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## Glucocorticoids induced allergic reaction

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### Abstract

Glucocorticoids can cause allergic reaction in rare cases. A ten year old boy, known asthmatic, was treated with intramuscular injection of glucocorticoids, followed by nausea, vomiting and abdominal pain. His lips turned pale along with palpitation and light headache. His right eye lid and lower lip were swollen. Heart rate was 177/min, and BP was 66/46 mmHg. Patient spontaneously improved and symptoms resolved. IV fluids bolus, anti-histamines or epinephrine were not required. The case was seen in September 2012.

**Keywords:** Allergic reaction, Glucocorticoids, Children.

### Introduction

Although the glucocorticoids have been extensively used for numerous medical problems, they are known for their anti-allergic and anti-inflammatory properties other than immunosuppression in high doses.<sup>1</sup> However recent literature has shown a reaction contrary to what steroids are known for. These contradicting reactions range from mild allergic reaction to life threatening anaphylaxis.<sup>2-4</sup> Nevertheless glucocorticoids are used in common practice, and physicians usually ignore the possibility of allergic reaction, which may lead to serious consequences. Although considered rare, the true extent of glucocorticoid induced reactions is unknown and no uniform mechanism has been identified. Steroid induced allergic reactions has been documented as far back as 1962.<sup>5</sup>

The immune-pathogenesis of allergic reaction is proposed to be IgE mediated against glucocorticoid molecules. Glucocorticoid is a hapten molecule, which binds irreversibly to other proteins and convert it to a complete antigenic structure. Cortisol in aqueous solution is degraded into steroid-glyoxal, with an aldehyde group in the C21 position, and is able to bind covalently with guanidine groups of the protein, thus establishing a potentially immunogenic steroid-protein compound.

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Succinate as an ingredient is more prone to have allergic reaction as compared to Sodium phosphate, because of high affinity of succinate esters to different serum proteins, and this could favour the immunogenic role of succinates and may promote an IgE mediated reaction.<sup>6</sup>

### Case Report

This was the case of a ten year old boy seen in September 2012, who presented to the paediatric clinic with shortness of breath and cough for the last 15 days. He was a known asthmatic for the last three years, and was on intermittent treatment on nebulizer or MDI (meter dose inhaler) salbutamol, and never had steroids before. There was no associated fever or headache, no cyanosis or chest tightness. One month back he had a similar episode which improved after inhaled bronchodilator. He was never admitted to the hospital and never used systemic steroids for his asthma. There was no other significant medical illness in the past. He was taking salbutamol and ipratropium and inhaler along with montelukast intermittently for the last 2 months. For the previous two days he was only on salbutamol. Family history of allergy was significant as father had allergic rhinitis, one elder male sibling had asthma, and sister was allergic to dust. There was no history of steroid allergy. They were living in a spacious house within the center of city but away from industrial pollution. He was not exposed to any new allergen or even no definitive allergen was known. No one smoked at home.

In the clinic he was given intra muscular hydrocortisone (100 mg), as he had already taken adequate puffs before coming to the clinic. When examined, there was an occasional wheeze but the child was clinically stable, with asthma score of 2-3. Physicians decided to give him an initial dose of parenteral steroid which would be followed by a short course of oral steroids. Child developed nausea and vomited once, his lips turned pale and he started complaining of abdominal pain (5-6/10) along with palpitation, and light headache. The right eye lid and lower lip were swollen. His vitals at that time showed significant tachycardia with hypotension (HR 177/min, BP was 66/46mmHg), and he looked pale. He was rushed to Emergency after starting oxygen through a nasal prong. At triage his vitals were; temp. 36.5°C, RR 20, HR 99 O2 sat

98%, BP 76/62 mmHg and weight 29 kg. The patient did not need fluid boluses, anti-histamine or epinephrine. Though his symptoms slowly regressed in the next 3-4 hours, he was hospitalized for observation. The child remained stable during the stay of 24 hours in the hospital and his asthma symptoms also improved on inhaled bronchodilators and ipratropium. He was followed in the clinic after 2 days and at that time he remained stable and was asymptomatic.

## Discussion

There are approximately 100 published reports of immediate hypersensitivity reactions occurring after oral and parenteral corticosteroid administration.<sup>7</sup>

To date the data on glucocorticoids induced allergy is limited, but increasing number of cases are being added to literature.<sup>2-4</sup> The active ingredient of glucocorticoid succinate has previously been documented in literature of producing allergic and anaphylactic reactions.<sup>8-10</sup> Although considered rare, the true extent of such reactions is unknown and no uniform mechanism has been identified.<sup>4</sup> Other than succinate, other ingredients like Phosphate containing corticosteroid preparations are not considered to be associated with systemic allergic reactions.<sup>6</sup>

As evidenced by our case, the allergic reaction of any variety can occur by any dose or route of administration of glucocorticoids, and can occur with even a very small quantity. This case might be an important reminder to all medical personnel, that any patients can have allergic reactions to parenteral corticosteroids containing succinate. Worsening symptoms may not be due to treatment failure, but could be due to allergic reaction to any one of the medications or its constituent/ ingredients. To find a safe and effective alternate for glucocorticoids is

thus required. The usefulness of intradermal test for selection of safe alternative corticosteroids should be practiced.

Little is known about the epidemiology and pathophysiology of steroid-induced hypersensitivity, as most data are derived from case reports. Clinical heterogeneity of steroid-induced hypersensitivity does exist. More studies are needed to know the extent of adverse reactions so as to have an effective therapeutic interventions.

## References

1. Erdmann SM, Abuzabra F, Merk HF. Anaphylaxis induced by glucocorticoids. *J Am Board FamPract* 2005; 18: 143-6.
2. Escribano-Rodriguez MM, Gonzalez-Pol J, Munoz-Bellido FJ, de la Calle-Toral A, Velazquez-Amor E, Conde-Hernandez J. Immediate reaction to methylprednisolone with tolerance of other corticosteroids. *Allergy* 1997; 52: 677-8.
3. Kamm GL, Hagemeyer KO. Allergic-type reactions to corticosteroids. *Ann Pharmacother* 1999; 33: 451-60.
4. Burgdorff T, Venemalm L, Vogt T, Landthaler M, Stolz W. IgE-mediated anaphylactic reaction induced by succinate ester of methylprednisolone. *Ann Allergy Asthma Immunol* 2002; 89: 425-8.
5. Butani L. Corticosteroid-induced hypersensitivity reactions. *Ann Allergy Asthma Immunol* 2002; 89: 439-45.
6. Calogiuri L, Muratore E, Netti MT, Ventura AF, Tursi A. Anaphylaxis to hydrocortisone hemisuccinate with cross-sensitivity to related compounds in a paediatric patient. *Br J Dermatol* 2004; 151: 707-30.
7. Rodrigues-Alves R, Spinola-Santos A, Pedro E, Branco-Ferreira M, Pereira-Barbosa M. Immediate hypersensitivity to corticosteroids: finding an alternative. *J Investig Allergol Clin Immunol* 2007; 17: 284-5.
8. Nakamura H, Matsuse H, Obase Y, Mitsuta K, Tomari S, Saeki S, et al. Clinical evaluation of anaphylactic reactions to intravenous corticosteroids in adult asthmatics. *Respiration* 2002; 69: 309-13.
9. Dajani BM, Sliman NA, Shubair KS, Hamzeh YS. Bronchospasm caused by intravenous hydrocortisone sodium succinate (Solu-Cortef) in aspirin-sensitive asthmatics. *J Allergy Clin Immunol* 1981; 68: 201-4.
10. Kawane H. Anaphylactoid reaction to intravenous hydrocortisone sodium succinate. *Med J Aust* 1991; 154: 783-4.