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Pulmonary Aspergilloma: About 167 Cases

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Abstract **Original Research Article**

Pulmonary aspergilloma is a serious deep mycosis, especially in countries with high tuberculosis endemicity, because of its bleeding complications, which are sometimes massive, and can be life threatening. Our work is a retrospective, descriptive and analytical study of 167 cases of pulmonary aspergilloma, collected from January 2003 to May 2021 in the department of respiratory diseases of the CHU IBN ROCHD of Casablanca, whose aim was to provide a better characterization of this pathology in our context in order to improve the management of these patients. We counted 111 (66.26%) men and 56 (33.53%) women, aged between 21 and 80 years, with an average age of 48.5 years. A history of tuberculosis was present in 150(89.8%) cases, as well as COPD in 25(15%) cases. Respiratory symptoms were dominated by hemoptysis in 151 (90.4%) cases, dyspnea in 83 (49.7%) cases and chest pain in 55 (33%) cases. 64 (38.32%) cases had a normal pleuropulmonary examination, while 79 (47.3%) cases had snoring. The diagnosis was made mainly on radio-clinical data. Aspergillus serology was positive in 98(59%) cases. On thoracic CT, the typical grelot image was present in 70 (42%) cases. The lesions were predominantly in the right upper lobe in 115(69%) cases. The CT scan also classified the lesions as simple aspergilloma (SCA) in 35(21%) cases and as chronic cavitary pulmonary aspergillosis (CCPA) in 132(79%) cases. The treatment was surgical in 108 (64,67%) cases. The postoperative course was simple in the majority of patients. However, we had 3 (2.77%) postoperative deaths. The average duration of follow-up of these patients was 3.5 years, during which an empyema was noted in 6 (6.81%) cases, a death in 5 (6%) cases and a recurrence in 2 (2.22%) cases. Medical treatment of PA with Itraconazole was indicated in 59 (35%) cases, for an average duration of 12 months with quarterly clinical, biological and radiological follow-up. The evolution was marked by clinical improvement in 15(25%) cases, radiological stabilization in 49(83%) cases, negativation of aspergillosis serology in 14(24%) cases, and death due to large hemoptysis in 6(10%) cases.

Keywords: Aspergillus, Hemoptysis, Lobectomy, Itraconazole.

INTRODUCTION

Pulmonary aspergilloma (PA) is a serious disease due to the proliferation of aspergillus spores organized in a dense felting within a preformed cavity most often of tuberculous origin. The pathogen is Aspergillus, a filamentous fungus or ubiquitous mold whose spores are spread mainly by air, rarely by skin or digestive tract. As a result, the respiratory tract is most often affected, particularly the lower airways [1]. Aspergilloma is considered one of the most frequent causes of hemoptysis, which can be very abundant and sometimes fatal. According to the World Health Organization (WHO), an estimated 370,000 people worldwide develop pulmonary aspergilloma each year (4). It can present as simple pulmonary aspergilloma (SPA) or as chronic cavitary pulmonary aspergillosis (CCPA) (6), formerly known as complex pulmonary aspergilloma, which may progress to chronic fibrosing pulmonary aspergillosis (CFPA) if untreated (7). Chest CT is the examination of choice for positive diagnosis, topography, investigation of other sites, and therapeutic guidance (8). The diagnosis of AP is based on a set of clinical, radiological and immunological arguments, and confirmed by an anatomopathological examination of the surgical specimen (7).surgical removal remains the reference treatment, in spite of the operative difficulties (9, 10), and of a significant postoperative morbi-mortality (10).the aim of our study is to determine the current epidemiological, clinical, radiological, biological, therapeutic and evolutionary profile of this affection in order to improve the therapeutic management of these patients.

MATERIALS AND METHODS

This is a retrospective descriptive study of 167 cases of pulmonary aspergilloma, spread over a period of 18 years from January 2003 to May 2021, and conducted at the department of respiratory diseases of the CHU Ibn Rochd of Casablanca. All patients hospitalized and diagnosed with pulmonary aspergilloma either on the basis of radio-clinical and serological data or on postoperative anatomopathological data were included in our study. Epidemiological (age, sex, history, favouring factors), clinical (mode of revelation, clinical signs), paraclinical (aspergillosis serology, chest X-ray and CT scan), therapeutic and evolutionary data were studied. The results obtained are described in percentage and number of cases, and were entered with Microsoft Excell 2016 software.

RESULTS

During the study period, 167 cases of pulmonary aspergilloma were collected. This number represents 0.9% of all patients hospitalized during this period and an average of 8.7 cases per year.

There were 111 men (66.5%) and 56 women (33.5%). The average age was 48.5 years (extremes: 21 to 80 years). Concerning risk factors, 150 (89.8%) patients were formé tuberculosis patients, 70 (41.91%) patients were smokers (active and passive), 25 (14.9%) patients were diabetics and 16 (9.5%) patients were hypertensive. The history of thoracic surgery was noted in 3 (1.7%) patients, operated for pulmonary hydatid cyst. The mean time to onset of aspergilloma in patients with a history of tuberculosis was 12.43 years, with an extreme delay ranging from 1 to 37 years. The frequent reasons for hospitalization were hemoptysis151 (90.4%) cases, dyspnea 83 (49.7%) cases and chest pain 55 (33%) cases. Clinical examination was normal in 64 (38.3%) patients. Chest radiography, performed in 159 (95%) patients, showed a grelot image in 57 (35.8%) cases (Figure 1), a destroyed lung in 55 (34.5%) cases, a cavitary image in 42 (26.4%) cases, and a retractile opacity in 25 (15.7%) cases. The thoracic CT scan, performed in all our patients, showed grelot-like images in 70 (42%) cases (Figure 2), pleural thickening in 62 (37.5%) cases, and cavitation in 58 (34.7%) cases (Table 1).The lesions were predominantly in the right upper lobe (69%). Flexible bronchoscopy was performed in 165 (98.8%) patients and was normal in 30 (18%). Aspergillosis truffle was found in 9 (5%) patients, presenting as a yellowish, friable and mobile formation filling the bronchial lumen (Figure 3). Biologically, aspergillosis serology was positive in 99 (59%) cases, negative in 54 (32%) cases and doubtful in 15 (9%) cases. The treatment was medical in 59 (35%) patients with Itraconazole 200 mg x2/d for a mean duration of 12 months. Surgery, such as posterolateral thoracotomy, was indicated in 108 (68.9%) patients. Among all the patients followed up, 64 (38%) had a favorable evolution with disappearance of clinical signs and regression of radiological images, 26 (44%) cases had recurrent hemoptysis and 10 (17%) patients worsened their radiological lesions. The postoperative mortality rate was 4.6%.

Table-1: Distribution of patients by scan appearance

Scannographic appearance	Number of cases	Percentage
Bell-shaped image	70	42
Pleural thickening	62	37.5
Cavity image	58	34.7
Sequential DDB image	39	23.35
Aspect of destroyed lung	33	20
Emphysema bulla	22	13.17
Foyer of alveolar condensation	20	11
Minimal pleurisy	3	2

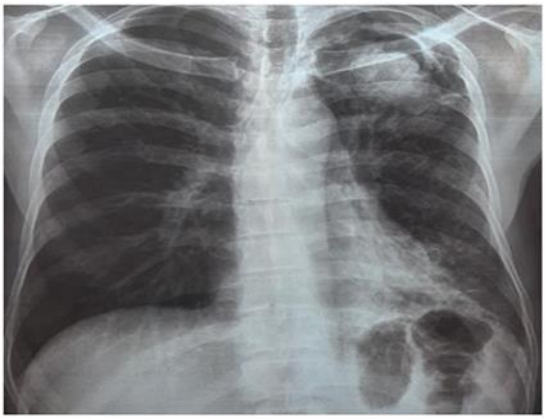

Fig-1: Frontal chest radiograph showing a left upper lobar cavity image occupied by two opacities realizing the image in grelot

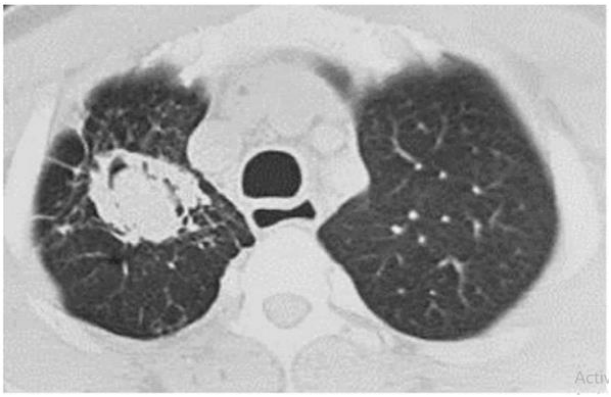

Fig-2: CT scan section showing a right upper lobar grelot image

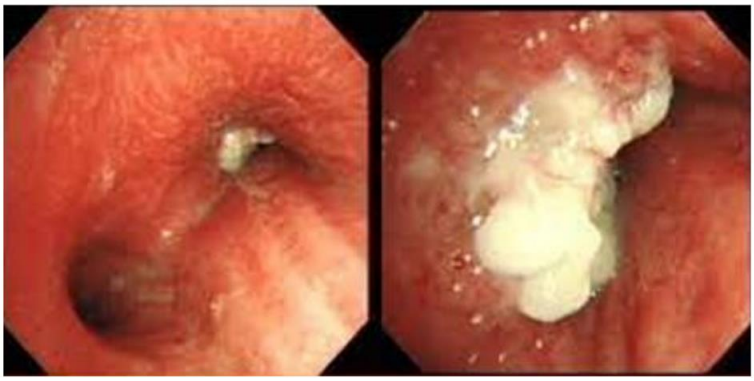

Fig-3: Endoscopic view of an aspergillary truffle located in the left lower lobe

DISCUSSION

Pulmonary aspergilloma is one of the most common saprophytic infections. The pathogen is aspergillus, most often fumigatus species, developing in a pre-existing cavity caused by an underlying pathology of which tuberculosis remains the most frequent in our context. In most studies, the authors report a male predominance with a mean age between 36 and 65 years. Eighty-nine percent of our patients had a history of pulmonary tuberculosis. This is in line with the study of Rakotoson *et al*. [24] in Madagascar and Sameer *et al*. [25] in India, in which a history of pulmonary tuberculosis was noted in 89% and 82% of cases respectively. But other factors can be noted, in particular sarcoidosis [1-4], hydatid cyst [5], excavated bronchial cancer, pulmonary infarction, pulmonary abscess, apical fibrosis of ankylosing spondylitis, spontaneous pneumothorax or bullous emphysema [2]. The average time of onset of aspergilloma after pulmonary tuberculosis is variable, ranging from a few days to several years. In our series, it was 12.43 years with an extreme delay of 1 to 37 years. The clinical picture is dominated by hemoptysis although the asymptomatic form is frequent [6]. The bleeding is due to the secretion of endotoxins by Aspergillus and/or the mechanical irritation of the vessels by the mobile aspergillus truffle inside the cavity [7]. The mortality rate due to hemoptysis varies between 2 and 14% [18]. Although the clinic represents an essential step in the diagnosis of pulmonary aspergilloma, imaging, particularly thoracic computed tomography (CT), remains an indispensable examination. It usually reveals the characteristic image of pulmonary aspergilloma, found in 70 (42%) patients in our series. It typically presents as a mobile intracavitary mass, surmounted by an apical gas crescent, called an "aspergillary cluster". Modification of a pre-existing cavity may be the first radiological sign [21]. The CT scan also allows to study the exact topography of the lesion as well as the whole lung parenchyma in search of other lesions, in particular sequelae of tuberculosis such as pachypleuritis, which presages the difficulty of the surgical procedure. Thus, to simplify the therapeutic decision, a new classification of chronic pulmonary aspergillosis has recently been proposed, based essentially on radiological criteria [22].It allows to define, the simple pulmonary aspergilloma(APS): formerly called the typical aspergilloma and which is represented radiologically by a single parenchymal cavity inhabited by a single fungal ball, with absence of radiological progression during several months of surveillance (14). Chronic Cavitary Pulmonary Aspergillosis (CCPA): Formerly called Complex Aspergilloma, where one or more parenchymal cavities carry aspergilloma, with radiological progression of the lesions (14) (Figure 2), clinically, patients with simple aspergilloma are often respiratory asymptomatic and do not present with functional or nutritional tare. In contrast, patients with APPC are in poor general condition and nutritionally deficient. They are usually symptomatic, most often with severe hemoptysis [7,8].

Positive aspergillosis serology is an indicator of pulmonary aspergilloma. However, it remains negative in 5 to 10% of casent because of the commensal nature of aspergillus [9]. In our study, it was performed in all our patients (100%) and came back positive in 99 (51%). In this context, bronchial fibroscopy remains an essential examination. It allows to identify the origin of the hemoptysis, to perform a possible hemostatic procedure, to take biopsies, and to look for the aspergillus truffle. Isolation of aspergillus fumigatus from bronchial aspirate fluid by culture on Sabouraud's medium is a key element of positive diagnosis (7). However, its identification is rare according to several authors. Therapeutically, surgery is the treatment of choice for pulmonary aspergilloma [10-12]. This is justified by the risk of hemoptysis, which progresses from minimal to severe forms in 20% of cases [13], and can be life-threatening [14]; the risk of the aspergilloma becoming semi-invasive or invasive (20%) [15]; and the progressive increase in the size of the aspergilloma which accentuates neovascularization and parietal and scissural adhesions, making the operation much more difficult and very hemorrhagic. Controlled excision is the standard procedure in pulmonary aspergilloma surgery. This type of surgery is associated with a high mortality rate ranging from 7 to 23% [13] depending on the study. Morbidity can reach 32% due to hemorrhages, pulmonary re-expansion defects, broncho-pleural fistulas, and empyema [14]. Speleotomy remains a treatment of last resort. Embolization by selective angiography is a temporal alternative in case of threatening hemoptysis [14]. In his study of 278 cases of pulmonary aspergilloma treated surgically, Caidi *et al*. [15] noted 16 postoperative deaths (5.7%), complications such as empyema (12.5%), incomplete pulmonary re-expansion (9.3%), postoperative bleeding (5%), respiratory infections (4.6%), respiratory failure (4%) and bronchial fistula (2.5%). In his study of 60 cases of pulmonary aspergilloma, Guerra *et al*. [16] found a postoperative mortality rate of 5% and postoperative complications of 16.3%. In our series, postoperative complications were prolonged air leakage (18%), hemoptysis (13%), and wall empyema (6.81%) with a death rate of 3%. Oral medical treatment is based on triazoles, which can penetrate the walls of the cavity and even inside the fungal ball, making them an important therapeutic option in pulmonary aspergilloma. This group of drugs is reasonably well tolerated. The response to treatment is slow, requiring courses of treatment of 4 to 6 months, or even 9 months. In patients who respond well to treatment after this time, and who are not eligible for surgery, treatment can be extended for several months or even years (23). Oral Itraconazole is the drug of choice for pulmonary aspergilloma because of its good tissue penetration [20]. Intravenous treatment with Amphotericin B is usually reserved for patients with rapidly progressive forms of aspergilloma or when triazoles fail [20]. In our series, we recommended medical treatment alone with Itroconazole in 35% of cases and medical-surgical treatment in 53% of cases.

CONCLUSION

Pulmonary aspergilloma is a deep and serious mycosis, due to its hemorrhagic complications and the poor terrain in which it occurs, especially in countries with high tuberculosis endemicity. The reference treatment of aspergilloma which is surgery is burdened with a heavy morbi mortality.

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