

AMSER Case of the Month

October 2021

HPI: 37 y/o M presents with acute hypoxic respiratory failure

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Patient Presentation

- HPI: 37 y/o male presents to the ED in acute hypoxic respiratory failure s/p near drowning. Pt was found by EMS with a bounding pulse and agonal respirations.
- ROS: chest pain, increased work of breathing, nausea
- PMHx: none
- PSHx: none
- Family Hx: none
- SocHx: heavy alcohol use disorder

Patient Presentation

Pertinent physical exam findings:

- General: A & O x3, in acute distress
- HEENT: pupils 4 mm bilaterally, reactive
- Cardiovascular: tachycardic, chest wall concavity deformity
- Lungs: decreased breath sounds bilaterally, mild wheezing heard in left lower lungs
- Neuro: A & O x3, follows commands

Pertinent Labs

- Basic Metabolic Panel: elevated anion gap of 26 (3-10 mEq/L)
- Complete Blood Count:
 - Hb 13.4 (13.5 - 17.5 g/dL)
 - MCV 105.2 (80-94 fl)
 - Folate 2.3 (2.7-17 ng/mL)
- Toxicology: EtOH level 369
- Arterial blood gas:
 - pH 7.236 (7.35-7.45)
 - PaCO₂ 33.6 (38-42 mmHg)
 - HCO₃ 13.8 (22-28 mEq/L)
- Lactic acid: 4.4 (4.5-19.8 mg/dL)

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

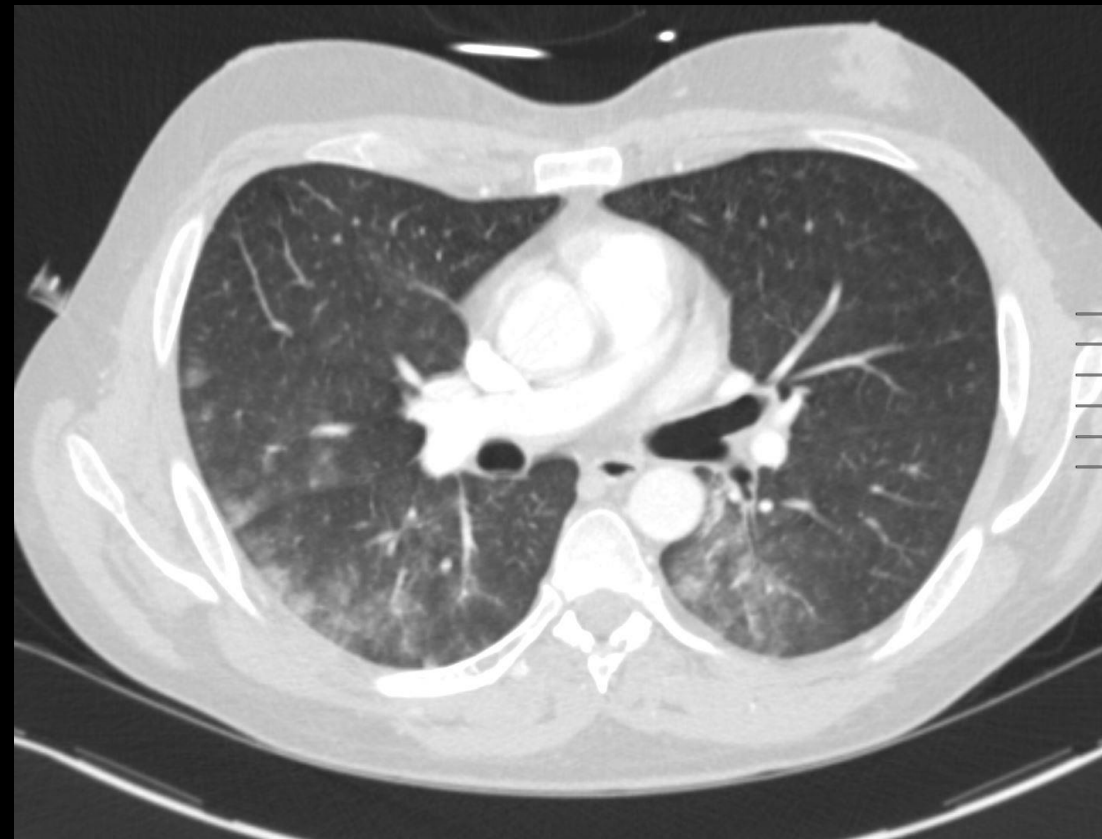
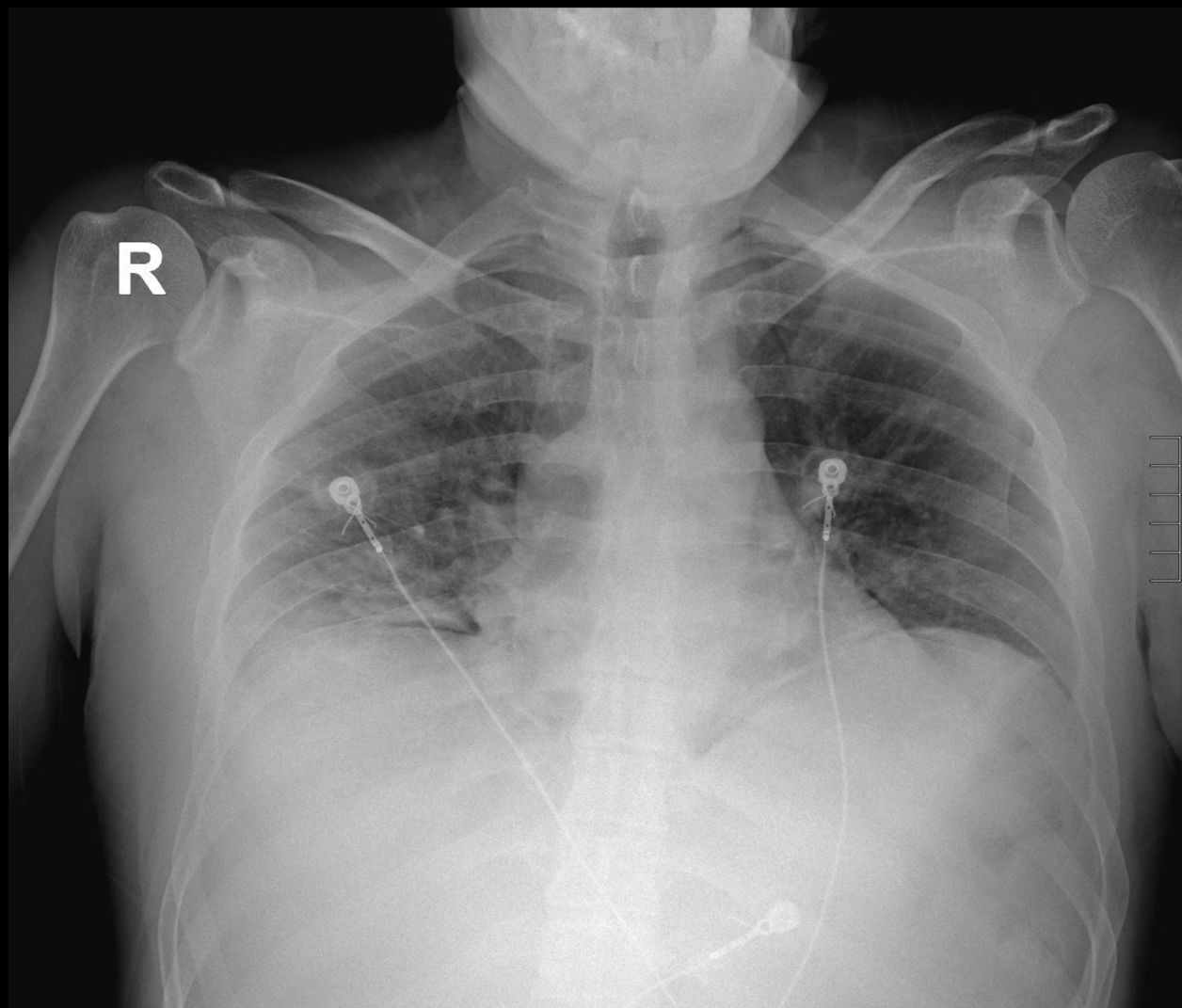
Variant 1:

Suspected diffuse lung disease. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
Radiography chest	Usually Appropriate	☼
CT chest without IV contrast	Usually Appropriate	☼☼☼
CT chest with IV contrast	May Be Appropriate	☼☼☼
MRI chest without and with IV contrast	Usually Not Appropriate	○
MRI chest without IV contrast	Usually Not Appropriate	○
CT chest without and with IV contrast	Usually Not Appropriate	☼☼☼
FDG-PET/CT skull base to mid-thigh	Usually Not Appropriate	☼☼☼☼

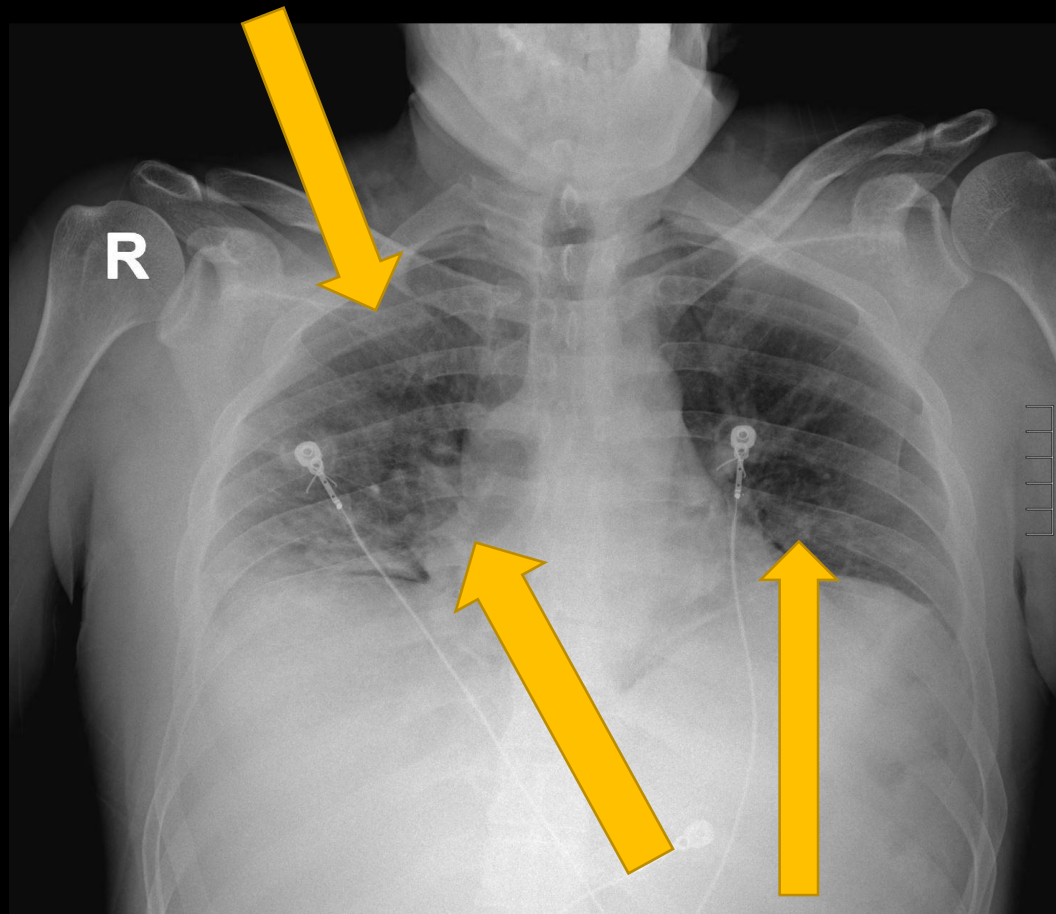
These imaging modalities were ordered by the ER physician

Findings (unlabeled)

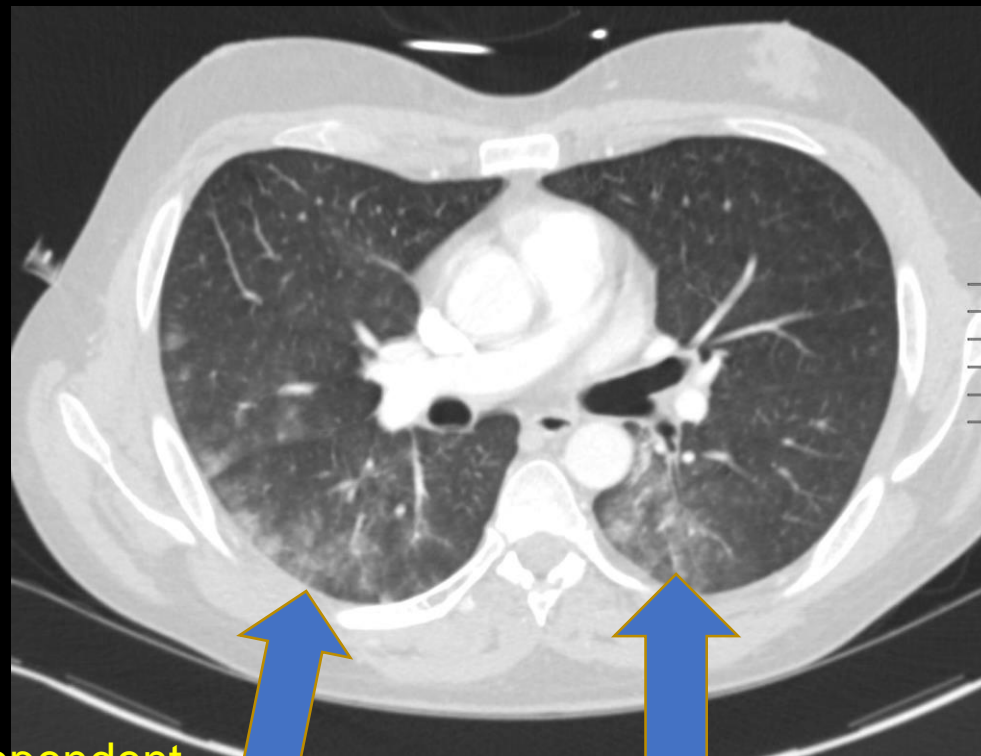


Findings: (labeled)

Low lung volumes



Increased bibasilar interstitial markings



Patchy, dependent areas of ground-glass opacity in both lungs, right greater than left

Final Dx:

Near-drowning non-cardiogenic pulmonary edema

Case Discussion

Epidemiology:

- Drowning is a leading cause of death in children
- Every year there are nearly 4000 fatal unintentional drownings and approximately 8000 nonfatal drownings
- More than 40% of drownings treated in ED require further hospitalization or transfer
- Among adolescents and adults, alcohol use is involved in
 - 70% of deaths associated with water recreation
 - Nearly 1 in 4 ED visits for drowning

Case Discussion

Pathology:

- Near drowning can be divided into 3 stages:
 - Stage 1: Acute laryngospasms after inhalation
 - Stage 2: Laryngospasms + water begins to enter stomach
 - Stage 3: Laryngospasms cease secondary to hypoxia and large amounts of aspirated water
- Pulmonary edema is thought to be secondary to direct hypoxic injury to the lungs
- Fluid aspiration then leads to acute lung injury

Case Discussion

Radiographic Findings:

- Radiographically we can see stages 2 and 3
- Looks comparable to other causes of non-cardiogenic pulmonary edema
- CXR:
 - Three basic patterns:
 1. CXR can be normal
 2. Increase in perihilar interstitial markings
 3. Generalized edema pattern

Case Discussion

Radiographic Findings:

- CT chest:
 - Ground glass opacities
 - “Crazy paving” appearance, with ground glass and interlobular septal thickening
 - Centrilobular nodularity may also be present
 - Complications include pneumomediastinum or pneumothorax in some patients
 - Fluid or debris can be seen in the trachea and central bronchi
 - “Sand bronchogram” in some patients with aspirated sand causing radiodensity in the affected airways

Case Discussion

Treatment:

- Restoring oxygenation: The patient was given CPR on the scene, later EMS provided bag-valve mask
- Correct hypoxic injury with respiratory support (high flow oxygen)
- Monitor acid base status, alveolar ventilation, gas exchange, perfusion, temperature, volume
- Monitor for signs of aspiration pneumonia, treat with Abx (this patient was found to have aspiration pneumonia a few days after admission and was given Unasyn)

References:

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