Aspergillosis of the nose and paranasal sinuses: A review of 54 cases
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Introduction
Aspergillus species are considered opportunistic fungi of increasing clinical importance. Information regarding extrapolmonary involvement is scarce.

Objective
The aim of this study was to isolate the different species of Aspergillus in patients with rhinosinusitis.

Methods
A retrospective study was conducted in a university hospital in Porto Alegre, Brazil (1986–2014). For mycological diagnoses, paranasal tissue obtained at surgery was subjected to histopathology examination and sent for fungal cultures.

Results
Of the 54 samples analyzed, 34 the diagnosis was made by direct examination and culture and in 19 patients, the diagnosis was made exclusively by histology with the visualization of the Aspergillus conidiophore. In one patient, the diagnosis was by direct fluorescent antibody staining (Aspergillus and Mucor). The underlying causes of immunodeficiency were: six with transplantation (bone marrow, thymus, lung, two; kidney, one) and two with hematological disease (bone marrow neoplasia, one; leukemia, two). In the present study, the clinical manifestations of rhinosinusitis aspergillosis were: allergic, 20; fungus balls, 20; and acute invasive, 14. The strains isolated were: Aspergillus fumigatus, 14; A. flavus, six; A. niger, two; A. terreus, one; A. fischeri, one; and Aspergillus sp., three. Two concomitant species of Aspergillus were observed in two patients: A. fumigatus and A. flavus; and A. fumigatus and A. niger. In four patients, Aspergillus was associated with other fungi: A. flavus and Fusarium, one; A. fumigatus and Rhizopus, one; A. flavus and Mucorales, one; and Aspergillus sp. and Mucorales, one. The most common strains of Aspergillus that are responsible for paranasal sinus infections are A. fumigatus, A. flavus, and A. niger.

Conclusions
Fungal infection of the nose and paranasal sinuses is rare, although it has been reported more frequently in children. The most isolated agents were Aspergillus and Dermatophytes.

Accepted occupational exposure to fungi in a cork industry
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Objectives
Different forms of fungal diseases affecting the nose and paranasal sinuses are recognized, including invasive and non-invasive fungal rhinosinusitis. Penicillium glabrum complex is associated with respiratory diseases such as aspergillosis, a typical disease of cork industry workers. In addition, Chrysosporium sitophila has been described as causing occupational asthma, associated to prolonged exposure to high counts of spores. In this study we aimed to access fungal exposure in workers from one cork industry through the mycological analysis of their nasal exudate and the environmental fungal contamination of their surroundings as well.

Methods
Nasal mucous samples from 127 workers were taken with sterilized cotton swabs. Parallel samples were taken from one nostril. The swabs were rotated against the internal anterior walls of the nostril and then placed in the provided transport tube. The obtained swabs were then plated onto malt extract agar (MEA) supplemented with chloramphenicol (0.05%), and onto screening media to detect azole-resistant Aspergillus isolates. Regarding environmental sampling, collections for conventional-based culture studies, were made through the collection of 50–100 L air samples from 5 indoor sampling sites by the use of an impaction method. All the collected samples were incubated at 27 °C for 5 to 7 days and fungal obtained in positive samples were identified according their morphological characteristics. In addition to cultural methods, four environmental samples collected from 250L were used to specifically identify the Penicillium glabrum complex, by Real Time PCR.

Results
Eighty workers (63.0%) presented contamination of their nose nostril with Chrysosporium sitophila, which number of colonies was countless. Talaromyces sp. was another species that also presented a countless number of colonies in 3 of the workers. The third most frequently found species/genus with very high colony forming units was Penicillium sp. (42.7%). Within the Aspergillus genus, the complexes Fumigaüti, Circumdati, Versicolors and Candidi were isolated. No azole-resistant Aspergillus isolates grew in the selective media used (screened itraconazole and voriconazole resistance).

Regarding the environmental results obtained by culture-based methods, all samples also showed countless Chrysosporium sitophila colonies. DNA from the Penicillium glabrum complex was detected in three out of the four samples.

Conclusion
The fungal species identified in the collected nose swabs were shown to be correlated with the results obtained in the environment. This approach allowed us to estimate the risk associated with these tasks performance. Moreover, the cork industry is related to high dust contamination and this can promote exposure to fungi since dust particles can act as carriers of fungi to the worker’s nose. Assessment by molecular tools will ensure the specific targeting of DNA from P. glabrum complex in worker’s nose.