

Methylprednisolone-induced anaphylaxis: diagnosis by skin test and basophil activation test

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Although corticosteroids are broadly used to treat asthma and allergic disorders, steroids themselves, however, can induce hypersensitivity reactions (IHS) (1). We present the first case of anaphylactic shock reaction due to intra-venous methylprednisolone (MP) that occurred during anaesthesia, with positive skin tests and positive basophil activation test (BAT).

In July 2007, an 18-year-old female patient experienced anaphylactic shock during general anaesthesia for a dental extraction [tryptase: 38 ($N < 15 \mu\text{g/l}$) and histamine 359 nmol/l ($N < 10 \text{ nmol/l}$)], which was rapidly reversed by epinephrin. The drugs used during anaesthesia were: diazepam, sufentanil,

Although corticosteroids are used to treat allergic disorders, steroids themselves, however, can induce hypersensitivity reactions. We present the first case of intra-venous methylprednisolone anaphylactic reaction (MP) that occurred during anaesthesia, with positive skin tests and positive basophil activation test (BAT). Our case suggests that the BAT could be a sensitive *in vitro* assay for the diagnosis of MP or corticosteroids allergy.

mepivacaine, MP and amoxicillin. The skin tests (prick and intra-dermal tests – IDT) carried out in January 2008 were negative for latex and every other drug used, but were positive for MP according to the prick test (10 mg/ml) and the IDT (positive at 100 and 10 $\mu\text{g/ml}$). The BAT analyses, by flow cytometry, the percentage of polynuclear basophils expressing CD203c after *in vitro* MP re-stimulation compared with the percentage of basophils expressing CD203c without re-stimulation. The patient's BAT was positive at 71% (control 2%). The BAT was negative in two healthy volunteers. We performed a corticoid battery of skin tests and found a positive cross-reaction with hydrocortisone, while the prick and IDT tests were negative for prednisone, betamethasone, prednisolone and beclomethasone. The BAT with prednisone was negative. Carboxymethylcellulose (CMC) was not tested in our case. In June 2008, the patient was challenged with prednisone in intensive care unit without allergic reaction.

Severe IgE mediated anaphylaxis after intra-venous corticosteroids injection occurs in 0.1% of the patients (2). Corticosteroids have been classified in four reactivity groups (A, B, C and D) based on their structural and clinical characteristics. Our observation suggests that skin tests could be useful for the diagnosis of MP IHS. Carboxymethylcellulose is a carbohydrate widely used as an additive in tablets, cosmetics, some injectable hormone formulations and food. Anaphylaxis to CMC in corticosteroid preparations has been reported (3). However, in our case, there was a cross reactivity with hydrocortisone, which does not contain CMC and excluded a CMC immediate hypersensitivity. Skin tests sensibility for MP anaphylaxis is unknown, but several observations have shown that they could be of interest (2). We have found cross reactivity between MP and hydrocortisone, and two drugs belonging to the A group of

corticosteroids, which are frequently involved in corticosteroids IHS. Nevertheless, our patient did tolerate prednisolone, another group A steroid, as previously described (4). Interestingly, the BAT was also positive confirming the patient IgE mediated MP hypersensitivity.

An increasing number of studies have demonstrated that flow cytometry is a reliable tool for monitoring basophil activation upon allergen challenge by detecting membrane expression of degranulation/activation markers (CD63 or CD203c) (5). BAT seems to be a reliable tool for the diagnosis of IgE mediated allergy to betalactams or muscles relaxants (curare) (6). To our knowledge, BAT has not been yet described as a diagnosis tool for corticosteroids anaphylaxis. Our present case suggests that the BAT could be a sensitive *in vitro* assay for the diagnosis of MP allergy.

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