magnetic Resonance Imaging certification examinations.

---

# References:

Mace, James D. and Kowalczyk, Nina; Radiographic Pathology for Technologists, Fourth Edition, Elsevier-C.V. Mosby-Saunders Co., St. Louis, MO., 2004.

Eisenberg, Ronald L. and Johnson, Nancy M.; Comprehensive Radiographic Pathology, Fourth Edition, Elsevier-C.V. Mosby-Saunders Co., St. Louis, MO, 2007.

Laudicina, Paul; Applied Pathology for Radiographers, First Edition, Elsevier-C.V. Mosby-Saunders Co., St. Louis, MO, 1989.

Wicke, Lothar; Atlas of Radiologic Anatomy, Sixth Edition, Williams & Wilkins, 1998

# Mission Statement:

---

*Provide high quality, affordable home study courses in a prompt and courteous manner for all health care professionals.*

---