İstanbul Med J 2017; 18: 100-2
DOI: 10.5152/imj.2017.60973

Case Report

Treatment of Methylprednisolone Allergy with Dexamethasone

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Abstract

Corticosteroids with anti-inflammatory/anti-allergic properties are used to treat allergies. However, steroids themselves cause drug hypersensitivity reactions. A 10-month-old girl with bronchiolitis was brought to the emergency room, where she developed urticarial reactions in response to intravenous methylprednisolone. Her urticarial reactions recurred with oral methylprednisolone. As she showed no response to bronchodilator treatment after performing skin prick and intradermal tests, another corticosteroid (dexamethasone) was administered. After successful oral then intravenous dexamethasone administration, the patient was discharged with improvement. This case indicates that drug hypersensitivity reactions might occur even with corticosteroids and an alternative corticosteroid can be safely used.

Keywords: Hypersensitivity, allergy, methylprednisolone, dexamethasone

Introduction

Glucocorticosteroids are widely used as anti-inflammatory and antiallergic drugs, and an allergic reaction against them rarely develops. Hypersensitivity reactions ranging from urticaria to anaphylaxis can develop even against strong anti-inflammatory and antiallergic drugs such as corticosteroids, and different reactions can be observed in different drug forms (1). For example, while contact allergy to topical steroids is common, it is rare against systemic steroids. Although methylprednisolone is one of the most commonly used corticosteroids, hypersensitivity reactions can be seen, ranging from urticaria to anaphylaxis in the type 1 reaction spectrum formed according to the Gell-Coombs classification (Table 1) (1-4).

We aimed to report that an allergic reaction may develop even with corticosteroids that are antiallergic drugs and an alternative corticosteroid can be safely used in the event of such allergies.

Case Report

A 10-month-old girl presented to the emergency service with complaints of fever, cough, and wheezing. It was found that she had bronchiolitis for the second time. The patient was born at 2.900 g by a mother with gestational diabetes mellitus; she was the first child of the family. She had no disease history; her family history was unremarkable. Her weight, height, and head circumference were normal at the time of admission. On performing a physical examination; her fever was 37.4°C, pulse was 140 beats/min, respiratory rate was 55/min, and oxygen saturation was 93%. The expirium was long and wheezy. Diffuse rales and rhonchi could be heard in the lungs. Examinations of other systems revealed no features. Her laboratory findings were as follows: white blood cell count, 10,100/mm^3; Hgb level, 11.6 g/dL; and CRP level, 18 mg/dL (n=<5). In her chest X-ray taken at that time, there was elevated lung aeration, the costae were parallel to each other, and there was no involvement or effusion (Figure 1). In her previous bronchiolitis attack, urticarial rashes developed against intravenous methylprednisolone sodium succinate that was administered when her respiratory distress could not be eliminated; the same reaction was observed with the accidental oral administration of methylprednisolone. For this reason, methylprednisolone therapy could not be continued. Dexamethasone sodium phosphate was administered as an alternative as a result of the allergy consultation performed because the patient's clinical complaints did not improve with bronchodilator treatment. Because of the risk of serious side effects, the skin prick test (SPT) was performed with dexamethasone without dilution. An intradermal skin test was performed with dexamethasone in the SPT-negative patient by diluting from 1/1000 up to 1/10. First, a full dose of dexamethasone was orally given to the patient who showed no reaction to the intradermal skin test. The patient showed no post-dexamethasone reaction and was given half a daily dose; the other half was given when no reaction was observed

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Received: 10.12.2016

Accepted: 30.01.2017

and intravenous dexamethasone treatment was attempted. When no reaction was observed, the patient was treated with full dose for 5 days and was discharged from the hospital. Written informed consent was obtained from the parents of the patient.

Discussion

Corticosteroids are widely used anti-inflammatory and antiallergic drugs, and though rare, various types (Gell-Coombs type I-type IV) of allergic reactions can develop after the use of a corticosteroid (Table 1). Urticaria, itching, sneezing, nausea, vomiting, shortness of breath, bronchospasm, angioedema, hypotension, unconsciousness, respiratory arrest, anaphylaxis, and death have been reported as the most common symptoms (1-4).

Studies have shown that such reactions are more frequent in patients with a renal transplant, atopy, asthma, and aspirin allergies and that steroid-induced hypersensitivity reactions may be misleading because their symptoms may be confused with asthma exacerbations; it has also been reported that the diagnosis was either not made or missed (5-7). It should be kept in mind that steroid-related side effects may have occurred if a patient with asthma worsens or if there is no response seen after steroid administration (8).

In the case series reported by Nakamura et al. (9), anaphylaxis, which developed in 7 patients with asthma after corticosteroid infusion, was evaluated. In all 7 patients, the reaction developed after the intravenous administration of succinate-containing preparations (methylprednisolone sodium succinate and hydrocortisone sodium succinate), and corticosteroid preparations (dexamethasone and betamethasone) containing phosphatase were used in 2 patients in addition to conventional treatment for reducing anaphylactic symptoms; no recurrence of anaphylactic symptoms was observed in these 2 patients. Interestingly, despite the use of another preparation containing succinate in 1 patient, improvement in the patient's clinical condition was important in terms of the fact that it showed that corticosteroid allergy could be due to to additive substances and the steroid itself (9).

The SPT, intradermal skin test, immunoCAP, basophil activation test, or drug provocation tests can be used for making a diagnosis (3, 6). The presence of type 1 reaction findings in the first bronchiolitis attack in our patient suggested an allergy to methylprednisolone. The administration of the drug a second time, though accidental, and the appearance of the same reaction can be considered as a kind of provocation test. Because of the observation of the reaction with the oral and intravenous administration of the preparation, because of the reaction was thought to be due to the drug itself, and because of the risk of anaphylaxis, skin tests were not performed with the drug. However, as described, for the safe administration of dexamethasone, which is an alternative drug, the SPT was performed first orally and then intravenously in a gradual dose after intradermal tests were performed.

Although allergic reactions to steroids may be against the additives (succinate, acetate, sodium phosphate, lactose, carboxymethylcellulose, polyethylene glycol, etc.) found in the drug, it may rarely be against the corticosteroid itself (3, 4, 10-13). Levy et al. (11) reported a hypersensitivity reaction to a methylprednisolone sodium succinate preparation containing lactose in 7 patients with cow's milk allergies and asthma. Corticoste-

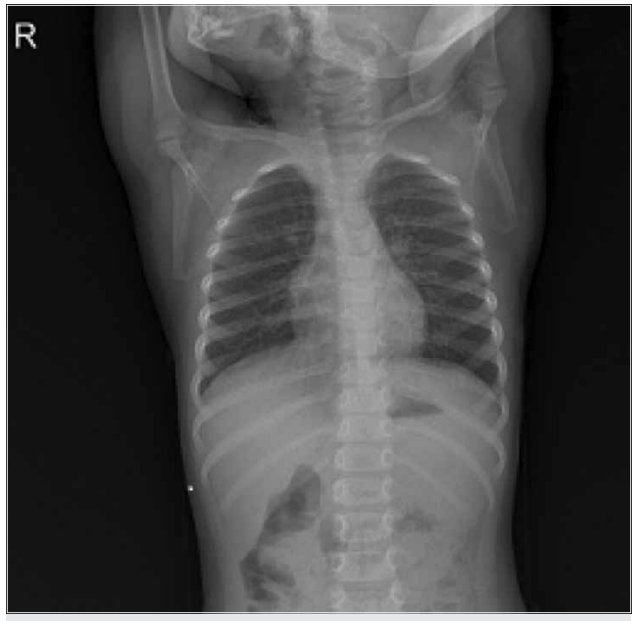

Figure 1. Change in the chest x-ray of our patient who had bronchiolitis. The parallelism in the costae due to respiratory distress, flatness in the right diaphragm and hyperaeration in the bilateral pulmonary tissue are evident.

Table 1. Clinical manifestation of hypersensitivity reactions to different corticosteroids and alternative corticosteroids that can be tolerated [modified from Venturi et al. (14)].

Patient Number	Type of corticosteroid against which the reaction developed	Reaction in the clinic	Tolerated corticosteroid
1	Triamcinolone	Urticaria+Angioedema	Dexamethasone, budesonide, deflazacort
2	Triamcinolone	Urticaria	Methylprednisolone, dexamethasone, budesonide, deflazacort, betamethasone
3	Triamcinolone	Anaphylaxis	Methylprednisolone, deflazacort
4	Triamcinolone	Anaphylaxis	Dexamethasone, budesonide
5	Methylprednisolone	Anaphylaxis	Betamethasone, budesonide, deflazacort, triamcinolone, hydrocortisone
6	Methylprednisolone	Anaphylaxis	Betamethasone, triamcinolone
7	Methylprednisolone	Urticaria	Betamethasone, triamcinolone, budesonide, deflazacort

roids are haptens that can bind to proteins and turn into an antigenic structure in the body. Succinated derivatives transform the steroid molecule from a hapten to a complete antigen and facilitate the development of IgE-mediated reactions (6, 12). Therefore, serious anaphylactic reactions are seen, particularly against hydrocortisone and methylprednisolone (1, 4, 9). It has also been reported that cross-reactions occur, particularly among the same group of corticosteroids. Among systemic corticosteroids, there may be a cross-reaction among hydrocortisone, methylprednisolone, and prednisone (3). As in our patient, corticosteroids that can be tolerated in the event of an allergic reaction to any corticosteroid can be determined by performing the SPT and intradermal skin tests (1-3). The use of dexamethasone, betamethasone, or deflazacort as an alternative is recommended to patients showing allergic reactions (3-5). Venturini et al. (14) administered different/alternative corticosteroids to 7 patients in whom they observed a hypersensitivity reaction, and no reaction was observed (Table 1). Urticarial rash developed in our patient after the intravenous and oral administration of methylprednisolone succinate. No reaction was observed against dexamethasone sodium phosphate, which was used as an alternative, and it was safely used.

To conclude, the fact that hypersensitivity was seen even with the use of an anti-allergic drug with the development of urticaria twice against methylprednisolone sodium succinate in a 10-month-old female patient is important to teach us that dexamethasone can be safely used after performing skin tests (15).

Informed Consent: Verbal informed consent was obtained from the parents of the patient who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - Ö.Ö., E.K.; Design - Ö.Ö., E.K.; Supervision - Ö.Ö., E.K.; Resources - Ö.Ö., E.K.; Materials - Ö.Ö., E.K.; Data Collection and/or Processing - Ö.Ö., E.K.; Analysis and/or Interpretation - Ö.Ö., E.K.; Literature Search - Ö.Ö., E.K.; Writing Manuscript - Ö.Ö., E.K.; Critical Review - Ö.Ö.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

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