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Treatment of generalised isobornyl acrylate contact allergy from diabetes pump with Dupilumab

Alexis Arasu , Gayle Ross

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Dear Editor,

Isobornyl acrylate (IBOA) is an adhesive allergen, which is integrated into many continuous glucose monitoring (CGM) devices and insulin pumps – IBOA was named as 2020 Allergen of the Year by the American Contact Dermatitis Society in reference to its sensitising potential in patients using these diabetic devices.¹ CGM devices provide a more convenient and consistent treatment option for patients and have been pivotal in changing patient attitudes, outcomes and quality of life surrounding diabetic management.²

The impact of sensitisation to IBOA can be significant. The majority (78%) of patients who experience allergic contact dermatitis (ACD) will require cessation of the pump.¹ First-line management strategies involve barrier agents including emollients or physical dressings, as well as topical corticosteroids or calcineurin inhibitors. However, these methods still require frequent changing of device sites. There are some ongoing concerns that these agents may interfere with proper sensor function of the device itself.¹ Further difficulties include identification of allergens in these devices, as device labels rarely display the list of potential allergens.¹

A 62-year-old man with type 1 diabetes who commenced treatment with the Medtronic MiniMed Sure T device was referred with signs consistent with ACD, including erythema, pruritus, xerosis and bullae around his device sites (Fig. [1](#)). This was further complicated by

multiple concurrent staphylococcus aureus infections at the pump and sensor sites. He had trialled use of topical mupirocin, mometasone furoate cream and an emollient. He was requiring frequent changes in the sensor pump, every three days, with significant cost burden.



Figure 1

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Allergic contact dermatitis at the site of sensor on thigh.

The patient has a history of lifelong moderate-to-severe atopic dermatitis (AD), managed with azathioprine 50mg daily for ten years. He has a history of asthma managed with fluticasone and tiotropium inhalers, and hypertension managed with amlodipine and enalapril. Complications of his diabetes include diabetic retinopathy. In conjunction with empagliflozin 5 mg and metformin hydrochloride 500 mg, the use of an insulin pump and CGM was commenced. Greater diabetic disease control across all parameters was achieved with a stable HbA1c of 6.9% – as such, his endocrinologist was reluctant to cease the device. A previous trial of an alternative insulin device was unsuccessful.

Initial dermatological management involved increasing azathioprine to 50mg BD and changing his topical corticosteroid from mometasone furoate to betamethasone dipropionate cream, with additional regular antihistamines, bleach baths and emollients. Trial of intralesional steroids (Kenacort 10) 0.5 ml injected into his thigh prior to placement of a new device yielded limited benefit. Topical agents allowed some improvement; however, his disease became more generalised over time with development of flexural,

facial and eyelid involvement (EASI 21, DLQI 16 and IGA 4).

The patient was commenced on dupilumab when this became available on the Pharmaceutical Benefits Scheme in Australia in April 2021. Azathioprine was ceased. Seven weeks after commencing dupilumab, the erythema and pruritus had almost completely resolved, with only mild localised erythema at the sensor site, which was well controlled with topical betamethasone dipropionate cream (Fig. 2). He developed some periorcular AD, and itchy eyes controlled with lubricant eye drops and topical tacrolimus 0.03% ointment on the eyelids. No further adverse effects have been experienced with dupilumab. After four months of therapy, the patient has experienced almost full resolution of his ACD (EASI 3, DLQI 0 and PGA1) and is able to leave the pump cannula in for the recommended full week.



Figure 2

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Thigh sensor site after treatment with 3 months of dupilumab therapy.

ACD is a delayed hypersensitivity reaction, with increased incidence in patients with AD. Dupilumab targets the IL-4 and IL-13 cytokine cascade; it has been postulated that there is some IL-4 receptor chain immunoreactivity in patients with ACD, and therefore, dupilumab may be effective in inhibition of the allergens that elicit a Th2-mediated IL-4 mediated disease.^{3, 4} Moreover, it has been shown that the response from dupilumab in treating ACD is heightened in patients with underlying AD as allergic responses in these patients are more often directed towards the TH2 pathway.^{3, 5} However, there have been some cases which demonstrate the response rate of dupilumab for ACD between patients with and without AD as equivalent.⁶

While not all cases of ACD will necessarily respond to dupilumab, it may be an option for recalcitrant disease, particularly where the underlying allergen is unable to be removed. This is of relevance for patients with concurrent AD as they are more likely to respond to dupilumab due to the synergistic effect of improving underlying barrier function, making the skin less susceptible to allergens. IBOA is a frequently implicated culprit allergen that found in glucose monitoring devices and insulin pumps. Thus, with greater uptake of these devices, clinicians should be aware of the potential for contact allergy. Our case is the first to demonstrate that dupilumab is a well-tolerated and efficacious therapeutic option for patients with treatment resistant ACD to IBOA, without disrupting or interfering with their diabetic management.

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