



# Case #108

NAME Educational Activities Committee

Case provided by:

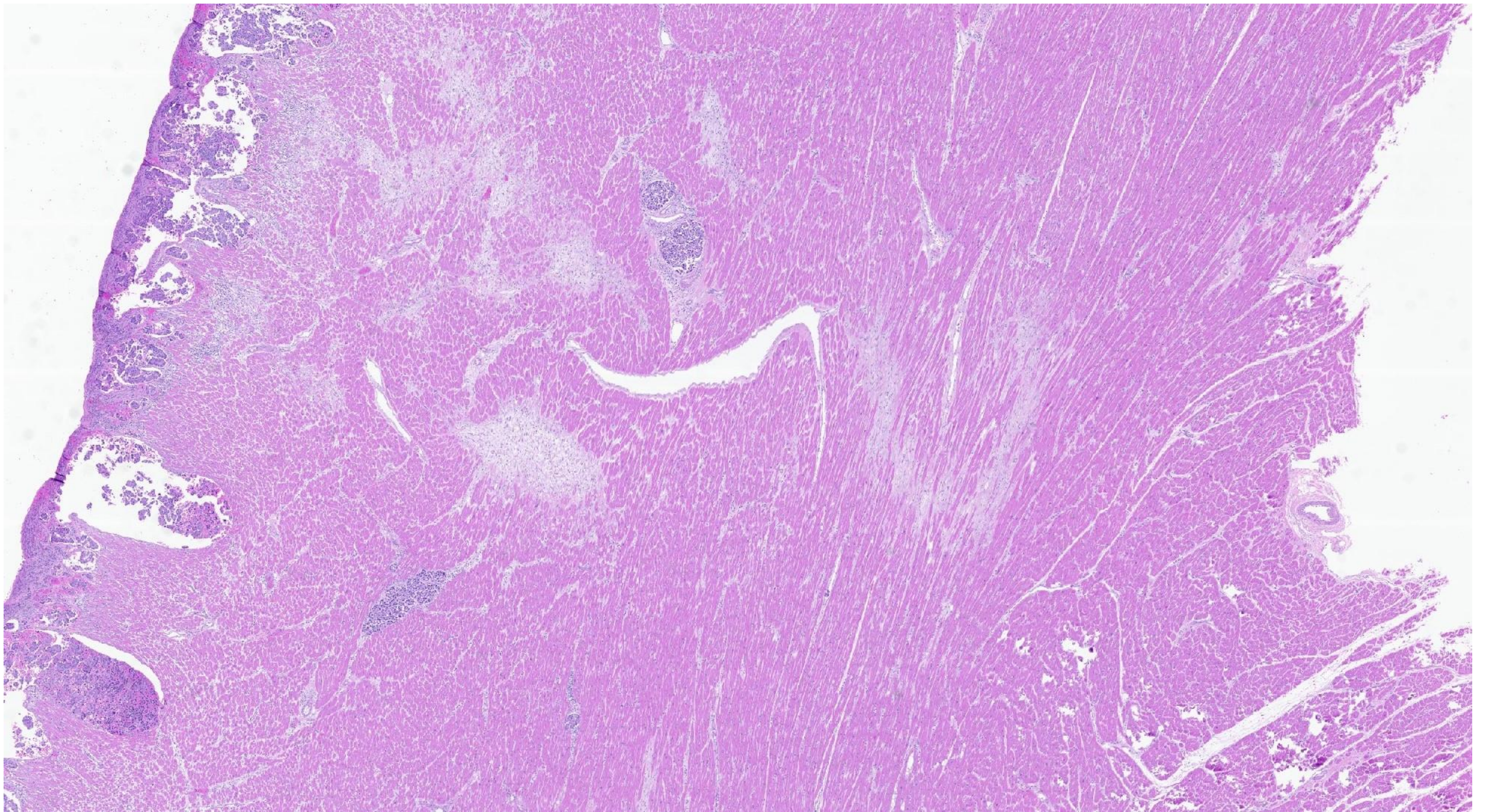
Dr. Thomas Auen (PGY3)

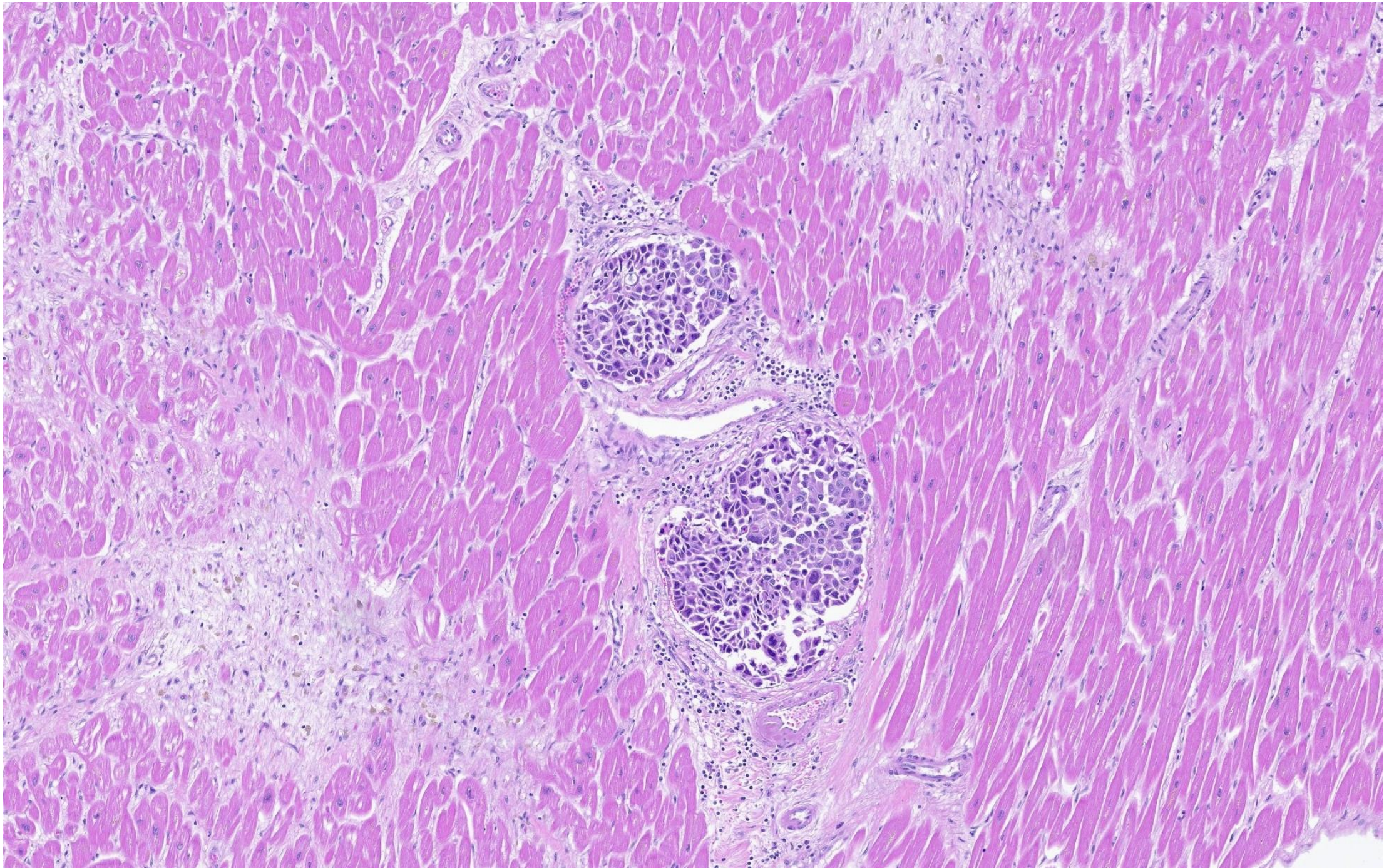
Dr. Nila Jones (PGY2)

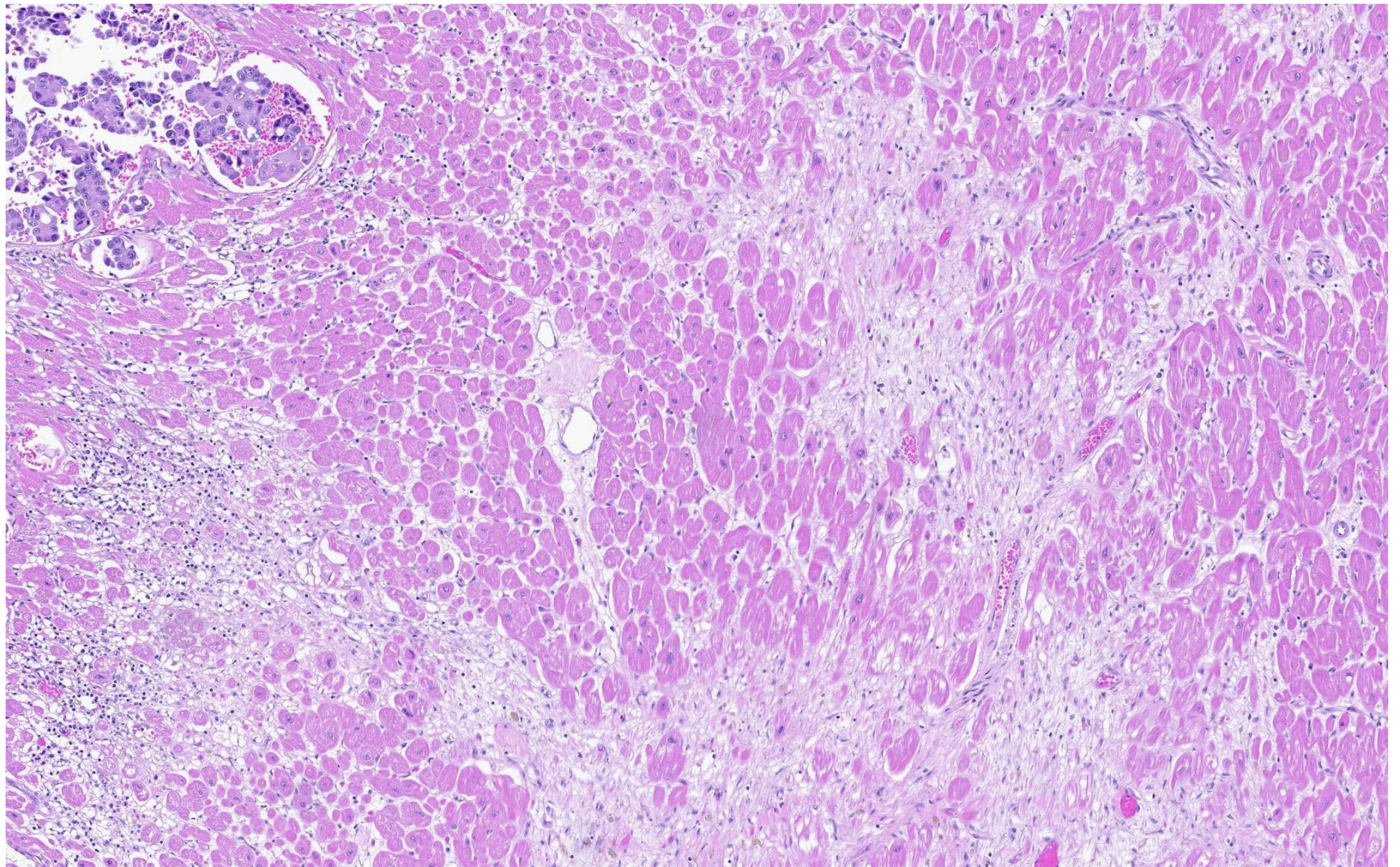
Dr. Benjamin Swanson (Associate Professor)

University of Nebraska Medical Center









1. The decedent is a 71-year-old male with extensive past medical history including severe peripheral vascular disease, alcohol-induced chronic pancreatitis, nicotine dependence, history of deep vein thrombosis, and atrial fibrillation.

Medical autopsy revealed the following gross heart findings, with roughened pericardium and adhesions to the surface. Microscopic examination of the anterior and septal region of the left ventricle are shown in subsequent images at 20x and 100x magnification. Which of the following choices best describes the features show in these sections:

- Infectious process adjacent to ischemic changes less than 24 hours post-injury
- Infectious process adjacent to ischemic changes greater 3-7 days post-injury
- Malignant process adjacent to ischemic changes 24-72 hours post-injury
- Malignant process adjacent to ischemic changes of greater than 1-week post-injury
- Malignant process adjacent to ischemic changes less than 24 hours post-injury

Answer...



**B. Malignant process adjacent to ischemic changes of greater than 1-week post-injury. (CORRECT ANSWER, 79.76% of responses)**

The identified myocardial infarction (MI) shown by H&E in the postmortem anterior and septal left ventricle demonstrates features that can help understand its timing. Review of our H&E material would support the injury as 1-2 weeks of age given the granulation tissue and amount of collagen deposition without decreased cellularity, often seen later in the scar formation process.

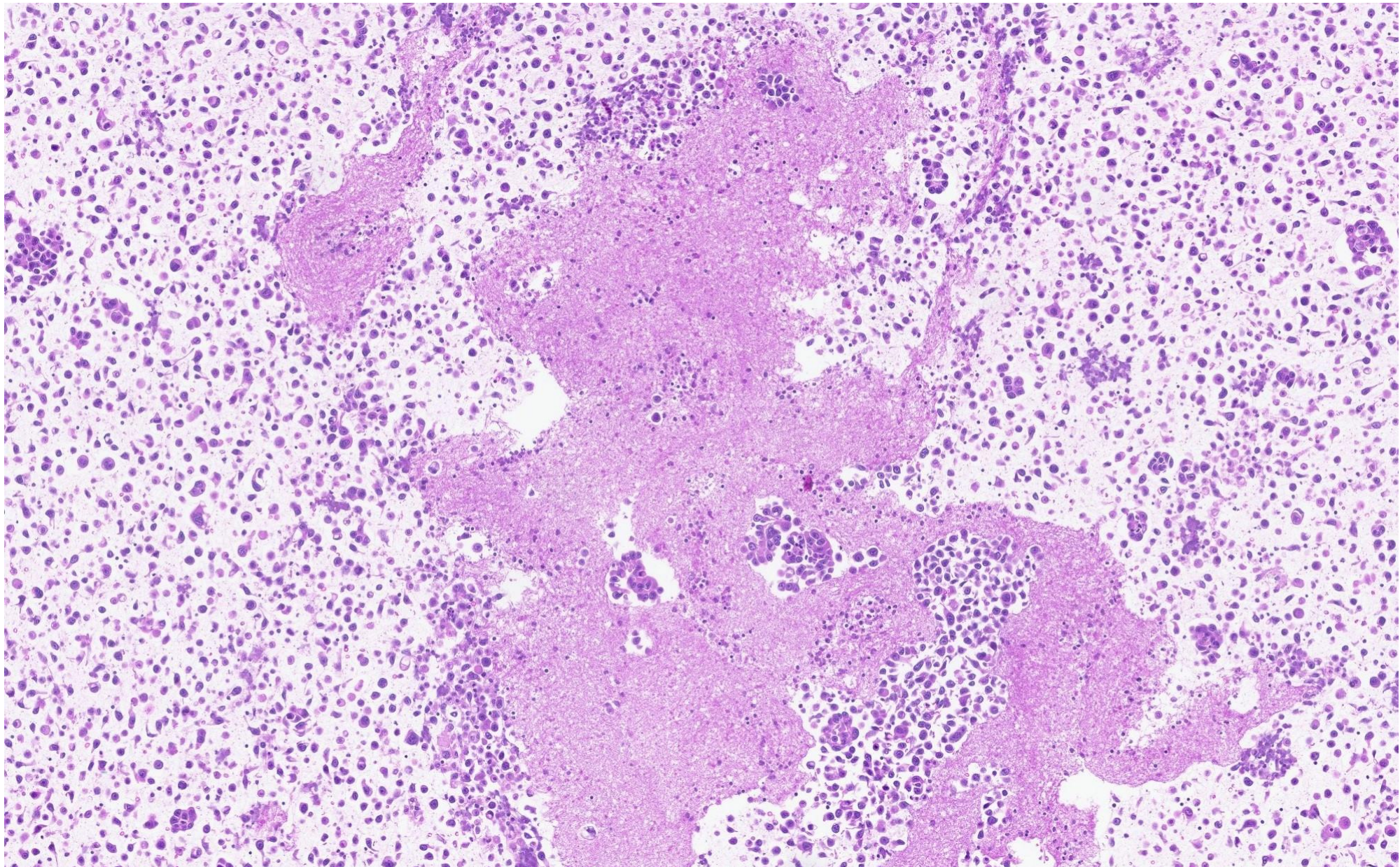
In the setting of an MI, injury is considered reversible within approximately the first 30 minutes, during which time gross and microscopic findings will be absent. However, within 30 minutes to an hour of the MI, irreversible changes begin. Initial changes may be fairly inconspicuous aside from wavy fibers that may form at the border of the injury. Dark mottling of the gross tissue will begin as coagulative necrosis becomes more extensive in the area of injury over the initial 24-hour period. By 1-3 days post-MI, the gross finding will show a more central yellow-tan lesion within the center of damaged tissue along with microscopically identified neutrophil infiltrates.

As the first week post-injury passes, the neutrophil aggregates are replaced by macrophages that phagocytose the necrotic cells and allow the formation of granulation tissues, initiation of neovascularization and collagen deposition. After one to two months post-injury, the collagen deposition will increase and eventually form a dense scar [1].

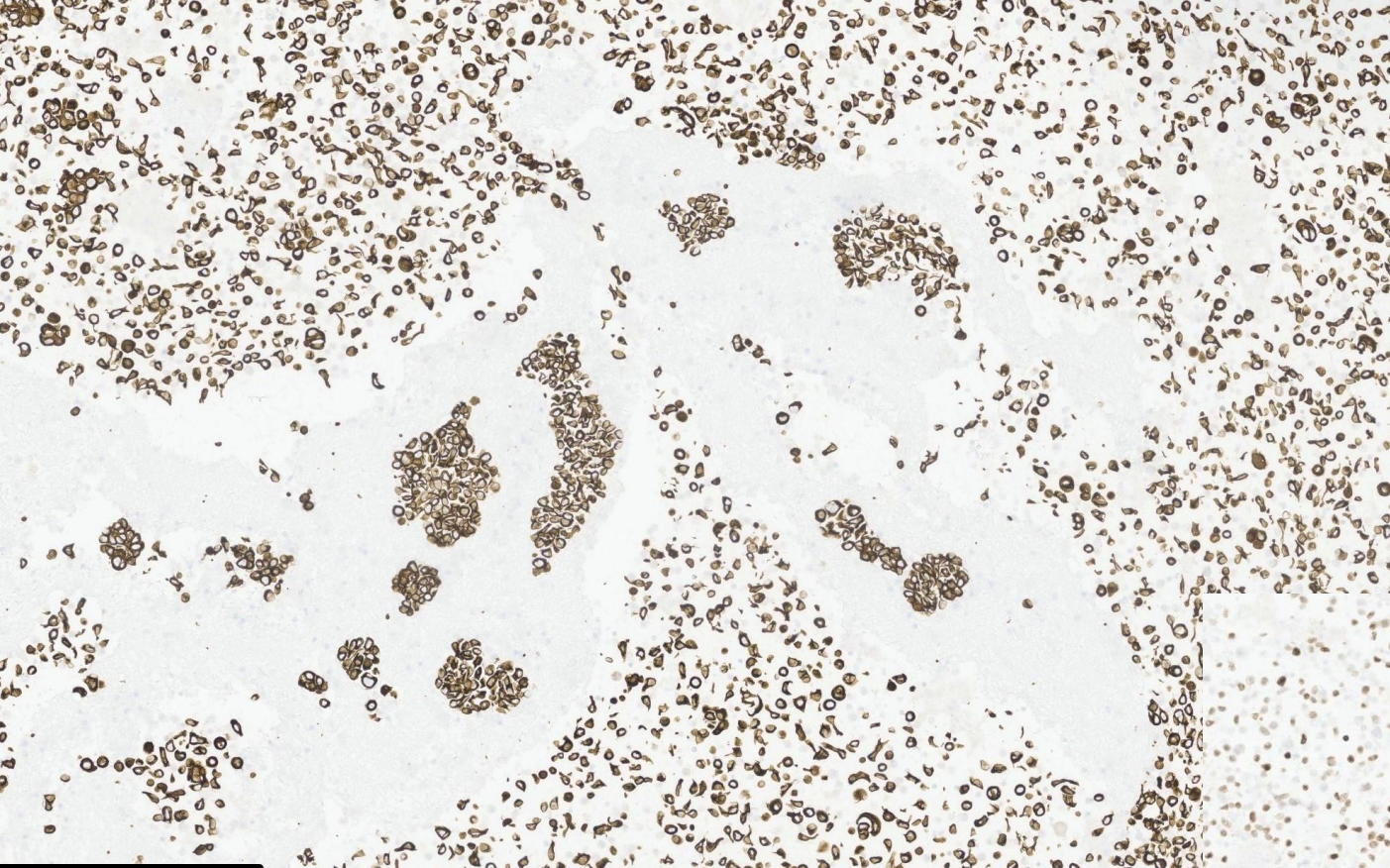
Metastasis of a lung primary carcinoma to the heart is more commonly noted in the pericardium or epicardium by direct invasion, and/or lymphatic spread. The identification of metastasis involving the left ventricular epicardium and myocardium is far rarer [2,3]. This postmortem finding, as shown with H&E preparation from the left ventricle, had direct clinicopathologic correlation with antemortem cytology specimens. A cell block prepared from pericardial fluid demonstrates aggregates of gland-forming cells with pleomorphic nuclear features that, by immunostaining, were consistent both with a primary lung adenocarcinoma and the same infiltrating metastatic cell population found in the decedent epicardium and myocardium. The primary neoplasm and its metastatic areas stained positive for TTF1, Napsin A, and CK7 and was found to be consistent with invasive moderately differentiated lung adenocarcinoma (see additional photos).



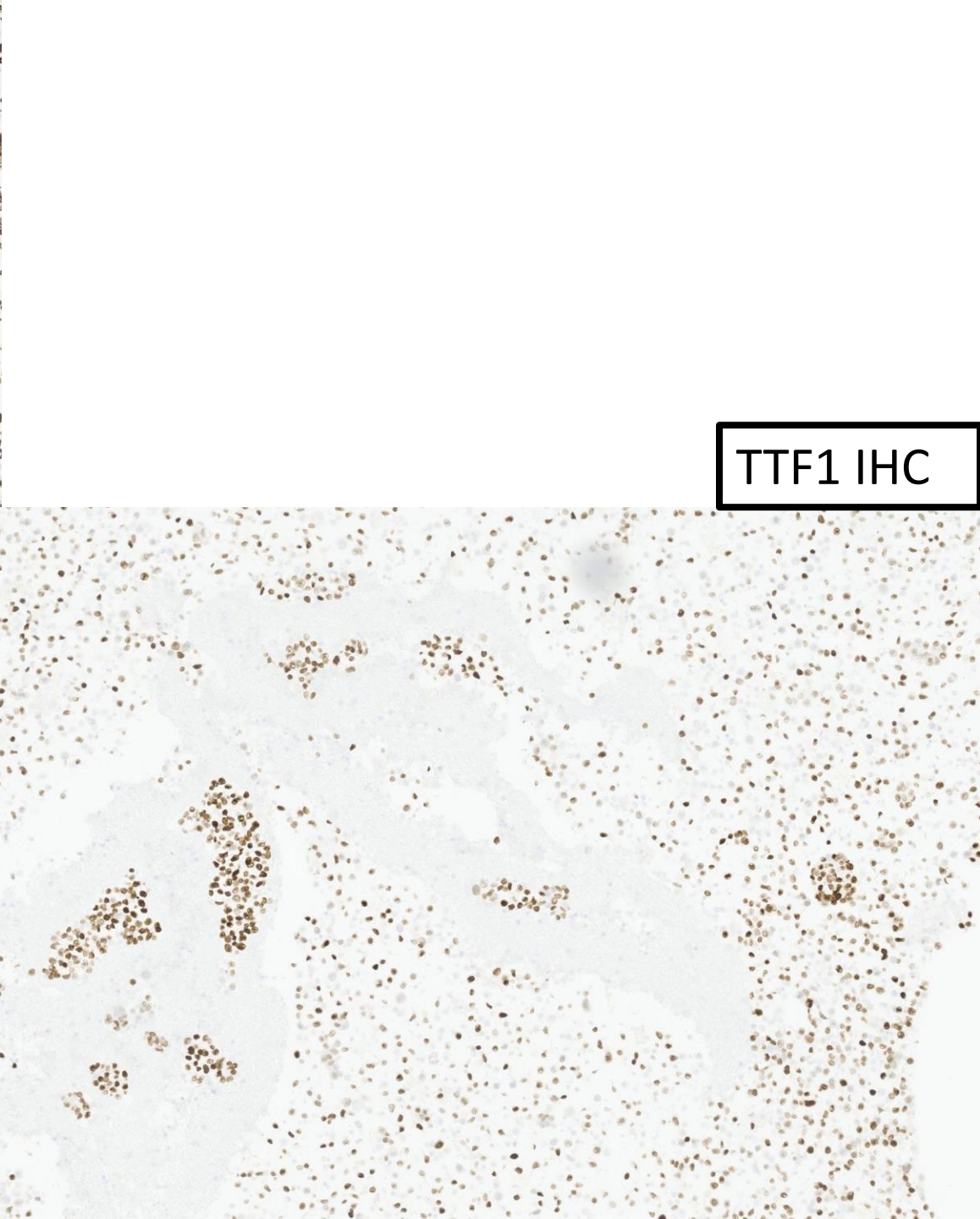
Cut section of the heart



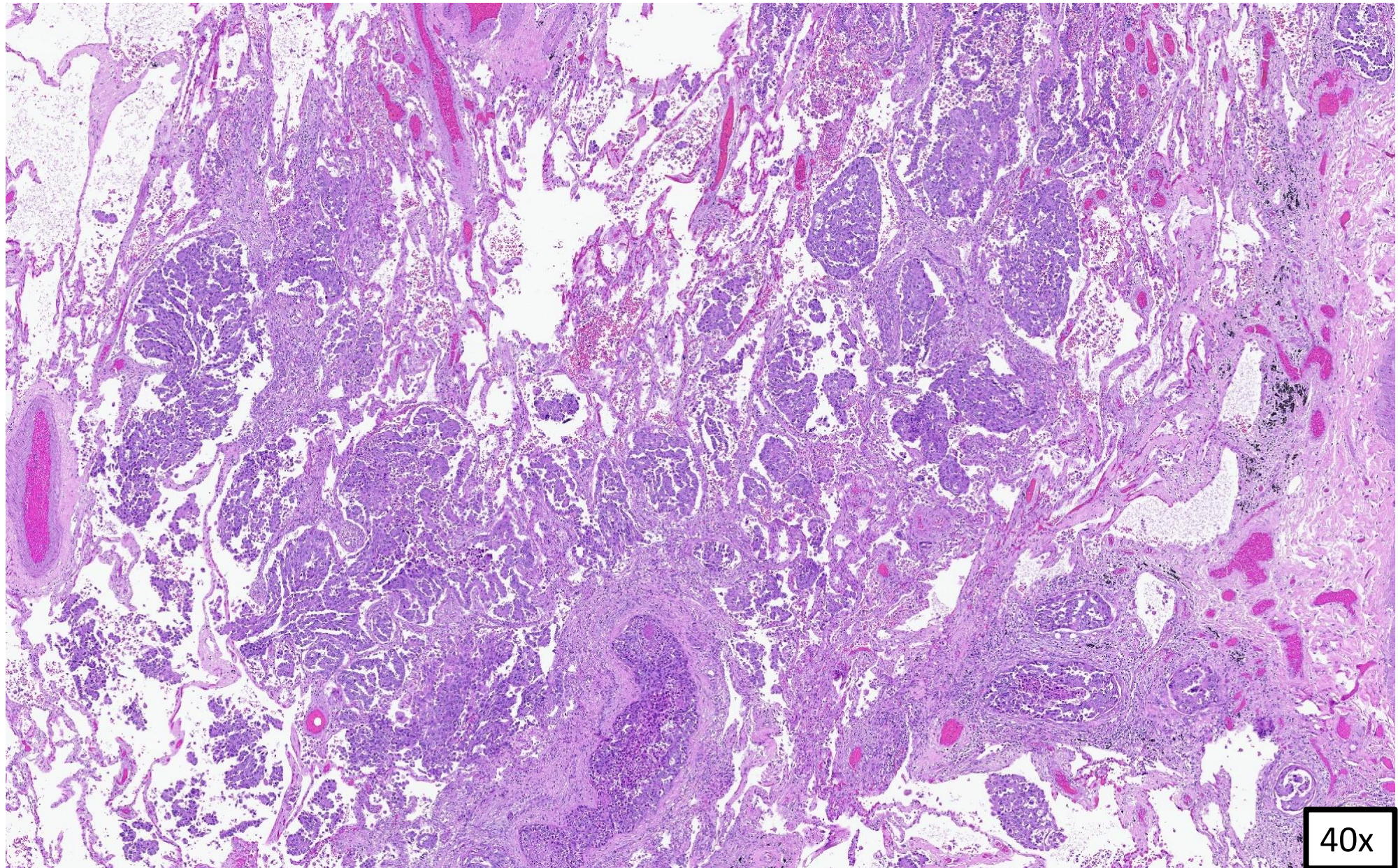
Antemortem cytology cell block from pericardial fluid



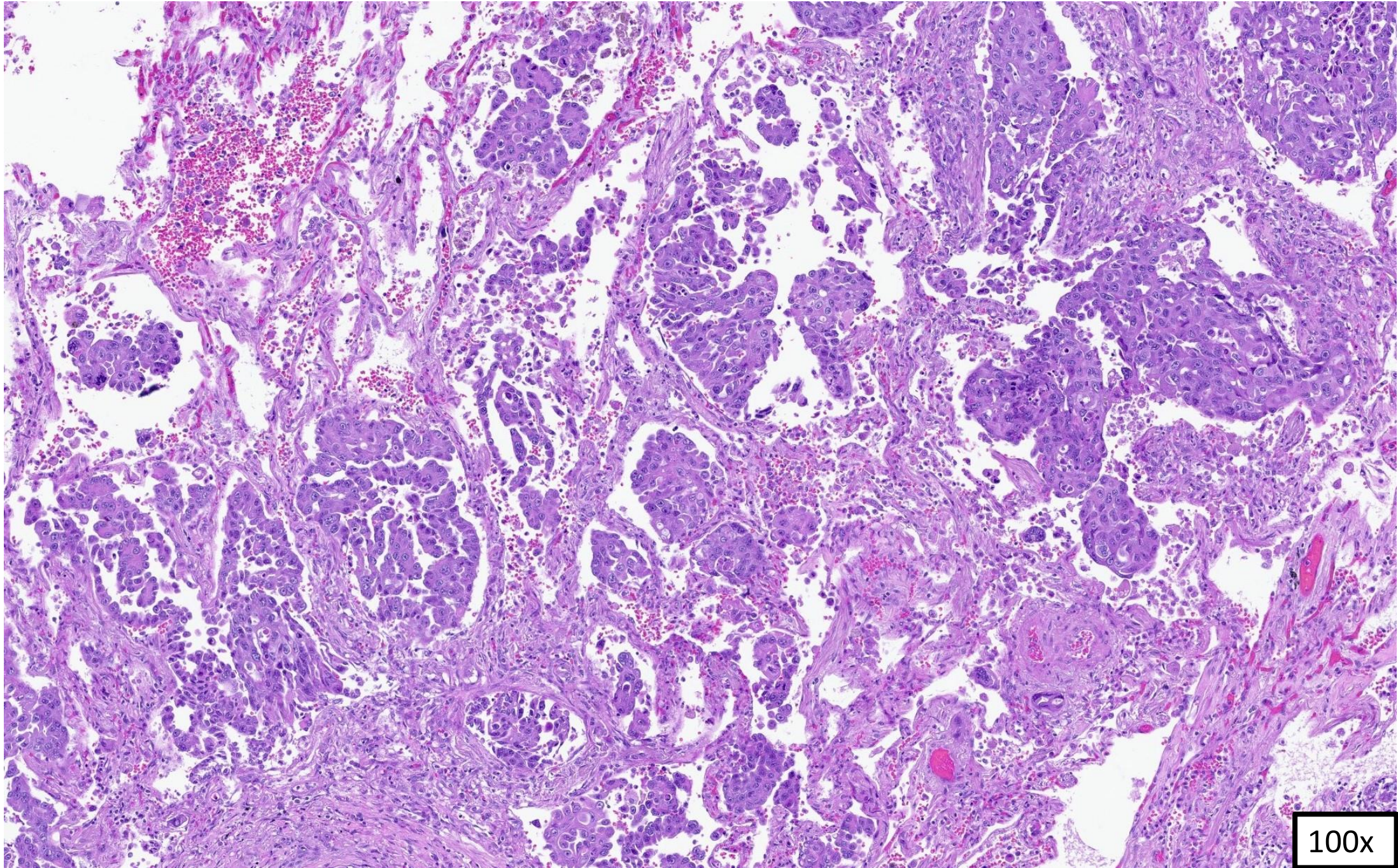
CK7 IHC



TTF1 IHC



Sections from the lung primary



100x

Other responses



- A. Infectious process adjacent to ischemic changes less than 24 hours post-injury (1.40% of responses)**
- B. Malignant process adjacent to ischemic changes 24-72 hours post-injury (9.62% of responses)**
- C. Malignant process adjacent to ischemic changes less than 24 hours post-injury (1.60% of responses)**
- D. Infectious process adjacent to ischemic changes greater 3-7 days post-injury. (7.62% of responses)**

# REFERENCES

1. Ghafoor M, Kamal M, Nadeem U, Husain AN. Educational Case: Myocardial Infarction: Histopathology and Timing of Changes. *Acad Pathol.* 2020;7:2374289520976639. Published 2020 Dec 17. doi:10.1177/2374289520976639
2. Son JW, Hong GR. Unusual left ventricular endocardial metastasis from primary lung cancer. *J Cardiovasc Ultrasound.* 2012;20(3):157-160. doi:10.4250/jcu.2012.20.3.157
3. Reynen K, Köckeritz U, Strasser RH. Metastases to the heart. *Ann Oncol.* 2004;15(3):375-381. doi:10.1093/annonc/mdh086