CHEST IMAGING
KISS PHILOSOPHY
KISS PHILOSOPHY

A complex, highly technical theorem developed over many years by a broad range of dedicated professionals working very, very hard for many long hours.
KEEP IT SIMPLE STUPID!
Everybody calls “clear” those ideas which have the same degree of confusion as his own

--Marcel Proust
1871-1922
RADIOGRAPHIC DENSITIES
What are the different basic radiographic densities?
Density Characteristics

1. Metal
2. Bone
3. Soft Tissue
4. Fat
5. Air
Hounsfield Units

Bone  1000 HU
Liver  40 - 60 HU
Blood  40 HU
Muscle  10 - 40 HU
Kidney  30 HU
Water  0 HU
Fat    -50 - -100 HU
Air    -1000 HU
Density Characteristics

1. Metal
2. Bone
3. Soft Tissue
4. Fat
5. Air
Which is denser (more radiopaque) the diaphragm or the rib?
Density Characteristics

1. Metal
2. Bone
3. Soft Tissue
4. Fat
5. Air
Radiographic Densities

This schematic is NOT absolute

It is referring to substances which are of equal thickness
Have you noticed?
The less knowledgeable a person is, the more rigid, dogmatic, and absolute they tend to be in their ideas and beliefs

-- An interesting paradox --
By contrast, the longer your shoreline of knowledge, the more aware you are of the vastness of the ocean of knowledge and information of things that you DON’T know
The first attitude fosters arrogance

The second attitude fosters humility

-- Another interesting paradox --
Density Characteristics

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Air     -1000 HU
We’re building the foundation for our house of knowledge

As for all foundations, it’s important that the foundation be solid and strong
Density Considerations
When I ask the question, what do you think this is? or what do you think about this?

The very first thing you should do is to decide what DENSITY the entity in question is.
Radiographic Densities

Metal
Bone
Soft tissue
Fat
Air
Hounsfield Units

Bone      1000 HU
Liver     40 - 60 HU
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Muscle    10 - 40 HU
Kidney    30 HU
Water     0 HU
Fat       -50 - -100 HU
Air       -1000 HU
Radiographic Densities

Metal - Radiodense (whiter)

Bone

Soft tissue

Fat

Air - Radiolucent (darker)
In order to decide what density the structure is, it’s helpful to have a baseline density in mind. I use soft tissue density as my baseline.
If you choose to use soft tissue density as your baseline, you then ask yourself, is the structure/entity in question the same density as, more dense than (whiter than), or less dense than (darker than) soft tissue density?
If the density in question is more dense than soft tissue, then it’s either bone or metal; if it’s less dense than soft tissue, then it’s either fat or air.
Next, ask yourself:
1) What structures/organs “live” in that part of the body? and
2) What type of processes, conditions, diseases with that density could affect those structures/organs?
But remember, this whole process starts out by determining the DENSITY of the entity in question.
AIR EMBOLUS
Summation shadow
Overlapping densities
Overlapping shadows
How can you tell the left diaphragm from the right diaphragm in the LATERAL projection?
COMMON RESPONSES

• 1. Left diaphragm lower than right
• 2. Can see stomach bubble under left diaphragm
• 3. Left diaphragm sharper than right
• 4. Left diaphragm is denser than right
THE SILHOUETTE SIGN
How many people in this room have ever even heard of the silhouette sign before today?
SILHOUETTE SIGN

1. Two structures of the same density come into contact with each other

2. The margins of both are obscured
Very simple ideas lie within the reach of only complex minds.

--Remy de Gourmont
1858-1915
E = mc^2
The 3 laws of thermodynamics
Force = mass \times acceleration
PV = nRT
SILOUETTE SIGN:
Like many other profound and important concepts, this one is also elegant in its simplicity!
QUESTIONS TO ANSWER

• Is the case normal or abnormal?
• WHY?
• What side is the abnormality on?
• WHY?
• What is the abnormality?
  – Give differential diagnosis
Sometimes its what you DON’T see that’s important
Only see 1 diaphragm
ANALYSIS/THOUGHT PROCESS/DEDUCTIVE REASONING

1. Is case normal or abnormal? – Abnormal

2. What is the abnormality? – Only see 1 diaphragm and should be seeing 2

3. Which diaphragm is present? – Right diaphragm, since can see its contour from front to back
4. Why can’t the contour of the left diaphragm be seen? – Is the left diaphragm absent/missing? - NO!!

The contour of the left diaphragm can’t be seen because there must be something of the same DENSITY as the left diaphragm, which is coming into contact with the left diaphragm, and thereby causing the contour of the left diaphragm to be obscured (silhouette sign)
ANALYSIS/THOUGHT PROCESS/DEDUCTIVE REASONING

5. The left diaphragm is of SOFT TISSUE DENSITY

6. Therefore, some disease processes of SOFT TISSUE DENSITY must be coming into contact with the left diaphragm, and thereby obscuring its contour
ANALYSIS/THOUGHT PROCESS/DEDUCTIVE REASONING

7. What disease processes of SOFT TISSUE DENSITY occur in the chest which could be contacting the left diaphragm?
ANALYSIS/THOUGHT PROCESS/DEDUCTIVE REASONING

Many disease processes of soft tissue density occur in the chest which could obscure the diaphragm, but the 3 most common entities are:

   FLUID
   PNEUMONIA
   TUMOR
Is there a pneumothorax at the left base, causing the contour of the left diaphragm to be obscured?
Is there a pneumothorax at the left base, causing the contour of the left diaphragm to be obscured?

Answer: No!! A pneumothorax is of AIR density, which is a different density than the diaphragm, which is of SOFT TISSUE DENSITY, therefore the margin of the diaphragm would NOT be obscured if a pneumothorax were present.
UNDERSTANDING AND USING THE SILHOUETTE SIGN
QUESTIONS TO ANSWER

• Is the case normal or abnormal?
• WHY?
• What side is the abnormality on?
• WHY?
• What is the abnormality?
  – Give differential diagnosis
MENISCUS SIGN
MENISCUS SIGN
RADIOGRAPHIC FEATURES

- Smooth contour
- Wedged shaped, reverse "V", triangular
- Lies along dependent portion of lung
- Indicates UNCOMPLICATED fluid
PLEURAL EFFUSION
PLEURAL EFFUSION

GENERAL

• A small amount of fluid is normally present to lubricate the surfaces of the pleura
• A pleural effusion occurs when an excessive amount of fluid accumulates between the layers of tissue that line the lungs
• At least 200-300 cc of fluid must be present before visible on an upright Chest X-Ray
  – Decubitus views of chest may show smaller amounts of fluid
PLEURAL EFFUSION

SYMPTOMS

Chest pain
  Usually sharp
  Worse with cough
  or deep breath
Dyspnea
Cough
Hiccups
Tachypnea
Shortness of breath
Sometimes no symptoms
PLEURAL EFFUSION

- Different types of fluid can accumulate in the pleural space
  - Serous fluid (hydrothorax)
    - Blood (hemothorax)
    - Chyle (chylothorax)
      - Occurs when thoracic duct is disrupted
        - Lymphoma, trauma, thoracic surgery most common causes
  - Pus (pyothorax or empyema)
PLEURAL EFFUSION
PLEURAL EFFUSION
PLEURAL EFFUSION
PLEURAL EFFUSION
PLEURAL EFFUSION
PLEURAL EFFUSION
UNDERSTANDING AND USING THE SILHOUETTE SIGN
QUESTIONS TO ANSWER

• Is the case normal or abnormal?
• WHY?
• What side is the abnormality on?
• WHY?
• What is the abnormality?
  – Give differential diagnosis
QUESTIONS TO ANSWER

• Is the case normal or abnormal?
• Abnormal
• WHY? - There should be two diaphragms, but we’re only seeing one
QUESTIONS TO ANSWER

• What side is the abnormality on?
• WHY? - If you can see one diaphragm, and not the other, the diaphragm that you cannot see MUST be the side of the abnormality
QUESTIONS TO ANSWER

• What is the abnormality?
  – Give differential diagnosis  - The abnormality MUST be an abnormal structure of soft tissue density that is coming into contact with the diaphragm (silhouette sign): e.g. pleural effusion, pneumonia, tumor, abscess, etc
COMMON RESPONSES

1. Left diaphragm lower than right
2. Can see stomach bubble under left diaphragm
3. Left diaphragm sharper than right
4. Left diaphragm is denser than right
COMMON RESPONSES

1. Left diaphragm lower than right
2. Can see stomach bubble under left diaphragm
3. Left diaphragm sharper than right
4. Left diaphragm is denser than right
5. Left diaphragm is SHORTER than the right
Is the left diaphragm shorter than the right?
Answer: No. The left diaphragm is APPARENTLY shorter than the right because of the silhouette sign, with the anteriormost portion of the left diaphragm not seen because it comes into contact with the heart.
Why is it necessary/important to be able to tell the left side from the right side, anyway??
The point of the discussion is not to be able to tell left from right, but to understand the principle of the silhouette sign, and to understand the power of the silhouette sign.
MEDICAL MODEL

ENGINEERING MODEL
Initial film
2 weeks later
CONGESTIVE HEART FAILURE
CONGESTIVE HEART FAILURE

- Affects up to 5 million Americans
- 400,000 new cases each year
- 40,000 deaths a year
- Contributing factor in over 200,000 deaths
- Men > Women
- Blacks > Whites
CONGESTIVE HEART FAILURE

Risk Factors

- Smoking
- High Cholesterol
- Hypertension
- Diabetes
- Obesity
- CAD
CONGESTIVE HEART FAILURE

-Radiographic Signs-

- Cardiac Enlargement
- Enlarged Pulmonary Vasculature
- Increased Interstitial Markings
  - Kerley B lines
  - Kerley A lines
- Pulmonary Edema
- Pleural Effusions
  - Blunting of CPA
  - If unilateral usually on right
  - If bilateral usually larger on right
  - If pt supine see homogeneous density over affected lung
KERLEY LINES

- Named after Peter Kerley
- Kerley A lines
- Kerley B lines
- Kerley C lines
KERLEY LINES

• Kerley B lines
  – Short, parallel lines at lung periphery
  – Represent dilatation of the interlobular septa
  – 1-2 cm in length, usually less than 1 cm
  – Parallel to one another
  – At right angles to pleura
  – Located peripherally
  – Most often seen at lung bases
    • at costophrenic angles on PA radiographs
    • in substernal region on lateral radiographs
KERLEY B LINES
KERLEY B LINES
KERLEY B LINES
KERLEY LINES

• Kerley A lines
  – Longer than Kerley B lines
    • at least 2cm in length or longer
  – Located in inner half of lung
  – Oriented diagonally from lung periphery toward hila
  – Caused by distension of anastomotic channels between peripheral and central lymphatics of lung
  – Less commonly seen than Kerley B lines
KERLEY A LINES
KERLEY A LINES
KERLEY A LINES
KERLEY LINES

• Kerley C lines
  – Less commonly seen than any of the Kerley lines
  – Short, fine lines
  – Reticular in appearance
  – Seen throughout the lungs
  – Caused by
    • thickening of anastomotic lymphatics or
    • superimposition of many overlapping Kerley B lines
KERLEY C LINES
KERLEY B LINES
RADIOGRAPHIC FINDINGS

Thin linear lines
1-2 cm in length
At lung bases
At right angles to pleura
Represent thickening of the interlobular septa
Usually an indication of raised venous pressure
Wall is normally hairline thin
Often associated with:
1) Thickening of the fissures
2) Fluid in subpleural space
3) Pleural effusions
KERLEY B LINES

CAUSES

Congestive Heart Failure
Mitral Stenosis
Lymphangitic carcinomatosis
Pulmonary fibrosis
Parasitic infection
Interstitial deposition of heavy metal particles
PNEUMONIA
PNEUMONIA

Can be caused by a variety of agents

Bacterial
Viral
Mycoplasma
Fungi
PNEUMONIA

An important cause of morbidity and mortality in the US

Millions of cases reported yearly

Accounts for over 1 mil hospitalizations

Accounts for over 1 mil ER visits
PNEUMONIA

VIRAL PNEUMONIA

Approx 50% of pneumonias believed to be caused by viruses
Generally less severe than those caused by bacteria
Often seen in very young patients
PNEUMONIA

BACTERIAL PNEUMONIA

Pneumococcus most common cause

Commonly called lobar pneumonia, even though infection does not usually involve the entire lobe

Lower lobes and posterior segments of upper lobes most common
PNEUMONIA

MYCOPLASMA PNEUMONIA

Has features of both bacterial and viral pneumonias.

Usually causes a mild, wide spread infection.

Common cause of community acquired pneumonia.
PNEUMONIA

SYMPTOMS

Fever
Cough
Headache
Muscle pain
Weakness
Fatigue
SOB
PNEUMONIA

SYMPTOMS

Chills
Chest pain
Sweats
Tachypnea
Tachycardia
Etc
PNEUMONIA

RADIOGRAPHIC FINDINGS

Patchy infiltrates
Mottled infiltrates
Peribronchial distribution
Diffuse
Homogeneous
PNEUMONIA

RADIOGRAPHIC FINDINGS

Focal alveolar infiltrates

Interstitial densities

Miliary, nodular, reticular

With or w/o adenopathy
PNEUMONIA

COMPLICATIONS

Pleursy with effusion
Empyema
Pulmonary abscess
Toxic ileus
PNEUMONIA

COMPLICATIONS

Rare:
Bronchopleural fistulas
Pericarditis with effusion
CHF
PNEUMONIA
PNEUMONIA
PNEUMONIA
PNEUMONIA
PNEUMONIA
PNEUMONIA
If abnormality is in the Right Lung, how can you tell if the abnormality is in the Right Middle Lobe or Right Lower Lobe on FRONTAL VIEW ALONE?
SILHOUETTE SIGN

• If contour of right heart border is obscured, this implies that pathology is at least in RML
  – Heart is an anterior structure
  – If right heart border is obscured, this means that the opacity is in contact with the right heart border
  – Therefore the opacity must at least be in an anterior location
SILHOUETTE SIGN

- If contour of right heart border is obscured, this implies that pathology is at least in RML
  - The RML is anterior, the RLL is posterior: Lobar anatomy
  - Therefore the opacity must at least be anterior, in the RML

Same thing applies to Lingula in Left Lung
SILHOUETTE SIGN

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Same thing applies to Lingula in Left Lung
You’re working the ER and at 3am the following patient presents with right lower chest discomfort and a low grade fever. Based on what you now know, and the CXR findings, is there an early pneumonia/abnormality developing at the medial right base?
Another patient, with similar symptoms and complaints
A 3rd patient, with left sided complaints, similar to the first two.

Is there a pneumonia/abnormality?
Here, again, we see, the power of the silhouette sign, in that how understanding and being knowledgeable about the silhouette sign can be helpful in understanding and differentiating normal anatomy from pathology.
THE ABDOMEN
KISS PHILOSOPHY
Keep It Simple Stupid!
DENSITY CHARACTERISTICS
What are the basic radiographic densities?
Radiographic Densities

Metal
Bone
Soft tissue
Fat
Air
Hounsfield Units

Bone   1000 HU
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Radiographic Densities

Metal - Radiodense (whiter)
Bone
Soft tissue
Fat
Air - Radiolucent (darker)
How can you tell a male from a female on an abdominal film?
When I ask the question, what do you think this is? or what do you think about this?

The very first thing you should do is to decide what DENSITY the entity in question is.
In order to decide what density the structure is, it’s helpful to have a baseline density in mind. I use soft tissue density as my baseline.
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Next, ask yourself: What structures/organs “live” in that part of the body, and what type of processes/conditions of that density could affect those structures/organs?
But remember, this whole process starts out by determining the DENSITY of the entity in question.
DERMOID CYST

An overgrowth of normal tissue in an abnormal location

A Cystic Teratoma
DERMOID CYST

Contains developmentally mature skin, including hair follicles and sweat glands

May also contain hair, blood, fat nails, teeth, cartilage, thyroid tissue
DERMOID CYST

Locations

Face
Orbits
Inside Skull
Brain
Spinal Cord
Nasal Sinuses
Ovaries
THE ABDOMEN
FREE AIR
“I don’t know why they call it free air - it always ends up being very expensive”
If you clinically suspect there is free air, besides a CT scan, is an upright film of the abdomen the best radiographic exam to order for detection?
Other than CT, what is the best x-ray to order if you’re suspicious of free air?
Answer: There’s no right or wrong answer. It depends on where/how you were trained, but most Radiologists would probably say an upright film of the chest.

Why?
It has to do with the technique and parameters of how the CXR is taken and the technique and parameters of how the abdominal film is taken.
Question: Is it easier to see free air (which is lucent or dark) against a white background or a dark background?
What’s the second best film to order?
Answer: Left lateral decubitus film (left side down) of the abdomen.

Why?
Pnuemoperitoneum

RADIOGRAPHIC FINDINGS
On left lat decubitus view, gas will rise to highest point in the flank and be visible as a horizontal translucent area between the lateral surface of the liver and the abdominal wall, with the background of the homogenous density of the liver making the gas more apparent.
Answer: Left lateral decubitus film (left side down) of the abdomen.

Why not a Right lateral decubitus (right side down)?
Answer: Because with a Right lateral decubitus film (right side down), air will rise to the LUQ, and could be confused with normal gas in the stomach.
Pneumoperitoneum

Air or gas in the abdominal cavity
Small amounts of free air can be missed on plain films
CT regarded as the standard and should be done if there is any question of free air
CT can detect quantities as small as 5 cc
Pneumoperitoneum

RADIOGRAPHIC FINDINGS
Thin, smoothly curved shadow
Superior surface of shadow curved where gas is bounded by the diaphragm
Gas may be found under one or both diaphragms
Gas easier to recognize on right because of the homogeneous density of the liver
Pneumoperitoneum

RADIOGRAPHIC FINDINGS
On the left normal gas shadow in the stomach may cause confusion
On left, close observation will sometimes show the presence of two shadows
Left lateral decubitus view of abdomen may be helpful
Pnuemoperitoneum

RADIOGRAPHIC FINDINGS
On left lat decubitus view, gas will rise to highest point in the flank and be visible as a horizontal translucent area between the lateral surface of the liver and the abdominal wall, with the background of the homogenous density of the liver making the gas more apparent.
Pneumoperitoneum

Perforated gas containing abdominal viscus most common cause
Usually a perforated peptic ulcer
Perforated tumor
Abdominal trauma
Laparoscopic surgery – insufflating the abdomen with carbon dioxide
Pneumoperitoneum

Bowel obstruction with perforation
Ruptured diverticulum
Ruptured inflammatory bowel disease (megacolon)
Necrotizing enterocolitis
Pneumoperitoneum

Bowel cancer
Ischemic bowel
Breakdown of surgical anastomosis
Bowel injury after endoscopy
Colonic or peritoneal infection
THE ABDOMEN
STOMACH AND SMALL BOWEL
How can you distinguish small bowel from large bowel?
STOMACH AND SMALL BOWEL

- Swallowed air is major source of gas in stomach
- Very common to see small amounts of gas in nondistended loops of small bowel
- Small bowel is a winding tube which is of variable lengths and position within the abdomen
- In general, the small bowel loops lie within the central portion of the abdomen
- Small bowel loops vary in size
- In general, small bowel loops normally range between 2cm to 4cm in transverse diameter
- Small bowel loops which are greater than 4 to 5cm should be considered to be dilated
STOMACH AND SMALL BOWEL

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• Very common to see small amounts of gas in nondistended loops of small bowel.
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• In general, the small bowel loops lie within the CENTRAL portion of the abdomen.
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• Small bowel loops which are greater than 4 to 5cm should be considered to be dilated.
THE SMALL BOWEL

• Small bowel folds
  – Generally are circumferential vs haustra of colon
  – Typically NOT obliterated when small bowel is distended
  – Slow passage of food along the intestine and allow increased surface for absorption
  – Names
    • Circular folds
    • Plicae circulares
    • Valvulae conniventes
    • Valves of Kerckring
THE LARGE BOWEL

- Located along the LATERAL PERIPHERY of the abdomen, and along the upper portion of the abdomen, below the stomach
- Portions of the large bowel are the Cecum, Ascending Colon, Transverse Colon, Descending Colon, Sigmoid Colon, and Rectum
- Size of large bowel loops vary, but in general range between 3cm to 6cm
- Haustral markings
  - Folds of large bowel are not circumferential
  - Folds of large bowel are wider spaced than small bowel
ADHESIONS
SMALL BOWEL OBSTRUCTION

- Symptoms
  - Abdominal pain
  - Abdominal distention
  - Vomiting
- Often history of prior surgery
  - After surgery adhesions may form
    - Common cause of obstruction
- Other causes
  - Hernia
  - Malignancy
  - Inflammatory bowel disease
  - Volvulus
  - Appendiceal abscess
  - Gallstone ileus
SMALL BOWEL OBSTRUCTION

ETIOLOGY

Postoperative adhesions most common cause of SBO

Incarcerated groin hernia

Malignant tumor (20%)

Inflammatory bowel disease (5%)

Volvulus (3%)

Miscellaneous causes (2%)
SMALL BOWEL OBSTRUCTION

COMPLICATIONS

Sepsis
Intra-abdominal abscess
Wound dehiscence
Aspiration
Short bowel syndrome (as a result of multiple surgeries)
Death (secondary to delayed treatment)
LARGE BOWEL OBSTRUCTION

- Obstruction of colon usually caused by cancer or diverticulitis
- Other causes
  - Volvulus, hernia, fecal impaction
- Symptoms
  - Constipation
  - Abdominal distention
  - Abdominal pain
- Dilated loops of bowel PROXIMAL to the obstructing point
- Diagnosis can be confirmed by endoscopy or barium enema
VOLVULUS
Here we have a third example of how a serious bowel obstruction was treated very conservatively, without surgery, and with a good outcome.
INTUSSUSUSCEPTION
INTUSSUSCEPTION

GENERAL CONSIDERATIONS

Initial abdominal film may be normal or may show moderate dilatation of gas filled loops of bowel.

Administration of barium can be diagnostic and therapeutic.
INTUSSUSCESSION

RADIOGRAPHIC FINDINGS

As the barium reaches the site of the obstruction, the end of the barium column assumes a concave or cup-shaped appearance as it surrounds the intussusceptum.

Thin, ringlike shadows of the barium may mark the end of the barium column.
INTUSSUSCESSION

RADIOGRAPHIC FINDINGS

These ringlike shadows represent barium caught in the haustral crevices as the barium surrounds the mass of the intussuscepted bowel.

This causes the “coiled-spring” appearance characteristic of intussusception.
INTUSSUSCESSION

RESOLUTION

The intussusception is successfully reduced when the entire colon is filled and barium is refluxed through the ileocecal valve into the ileum.

If barium is not refluxed into ileum, surgeon decides on next step.
COLORECTAL CANCER
COLORECTAL CANCER

• Fourth most common cancer in US
• In 2012, an estimated 103,000 new cases of colon cancer expected
• 40,000 new cases of rectal cancer
COLORECTAL CANCER RISK FACTORS

- **Age** - most common over 50
- **Diet** - diets high in fats and low in fiber
- **Polyps**
- **Medical History** - Ovarian cancer, uterine cancer, breast cancer, prior colorectal cancer
- **Family History**
- **Ulcerative Colitis**
COLORECTAL CANCER SYMPTOMS

- Change in bowel habits
- Blood in stool
- Diarrhea
- Constipation
- Bloating
- Stools that are narrower than usual
- Weight loss
- Abdominal cramping
COLORECTAL CANCER SYMPTOMS

• Change in bowel habits
• Blood in stool
• Diarrhea
• Constipation
• Bloating
• Stools that are narrower than usual
• Weight loss
• Abdominal cramping
COLORECTAL CANCER DETECTION

• Fecal occult blood test
• Sigmoidoscopy
• Colonoscopy
• Barium enema
• Digital rectal examination
• Virtual colonoscopy
INTERESTING CASES
62 year old woman who presents to the ER with abdominal pain
LITHOPEDION
LITHOPOEDION

Litho – stone, Pedion – child or baby
Rare – less than 300 cases reported in the world
Fetus dies in utero and is too large to be absorbed by the body
Fetus and amniotic sac calcifies shielding mother’s body from the dead tissue of the baby and preventing infection
LITHOPEDION

As in this case, condition may go undiagnosed for decades

Patient often comes in for an unrelated problem when the lithopedion is discovered

Oldest reported case is in a 94 year old woman
It is one of the most beautiful compensations of this life that no man can sincerely try to help another without helping himself.

--Ralph Waldo Emerson
The quality of a person’s life is in direct proportion to their commitment to excellence, regardless of their chosen field of endeavor.

--Vincent T. Lombardi
DO WELL THE LITTLE
THINGS CLOSE AT HAND,
AND GREAT THINGS WILL
COME TO YOUR HAND TO BE
DONE
"There's still a lot we don't know."
METASTATIC DISEASE
METASTASES FROM COLORECTAL CARCINOMA

Liver most frequent site – when mets occur, reported in liver up to 50% to 72% of the time

Lung, brain, and bone mets unusual in the absence of liver mets
METASTASES FROM RENAL CELL CARCINOMA

Lung (75%)
Lymph nodes (36%)
Bones (20%)
Liver (18%)
Metastatic Renal CA with destruction of left pedicle

Normal L/S spine for comparison
Normal L/S Spine Anatomy

“Scotty Dog”
Renal Carcinoma
with mets to bone
METASTASES FROM RENAL CELL CARCINOMA

Lung (75%)
Lymph nodes (36%)
Bones (20%)
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METASTATIC RENAL CELL CARCINOMA

20-25% of patients have metastatic spread by the time of diagnosis. This high proportion thought to be due to the fact that the symptoms the patients experience are mild until the disease progresses to a more severe state.
METASTATIC RENAL CELL CARCINOMA

Average survival time in 2008 for patients with renal metastases was under 1 year.

By 2013 this had improved to an average of 22 months.

5 year survival remains under 10%.
DISC MATERIAL

- Disc material is relatively avascular
- Ways we can use this information:
  - Spread of tumor
  - Disc space acts as a relative barrier to tumor spread from one disc space to the next
  - Spread of infection
    - Disc space does NOT act as barrier to spread of infection
  - Recurrent disc in post-op patient with back pain
    - When do post-op MRI or CT scan use contrast to see if enhancement occurs
    - If no enhancement – recurrent disc
    - If enhances – scar tissue (if surgeon operates may make matters worse by causing more scar tissue)
DISC SPACE INFECTION
Metastatic Renal CA with destruction of left pedicle

Normal L/S spine for comparison