

SENSITIZATION TO HORSE ALLERGENS WITHOUT APPARENT EXPOSURE TO HORSE. REPORT OF TWO CASES

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SUMMARY: It has been well established that occupational exposure to horses increases the risk of allergic sensitization to horse hair, on the contrary very few data have been published in individuals without direct contact with horses.

We describe two cases of severe respiratory symptoms triggered by a single direct exposure in two patients with only 4-5 previous short contacts with horses during the entire their life, since they live in urban area of Naples.

Cutaneous and serological diagnostic tests showed significant sensitization to horse dander other than some common inhalant allergens.

Our report suggests that, in already (but unaware) horse-sensitized patients, the last direct contact with a horse has triggered severe respiratory symptoms.

Passive carriage of horse allergen by the clothes of individuals in contact with horses/horse environments or a cross-reactivity between horse allergen (a lipocalin) and the major allergens (also lipocalins) of several furred animals are likely to explain our findings.

Some other considerations can be derived by the clinical observation. First, it is likely that allergic sensitization to horse allergens could be more frequent than expected also in subjects without direct exposure to horse because of living in urban areas. Secondly, individuals suspected to be highly atopic or those already sensitized to some pet dander should be tested by SPTs/radio-allergo-sorbent test before the introduction of a pet indoors or, in the case of a big animal as the horse, a direct horse contact / entering into environments containing a horse.

Key-words: Bronchial asthma - Horse - Horse allergen - Respiratory allergy - Rhinitis - Pets.

It has been clearly shown that occupational exposure to horse increases the risk of allergic sensitization to horse hair (1). The most of studies on sensitization to horse allergens in populations without professional exposure have been carried out in Northern Europe where the rate of animal ownership is generally high and sports riding is rather common (2-6). Some observations have been carried out also in children (7, 8).

On the contrary in Southern Europe and in Italy no studies have been previously published on respiratory allergy induced by horse allergens.

In this report we describe two cases of severe respiratory symptoms triggered by a single direct exposure to horse in sensitized subjects without regular contact with this animal.

CASE REPORTS

Patients had experienced severe respiratory symptoms (rhinitis and bronchial asthma) after a single direct contact with a horse. Clinical symptoms disappeared after the use of inhaled short-acting β_2 agonists (salbutamol, 400 mcg) and systemic corticosteroids (methylprednisolone, 500 mg intravenously) and oxygen at the EC unit.

These episodes were a surprise for our patients because they have had only 4-5 previous short contacts with horses during the entire their life, since they live in urban area of Naples. Moreover they denied also any indirect contact with horse-derived materials and/or with individuals usually exposed to horses.

Although both patients suffered from respiratory allergy induced by mite and/or pollen allergens, previous diagnostic tests have not shown cutaneous and/or serological sensitization to horse allergens.

METHODS

Two months after these episodes, patients underwent diagnostic procedures to establish the eventual role of

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horse allergens in triggering exacerbation of respiratory symptoms. Written informed consent was obtained from the pat. n° 2 and from the parents of pat.n°1. Skin-prick-tests (SPTs) were performed with commercial standardized extracts and prickers (ALK-Abello Group, Milan, Italy). The panel included the following allergenic extracts: house dust mites, *Parietaria* species, grasses, cat, rabbit, dog and horse dander, olive, birch, *Alternaria alternata*, *Cladosporium herbarum* and mugwort, plus a positive (1% histamine hydrochloride) and negative (glycerinate solution) control. The SPTs were carried out and interpreted according to international guidelines: the results were read after 15 min and expressed as the major diameter of the wheal and its orthogonal. A skin reaction of 3 mm or greater was considered positive (9).

A blood sample was taken from both patients for the measurement of total IgE and specific IgE to the same allergens of the SPTs panel (CAP System FEIA, Pharmacia Diagnostics, Uppsala, Sweden).

Bronchial challenge with metacholine was performed according to a standard procedure on a different day (10, 11). After three reproducible FEV1 measurements, double concentrations of metacholine, starting from 0.1 mg/ml were inhaled at 5-min intervals. Solutions were delivered by a de Vilbiss 646 nebulizer attached to a dosimeter (Mefar MB3, Brescia, Italy). The challenge was discontinued when FEV1 fell by 20%.

RESULTS

In table 1 patients' characteristics and diagnostic results are shown. Both patients exhibited significant cutaneous and serological sensitization to horse dander. On the contrary no specific IgE antibodies to horse serum proteins was found.

Since our patients showed cutaneous and serological positive responses to other important allergens such as those derived from mites, pollens and dog, we cannot quantify the role of horse sensitization on patients' symptoms.

As monoclonal antibodies-based methods to measure the amount of horse allergen in the dust of indoor environments are not commercially available, we have no information on the levels of exposure to this allergen.

DISCUSSION

Allergic sensitization to horse allergen is usually considered rare in patients living in urban areas because the lacking of a regular exposure to horse and its allergens (12). The results of our report suggest that allergic sensitization to horse dander can be induced also without any apparent direct or indirect contact with horse. It is not easy to explain these findings. Horse allergen could be transferred through

	Patient n° 1	Patient n°2
INITIALS	M.M.	C.A.
SEX / AGE (years)	F / 17	M / 33
PET OWNERSHIP	Dog at home	No contact with animals
FAMILY HISTORY OF ALLERGY	Yes	Yes
RESPIRATORY SYMPTOMS	Rhino-conjunctivitis + bronchial asthma	Rhinitis + bronchial asthma
TYPE OF SYMPTOMS	Persistent	Intermittent
SEVERITY OF SYMPTOMS	Moderate-severe	Moderate-severe
SKIN-PRICK-TESTS (allergens and wheal diameters)	<i>Dermatoph.pt</i> : 10x 11 mm Dog dander : 5 x 6 mm <i>Olea europaea</i> : 11 x 8 mm Horse dander : 15 x 10 mm Histamine : 6 x 8 mm	<i>Parietaria</i> : 15x12 mm Horse dander : 11 x 7 mm Histamine : 7 x 7 mm
TOTAL IgE (KU/L)	139	413
SPECIFIC IgE (KU/ L and classes)	<i>Dermatoph.pt</i> (d1) : 27,4 / 4 <i>Olea europaea</i> (t9) : 5,3 / 3 Dog dander (e2) : 1,4 / 2 Horse dander (e3) : 1,5 / 2	<i>Paritaria</i> (w21) : 46,9 / 4 <i>Olea europaea</i> (t9) : 0,5 / 1 Rabbit dander (e82) : 0,4 / 1 Horse dander (e3) : 25,7 / 4
Bronchial challenge with inhaled metacholine (PD20 metacholine value as mcg)	390 mcg	100 mcg

Table 1: Patients' characteristics and diagnostic results.

the clothes of individuals in contact with horses or horse-related environments. Such carriage probably justifies the presence of horse allergen in domestic dust samples from urban environments (13). This modality of passive transport has been previously demonstrated for cat allergen (14, 15) and, recently, also for rabbit allergens (16).

Another possible explanation of our findings could be a cross-reaction between horse allergen (17), and the major allergens of several mammalian species including cows (18), dogs (19), guinea-pigs (20), rabbits (21), rodents (22) and, recently, cats (23). In fact all these allergens are lipocalins. These are typically small proteins whose most important feature is the ability to bind small hydrophobic molecules such as steroids, all lipocalin proteins belong to the calycin super-family (24). Moreover, it is likely that horse-sensitized and non-professionally exposed patients displayed a specific susceptibility to the allergens of this animal.

Our report suggests that, in already (but unaware) horse-sensitized patients, the last direct contact with a horse has triggered severe respiratory symptoms. Some other considerations can be derived by the clinical observation. First, it is likely that allergic sensitization to horse allergens could be more frequent than expected also in subjects without direct exposure to horse because of living in urban areas.

Secondly, individuals suspected to be highly atopic or those already sensitized to some pet dander should be tested by SPTs/radioallergosorbent test before the introduction of a pet indoors or, in the case of a big animal as the horse, a direct horse contact/entering into environments containing a horse.

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