Bee Safe: Omalizumab to the Rescue for Anaphylactic Beekeeper on Venom Immunotherapy

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Introduction

- Anaphylaxis to Hymenoptera venom is a life-threatening hypersensitivity reaction, affecting 14-47% of beekeepers.
- While life-long bee venom immunotherapy (b-VIT) is effective in preventing anaphylaxis, it may also be a risk for anaphylaxis.
- We report a case of a beekeeper with honeybee allergy undergoing b-VIT, who experienced recurrent anaphylaxis requiring epinephrine for whom omalizumab was introduced and mitigated systemic reactions.
- This patient is the first case in our clinic who receives Omalizumab in conjunction with b-VIT, due to anaphylaxis

Case Description

- 32-year-old woman, beekeeper, presented with worsening reactions consistent with anaphylaxis to honeybee stings, had positive testing only to honeybee. While on built-up on b-VIT, developed anaphylactic reactions, requiring epinephrine administration. De-escalating the immunotherapy dose, did not prevent anaphylactic episodes. Omalizumab was started to achieve the effective dose of b-VIT.

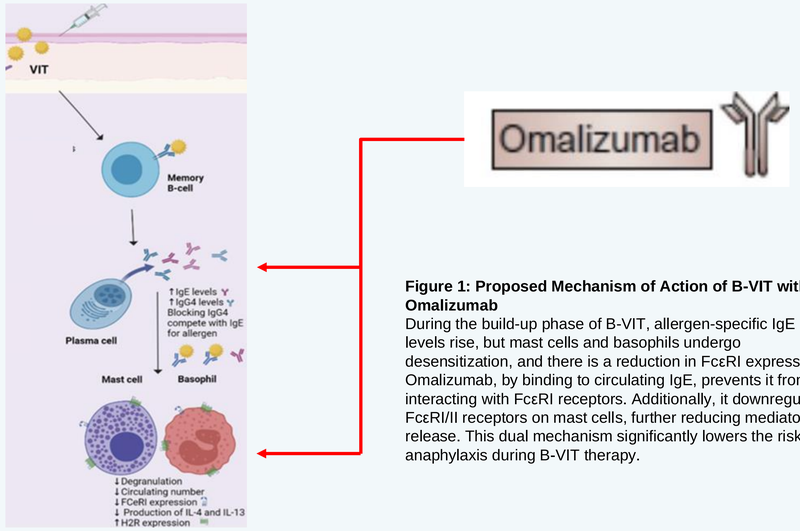

Figure 1: Proposed Mechanism of Action of B-VIT with Omalizumab
During the build-up phase of B-VIT, allergen-specific IgE levels rise, but mast cells and basophils undergo desensitization, and there is a reduction in FcεRI expression. Omalizumab, by binding to circulating IgE, prevents it from interacting with FcεRI receptors. Additionally, it downregulates FcεRI/II receptors on mast cells, further reducing mediator release. This dual mechanism significantly lowers the risk of anaphylaxis during B-VIT therapy.

Adapted from Figure 2 of Demsar Luzar et al (2021). *Hymenoptera* Venom Immunotherapy: Immune Mechanisms of Induced Protection and Tolerance https://doi.org/10.3390/cells10071575

Summary

- Honeybee stings cause high rates of recurrent anaphylactic reactions.
- A life-long b-VIT is life-saving in patients with history of anaphylaxis and sensitization to honeybees.
- Omalizumab, a humanized monoclonal antibody, has been shown to be successfully used in conjunction with b-VIT in patients who experienced systemic reactions to b-VIT.
- After initiation of Omalizumab, patient was able to achieve maintenance b-VIT without anaphylactic reaction
- Patient was sting by honeybee since reaching maintenance, with only localized reaction.

References

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