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Plain film - CT correlation: A case series

7/15/21
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Outline

- 6 cases
- Group discussion of plain film: Findings and differential diagnosis
- Interpret corresponding CTs individually via PACSbin
- Group discussion of CT findings
- Wrap-up with teaching points
Hounsfield units and slice thickness

3mm slices - less “grainy” appearance, faster scrolling, tissue abnormalities may “jump out” more.

0.75mm slices - for problem solving and seeing small structures (need to use for PE studies, nephrolithiasis, lung nodules, fractures).

<table>
<thead>
<tr>
<th>Tissue</th>
<th>Hounsfield Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bone</td>
<td>1000</td>
</tr>
<tr>
<td>Liver</td>
<td>40 to 60</td>
</tr>
<tr>
<td>White Matter</td>
<td>46</td>
</tr>
<tr>
<td>Grey Matter</td>
<td>43</td>
</tr>
<tr>
<td>Blood</td>
<td>40</td>
</tr>
<tr>
<td>Muscle</td>
<td>10 to 40</td>
</tr>
<tr>
<td>Kidney</td>
<td>30</td>
</tr>
<tr>
<td>Cerebrospinal Fluid</td>
<td>15</td>
</tr>
<tr>
<td>Water</td>
<td>0</td>
</tr>
<tr>
<td>Fat</td>
<td>-50 to -100</td>
</tr>
<tr>
<td>Air</td>
<td>-1000</td>
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</tbody>
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Windowing

<table>
<thead>
<tr>
<th>Soft tissue</th>
<th>Lung</th>
<th>Bone</th>
<th>Liver</th>
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<tbody>
<tr>
<td>F5</td>
<td>F6</td>
<td>F7</td>
<td>F8</td>
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</tbody>
</table>
Views

Axial - workhorse

Coronal - useful for bowel, mesenteric lymph nodes, problem solving

Sagittal - useful for spine, checking arterial patency, problem solving
Warmup case

40 year old male with history of HIV presents with shortness of breath.

Current and prior chest radiographs:
Right middle lobe pneumonia
Cases!
Case 1

25 year old male presenting with 2-3 days low back pain and sore throat
Case 1

https://www.pacsbin.com/c/-JvlEYk8EU

- Describe the findings
- What study would you consider next?
- What would you like to know about the patient’s history?
Differential of cavitary pulmonary masses

Mnemonic: CAVITY

Cancer: Primary lung (most frequently squamous cell carcinoma), or metastases (most frequently also SCC)

Autoimmune: Granulomatosis with polyangiitis, rheumatoid nodules

Vascular: Bland or septic pulmonary emboli

Infection (bacterial/fungal): Pulmonary abscess, pulmonary tuberculosis

Trauma: Pneumatoceles

Youth: CPAM, pulmonary sequestration, bronchogenic cyst
Septic emboli secondary to Lemierre Syndrome

Lemierre syndrome: Jugular vein suppurative thrombophlebitis

Admitted for septic emboli after CT

Blood cultures positive for Fusobacterium necrophorum

CT neck: Left internal jugular thrombosis compatible with Lemierre disease

Prolonged ICU course with empyema requiring VATS decortication and ventilator-associated pneumonia
Case 2

8 year old female with abdominal pain and leukocytosis
Case 2

https://www.pacsbin.com/c/b1MB95K84I

- Describe the findings
- What are the top two things on your differential and how can you distinguish between them?
- What complications do you need to exclude? How would you look for these complications on plain film?
- What are some common causes of this diagnosis?
Small bowel obstruction secondary to Meckel’s

Small bowel obstruction vs. ileus:

- History (recent vs. remote surgery, possibility of malignancy, hernia, IBD)
- Need to look for signs of bowel ischemia and perforation

This patient had an omphalomesenteric duct remnant with Meckel’s diverticulum. Pathology revealed oxyntic gastric-type mucosa.
Case 3

35 year old female presents with vaginal bleeding and tachypnea
Case 3
https://www.pacsbin.com/c/Z1qO2qY8N8

What is the cause of the finding on chest radiograph?
What complication do you need to look for next?
Pulmonary embolism

- Pulmonary CTA
  - Filling defect(s) in pulmonary arterial system
  - Distension of involved vessel
- Right heart strain
  - Ratio of right ventricular to left ventricular diameter > 1; good predictor of mortality
  - Venous thrombus in vena cava or internal jugular or subclavian veins
- Thrombus or embolus in right ventricle
- Pulmonary infarct
  - Peripheral wedge-shaped opacity
  - Points toward hilum with broad pleural base (often in lower lobes)
Pulmonary infarcts secondary to pulmonary emboli
Case 4

27M, landed wrong while playing basketball
Case 4

Which bones of the foot are fractured?
Lisfranc fracture-dislocation

Lisfranc injury and

Comminuted cuboid fracture

Lisfranc injury:
- Malalignment of metatarsals and cuneiforms
- >2mm between 2nd metatarsal base and 1st cuneiform
- “Fleck sign”
Case 5: 93F, concern for CHF exacerbation

93 year old female, history of congestive heart failure. Saw outpatient cardiologist, concern for CHF exacerbation.
Case 5
http://www.pacsbin.com/collection/WJhQycfr6I/review

Describe the findings in the chest

What are the likely causes for the findings within the chest?
Pulmonary metastases; pancreatic adenocarcinoma

- Pancreatic mass protocol CT includes:
  - Unenhanced
  - Late arterial phase (pancreatic parenchymal phase)
  - Portal venous phase

- Classic appearance on CT: hypodense, ill defined hypovascular mass often causing ductal obstruction
  - “Double duct sign” = dilation of both pancreatic duct and CBD

- Staging: unresectable tumors show encasement (>180 degrees circumference) of the SMA or celiac axis, extensive venous invasion, or evidence of metastasis
Companion case: 32 year old male

32 year old male with testicular “heaviness”, lost to followup
Case 6:

83 year old female with altered mental status
What is causing the hemithorax white-out in this patient?

What other findings are there in the abdomen?
Bronchial mucus plugging with complete left lung collapse + pleural effusion

Differential for hemithorax whiteout:

- Trachea in central position: Consolidation, pleural mass (e.g. mesothelioma), chest wall mass (e.g. Ewing’s/Askin tumor)
- Trachea pulled towards opacified side: Post-pneumonectomy, total lung collapse, pulmonary agenesis/hypoplasia
- Trachea deviating away from opacified side: Pleural effusion, large pulmonary mass, diaphragmatic hernia, diaphragmatic rupture
Thank you!