



Is pollinosis in Rio de Janeiro possible? Case report

Polinose no Rio de Janeiro é possível? Relato de caso

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ABSTRACT

Pollinosis is a common disease in temperate countries, which have well-defined seasons. It presents clinically as rhinoconjunctivitis and/or seasonal or perennial asthma that is exacerbated in spring. In Brazil, cases of pollinosis due to grass pollens have been reported, especially in the south, despite its subtropical climate. The expansion of the population and deforestation, including increasing urbanization of forest areas, are contributing to the rise in cases in various regions of the country. This case report describes a case of pollinosis due to grass pollens in a military patient who lived in Europe and currently resides in a region of native forest in Rio de Janeiro metropolitan area. Although pollinosis is not found in the state of Rio de Janeiro, this diagnosis should not be excluded in patients with seasonal conjunctivitis/rhinoconjunctivitis, especially when they have lived outside the country for several years.

Keywords: Pollinosis, grasses, Brazil.

Introduction

Pollinosis (also known as hay fever or seasonal conjunctivitis/rhinoconjunctivitis) is a disease caused by sensitization to plant pollen (flowers, grasses, or trees).¹ Not all pollens are allergenic, but anemophilous pollens (carried by the wind) are more closely related to pollinosis.^{2,3}

Pollinosis commonly occurs in temperate climate regions, where the seasons are well defined, but in

RESUMO

A polinose é uma doença comum dos países de clima temperado, onde as estações do ano são bem definidas. Apresenta-se clinicamente como rinoconjuntivite e/ou asma sazonal ou perene com exacerbação na primavera. No Brasil, há relatos de casos de polinose por polens de gramíneas que são os principais causadores dessa patologia, principalmente na Região Sul, apesar do clima subtropical. A expansão da população e desmatamento com crescente urbanização de áreas florestais são alguns dos responsáveis pelo aumento de casos em vários locais do país. Neste relato de caso, descrevemos um caso de polinose por polens de gramínea em um paciente militar que morou em países da Europa e que atualmente reside em uma zona de mata nativa no Rio de Janeiro, RJ, Brasil. Apesar de a polinose não ser uma doença encontrada no RJ, este diagnóstico não deve ser excluído em pacientes com conjuntivite/rinoconjuntivite sazonal, principalmente quando têm uma história progressiva de morar vários anos fora país.

Descritores: Polinose, gramíneas, Brasil.

Brazil, where a large area of the territory has a tropical or subtropical climate with poorly defined seasons, cases of pollinosis have been mostly described in the southern region.^{4,5}

Grass pollens are a common cause of pollinosis because they are distributed worldwide and because they have a great capacity to produce allergenic pollens.⁵⁻⁸

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Several factors, including population growth, travel, climate change, and the introduction of grasses in agricultural activities, have increased the exposure to pollens and, consequently, favored the increase in cases of pollinosis in several regions of Brazil.⁹

The diagnosis of pollinosis is based on a clinical history of rhinoconjunctivitis/conjunctivitis/asthma, with onset or exacerbation between September and December, and *in vivo* and/or *in vitro* tests that identify the presence of specific immunoglobulin E (IgE) to proteins of allergenic pollen grains.^{10,11}

Treatment includes prophylactic measures against the allergens involved, preventive medications (nasal or ophthalmic corticosteroids or nasal corticosteroids/antihistamines) and, in certain cases, specific immunotherapy.⁷

Case report

A 73-year-old male patient retired from the military complained of nasal, ocular, and oral pruritus for 2 years. Symptoms were intermittent but worsened in September. He denied associated cough, dyspnea, wheezing, or angioedema. The patient reported improvement of symptoms with mometasone nasal spray despite irregular use.

The patient reported symptom onset in 2008 while he lived in Europe (Brussels, Belgium), which persisted until 2011, when he returned to Brazil. In Brazil, the

patient remained asymptomatic until 2 years ago, when he moved to Recreio dos Bandeirantes, and symptoms further intensified 6 months ago, when he moved to Vargem Grande (both neighborhoods in the western region of Rio de Janeiro). There was no family history of allergic rhinitis/conjunctivitis or asthma, but there was a current pathological history of hypertension and hyperthyroidism.

On physical examination, the patient had inferior turbinate hypertrophy with pale mucosa, hyaline post-nasal drip, and bilateral conjunctival hyperemia. There were no changes on pulmonary auscultation.

Skin prick testing for inhalant allergens was performed on the volar forearm using antigens from Alergotina – Produtos Alergênicos Ltda. Results with papules 3 mm greater than the negative control were considered positive¹² and are described in Table 1 and Figure 1.

Total and specific IgE dosages for inhalants, including grass and tree pollen, were requested and obtained using the fluoroenzyme immunoassay (ImmunoCAP, Phadia®) method. Results showed a total IgE of 43.3 (laboratory reference value: ≥ 15 years old – up to 160 kU/L). Specific IgE values for other inhalants are described in Table 2.

These results, in combination with the patient's clinical history, confirmed the diagnosis of grass pollen allergy (pollinosis).

Table 1
Results of skin prick test for inhalants

Tested inhalants	Results
<i>Dermatophagoides pteronyssinus</i>	< 3 mm
<i>Dermatophagoides farinae</i>	< 3 mm
<i>Blomia tropicalis</i>	< 3 mm
Dog epithelium	< 3 mm
Cat epithelium	< 3 mm
Grass mix (<i>Lolium multiflorum</i> [Italian ryegrass] + <i>Paspalum notatum</i> [bahiagrass] + <i>Cynodon dactylon</i> [common grass])	10 mm
Positive control (histamine) 10 mg/mL	7 mm

Discussion

In this case report, the patient was diagnosed with pollinosis after presenting symptoms of seasonal rhinoconjunctivitis and positive *in vivo* and *in vitro* tests for specific IgE to grass pollen.

Pollen consists of a set of grains that carry male gametes, which fertilize the ovules (female) of certain plants. Some plants have both female and male parts, whereas others only have a female or male part. In these cases, pollen needs to be transferred to the female part, and this movement is called pollination. Pollen can be carried by insects, water, or the wind.^{2,3}

Rhinoconjunctivitis and/or asthma caused by a specific IgE-mediated hypersensitivity reaction to proteins in the pollen grains of flowers, trees, and/or grass is called pollinosis.⁹



Figure 1
Skin prick test for grasses

When pollen grain proteins get in contact with the conjunctival, nasal, or bronchial mucosa, they bind to specific IgE on mast cells and basophils, triggering degranulation and release of inflammatory mediators that cause symptoms such as ocular pruritus and conjunctival hyperemia in association or not with coryza, sneezing, nasal pruritus and congestion, and eventually bronchospasm. The periodicity of symptoms is of note, as they normally occur in the spring.⁷

Not all pollens are allergenic, but anemophilous pollens (those carried by the wind) are more closely related to pollinosis.¹³ Pollinosis often occurs in temperate climate regions, where seasons are well defined.⁴ In Brazil, where a large area of the territory has a tropical or subtropical climate with poorly defined seasons, cases of pollinosis have been mostly described in the southern region.^{8,14-18}

This happens because in the south, winter has lower temperatures and is followed by spring, which has higher temperatures, favoring the growth of certain species that need pollination for their development.^{6,19}

Most patients report that ophthalmologic and nasal symptoms occur in October and subside in December, coinciding with the pollen season. However, symptoms may last from August to March and, therefore, clinical manifestations may persist during this period, depending on the patient's degree of awareness.^{6,19}

Grass pollens are a common cause of pollinosis^{5,6} because they are distributed worldwide and because they have a great capacity to produce allergenic proteins.⁸

Grasses belong to the large *Poaceae* family, and the subfamilies *Pooideae* (*Phleum pratense*, *Lolium multiflorum*), *Chloridoideae* (*Cynodon dactylon*), and *Panicoideae* (*Paspalum notatum*) are associated with most cases of pollinosis.⁸

Several factors, such as deforestation, land exploitation, population growth, and the introduction of grasses with highly allergenic pollen in areas of agricultural activity, are responsible for the increase in cases of pollinosis in Brazil not only in the southern region, but in other regions as well.^{9,20}

In addition, climate changes due to global warming are happening all over the world and are associated with rapid and early blossoming, making the pollen season start earlier and last longer, thus increasing the possibility of sensitization to pollen.^{5,7}

Another important factor is globalization, as people travel to diverse and remote parts of the world,

exposing themselves to a variety of allergens and even carrying allergens to non-native environments, promoting sensitization to new components.⁵

The Recreio dos Bandeirantes and Vargem Grande neighborhoods are located in the western region of the city of Rio de Janeiro, in the Pedra Branca State Park, which is considered the largest urban forest in Brazil. These neighborhoods have undergone a progressive urbanization process over the years, but the forest on the hillside has been preserved.²¹ The possible proximity between the patient and the native flora of that region promoted by this urbanization process may have exposed him to anemophilous species and, consequently, to pollens to which he became sensitized when he lived in Europe, where he probably developed pollinosis.

The grass pollens most often related to pollinosis are *P. pratense*, *L. multiflorum*, *C. dactylon*, and *P. notatum*.⁸

Among grasses that cause pollinosis in Brazil, the subfamily Pooideae is the most common, with *L. multiflorum* (ryegrass or Italian ryegrass), *Anthoxanthum odoratum* (sweet vernal grass), and *Holcus lanatus* (meadow soft grass) being the main representative species. It is important to note that there is cross-reactivity between these species. Although *P. pratense* is not found in Brazil, it cross-reacts with *L. multiflorum*, which can be found in several regions of the country.⁸

C. dactylon (Bermuda grass or common grass), from the *Chloridoideae* subfamily, and *P. notatum* (bahiagrass), from the *Panicoideae* subfamily, are also

Table 2
Specific IgE dosage results

Specific IgE	Result (kUA/L)
<i>Dermatophagoides pteronyssinus</i>	0.1
<i>Dermatophagoides farinae</i>	0.2
<i>Blomia tropicalis</i>	0.1
Dog epithelium	0.1
Cat epithelium	2.1
Grass mix 2 (GX2)	
(<i>Cynodon dactylon</i> [G2] + <i>Lolium perenne</i> [G5] + <i>Phleum pratense</i> [G6] + <i>Poa pratensis</i> [G8] + <i>Sorghum halepense</i> [G10] + <i>Paspalum notatum</i> [G17])	6.4
Grass mix 1 (GX1)	
(<i>Dactylis glomerata</i> [G3] + <i>Festuca elatior</i> [G4] + <i>Lolium perenne</i> [G5] + <i>Phleum pratense</i> [G6] + <i>Poa pratensis</i> [G8])	7.0
<i>Cynodon dactylon</i>	0.9
<i>Lolium perenne</i>	4.7
<i>Phleum pratense</i>	4.9
<i>Poa pratensis</i>	5.9
<i>Festuca elatior</i>	4.9

found in Brazil, but have lower cross-reactivity with the *Pooideae* subfamily.²²

This case report shows that the patient had a clinical history and symptoms compatible with seasonal allergic rhinoconjunctivitis, in addition to the presence of specific IgE to various grass pollens. However, the ImmunoCAP and prick tests were positive for specific IgE to grass pollens that are not found in Brazil (*P. pratense*) but that cross-react with *L. multiflorum*, the main grass pollen in the country. In addition, specific IgE to pollens that have low cross-reactivity with each other and with *L. multiflorum*, such as *C. dactylon*, *Poa pratensis*, and *Festuca elatior*, were also identified. These facts suggest that the patient developed pollinosis in Europe and that the condition recurred when he moved to Rio de Janeiro.

Another important fact is the small amount of specific IgE to dust mites (*Dermatophagoides farinae*, *D. pteronyssinus*, *Blomia tropicalis*), which are the main agents responsible for cases of rhinoconjunctivitis and/or perennial asthma in Brazil.

This study has some limitations, including the impossibility of collecting and classifying grass pollen samples from the region where the patient lived (Recreio dos Bandeirantes and Vargem Grande) to confirm the presence of these pollens in that region and the fact that conjunctival and nasal provocation tests were not performed to determine the cause-and-effect relationship of these pollens on the patient's clinical presentation.

However, the association between *in vivo* and *in vitro* allergic test results and the patient's seasonal symptoms was strongly suggestive of pollinosis or seasonal rhinoconjunctivitis.

These results suggest that patients with symptoms of allergic rhinoconjunctivitis who live in close proximity to native vegetation in Rio de Janeiro should also be tested for grass pollen allergy. These agents may be among the antigens responsible for the symptoms experienced by these patients.

Although pollinosis is not commonly found in Rio de Janeiro, it should not be ruled out when treating a patient with seasonal conjunctivitis/rhinoconjunctivitis, especially when the patient has a previous history of living abroad.

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