

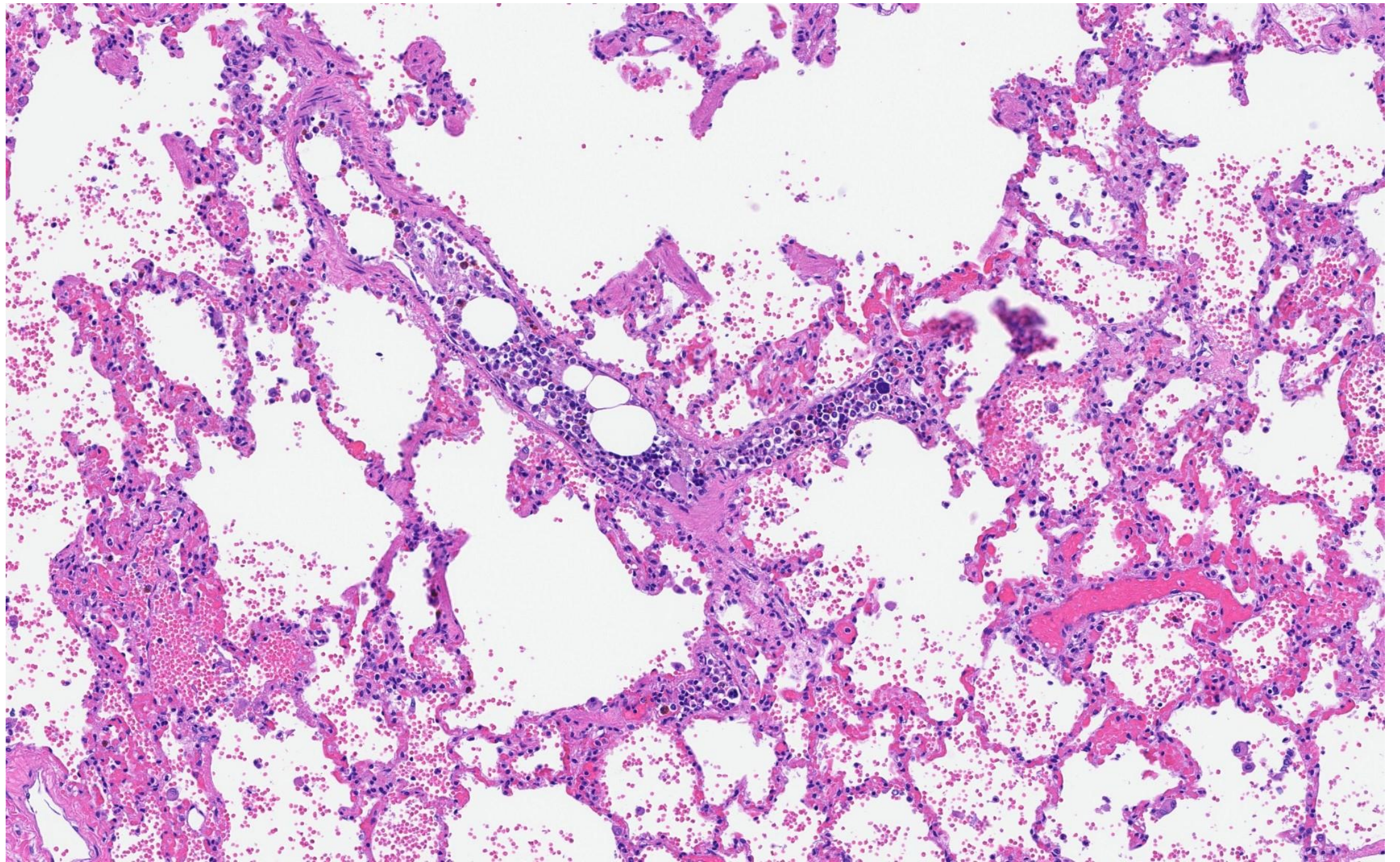


Case #66

NAME Educational Activities Committee

Case provided by:

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1. The pictured finding was identified on histologic sections of the lung of a deceased 17-year-old male. Which of the following circumstances would be most consistent with this finding?

- Blood cultures positive for *Strep. pneumoniae*
- Intravascular injection of crushed pills
- Metastatic carcinoma with extensive lymphovascular invasion
- Multiple blunt force injuries
- Scuba diving accident with rapid ascent

Answer...

D. Multiple blunt force injuries – (CORRECT ANSWER, 63.44% of responses)

Our picture shows intravascular hematopoietic elements and fat, consistent with a bone marrow embolus. The decedent in this case was a young man involved in a snowmobile crash, who suffered multiple blunt force injuries, including multiple long bone fractures. Due to the extent of his injuries, he was pronounced deceased at the scene without any attempts at resuscitation.

Fat/bone marrow emboli happen when marrow elements enter vascular circulation. They classically associated with long bone (especially femur) and pelvic fractures but can be seen with fractures of any marrow-containing bones (e.g., ribs). As expected, they are more often seen with multiple and open fractures, as well as with a delay in reduction of the fracture. Fat/marrow emboli are also common following cardiopulmonary resuscitation, especially if rib fractures are present.

Although a common finding in autopsy, these emboli are not always clinically significant, and history of presentation should be considered before a diagnosis of fat embolism syndrome (FES) can be made. The classic history for FES would involve a decedent that presented with sudden shortness of breath, neurologic abnormalities and a petechial rash 24 to 72 hours following a long bone fracture. Given that CPR was not one of the options in the question, D is the most appropriate response.

A. Blood cultures positive for *Strep. pneumoniae* (4.01% of responses)

The postmortem diagnosis of sepsis, without having a clear source of infection, can be challenging without antemortem clinical data. There are no specific gross or histopathologic findings that are reliably associated with sepsis. Intravascular neutrophils are a normal finding in peripheral blood, and alone do not yield a diagnosis of sepsis. Furthermore, rather than mature blood elements, our image shows hematopoietic cells and fat, more consistent with a bone marrow emboli.

B. Intravascular injection of crushed pills (7.24% of responses)

When oral tablets are crushed and injected intravenously, particles of excipients can show up as birefringent foreign material within pulmonary arteries. Some excipient crystals are fine enough to pass through capillaries to pulmonary veins, and lodge in the retina, spleen, liver, kidneys, lymph nodes, bone marrow, and spinal cord. Although the finding in our image is within a pulmonary artery, it consists of hematopoietic cells and fat rather than foreign material.

C. Metastatic carcinoma with extensive lymphovascular invasion (8.79% of responses)

Pulmonary tumor embolism is a rare event that can be seen in late stages of malignancy. These microscopic tumor emboli are rarely recognized prior to death due to their clinical and radiological similarities to pulmonary thromboemboli, much more commonly seen with advanced malignancies, and therefore they are usually incidental findings during autopsy. Our picture shows hematopoietic cells and fat rather than carcinoma cells within the lung vasculature.

E. Scuba diving accident with rapid ascent (16.54% of responses)

Pulmonary barotrauma is a consequence of failure of pressure equalization of gas-filled spaces with their immediate environment. During descent, gas compresses within such spaces and tissues, and upon ascent (especially if rapid) there is re-expansion of the gas. Pulmonary over-distension can rupture alveoli, which can lead to pneumomediastinum, subcutaneous emphysema, pneumothorax and gas embolization.

Imaging rather than histology is most helpful in identifying abnormal air collections within vasculature or body cavities. Major vessels and chambers of the heart can also be opened under water to look for trapped air bubbles.

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