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Severe respiratory syndrome induced by allergic mono-sensitization to European hamster (*Cricetus cricetus*) in a older woman

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KEY WORDS

Allergic rhinitis, Allergic sensitization, Bronchial asthma, Cricetus cricetus, European hamster, Hamster allergy, Hypersensitivity, Respiratory allergy

SUMMARY

*Although the increase in the rate of hamster ownership, no report of allergic sensitization to common hamster (*Cricetus cricetus*)-derived allergens as a consequence of domestic exposure has been published in Italy. A 64-year-old woman was referred to our Allergy Centre for the recent onset of conjunctival and severe respiratory symptoms (rhinitis, cough, wheezing and dyspnea). About three months ago she had purchased a common hamster as home pet. Another hamster had lived at patient's home for about four months nine years ago. The results of SPT revealed allergic sensitization to *Cricetus cricetus* dander only (wheal 6x7 mm, positive control 7x7 mm). Total IgE were 59,3 kU/L. Specific IgE only to *Cricetus cricetus* epithelia (2,10 kUA/L), were also detected. Spirometry revealed a moderate degree of bronchial obstruction. Some important considerations can be drawn from our report: a) few months of hamster ownership are probably sufficient to induce an allergic sensitization and clinical symptoms, b) older age of sensitization in comparison to other studies, c) rapid remission of clinical symptoms after the removal of hamster d) skin prick tests and/or evaluation of specific IgE for hamster allergens should be performed in all potentially susceptible individuals.*

Exposure to common hamster (*Cricetus cricetus*) – derived materials is well recognized as an occupational hazard for people who are in contact with this animal in laboratory or other occupational settings (1, 2). In the recent years, hamsters became more and more popular as pets to have at home, like dogs and cats, in Italy and in other countries. For instance, in Japan, hamster ownership has largely increased in the 1990s (about 20% of all pets) (3, 4), as a consequence of this, a number of patients started to suffer from respiratory symptoms related to hamster ownership (5). Although in Italy there are no official data on the overall number of hamsters living in domestic environments, some indirect indexes suggest a significant in-

crease in the rate of hamster ownership. In fact, commercial sources indicate an increasing business in hamster breeding as well as in production of hamster-related materials such as food, accessories etc. Nevertheless, no report of allergic sensitization to common hamster-derived allergens as a consequence of domestic exposure has been published in Italy so far.

Case report

A 64-year-old woman was seen at our Unit for the recent onset (about two weeks) of conjunctival and severe respi-

ratory symptoms (rhinitis, cough, wheezing and dyspnea). Although family history was positive for atopy, her personal history was negative for previous cutaneous and/or respiratory symptoms of a suspected IgE aetiology. She had a dog at home since three years. About three months ago she had purchased a common hamster to be kept as pet. Another hamster had lived at patient's home for about four months nine years before. The patient reported a strict contact with this animal (hamster was allowed to enter also the bedroom) and a worsening of respiratory symptoms after hamster exposure.

Methods

Skin-prick-test (SPT) was 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, common hamster (*Cricetus cricetus*) and dog dander, olive, birch, *Alternaria alternata*, *Cladosporium herbarum* and mugwort, plus a positive (1% histamine hydrochloride) and negative (glycerinate solution) control. The SPT was carried out and interpreted according to international guidelines (6), the result was read after 10 min and expressed as the major diameter of the wheal and its orthogonal. A skin reaction of 3 mm or greater was considered positive. A blood sample was taken for the measurement of total IgE and specific IgE to the same allergens of SPT panel (CAP System, Phadia, Uppsala, Sweden). A standard spirometric evaluation was also carried out. As monoclonal antibodies-based methods to measure the amount of hamster allergen are not available, we could not evaluate the degree of hamster allergen contamination in patient's indoor environments.

Results

The SPT showed an allergic sensitization only to *Cricetus cricetus* dander with a wheal diameter of 6x7 mm, compared to 7x7 mm of the positive control. Total IgE were 59,3 kU/L. Specific IgE only to *Cricetus cricetus* epithelia (2,10 kUA/L), were also detected. Spirometry revealed a moderate degree of bronchial obstruction. The removal of hamster from patient's home as well as an intensive cleaning of indoor environments resulted in a reduction and, after about three months, a complete disappearance of all respiratory symptoms

Discussion

At the best of our knowledge, this is the first documented report of a severe respiratory allergy induced by single-sensitization to European hamster in Italy. Some important considerations can be drawn from our report:

- 1) A total of seven months (four + three with an interval of nine years) of indoor exposure to hamster epithelia was sufficient enough to induce allergic sensitization and then to trigger respiratory allergic symptoms. It is likely that the short term period necessary to induce allergic sensitization and development of symptoms might be due to the high sensitizing capacities of hamster allergens. This finding has been observed also by other authors (5, 7-10).
- 2) The age of our patient was higher in comparison to those found in other studies (5, 7-10).
- 3) The rapid remission of clinical symptoms after the cessation of hamster keeping demonstrates the exclusive role of hamster sensitization in determining respiratory allergy in our patient.
- 4) A progressive increase in hamster sensitization may be expected in the future as a consequence of the increase of hamster ownership such as observed for rabbit allergy (11, 12).
- 5) Skin prick tests and/or evaluation of specific IgE for hamster allergens should be performed in all potentially susceptible individuals (for example those sensitized to several animal allergens) before the introduction of an hamster indoors also in the absence of respiratory symptoms after previous occasional hamster contact (13, 14).

References

1. Bush RK, Wood RA, Eggleston PA. Laboratory animal allergy. *J Allergy Clin Immunol* 1998; 102: 99-111.
2. Ruoppi P, Koistinen T, Susitaival P, Honkanen J, Soininen H. Frequency of allergic rhinitis to laboratory animals in university employees as confirmed by chamber challenges. *Allergy* 2004; 59: 295-301.
3. Maeda Y, Kudoh M, Tomita S, Hasegawa M, Akiyama K. Annual change of the pet in allergic patients home for ten years. *Arerugi* 1999; 48: 27-32.
4. Cabinet Office, Government of Japan. National survey of pet keeping. *The Public Opinion Survey* 2002.
5. Suzuki K, Kayaba K, Tanuma T, Kitazawa J, Yanagawa H. Respiratory symptoms and hamster or other pets: a large-sized population survey in Saitama Prefecture. *J Epidemiol* 2005; 15: 9-14.
6. Dreborg S, Frew A. editors. Position Paper: allergen standardization and skin tests. *Allergy* 1993;48 (Suppl 14): 49-82.

7. Gonzalez-Mendiola R, Montano Prieto P, Hinojosa Macias M, Lombardero M, Munoz Martin T. Allergic rhinoconjunctivitis and asthma due to sensitization to Siberian hamster. *Allergy* 2004; 59: 1016-17.
8. Bertò JM, Pelàez A, Fernandez E, Lombardero M, Ferrer M. Siberian hamster: a new indoor source of allergic sensitization and respiratory disease. *Allergy* 2002; 57: 155-9.
9. Niitsuma T, Tsuji A, Nugaka M, Izawa A, Okita M, Maruoka N, Oguchi A, Morita S, Matsumura Y, Tsuyuguchi M, Hayashi T. Thirty cases of bronchial asthma associated with exposure to pet hamsters. *J Investig Allergol Clin Immunol* 2004; 14: 221-4.
10. Origuchi T, Tachikawa S, Kasahara J, Kondo R, Mivazaki J, Shiga M, Sugiyama M, Sazaki Y, Hirose M, Teruva S. Clinical studies on bronchial asthma caused by contact with hamsters. *Asian Pac J Allergy Immunol* 2000; 18: 141-5.
11. Liccardi G, Passalacqua G on behalf of the Allergy Study Group of the Italian Society of Respiratory Medicine (SIMEr). Sensitization to rabbit allergens in Italy-A multicentre study in atopic subjects without occupational exposure. *Int Arch Allergy Immunol* 2006; 141: 295-9.
12. Liccardi G, Piccolo A, Dente B, Salzillo A, Noschese P, Gilder JA, Russo M, D'Amato G. Rabbit allergens : a significant risk for allergic sensitization in subjects without occupational exposure. *Respir Med* 2007; 101: 333-9.
13. Liccardi G, Cazzola M, Canonica GW, Passalacqua G, D'Amato G. New insights in allergen avoidance measures for mite and pet sensitized patients. A critical appraisal. *Respir Med*. 2005; 99: 1363-76.
14. Liccardi G, D'Amato G, D'Amato L, Salzillo A, Piccolo A, De Napoli I, Dente B, Cazzola M. The effect of pet ownership on the risk of allergic sensitisation and bronchial asthma. *Respir Med* 2005; 99: 227-33.