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Original article

Voice disorders in residual paracoccidioidomycosis in upper airways and digestive tract

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ABSTRACT

Background: Paracoccidioidomycosis (PCM) is a systemic mycosis of acute and chronic evolution, caused by species belonging to the genus *Paracoccidioides*. It is considered the most prevalent systemic endemic mycosis in Latin America, with cases in the tropical and subtropical regions. Residual PCM refers to the fibrotic scar sequelae resulting from the disease treatment which, when associated with collagen accumulation, leads to functional and anatomic alterations in the organs.
Aims: The aim of this study was to evaluate the vocal function of patients with residual PCM in upper airways and digestive tract.
Methods: We performed a cross-sectional study in 2010 in a cohort of 21 patients with residual PCM in upper airways and digestive tract.
Results: The average age was 49.48 ± 9.1 years, and only two (9.5%) patients were female. The study was performed in the 1–113 month-period (median 27) after the end of drug treatment. Five (23.8%) patients had alterations in the larynx as a sequela of the disease. However, all patients had vocal changes in vocal auditory perceptual analysis by GRBASI scale. The computerized acoustic analysis using the software Vox Metria, showed that 11 patients (52.4%) presented alterations in jitter, 15 (71.4%) in shimmer, 8 (38.1%) in F0, 4 (19%) in glottal to noise excitation (GNE), 7 (33.3%) in the presence of noise and 12 (57.1%) in the presence of vibratory irregularity.
Conclusions: The great frequency of alterations in residual PCM suggests that the patients in such phase could benefit from a multidisciplinary treatment, offering them integral monitoring of the disease, including speech rehabilitation after the PCM is healed.

Trastornos de la voz en paracoccidioidomicosis residual en las vías respiratorias superiores y el tubo digestivo

Palabras clave:
Paracoccidioidomicosis
Laringe
Disfonía
Logopedia
Calidad vocal

RESUMEN

Antecedentes: La paracoccidioidomicosis (PCM) es una micosis sistémica de evolución aguda y crónica causada por especies que pertenecen al género *Paracoccidioides*. Se considera que es la micosis sistémica endémica de mayor prevalencia en América Latina, con casos en las regiones tropicales y subtropicales. La PCM residual se refiere a las secuelas de las cicatrices fibróticas que provoca el tratamiento de la enfermedad; cuando se asocia con la acumulación de colágeno, conduce a alteraciones funcionales y anatómicas en los órganos.

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Objetivos: El objetivo de este estudio fue evaluar la función vocal de los pacientes con PCM residual en las vías respiratorias superiores y el tubo digestivo.
Métodos: En 2010 se realizó un estudio transversal con una cohorte de 21 pacientes con PCM residual en las vías respiratorias superiores y el tubo digestivo.
Resultados: La media de edad fue 49,48 ± 9,1 años y solo dos pacientes (9,5%) eran mujeres. El estudio se realizó durante un período entre 1 y 113 meses (mediana: 27) después de finalizado el tratamiento farmacológico. Cinco pacientes (23,8%) presentaban alteraciones en la laringe como secuela de la enfermedad. Sin embargo, se encontró que todos los pacientes tenían alteraciones vocales en el análisis de percepción auditiva vocal por la escala GRBASI. El análisis acústico computarizado con el software Vox Metria mostró que 11 pacientes (52,4%) presentaron alteraciones en la variación ciclo a ciclo de la frecuencia fundamental (parámetro denominado *jitter*), 15 (71,4%) en la variación ciclo a ciclo de la amplitud de la señal vocal *(shimmer)*, 8 (38,1%) en la frecuencia fundamental (F0), 4 (19%) en la relación señal-ruido (*glottal to noise excitation* - GNE), 7 (33,3%) en la existencia de ruido y 12 (57,1%) en la existencia de irregularidad vibratoria.
Conclusiones: La gran frecuencia de alteraciones en la PCM residual indica que los pacientes en dicha fase podrían beneficiarse de un tratamiento multidisciplinario con vigilancia integral de la enfermedad que incluyera la rehabilitación del habla tras la curación de la PCM.

Paracoccidioidomycosis (PCM) is a systemic mycosis of subacute or chronic evolution, caused by species belonging to the genus *Paracoccidioides*.[16] It is considered the most prevalente systemic endemic mycosis in Latin America, with cases in the tropical and subtropical regions.[13] Brazil is considered an endemic zone of this disease, concentrating about 80% of the world cases within its south, southeast, center-west and north regions. Since it is not a disease of compulsory notification the number of cases is underestimated and, therefore, based on hospital records, literature reports and precarious official data.[23]

Hospitalization due to PCM is concentrated in few municipalities, and the disease records in official databases are inadequate, with no interoperability or standardization amongst the data sets, with almost half of hospitalization and death numbers being mistakenly codified as blastomycosis.[9]

The disease PCM is subdivided into three forms: acute/subacute, being this clinical form more frequent in children with no gender prevalence; chronic (unifocal and multifocal), and residual. The chronic form in the most frequent, corresponding to about 90% cases, with prevalence on adult males, mainly between 30 and 50 years of age. Once it affects individuals in the most productive phase of their lives, this disease results in social and economic impacts.[21,23] Therefore, PCM represents an important problem in public health due to its disabling potential and the amount of premature death when the cases are not properly diagnosed and treated, especially in specific social segments such as rural workers who meet great difficulties to access and obtain support from the health care network.[21] PCM is acquired through the inhalation of infectious propagules.[7] Its evolution is related to fungal load, to the amount of inhaled infectious particles and the infected individual's general state,[4] with no transmission from man to man.[17] PCM involves the lungs because of the inhalation, and it can disseminate to several organs and systems, originating secondary lesions in the lymph nodes, skin, adrenal glands and, mainly, mucosae.[4] Mucous lesions are located most frequently on the lips, gingiva, tongue, jugal mucosa, palate, uvula, tonsillar pillars, floor of the mouth, nose and larynx.[24] Usually the clinical condition of mucosal involvement by PCM is associated with sialorrhea, odynophagia, dysphonia and shortness of breath. Pain on swallowing and on oral hygiene contribute effectively to jeopardize the nutritional condition of the patient.[22] When there is laryngeal involvement (PCML), the vocal folds are the most affected structures, and consequently high degrees of dysphonia and even aphonia are the main complaints.[2,4]

Residual PCM refers to the fibrotic scar sequelae resulting from the disease treatment which, when associated with collagen accumulation, leads to functional and anatomic alterations in the organs. The process of fibrosis in the airways can lead to dysphonia, due mainly to the thickening of the vocal folds, besides dyspnea, due to stenosis of the larynx and the trachea, and pulmonary emphysema, among others.[10,24] The aim of this study was to evaluate the vocal function of patients with residual PCM in upper airways and digestive tract (UADT).

Materials and methods

Between 1997 and 2010, 471 patients were diagnosed with PCM in the National Institute of Infectious Diseases Oswaldo Cruz Foundation, INI/FIOCRUZ, Rio de Janeiro RJ, Brazil, from whom 81 had UADT involvement. All patients were recruited to participate in the study; however, some died or changed their addresses. In 2010, a cross-sectional study with 21 patients with residual PCM in UADT was performed. The retrospective clinical, laboratorial and therapeutic data from these patients were obtained through active research within the records. The selected individuals had a proven mycological infection, confirmed through the observation of *P. brasiliensis* in biological samples, and had also already healed UADT mucosa lesions. All patients underwent anamnesis and otorhinolaryngologic examination by Karl Storz's 30° optical rigid nasal endoscopy and 70° rigid optical videolaryngoscopy (Tuttlingen, Germany). The auditory-perceptual evaluation was performed through the GRBASI scale, which evaluates the overall grade of hoarseness (G), considering the level of roughness (R), breathiness (B), asthenia (A), strain (S) and instability (I), which are classified as follows: (0) no alteration, (1) slightly altered, (2) moderately altered and (3) severe alteration.[18]

In the vocal acoustic analysis, all patients underwent voice recording in a quiet environment, directly into the computer for a better capture of the voice by the software VoxMetria (CTS Informática, Pato Branco, Brazil). A Plantronix A-20 model microphone was used within a distance of 10 cm to the mouth, during the emission of the/e/sustained vowel at common condition.[3] The following parameters were analyzed in the present study: jitter, that indicates the variability of the fundamental frequency perturbation in the short term, with normal pattern up to 0.6%; shimmer, that indicates the variability of the amplitude of the vocal note in the short term and with normal values up to 6.5%; measures of

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