

Title: STEMI, Cardiogenic Shock and Mechanical Circulatory Support in Alpha-Gal Allergy

Background: Alpha-gal (AG) allergy is an IgE-mediated allergic reaction to galactose-alpha-1,3-galactose found in mammalian meats. ^[1] Heparin is derived from porcine intestinal tissue, and may trigger an allergic reaction in AG allergy patients. It is secondary to cross-reactivity between heparin and AG antigen, however data on it is still lacking. ^[2] As a result, this poses a challenge when anticoagulation with heparin is needed, such as myocardial infarction (MI) and perioperative anticoagulation.

Case Presentation: A 56-year-old male with a past history of coronary artery disease and AG allergy presented with anterior wall ST segment elevation MI requiring percutaneous coronary intervention of the mid left anterior descending artery. Hospital course was complicated by cardiogenic shock requiring inotrope therapy, and eventually left ventricular assist device (LVAD) placement. He was anticoagulated with bivalirudin initially and peri-operatively for LVAD placement.

Decision Making: There are no standardized desensitization protocols that could have facilitated the use of heparin in this patient. Moreover, it is unclear the amount of heparin required to trigger an allergic reaction, since a non-standardized amount of AG is present in each lot of heparin. ^[2] However, there have been reported cases of patients with AG allergy who received heparin products during cardiac surgery after being preoperatively treated with steroids and antihistamines, with acceptable outcomes. Given the risk, alternative options for anticoagulation include bivalirudin and direct oral anticoagulants, specifically apixaban or rivaroxaban. ^[3] However, the lack of experience with those drugs in this setting as compared to heparin presents a challenge as well.

Conclusions: Further research regarding alpha-gal cross-reactivity with heparin in acute coronary syndromes and peri-operative anticoagulation in mechanical circulatory support is necessary. A standardized test that can quantify the exact amount of alpha-gal in different heparin products is essential. In the meantime, standardized heparin desensitization protocols in patients with alpha-gal allergy would be instrumental.

References

1. Jackson WL. Mammalian meat allergy following a tick bite: a case report. *Oxf Med Case Reports*. 2018;2018(2):omx098. Published 2018 Feb 21. doi:10.1093/omcr/omx098

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3. Parikh, V. et al. Novel Oral Anticoagulants in Patients with Continuous Flow Left Ventricular Assist Devices. *The Journal of Heart and Lung Transplantation*, Volume 38, Issue 4, S425.