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## Beekeepers anaphylaxis: successful immunotherapy covered by omalizumab

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**Key words:** omalizumab; ultrarush immunotherapy; venom allergy.

Insect stings by *Hymenoptera* species are currently responsible for at least 20–40 deaths from allergic reactions per year in Europe. Effective management strategies using specific immunotherapy (SIT) can greatly reduce the risk of future anaphylactic reactions. Successful rush immunotherapy schedules have been developed. However, systemic reactions have been reported to occur in 3–12% of patients.

We report on a 15-year-old son of a beekeeper who experienced in May 2004, following a bee sting, a systemic allergic

### Omalizumab may help in difficult immunotherapies.

reaction with general urticaria and a slight cough. He was treated with adrenalin and corticosteroids and later referred to our outpatient clinic. The history revealed that he was frequently stung in the year before without any local and systemic side effects. The Prick test was weakly positive at 100 µg bee-venom, the RAST showed 13.3 U/ml (class 3), and the IgE level was 170 U/ml. The allergy testing for wasp was negative. In addition, the tryptase level was normal (5.4 µg/l), and occult mastocytosis, which has been described in severe life-threatening allergy, could be excluded. Because the risk of a second systemic reaction in adolescents is low (1) and in order to estimate the patient's individual risk we performed a bee-sting challenge. Immediately after the boy was stung, he had a severe systemic reaction with urticaria, running nose, conjunctivitis, asthma symptoms and arterial hypotension (Fig. 1). Thus, specific immunotherapy was strongly indicated. In our clinic we have 6 years uneventful experience with the ultra rush-immunotherapy described by Brehler (2).

Ultra rush SIT was initiated, but had to be stopped after 10 µg bee venom due

to immediate cardiovascular reactions. The following day, even after an antihistamine, the patient again experienced hypotension at 10 µg venom. Considering the risk of the patient who was following his father's footsteps and had his own beehives, we looked for an alternative treatment option.

Recently it was shown that anti-IgE successfully reduces side effects of specific immunotherapy with ragweed extract (3). Choosing this therapeutical option, we repeated ultra rush immunotherapy under Omalizumab, a monoclonal anti-IgE antibody. The patient's body weight was 85 kg; according to the dosing schedule he received a single subcutaneous injection of 300 mg Omalizumab. Two weeks after the injection the patient was readmitted to the hospital. Now the SIT could be increased according to the schedule and we achieved the full dose of 100 µg venom without any side effects. Up to now the patient had been treated for 1 year, during which the patient had no field stings. In order to evaluate the effect of the immunotherapy we performed a second sting challenge in July 2006. After the insect had stung, the patient developed only a slight reaction with rhinitis and conjunctivitis which resolved spontaneously within 15 min. In addition, the monitoring of tryptase in serum indicated no mast cell activation at all (3.51 µg/l before the sting, 3.86 µg/l after 15 min, and 4.06 µg/l after 60 minutes, respectively). These results confirm our successful specific immunotherapy.

This case suggests that Omalizumab may be able to prevent anaphylaxis during rush immunotherapy. The combination of Omalizumab and SIT is a perfect treatment option for patients who do not tolerate SIT and one single dose of omalizumab might be sufficient to allow tolerance induction by ultra-rush SIT.

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Figure 1. Anaphylactic reaction after sting challenge.

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