



Case #106

NAME Educational Activities Committee

Case provided by:

Sam K. Engrav

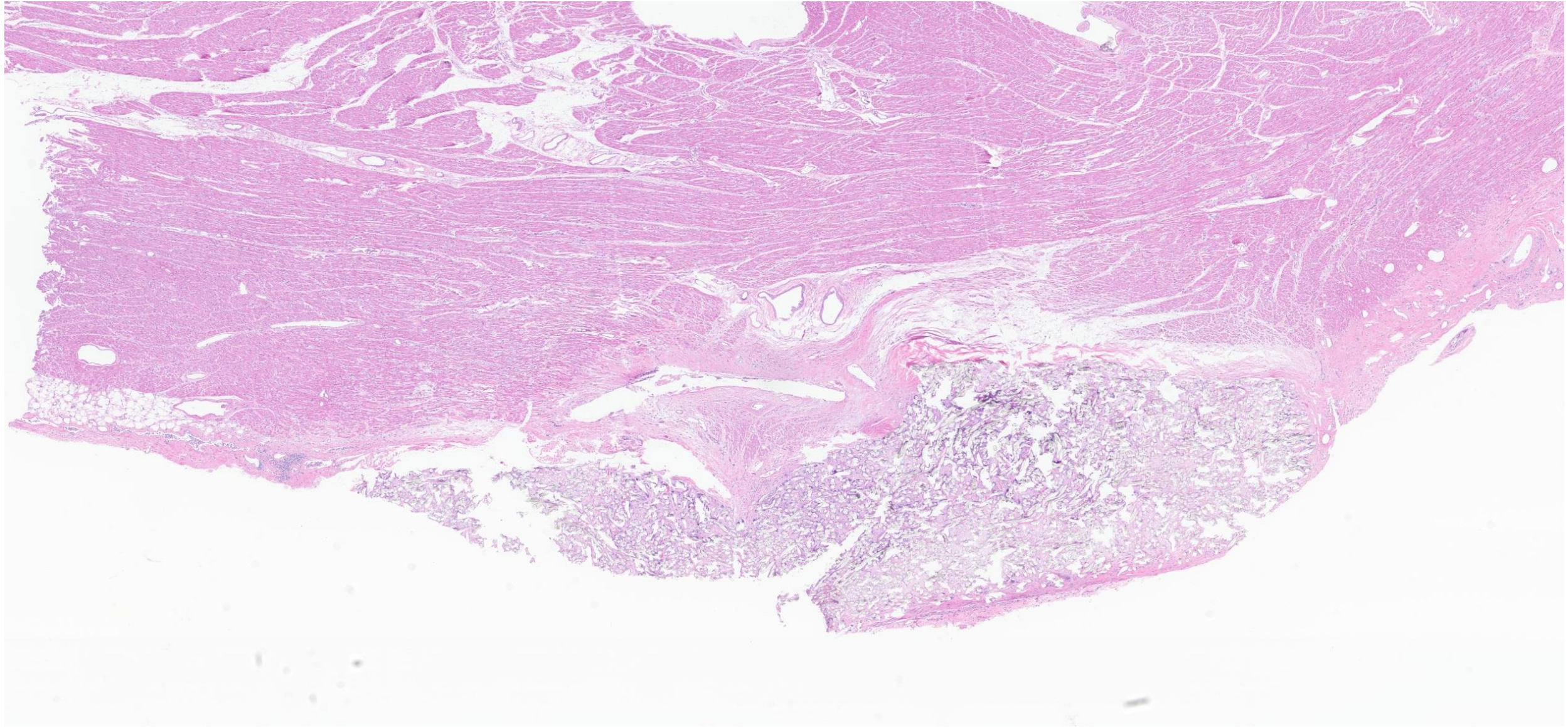
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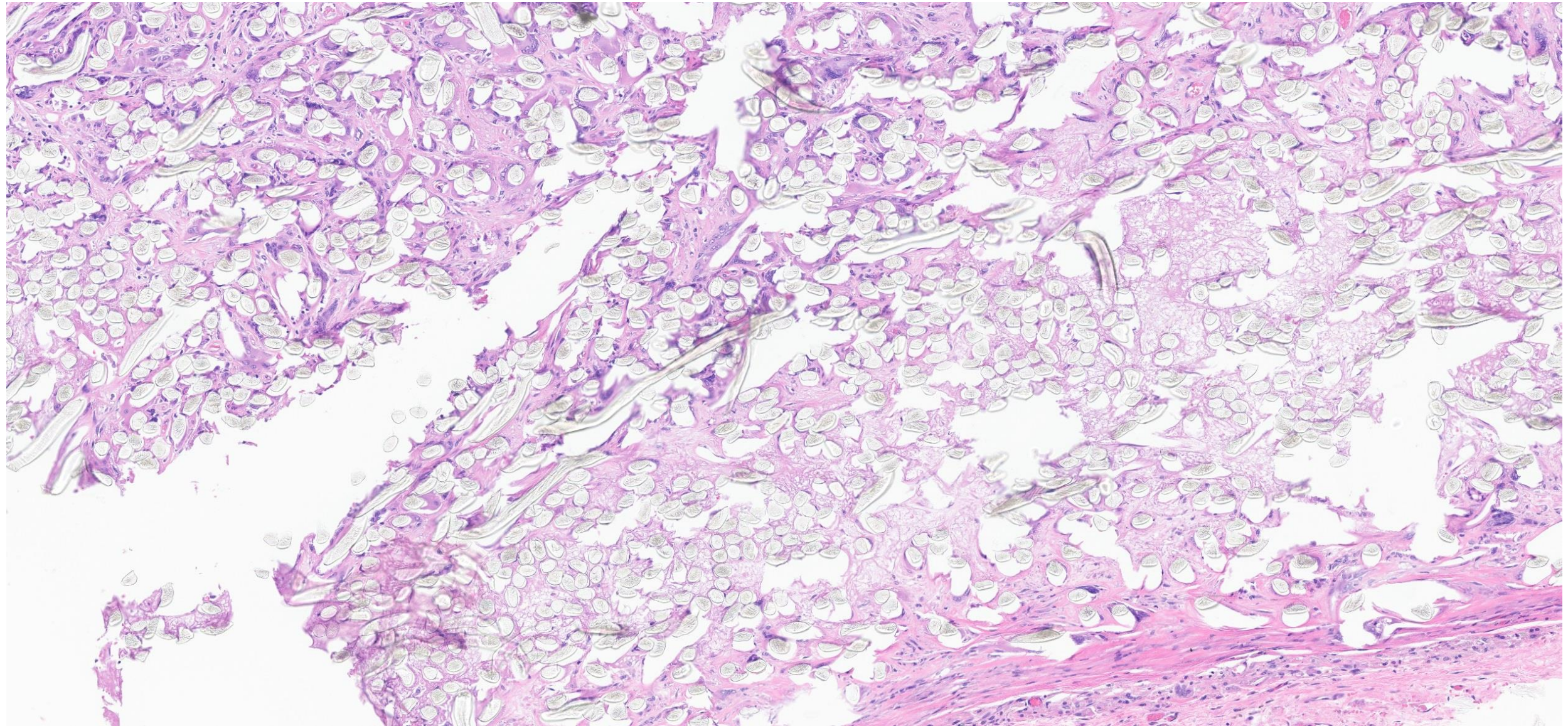
Mayo Clinic Alix School of Medicine

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1. The decedent is a 58-year-old male with a past medical history notable for significant atherosclerotic heart disease resulting in left ventricular assist device (LVAD) placement and subsequent heart transplant, and chronic kidney disease (stage 4) also resulting in renal transplant. Following his transplants, he had a complicated hospital course and died 8 months later.

The images shown are from histological sections from the heart taken at autopsy. What is the most likely cause of these findings?

- Parasitic infection
- Surgical patch (Dacron)
- Post-transplant inflammatory changes
- Suture material

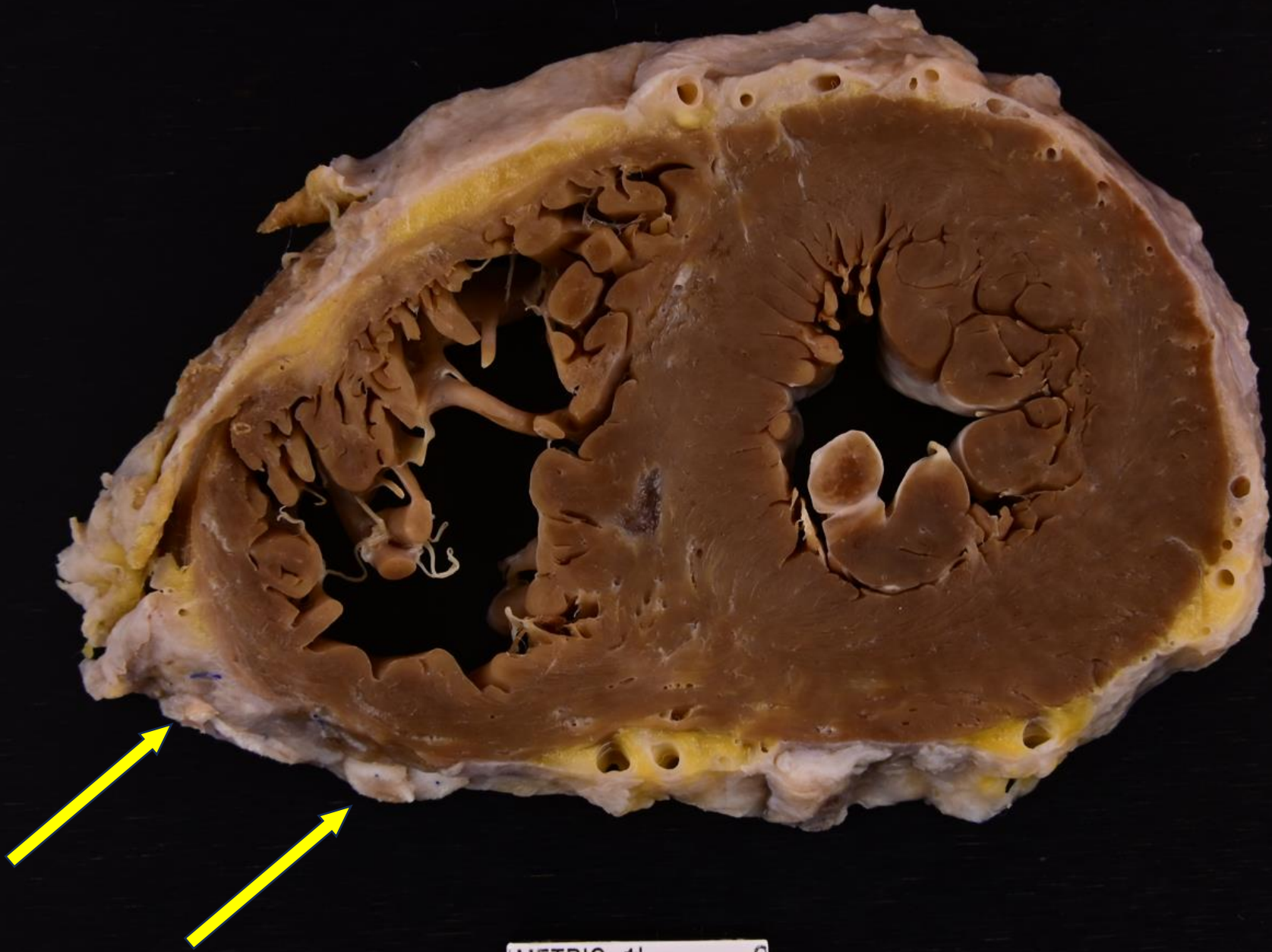
Answer...

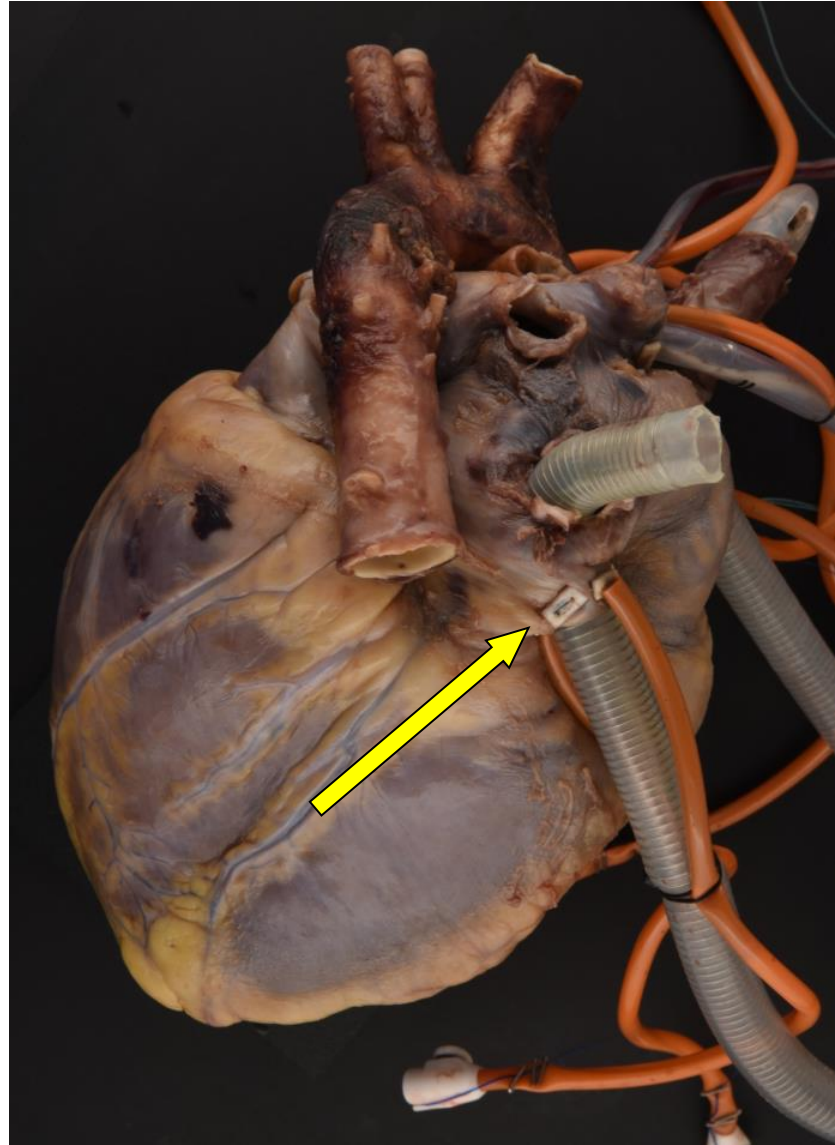
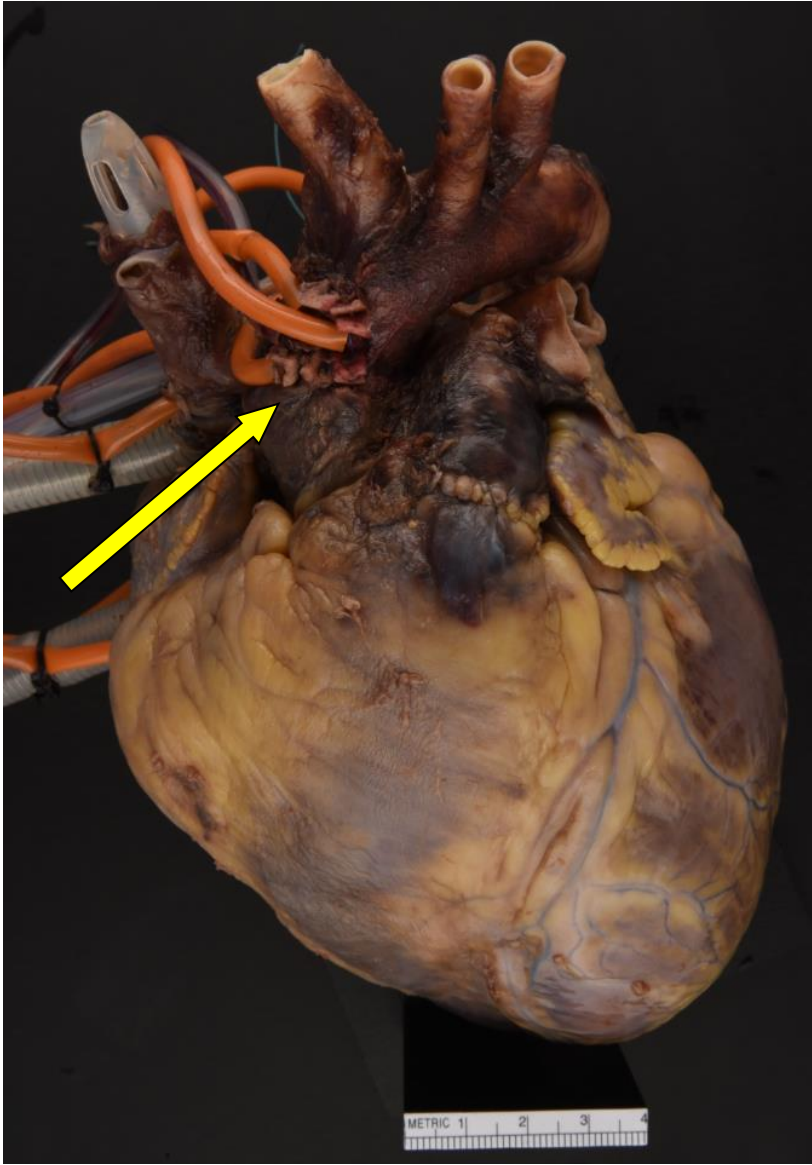
B. Surgical patch (Dacron) (CORRECT ANSWER, 58.02 % of responses)

At autopsy, examination of the heart showed numerous areas of graft material and sutures overlying the right ventricle and aorta. These sutures were pledgeted with white gauze-like material which was endothelialized on the epicardial surface (see short axis section on the next slides).

Dacron is a synthetic fabric made of woven polyethylene terephthalate (PET). The woven nature of this material provides a robust substrate for fibroblastic ingrowth (demonstrated in the H&E images provided). This feature can aid in tissue healing and adhesion. It is commonly used in valve replacement, aortic root repair, coronary artery bypass grafting, atrioplasty, heart transplant procedures, and countless other surgical interventions. An extreme example can be seen in the attached case photo of central ECMO cannulization.

Sutures can also be pledgeted with Gore-Tex (expanded polytetrafluoroethylene, e-PTFE); however, the histologic appearance of that material is more gelatinous and layered as opposed to the woven appearance seen in this case.





Other responses

A. Parasitic infection (5.97 % of responses)

While abnormal appearing at first glance no identifiable structures of a parasite or microorganism are present.

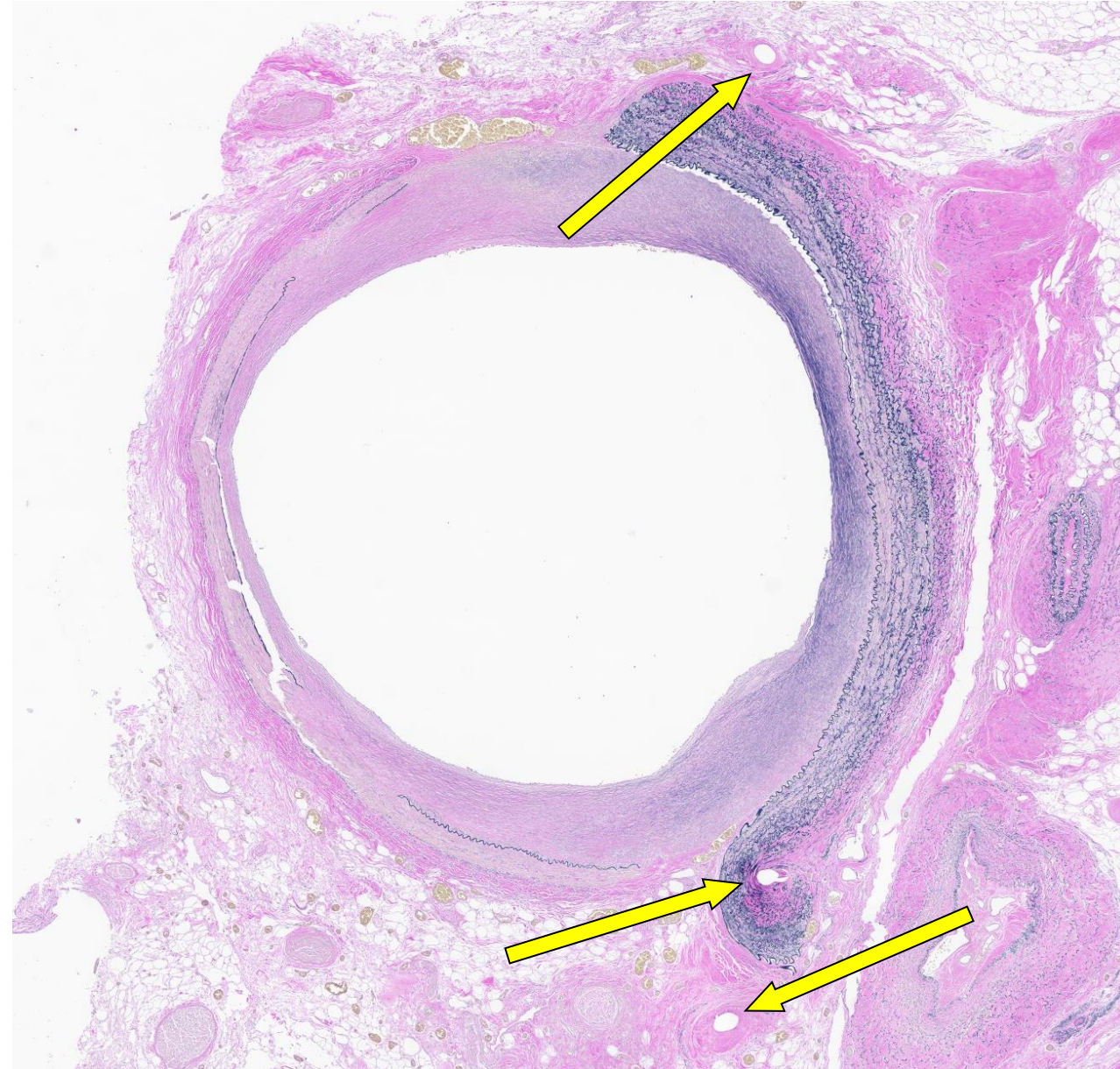
C. Post-transplant inflammatory changes (5.97 % of responses)

Histopathologic changes in the immediate post-transplant period can include acute and subacute ischemic changes of the myocardium, generally from the organ preservation and procurement process.

Chronic interstitial inflammatory infiltrates are characteristic of acute cell-mediated rejection. Interstitial edema with endothelial swelling and intraluminal mononuclear cells are the hallmark of antibody-mediated rejection. None of these are present in the representative images.

D. Suture material (30.04 % of responses)

Sutures can be made of a variety of materials (silk, nylon, polypropylene, etc.) Under the microscope it characteristically leaves a perfect round void in the tissue, as is seen in the attached image of an elastic stain from a veinous coronary artery bypass graft. Sometimes there is an associated foreign body reaction. The blue pigment of some sutures can also be occasionally seen. The material seen on the H&E in the initial prompt, while associated with a suture, does not represent the suture itself.



REFERENCES

1. Velders BJJ, Vriesendorp MD, Sabik JF, et al. Pledged versus nonpledged sutures in aortic valve replacement: Insights from a prospective multicenter trial. *JTCVS Tech.* 2022. 17: 23-46. Doi: 10.1016/j.xjtc.2022.10.016
2. Anderson JM, Rodriguez A, Chang DT. Foreign body reaction to biomaterials. *Semin Immunol.* 2008. 20(2): 86-100. Doi: 10.1016/j.smim.2007.11.004
3. Haverich A, Oelert H, Maatz W, Borst HG. Histopathological Evaluation of Woven and Knitted Dacron Grafts for Right Ventricular Conduits: A Comparative Experimental Study, *The Annals of Thoracic Surgery*, 198. 37(5):404-411. Doi: 10.1016/S0003-4975(10)60766-7.