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Original article

Evaluation of the prevalence and specificities of asymptomatic paranasal sinus aspergillosis: Retrospective study of 59 cases

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ABSTRACT

Study objectives: To calculate the prevalence of asymptomatic localized paranasal sinus aspergillosis (or fungus ball) in the general population and to compare asymptomatic and symptomatic fungus balls (FB) in order to determine their specificities.
Material and method: Retrospective study including 59 patients operated for FB between 2006 and 2011 in a single unit. Patients were divided into two groups: asymptomatic patients (group 1, $n=10$), and symptomatic patients (group 2, $n=49$). All patients in group 1 were identified by systematic screening for a site of infection prior to cataract surgery during this period ($n=6198$). All patients were treated by endonasal surgery. Calculation of the prevalence of asymptomatic FB was based on standardization of the source population (normal distribution, 95% confidence interval). The two groups were then compared (clinical context, age, history of root canal treatment, topography, recurrence rate), after randomization test by Student's test and Chi^2 test.
Results: The prevalence rate of asymptomatic FB in our study was 1.6/1000 in the population over the age of 55 years. A statistically significant difference was demonstrated between the two groups in terms of the following parameters: more advanced age for patients of group 1, constant history of root canal treatment in group 1, constant maxillary topography in group 1, and higher recurrence rate in group 2. Mean follow-up was 18.7 months (range: 3–49 months).
Discussion: This study, the first to determine the prevalence of asymptomatic FB, suggests the existence of very slowly progressive, minimally symptomatic forms, raising the problem of the surgical indications in these patients.
Conclusion: The prevalence of asymptomatic fungus balls is 1.6/1000. Prospective studies are necessary to justify conservative management in these patients.

1. Introduction

Localized paranasal sinus aspergillosis (or fungus ball) is a form of chronic sinusitis due to fungal infection caused by certain species of *Aspergillus*. According to the Société française d'ORL (SFORL) guidelines, fungus ball (FB) generally requires surgical treatment [1]. However, radiological images suggestive of FB are fairly commonly detected on imaging examinations performed in the context of screening for sites of infection prior to immunosuppressive therapy, prosthetic surgery or dental implants. The discovery of such images in a patient with no sinonasal symptoms raises the question of the need for surgical treatment.

All patients eligible for cataract surgery in the Institut Arthur-Vernes Ophthalmology department between 2006 and 2011 underwent systematic screening for a site of infection including radiological assessment (Waters' view) and an otorhinolaryngology consultation (clinical interview and nasal endoscopy) to detect paranasal sinus infection. This systematic screening was performed in order to detect asymptomatic aspergillosis, which was treated surgically to eliminate this site of infection prior to cataract surgery.

The objectives of this study were to:

- analyse the group of patients detected by routine screening in order to determine the prevalence of asymptomatic FB;
- compare this group with patients with symptomatic FB managed in the department during the same period in order to identify the specific clinical and radiological features and clinical course of this form of aspergillosis.

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2. Material and methods

2.1. Patients

This retrospective study was based on a series of 59 patients operated for fungus ball (FB) in the Institut Arthur-Vernes Otorhinolaryngology department between January 2006 and December 2011. The diagnosis of FB was suspected on clinical and CT findings. Only patients with histological confirmation of the diagnosis were included. This series comprised 16 men and 43 women with a mean of age of 60.1 years (range: 24 to 84 years). None of these patients had diabetes, HIV infection or immunosuppressive treatment at the time of the operation.

The otorhinolaryngology consultation systematically comprised of:

- clinical interview looking for signs of sinonasal dysfunction (anterior and/or posterior purulent rhinorrhoea, localized headache, facial pain, cacosmia);
- nasal endoscopy looking for purulent discharge.

Patients were divided into two groups:

- a group of asymptomatic patients, i.e. not reporting any symptoms and with no signs of purulent discharge on nasal endoscopy; these patients were identified by systematic screening prior to cataract surgery (group 1; $n = 10$);
- a group of symptomatic patients, reporting one or more of the above symptoms; these patients were derived from the otorhinolaryngology department (group 2; $n = 49$).

The group of patients identified by systematic screening (group 1) was submitted to statistical analysis with respect to the total source screening population ($n = 6198$). This source population comprised a total of 6198 patients undergoing cataract surgery during the same period and submitted to systematic screening for sites of paranasal sinus infection by Waters' view X-rays and an otorhinolaryngology consultation (clinical interview and nasal endoscopy). Data concerning the source population undergoing screening prior to cataract surgery ($n = 6198$) were derived from the PMSI database.

In the presence of suggestive radiographic signs (presence of calcifications and/or a sinus foreign body), nonenhanced CT scan of the sinuses was performed. Paranasal sinus surgery was proposed to the patient in the presence of suggestive CT features (tissue opacity associated with diffuse microcalcifications and/or metal density foreign body).

These two groups of patients were compared in order to detect differences between the group of patients derived from systematic screening and those with symptomatic aspergillosis.

This comparison was based on the following criteria:

- clinical context: age, gender;
- history of root canal treatment;
- site of FB;
- surgical technique used;
- postoperative course and recurrence rate.

2.2. Treatment

According to the Société française d'ORL (SFORL) guidelines, fungus ball generally requires surgical treatment [1]. All asymptomatic patients consented to endonasal resection of FB, which constitutes the standard treatment for FB and in order to eradicate a potential site of infection prior to cataract surgery, in agreement with the ophthalmologists. All 59 patients included (symptomatic and asymptomatic) therefore underwent sinus surgery.

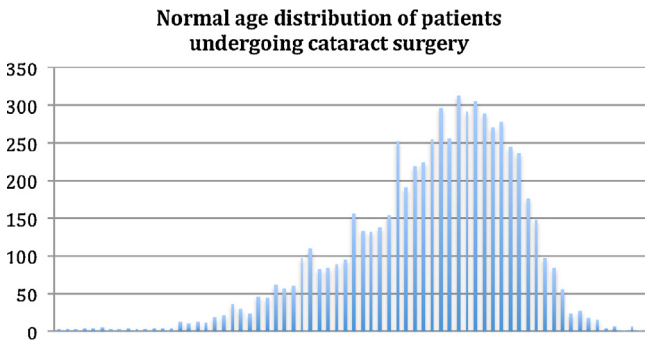

Fig. 1. Normal age distribution in the source population.

Patients with maxillary FB were treated by endonasal middle meatal antrostomy using a 30° endoscope, associated with a Caldwell-Luc procedure in 3 cases. The surgeon sometimes had to use a 70° endoscope at the end of the operation. No patient was treated exclusively by Caldwell-Luc procedure. Patients with sphenoid FB were treated by endonasal sphenoidotomy using a 30° endoscope and a neuronavigation system. Postoperative care consisted of irrigation of the nasal cavities with physiological saline several times a day for 3 weeks.

All patients were reviewed by their surgeon and evaluated by nasal endoscopy on postoperative day 8. Subsequent follow-up was ensured either by the surgeon or by the otorhinolaryngologist who referred the patient. Patients followed outside of the department were contacted by telephone to determine their long-term postoperative course (clinical interview to identify any symptoms). Patients who could not be recontacted or who were not reviewed after 3 months were considered to be lost to follow-up. Follow-up CT scan was only performed when recurrence was suspected.

2.3. Data analysis

Prevalence is an indicator of morbidity and constitutes an epidemiological tool to identify health problems and define public health priorities. It is defined as the number of subjects affected by the disease in a population at a given point in time. The prevalence rate is the prevalence observed in the mean population during the observation period [2].

Based on the hypothesis that, according to current medical knowledge, susceptibility to paranasal sinus aspergillosis is the same in patients with cataract and in the general population, standardization of the source population (patients operated for cataract, $n = 6198$) should be possible. This standardization was based on the normal distribution of the age pyramid of the source population with a 95% confidence interval (Fig. 1).

A randomization test was performed prior to comparison of the groups of asymptomatic patients (group 1) and symptomatic patients (group 2) in view of the different sample sizes (group 1, $n = 10$; group 2, $n = 49$). The various parameters were then compared by Student's test for values, and Chi^2 test for other variables.

3. Results

3.1. Prevalence of asymptomatic FB

The source population, i.e. all patients undergoing screening for the presence of paranasal sinus infection, comprised 6198 patients (over a 5-year period). The mean age of the source population was 74.1 years with a standard deviation of 9.67 years. The age