Quiz in emergency radiology

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72 year-old women; hit by a motorbike while crossing the road (mild energy mechanism)
Complaint:
wrist pain
diffuse cervical tenderness => collar

GCS=15; no neurological deficit
Clinical examination: obvious wrist fracture => X-Ray
Question 1

What do you do first for the cervical spine?

1. X-Ray; nothing else if normal
2. CT
3. Clinical examination to select the proper imaging
4. Nothing
Question 1

What do you do first for the cervical spine?

1. X-Ray; nothing else if normal
2. CT
3. Clinical examination to select the proper imaging
4. Nothing
Cervical spine injuries

Clearing the cervical spine

Nexus Criteria

No midline cervical tenderness
No focal neurologic deficit
Normal alertness
No intoxication
No painful, distracting injury

Canadian Criteria

1. Any High-Risk Factor That Mandates Radiography?
   - Ages ≥ 65 Years
   - Dangerous Mechanism*
   - Paresthesias in Extremities

   No

2. Any Low-Risk Factor That Allows Safe Assessment of Range of Motion?
   - Simple Rear-end MVC
   - Sitting Position in ED
   - Ambulatory at Any Time
   - Delayed Onset of Neck Pain*
   - Absence of Midline C-Spine Tenderness

   No
   Yes

   Radiography

   Unable

3. Able to Actively Rotate Neck?
   - 45° Left and Right

   Able
   No Radiography

Hoffman Jr et al, 2000, NEJM
Stiell IGet al, 2001, JAMA
Cervical spine injuries

Imaging Techniques

Cervical spine X-Ray: 3 views

- 60-80% sensitivity for CS fractures

Back to our patient => she underwent CT
CT of the cervical spine (high energy trauma)

No fracture; reported as normal
Question 2

What can be recommended now?
1) Nothing more
2) X-Ray
3) MRI
Question 2

What can be recommended now?

1) Nothing more
2) X-Ray
3) MRI
No fracture; reported as normal

- underestimates ligamentous injury (supine position)

=> Standard Xray is a good complement to CT to assess the cervical spine statics
Cervical spine injuries

*Clearing the cervical spine*

« The Geneva approach »

1) Negative NEXUS criteria: no imaging

2) Low risk for Fx*: standard X-Ray + collar/ delayed functional standard imaging

3) Moderate risk: standard X-Ray + CT / delayed functional imaging when no Fx at CT

4) Neurological deficit: CT + MRI (ACR criteria)

*Blackmore C Radiology 1999,*
74 year-old man. Fall in his bathroom; Upper cervical pain no neurological deficit
Question 3

Where is the main problem?
1.
2.
3.
4. Xray is normal
74 year-old man. Fall in his bathroom; Upper cervical pain no neurological deficit

Question 3

Where is the main problem?
1. 
2. 
3. 
4. Xray is normal
74 year-old man. Fall in his bathroom;
Upper cervical pain no neurological deficit
61 year-old man

Type 2 diabetes

General weakness since 3 weeks

Admitted to the ER by his general practitioner for sudden dyspnea and lower limbes oedema, no fever
What is the most salient finding?

1) Mediastinal syndrome
2) Large pleural effusion
3) Heart failure
4) All these items
What is the most salient finding?

1) Mediastinal syndrome
2) Large pleural effusion
3) Heart failure
4) All these items
After pleural drainage

Pleural fluid analysis: empyema
Bacteriology: methicilline sensitive staphylococcus
5 days after admission:

worsening of the general condition in spite of the antibiotic treatment

severe sepsis
61 year-old man

Retrospectively, what could explain the persisting sepsis?

1) Lung abscess
2) Soft tissue infection
3) Pericarditis
4) Abdominal perforation
Question 5

61 year-old man

Retrospectively, what could explain the persisting sepsis?

1) Lung abscess
2) Soft tissue infection
3) Pericarditis
4) Abdominal perforation
Acromioclavicular + trapezius infection
Case 1

Modification of ttt
Hospitalized for 6 weeks
Good outcome
Take home message

Presence of a prominent finding must not divert from seeking a smaller one
32 year-old woman; no medical history, non smoker
Excellent health condition, no weakness
Referred to the hospital for persisting cough since 2 months, progressive mild dyspnea
treated by azythromycine (abroad): no improvement

T=37.2
Reduced respirat. sounds left lower lung
AP  120/80  HR 109
Lab: normal (WBC=7000)
**Question 6**

Where is the main problem:
1) Heart
2) Lung
3) Mediastinum
4) Aorta
Question 6

Where is the main problem:

1) Heart
2) Lung
3) Mediastinum
4) Aorta
Question 7

What is the most probable diagnosis:
1) Lymphoma
2) Extramedulary hematopoiesis
3) Bronchogenic cyst
4) Neurogenic tumor (DD neurofibroma)
Question 7

What is the most probable diagnosis:

1) Lymphoma
2) Extramedulary hematopoiesis
3) Bronchogenic cyst
4) Neurogenic tumor (DD neurofibroma)
Diagnosis: B Lymphoma (DLBCL)
52 year-old Portuguese women, living in Geneva since many years

Non smoker

Early December 2015: AB for a cough; initial improvement, then relapse

Productive cough, white sputum, no hemoptysis, no weight loss

29.12.2015: consultation HUG

Clinical examination: \( T = 37.6 \) \( \text{BP} = 135/60 \text{ mmHg} \) \( \text{HR} = 80/\text{min} \) \( \text{Sao2} = 100\% \)

Good general condition; bronchial breathing right ("souffle tubaire") otherwise normal clinical examination

Laboratory: severe anemia \( \text{HB} = 54 \text{ g/L} \) \( \text{(N=120)} \) \( \text{Plt} = 637 \text{ G/L} \) \( \text{CRP} = 33 \) \( \text{ferritine <5 ug/L} \) liver tests slightly elevated
Question 8

Where is the (main) problem:
1. Mediastinal + hilar adenomegalies
2. Right lung infiltrate
3. Left lung infiltrate
4. Normal chest X-Ray
Question 8

Where is the (main) problem:
1. Mediastinal + hilar adenomegalies
2. Right lung infiltrate
3. Left lung infiltrate
4. Normal chest X-Ray
What would you do now:

1) Change antibiotherapy + sputum analysis + see patient in 1 week

2) CT

3) Other imaging
Question 9

What would you do now:

1) Change antibiotherapy + sputum analysis + see patient in 1 week

2) CT

3) Other imaging
CT
Question 10

What is the most probable diagnosis:

1) Primary TB
2) Post primary TB
3) Tumor
What is the most probable diagnosis:

1) Primary TB
2) Post primary TB
\textit{cavitation, endobronchial spread ("tree in buds"), old calcifications, no pleural effusion,}
3) Tumor

\textit{Mycobacterium tuberculosis} - Ziehl-Neelsen Staining

Robert Koch (1843-1910)
**TABLE 12.10** Primary *Mycobacterium tuberculosis*

- Clinical infection following first exposure
- Ghon focus: local infection
- Ranke complex: local infection with lymph node spread
- Often asymptomatic in children
- Adults: weight loss, fever, cough, hemoptysis
- Radiographs may be normal
- Air-space consolidation, may be lobar; often slow to clear
- Atelectasis in children
- Cavitation and miliary spread uncommon
- Lymphadenopathy common in children, uncommon in adults
- Pleural effusion may be seen without lung disease

**TABLE 12.11** Postprimary *Mycobacterium tuberculosis*

- Reactivation of latent infection
- Most often involves apical and posterior segments of upper lobes and superior segments of lower lobes
- Often associated with progressive disease
- Cavitation common; endobronchial spread may occur
- Fatigue, night sweats, weight loss, low-grade fever, hemoptysis
- Radiographic findings:
  - Poorly defined areas of consolidation
  - Cavitation visible in 20%–45%
  - Tree-in-bud or centrilobular nodules on HRCT
  - Lymphadenopathy and effusions uncommon
  - Miliary spread
  - Airway stenosis
  - Tuberculoma

From Webb & Higgins Thoracic imaging LWW 2011
Example of miliary spread (other case)
Patient had no mask and is contagious:

Should we specifically check the emergency medical and radiological team for TB:

1) yes
2) no
Patient had no mask and is contagious:

Should we specifically check the emergency medical and radiological team for TB:

1) yes
2) no
Contagiousness for the emergency medical team?

Question to the pneumologist:

Answer: no control is contact < 8 hours

Comme nous avons pu l’évoquer lors d’un staff meeting avec une partie de l’équipe de radiologie, nous pensons que la durée du contact entre l’équipe des techniciens en radiologie et des radiologues et les patients ayant une TB dans ce genre de situations est trop court pour justifier des mesures de type « contrôle d’entourage ». A titre d’illustration, nous utilisons la valeur de 8 heures d’exposition cumulée pour décider ou non d’un contrôle d’entourage lors de l’exposition à une personne ayant une tuberculose contagieuse.

Par contre, ces cas sont signalés à la médecine d’entreprise (qui nous lit en copie).
30 year-old woman

Referred for tiredness, dyspnea with rare white sputum, no hemoptysis, upper abdominal pain (right upper quadrant);

**Clinical exam:**
good general condition; mild fever (37.8°C)
tachypnea
normal BP and HR
Auscultation: slightly reduced sounds in the left basal lung

Treatment: antidepressive treatment, nothing else.

Laboratory: not immediately available

Chest X-Ray
Question 12
What is the most probable diagnosis:
1. Lobar pneumonia
2. Interstitiel pneumonia
3. Pulmonary infarction
4. Atelectasis of the lingula
Question 12
What is the most probable diagnosis:
1. Lobar pneumonia
2. Interstitiel pneumonia
3. Pulmonary infarction (Hampton hump)
4. Atelectasis of the lingula
Focal air space consolidation in PE may represent pulmonary hemorrhage without infarction or infarction

No aeriobronchogram (DD pneumonia)
Frequency: 10% to 60% of patients

“circumscribed, subpleural opacity with rounded convex medial border facing toward the pulmonary hilum: this sign is neither common nor specific”
Chest X-Ray for PE

Sensitivity 33%, specificity 59%

- Hampton Hump
- pleural effusion
- Westermark sign: focal oligemia (vasoconstriction) distal to embolus; visible in 2%
- enlargement of a pulmonary artery
- increase of the size of the right ventricle

Ref Webb & Higgins Thoracic imaging LWW 2011 + Daehnert Radiology review manual
51 year-old man

Bike accident: crash into a traffic light at about 50 km/h

Alert and conscious at admission GCS = 15, HR=80/min

Normal blood pressure, dyspnea
FAST: pleural fluid; no peritoneal fluid
What is the main finding on the left hemithorax?

1) Hemothorax
2) Hemothorax + Pneumothorax
3) Pulmonary contusion/laceration
4) Pulmonary atelectasis
What is the main finding on the left hemithorax?

1) Hemothorax
2) Hemothorax + Pneumothorax
3) Pulmonary contusion/laceration
4) Pulmonary atelectasis
What should the clinicians do? (dyspnea, HD stable, negative FAST)

1) Immediately go to CT

2) Repeat chest sonography (reevaluate pleural fluid)

3) Put a chest drain, then go to CT

4) Put a chest drain, then repeat XRay
Question 14

What should the clinician do? (dyspnea, HD stable, negative FAST)

1) Immediately go to CT

2) Repeat chest sonography then decide chest drain or not

3) Put a chest drain, then go to CT

4) Put a chest drain, then repeat XRay

The clinicians’ choice
Question 15

Is there still a life-threatening condition in this patient?

1) No  
2) Aorta  
3) Heart  
4) Diaphragm
Question 15

Is there still a life-threatening condition in this patient?

1) No

2) Aorta

3) Heart

4) Diaphragm
Normal mediastinum  Abnormal mediastinum
Traumatic pseudoaneurysm

Follow-up: Aortic rupture
Take home message

Importance of thorough analysis of chest X-Ray in trauma patients and of a rapid transfer to CT
75 year-old man
Acute abdominal pain & fever

=> Abdominal i.v. CT with oral contrast (60 minutes prior to CT)
Appendicitis + reflex ileus
=> surgery
1 hour after surgery: dyspnea, hypoxia

CT before surgery

Xray after surgery
What is your diagnosis?

1) Pulmonary embolism
   (pleural based, triangular)

2) Cardiogenic edema
   (perihilar opacities, bat’s wings,
    normal periphery, cardiomegaly)

3) ARDS
   (widespread opacities, air bronchograms,
    rapid onset after aspiration of gastric content)

4) Bronchopneumonia
What is your diagnosis?

1) Pulmonary embolism
   (pleural based, triangular)

2) Cardiogenic edema
   (perihilar opacities, bat’s wings, normal periphery, cardiomegaly)

3) ARDS
   (widespread opacities, air bronchograms, rapid onset after aspiration of gastric content)

4) Bronchopneumonia
Predictive risks of bronchoaspiration in this patient

1) Stagnation of contrast in the oesophagus
2) Ileus
3) Hiatal hernia
Take home message

Clinicians should be informed of the stagnation of oral contrast in the oesophagus

=> nasogastric tube
Thank You!