



Case #129

NAME Educational Activities Committee

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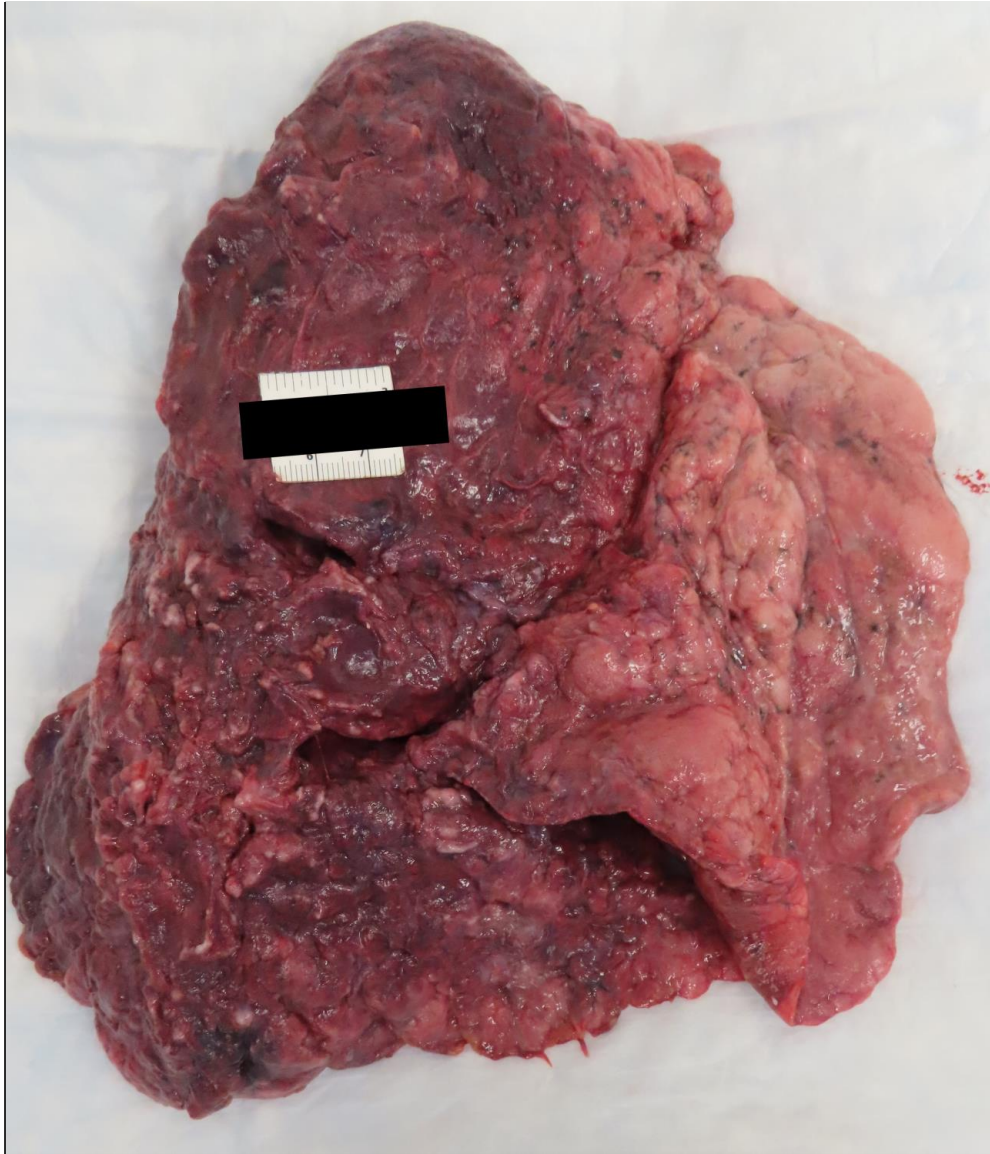
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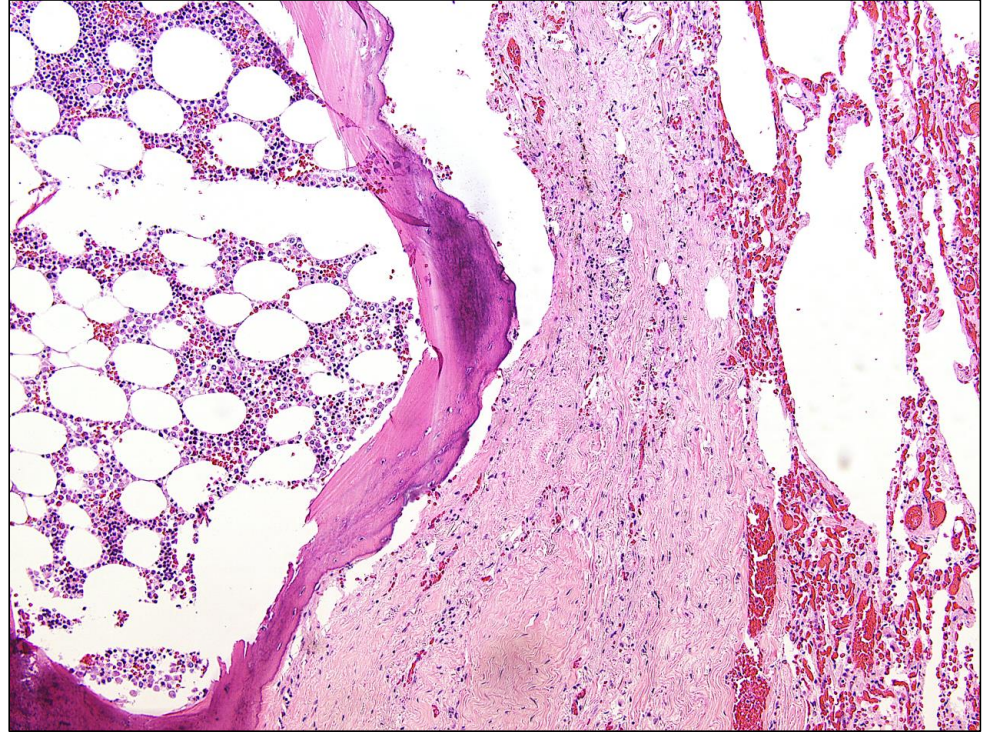
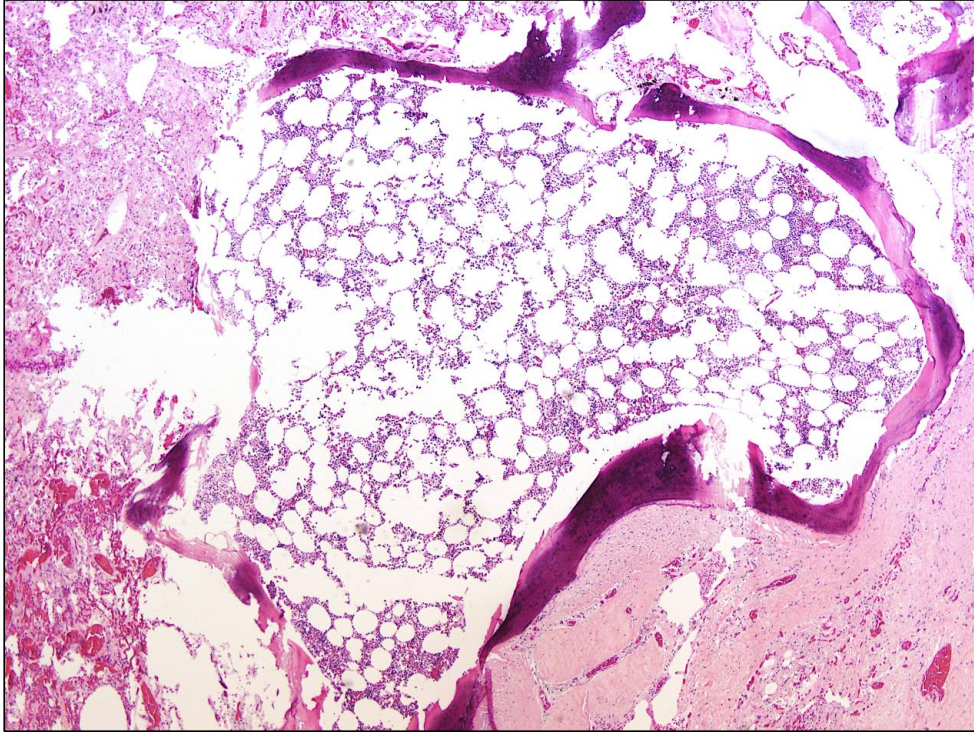
Pulmonary Pathologist and Case Consultant

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A 61-year-old man was found deceased in his home with a head injury after a presumed, unwitnessed fall. The decedent was retired from the Navy, and available past medical history was significant for hypertension, alcohol use disorder, and chronic lung disease, for which he was prescribed several medications, including albuterol, fluticasone/salmeterol, tiotropium, and montelukast. At autopsy, diffuse pathologic lung abnormalities were appreciated, with extensive calcifications, including near skeletonization of the tracheobronchial tree and pleura, with congested parenchyma, as shown in the included gross photographs. Histology was significant for the findings shown in the images. **Which of the following of the decedent's risk factors, *in addition to his chronic lung disease*, is most associated with the demonstrated histopathologic findings?**

- A. Orthopedic trauma
- B. Chronic aspiration
- C. Hypertension
- D. Direct drug toxicity





Answer...

B. Chronic aspiration (correct - 37.80%)

The pathologic finding demonstrated is dendriform pulmonary ossification (DPO), a rare entity in which metaplastic, mature bone is present in lung parenchyma. The pathophysiology is incompletely understood, but it has been most characterized in association with primary lung diseases (like usual interstitial pneumonia, UIP) and chronic aspiration of gastric acid.

The decedent had a past medical history significant for chronic lung disease of clinical diagnostic uncertainty, reportedly having been updated in recent records from interstitial lung disease (ILD) to emphysema, with an available pulmonology note considering a differential that included hypersensitivity pneumonitis versus pneumoconiosis, in the setting of his occupational history. On histology, beyond the DPO, the background lung tissue was relatively unremarkable, with only patchy, limited interstitial fibrosis among large areas of intervening uninvolved alveolar tissue. The observed morphology was not consistent with usual interstitial pneumonia (UIP) and therefore IPF, nor any of the recognized diagnostic patterns of chronic interstitial lung disease (ILD). Available clinical notes commented that his radiologic parenchymal changes were present and stable for years, which has been reported in DPO in the absence of UIP in elderly men, following a stable, indolent course.

The decedent had a reported history of alcohol use disorder, which is associated with increased risk for chronic aspiration.

Histologically proven DPO is **almost invariably found at autopsy**, and in frequent association with chronic lung disease. **DPO is rare, and poorly understood, but has been associated with chronic lung disease and aspiration events.**

Other responses...

A. Orthopedic trauma (wrong - 26.59%)

The histologic findings in isolation could easily be mistaken for a bone marrow embolism, a finding commonly associated with bony injury, which occurs when bone fragments, frequently the result of orthopedic trauma or cardiopulmonary resuscitation, embolize to the lungs and are seen on histology as fragments of mature bone marrow particles with myeloid and lymphoid precursors and adipose tissue in the lumens of pulmonary vessels. DPO can mimic bone marrow embolism, so careful attention to the location of ossified elements within the parenchyma or bronchi (suggesting DPO) versus within vascular lumens (suggesting embolism) is essential for accurate diagnosis. This decedent indeed had a history of an unwitnessed fall and a head injury, and therefore risk factors for a bone marrow embolism, but the diffuse gross findings in the lungs, chronic pulmonary disease history, and histologic findings, including marrow in association with cortical bone with parenchymal/bronchial localization (rather than within vessels), all support DPO over bone marrow embolism.

C. Hypertension (wrong - 10.73%)

The significant histologic finding of DPO is not characterized in association with systemic hypertension or general cardiovascular disease. DPO is frequently identified in the setting of primary lung disease, and as discussed in answer choice B, chronic aspiration, likely as a protective metaplasia in response to chronic exposure to the chemical irritant of gastric acid.

D. Drug Toxicity (wrong - 24.88%)

The decedent was prescribed several pulmonary medications, none of which are known to be directly associated with gross or histopathologic findings as shown. It is worth considering that while not classically implicated in DPO, chronic use of inhaled corticosteroids may theoretically contribute to localized airway remodeling, impaired mucociliary clearance, or chronic low-grade inflammation. Although speculative, this raises the possibility that ICS use could act as a permissive factor in the development of DPO in susceptible individuals.

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