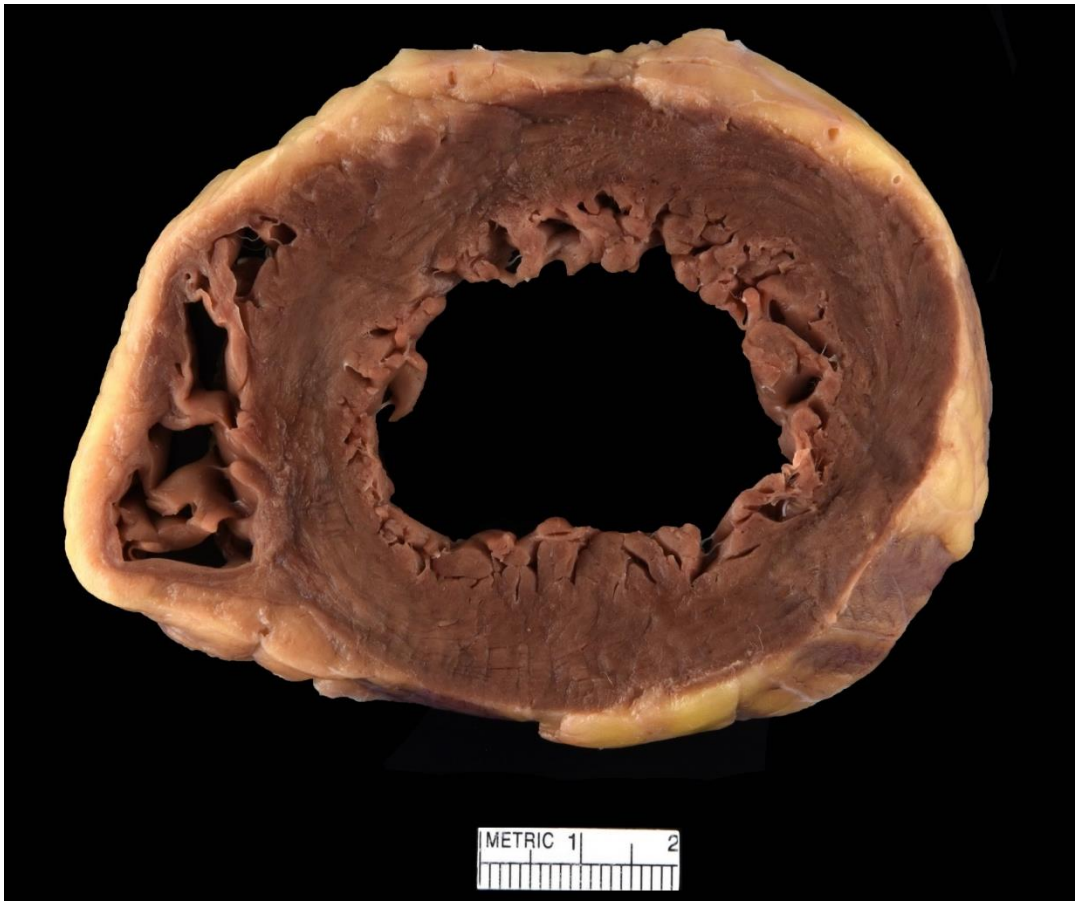
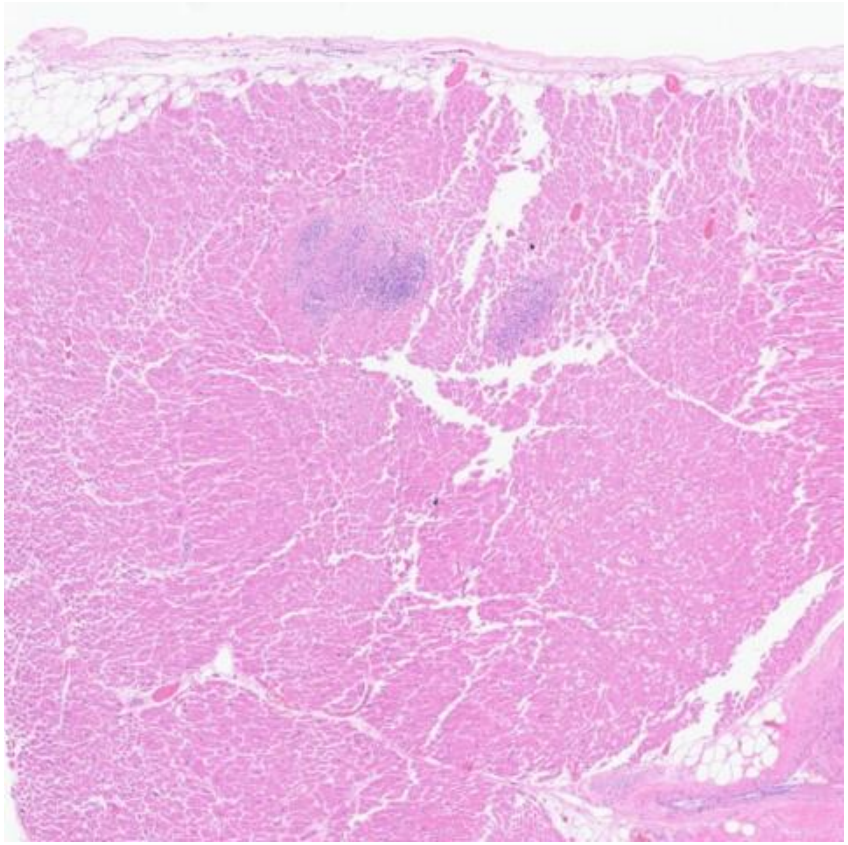
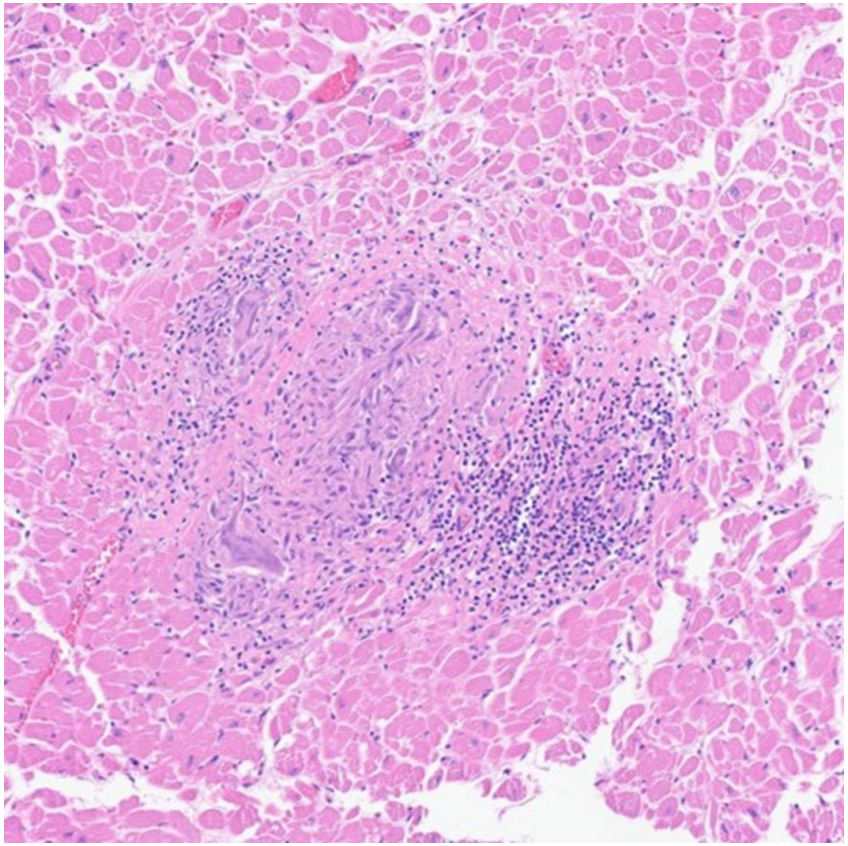


Case and images courtesy of Dr. Ameya Patil and Dr. Melanie Bois (Mayo Clinic, Rochester)

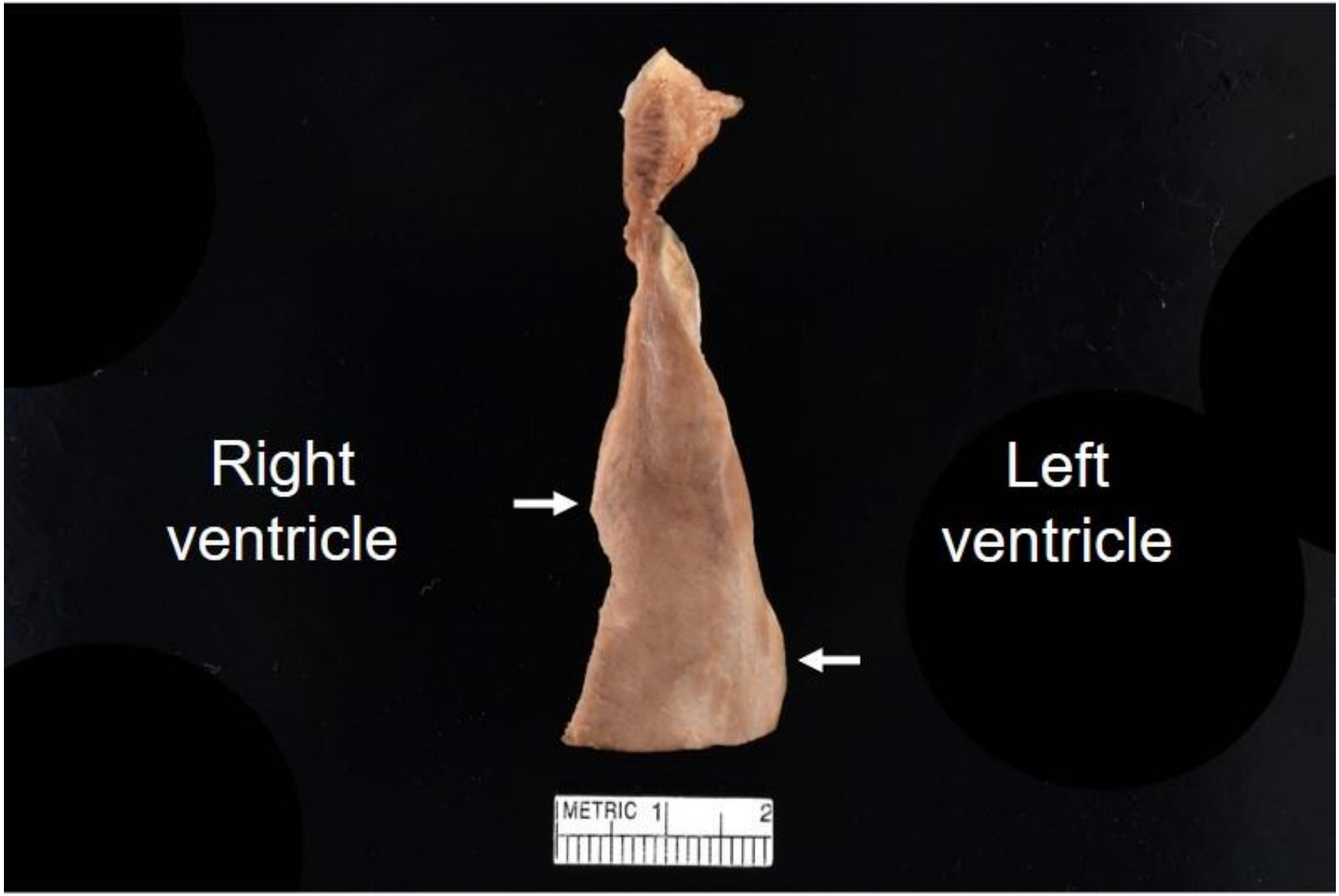


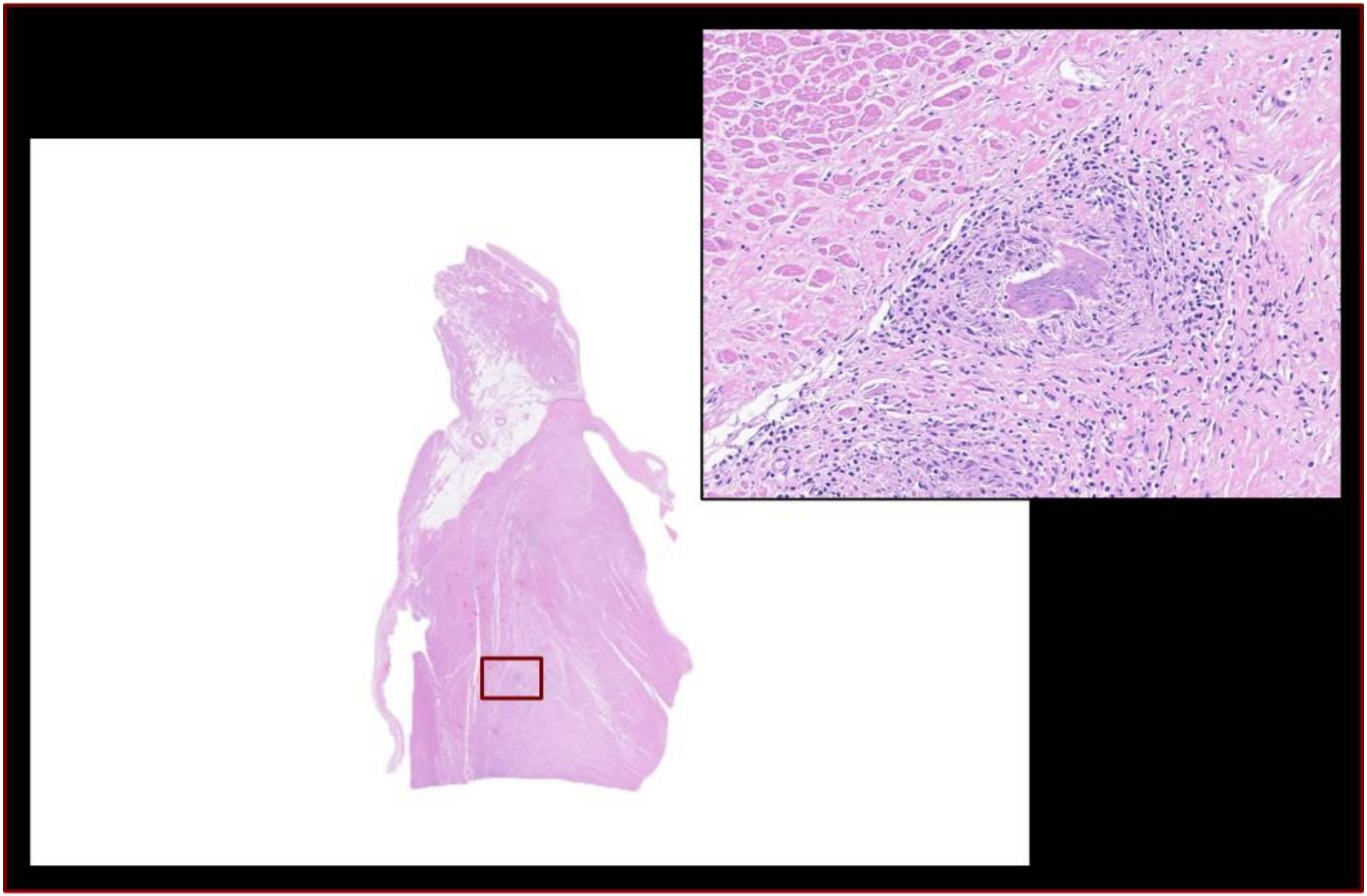


1. A 50-year-old man with morbid obesity (BMI- 42.17 kg/m2), obstructive sleep apnea, and hypertension was found deceased in bed by his wife. He had a history of fascicular block and ventricular tachycardia. Antemortem testing including a coronary angiogram and echocardiogram showed patent coronary arteries and an ejection fraction of 53%. At autopsy, he had a cardiomegaly, dilated left ventricle, pulmonary edema, and splenomegaly.

Histologic sections of the heart are shown. What is the most likely cause of sudden death in this case?

- ◯ Giant cell myocarditis
- ◯ Cardiac sarcoidosis
- ◯ Mycobacterial infection
- ◯ Acute Chagas disease
- ◯ Amyloidosis


Right
ventricle
Left
ventricle
METRIC 1
2



Section of AV node region

A. Giant cell myocarditis (38.2% responses)
Giant cell myocarditis presents aggressively with fulminant cardiac failure. Microscopically, there is diffuse lymphocytic infiltration of the myocardium with prominent giant cells with admixed eosinophils and associated myocyte degeneration and necrosis. Unlike sarcoidosis, giant cell myocarditis lacks well-formed granulomas in the myocardium.

B. Cardiac sarcoidosis (CORRECT ANSWER, 47.21% responses)
Given the histologic findings, this is the best diagnosis. Histologic sections of the AV node confirmed non-necrotizing granulomas, suggesting arrhythmia as the mechanism of death. Cardiac sarcoidosis is characterized by granulomatous infiltration of the myocardium and the conduction system, preferentially the AV node. Microscopically, non-caseating granulomas and multinucleated giant cells are seen with focal or transmural distribution, often associated with fibrosis. In patients with cardiac sarcoidosis, arrythmias and sudden death are the most frequently reported manifestations. The condition often goes undiagnosed, but cardiac dysfunction can occur suddenly and progress rapidly, ultimately presenting with sudden death. There can also be ventricular wall thinning secondary to healed granulomas and subsequent scarring, which was shown in the question's gross image. The left ventricle is most commonly affected, followed by the septum, with the involvement of the crest of the muscular ventricular septum and the vicinity of atrioventricular bundle resulting in conduction abnormalities.

C. Mycobacterial infection (4.77% responses)
Mycobacterial granulomas have variable numbers of necrotic cells and exhibit caseation which appears as amorphous material on microscopy. Epithelioid cells may be difficult to spot. In contrast, the sarcoid granulomas usually lack necrosis and have prominent epithelioid cells.

D. Acute Chagas disease (5.57% responses)
Chagas disease is an infectious condition caused by parasite *Trypanosoma cruzi* and transmitted by the reduviid bug. Acute infection on cardiac histology shows acute myocarditis with mixed inflammation surrounding the parasite-containing, degenerating myocytes. Infection can also become chronic, presenting with arrythmia. With chronic infection, the histology may occasionally show poorly formed granulomas which are non-caseating, but will have mixed inflammatory infiltrate, fibrosis and lysis of myocytes. Cardiac failure is a late manifestation which is usually biventricular with right predominance.

E. Amyloidosis (4.24% responses)
Cardiac amyloidosis is characterized by extracellular deposition of misfolded protein that results in a restrictive cardiomyopathy. The abnormal protein can be derived from monoclonal light chains in the setting of plasma cell dyscrasia or can be abnormal transthyretin produced by the liver. Patients can present with arrythmia and sudden cardiac death. On histology, widening interstitium around the myocytes with pale, homogenous amyloid deposition can be seen. Amyloid can rarely be associated with a giant cell reaction and inflammation

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