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Parasitology

Aspergillary Infections in Immunocompromised Patients in the Parasitology Department of Chu Mohamed VI de Marrakech 23 Cases

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Abstract | **Case Series**

This retrospective study analyzed the records of 23 immunocompromised patients with aspergillosis at CHU Mohamed VI in Marrakech between January 2022 and June 2024. The main risk factors were diabetes (43.5%) and HIV infection (26%). Samples were taken in different hospital departments, with a predominance of dermatology (39%) and infectious diseases/hematology (17%). The samples were directly examined by optical microscopy after MGG staining, and then cultured on Sabouraud medium at 30-35°C for 30 days. The identification of species was based on macroscopic and microscopic features of colonies. Galactomannan antigen assay was performed when requested by clinicians. The results show a male predominance (sex-ratio 3.2) with an average age of 50 years. *A. fumigatus was the most common species (48%), followed by* A. flavus *(35%) and* A. niger (17%). *The majority of samples were superficial mycoses (74%).* This study highlights the importance of aspergillary infections in immunocompromised people in Morocco and underlines the need for early diagnosis combining mycological examinations and antigen detection. Limitations include small size and retrospective nature, justifying additional studies.

Keywords: Aspergillosis, immunosuppression, mycological diagnosis, galactomannan, Morocco.

1. INTRODUCTION

Aspergillus spp. , a filamentous fungus ubiquitous in the environment, represents a growing public health concern, particularly among immunocompromised individuals[1]. Of the 300 species identified, 38 species are pathogenic to humans, with *A. fumigatus, A. flavus* and *A. niger* being most frequently involved in human infections[2]. These fungi are ubiquitous, present in soil, decaying plants and hospital environments[3]. Although they are generally harmless to immunocompetent individuals, they can cause severe or even fatal infections in immunocompromised patients[4].

The diagnosis of aspergillosis is based on a multidisciplinary approach, combining medical imaging, biological analyses (detection of antigens or fungal DNA) and mycological examinations. The prevalence of these infections varies by region and socio-economic conditions, with a significant impact on health systems[5]. In Africa, these infections remain under-diagnosed due to limited resources and lack of extensive epidemiological studies.

In Morocco, few data are available on aspergillosis in hospital settings, especially in services for immunocompromised patients. This study aims to fill this gap by analysing the *prevalence of aspergillary infections in immunocompromised patients treated at CHU Mohamed VI in Marrakech, to identify the most frequent Aspergillus* species and analyse their distribution in different hospital departments.

This study will allow us to have an idea on the distribution and identify the species of Aspergillus frequently isolated.

2. METHODOLOGY

This is a retrospective study based on the analysis of medical records of 23 immunocompromised patients diagnosed and treated for aspergillosis between January 1, 2022 and June 30, 2024 at CHU Mohamed VI in Marrakech.

Included patients had risk factors for immunosuppression: diabetes, HIV infection, prolonged

corticosteroid therapy, or organ transplantation. Contaminated samples were not included in the study.

Samples received in our department were blood samples from fungal hemoculture vials, tissue samples (biopsies of various tissues), respiratory samples (sputum, broncho-alveolar lavage, bronchial aspiration), Punctures of various liquids (cerebrospinal, joint, pleural, pericardial, ascites...), urinary sampling, skin samples, nails, swabs from various sites, etc. In all cases, sampling was guided by the clinic.

Samples were taken under strict aseptic conditions, collected in sterile vials adapted to the type of sample and sent to the laboratory in accordance with the recommended conditions and deadlines.

On receipt of samples, after validation of the pre-analytical stage, a part of each sample was subjected to a systematic direct microscopic examination after treatment according to the nature of the sample: microscopic observation in the fresh state between slide and lamella and after colouring at May Grunwald Giemsa (MGG) of the prepared smears.

Each sample received was seeded on a cycloheximide-free Sabouraud culture medium, and incubated at 30-35°C and 25-27°C in an aerobic environment.

Aspergillus are usually of rapid growth from 3 to 5 days. After the shoots, lactophenol blue staining for aspergillus identification.

Filamentous fungi (dermatophytes, pseudodermatophytes and moulds), the identification was made on the basis of the time of growth and on the morphological aspects macroscopic and microscopic colonies.

Aspergillary serology (Dosage of the galactomannan antigen by ECL.Virclia Lotus Technique of immunoanalysis by chemiluminescence manufactured by the company Vircell, S.L) was carried out at the clinician's request on Bronchiolo-alveolar washing fluid (LBA) or serum.

Interpretation of the results considered clinical data, favoring factors, anatomical site of sampling and direct examination and culture results.

The data were collected on a collection sheet prepared for this purpose and taking into account sociodemographic, clinical, paraclinical, therapeutic and evolutionary data. Figures, text and tables were prepared using Microsoft Office Word and Excel 2010.

Data were collected from the records of the parasitology department and analyzed using an Excel spreadsheet.

3. RESULTS

3.1 Demographic data

A total of 23 cases of Aspergillus in immunocompromised patients were selected during this study period. The mean age of our patients was 50 years with extremes of 6 and 89. We found a male predominance (18 men, 5 women) with a sex ratio of 3.2 men to one woman.

The main risk factors (Figure 1) were diabetes (43.5%) and HIV/AIDS (26%)

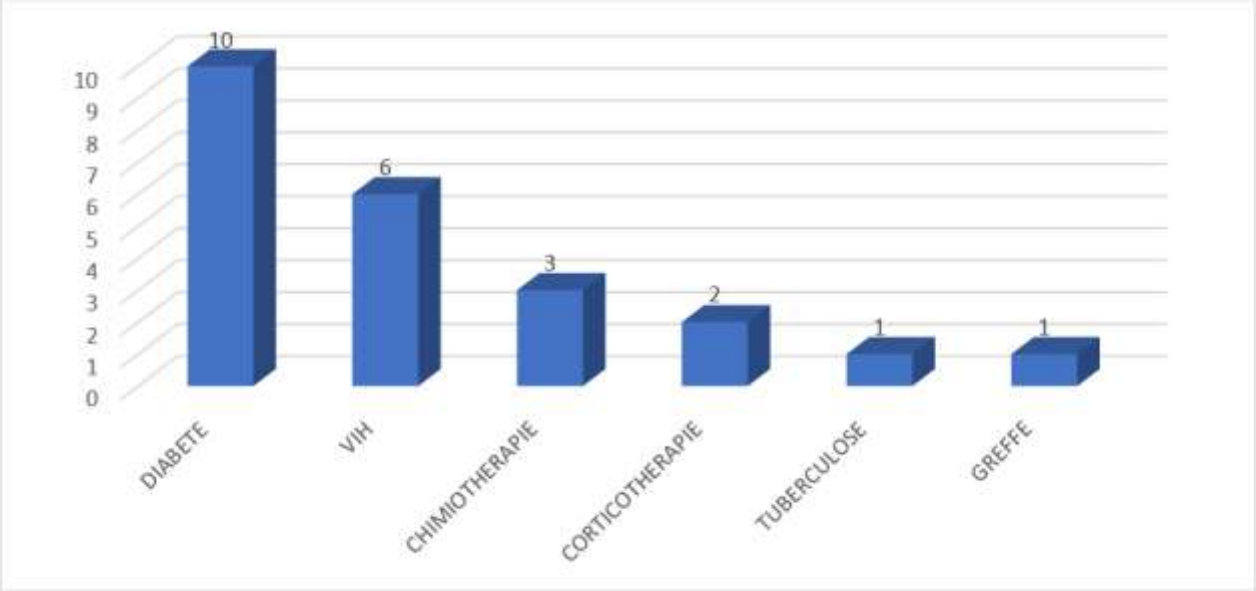

Figure 1: Patient history

3.2 Breakdown by hospital department

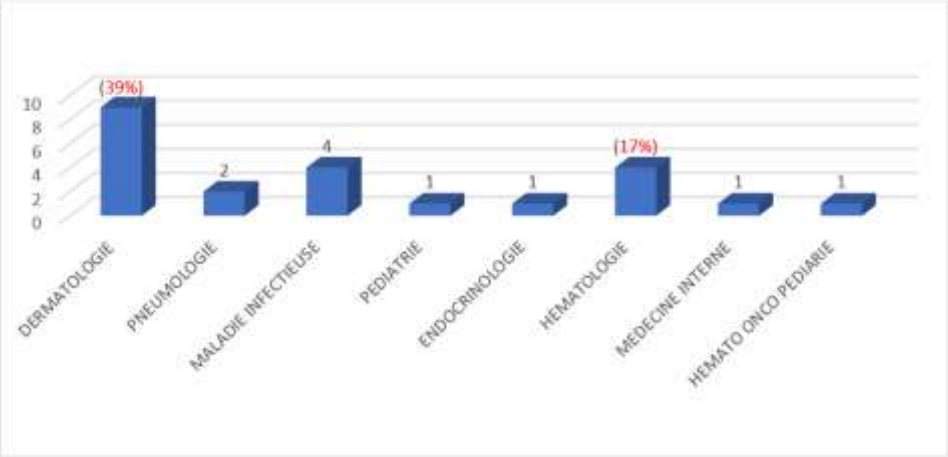

Figure 2 : Distribution of pathogens relative to services

The highest incidence services are dermatology (39%) and infectious diseases/hematology (17%).

3.3 Distribution According to the Nature of the Withdrawal

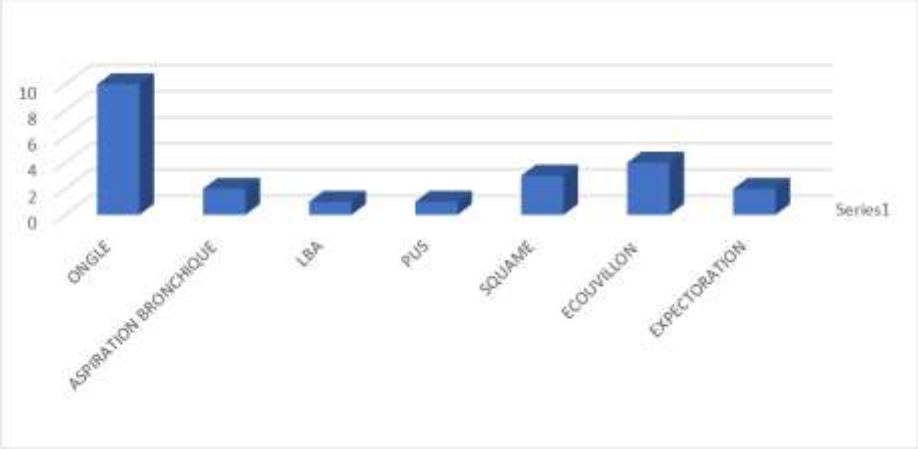

Figure 3: Breakdown of the nature of levies

Nail perforations were the most common type of sample (43.5%), followed by swabs and scales 17.4% and 13% respectively.

3.4 Species of Aspergillus identified

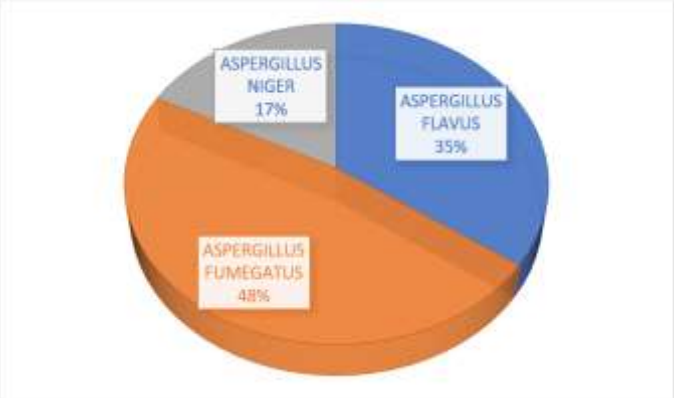

Figure 4: Pathogen distribution

Aspergillus fumigatus (48%) dominates, followed by *A. flavus* (35%) and *A. niger* (17%), in line with global trends where *A. fumigatus* is the main agent of invasive aspergillosis.

Types of levies

Superficial mycoses: 74% of samples.
Deep mycosis accounted for 26% of samples.

Therapeutic aspects

All three patients tested positive for galactomannan antigen were treated with amphotericin B.

4. DISCUSSION

Aspergillary infections, although rare, pose a serious threat to immunocompromised patients. Our study, conducted at CHU Mohamed VI of Marrakech, identified 23 cases of aspergillosis in immunocompromised patients over a period of two and a half years. These results highlight the clinical impact of aspergillosis in immunocompromised patients.

The mean age of the patients in our study was 50 years, with a male predominance (sex-ratio H/F = 3.2). These observations are consistent with literature data. For example, a study by Zait *et al.,* (2020) reported an average age of 49.5 years and sex ratio of 1.2 in patients with pulmonary aspergilloma [6]. Male predominance could be explained by increased occupational exposure to contaminated environments (construction sites, agriculture) or differences in underlying co-morbidities.

Risk factors associated with aspergillary infections include prolonged corticosteroid therapy, neutropenia, HIV infection, organ transplants and immunosuppressive treatments [2]. In our study, the majority of cases came from dermatology, infectious disease and hematology services, reflecting the increased vulnerability of patients in these units. These results are in line with those of Segal (2009), who pointed out that patients with hematological diseases or those who have undergone stem cell transplants are particularly at risk for invasive aspergillosis [7]. The study of [8] showed that the prevalence of comorbidities such as diabetes was significant, reaching 58.2%, which was slightly higher than in your case 43.5%. Patients in critical care (resuscitation) crike with diabetes associated with aspergillary infection have a particularly poor prognosis [9]. Our analysis thus confirms the role of diabetes as a significant risk factor for aspergillary infection in hospitals despite our somewhat low sample size. In our study, Aspergillus fumigatus *was the most frequently identified species (48% of cases), followed by* Aspergillus flavus *(35%) and* Aspergillus niger *(17%). This distribution is consistent with global data, where* A. fumigatus *is responsible for the majority of human infections due to its ability to grow at body temperature and produce small, easily inhalable spores* [2].

The diagnosis of aspergillary infections is based on a multidisciplinary approach, combining medical imaging, mycological examinations and serology. In our study, 83% of the samples were positive on direct examination, highlighting the importance of this method for rapid diagnosis. However, as noted by Patterson et al. (2016), the sensitivity and specificity of diagnostic methods vary considerably, and a combination of techniques is often required to confirm diagnosis[10].

In Africa, aspergillosis infections are often under-diagnosed due to limited resources and lack of awareness. A study by Bongomin *et al.,* (2017) estimated that the prevalence of invasive fungal infections, including aspergillosis, is significantly higher in low-income countries where health systems are less equipped to cope with these infections[11].

The results of this study highlight the need for increased vigilance and early diagnosis in immunocompromised patients. Prevention protocols, such as isolation of at-risk patients, improved hospital hygiene conditions and the use of air filters in high-risk units could help reduce the incidence of these infections. In addition, continuing training of medical staff on the clinical signs and diagnostic methods of aspergillosis is essential to improve patient management. This study has some limitations. Its retrospective nature and small sample size limit the generalization of results. In addition, the diagnosis of aspergillary infections is based on a variety of methods, and some cases may have been underdiagnosed due to limited availability of advanced techniques such as PCR.

5. CONCLUSION

In summary, this study confirms that aspergillary infections represent a major clinical challenge for immunocompromised patients, especially in resource-limited settings. The results highlight the importance of a multidisciplinary approach to the diagnosis and management of these infections, as well as the need to strengthen prevention and awareness measures. Further research is needed to better understand the region-specific risk factors and develop appropriate therapeutic strategies.

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