Quest Journals
Journal of Medical and Dental Science Research
Volume 9~ Issue 5 (2022) pp: 07-11
ISSN(Online) : 2394-076X ISSN (Print):2394-0751
www.questjournals.org

Research Paper

Ocular mycosis: epidemiological and mycological features at the parasitology-mycology laboratory of the Hassan II University Hospital of FEZ

Mouna Samouche[1,3], Bhallil Ouahiba[2,3], Mouna Amrani[1,3], Soukaina Adadi[1,3], Tlamçani Zineb [1,3]

[1](*Department of Parasitology Mycology in central laboratory of the University Hospital Center HASSAN II - Fez MOROCCO)*
[2](*Department of Immunology of the University Hospital Center HASSAN II - Fez MOROCCO)*
[3](*University of Sidi Mohamed Ben Abdellah, FEZ MOROCCO)*

Corresponding Author: mouna.samouche@gmail.com

ABSTRACT:
Background*: Ocular mycosis is one of the most serious eye diseases, which can cause visual deficiency and preventable blindness. The fungi involved are yeasts or molds.*
Candida is the main pathogenic yeast; it can affect a normal ocular surface as well as a previously pathological one. Aspergillus often develops after a wound caused by soil and/or a plant.
The aim of our study is to describe the main epidemiological and mycological aspects of ocular mycosis diagnosed in the parasitology-mycology laboratory of the Hassan II University Hospital of Fez.
Materials and Methods*: This is a retrospective descriptive review of all culture-proven ocular mycosis seen over a 5-year period, from January 2017 to December 2021, in parasitology-mycology laboratory of Hassan II University Hospital of Fez.*
The literature search was performed using Pubmed and Google scholar databases.
Results*: During the study period, 620 samples were received in the laboratory, 14 out of them returned positive, that is to say an average of 2.25%. Men (64.3%) were more often affected. Half of patients (46.15%) were in the youngest age group (22 to 50 years).*
The predominant fungal genera isolated were Candida (64.28%) and Aspergillus sp (14.28%).
Non-albicans species were predominant (57.14%).
Trauma is the most important predisposing cause; ocular and systemic defects and prior application of corticosteroids are also important risk factors.
Conclusion*: Fungal ocular infections continue to be an important cause of ocular morbidity, particularly in the underdeveloped countries. A better understanding of risk factors and pathogens involved in these infections, will improve the prognosis of ocular mycosis.*
KEYWORDS: *Ocular mycosis; Yeast; Molds.*

R*eceived 22 Apr, 2022;* ***R****evised 03 May, 2022;* ***A****ccepted 05 May, 2022 © The author(s) 2022.*
P*ublished with open access at* ***www.questjournals.org***

I. INTRODUCTION

Ocular mycosis is a fungal infection that can specifically affect the cornea (keratitis) or, more rarely, affect other structures of the eye: the conjunctiva, the eyelids, the lacrimal apparatus, the sclera and the orbit (endophthalmitis). The incidence of fungal keratitis is 1.8% to 6.0% [1].

Fungi are ubiquitous eukaryotic organisms found in decaying plants, soil, and air. Genetic studies have revealed that they are more closely related to animals than plants. The fungi in question are often opportunistic and infect pathological corneas, but can also appear on normal corneas after a trauma, most often by a plant [2; 3].

The genera *Candida*, *Aspergillus*, and *Fusarium* remain the most frequently isolated pathogens in the world [4; 5].

The risk factors identified are: immunosuppression, untimely corticosteroid therapy, antibiotherapy, sepsis, transplantation and intravenous drug abuse [6].

Because of its non-specific manifestations, patients are often misdiagnosed and even treated with steroids that aggravate the situation and cause serious complications.

Ocular mycosis is one of the most serious eye diseases, which can lead to visual deficiency and avoidable blindness. The final functional prognosis of these infections is conditioned by the patient's terrain, the virulence of the fungi, and the diagnostic and therapeutic delay [4].

The purpose of our study is to analyze the epidemiological and mycological characteristics of fungal keratitis diagnosed in the parasitology laboratory of the Hassan II University Hospital of Fez.

II. MATERIALS AND METHODS

The This is a retrospective study of 14 cases of fungal keratitis (out of a total of 620 samples received) collected over a period of 5 years (January 2017-December 2021) analyzed in Parasitology -Mycology laboratory of the University Hospital HASSAN II of Fez.

The mycological specimens retained were corneal scrapings and biopsies; simple conjunctival smears were not considered. Mycological analysis involved direct examination in the fresh state and a systematic culture. Direct microscopic detection allows rapid presumptive diagnosis.

Culture is necessary because it identifies the fungus and allows the adaptation of the treatment according to the species. Yeasts sprout in 24 to 48 hours and filamentous fungi in 3 to 5 days.

The culture media systematically inoculated in the first instance were Sabouraud's medium, Sabouraud with Gentamicin and Chloramphenicol and Sabouraud with cycloheximide agar. Incubation was done at 27°C and 37°C with daily reading. The tubes were conserved for one month.

A sample is considered positive when a fungus is detected in direct examination or in culture or both.

Isolation and identification of fungal elements were based on morphological criteria (macroscopic and microscopic examination), phenotypical criteria (filamentation test), biochemical criteria (identification galleries using sugar assimilation as a principle), and immunological criteria (agglutination tests of latex particles sensitized with monoclonal antibodies).

III. RESULTS

The study population was represented by patients who came from ophthalmology department of Omar Drissi hospital, for a mycological examination at the parasitology-mycology laboratory of the HASSAN II University Hospital of Fez,

Culture remains the cornerstone of diagnosis; direct microscopic detection of fungal structures in corneal scrapings allows rapid presumptive diagnosis.

During the study period, we received 620 ocular samples; 14 were in favor of ocular mycoses. It concerned 9 men (64.3%) and 5 women (35.7%), with a sex ratio W/M of 0.55. The mean age of our patients was 55.7 years with extremes ranging from 22 to 77 years.

The main risk factors were: the use of initial local corticosteroid therapy in 2 patients, diabetes in 3 patients, the use of contact lenses in 2 patients, and associated ophthalmologic pathology in 6 patients. Ocular trauma was reported in 6 patients.

Corneal scraping was performed with a slit lamp in the ophthalmology department and sent to the parasitology laboratory for direct examination and culture.

Direct examination was positive in 53% of cases showing yeast with pseudohyphae in 17% of cases and hyphae in 36% of cases. The negativity of the direct examination could be justified by the difficulty of scraping, which is limited to the superficial stroma.

The culture was positive in 100% of cases, showing the predominance of yeasts found in 85.71% of cases. The genus *Candida* remains the most frequently implicated yeast. It was found in 9 cases (64.28%). *Non-albicans* species were predominant (57.14%) represented by: *Candida glabrata* in 3 patients, *Candida Krusei* in 3 patients, *Candida dubliniensis* in one patient, *Candida parapsilosis* in one patient. *Candida albicans* species was found in one case. One case of *Saccharomyces cerevisiae* was found.

These strains were sensitive to all antimycotics that were tested: amphotericin B, 5-fluoro-cytosine, itraconazole, ketoconazole and econazole.

Filamentous fungi were represented by the genus *Aspergillus*, which was isolated from two patients (14.28%): *Aspergillus sp* in one case and *Aspergillus fumigatus* in the other. The genus *Alternaria Sp* was found in 2 cases.

Figure 1: Positive culture showing à *Aspergillus fumigatus*

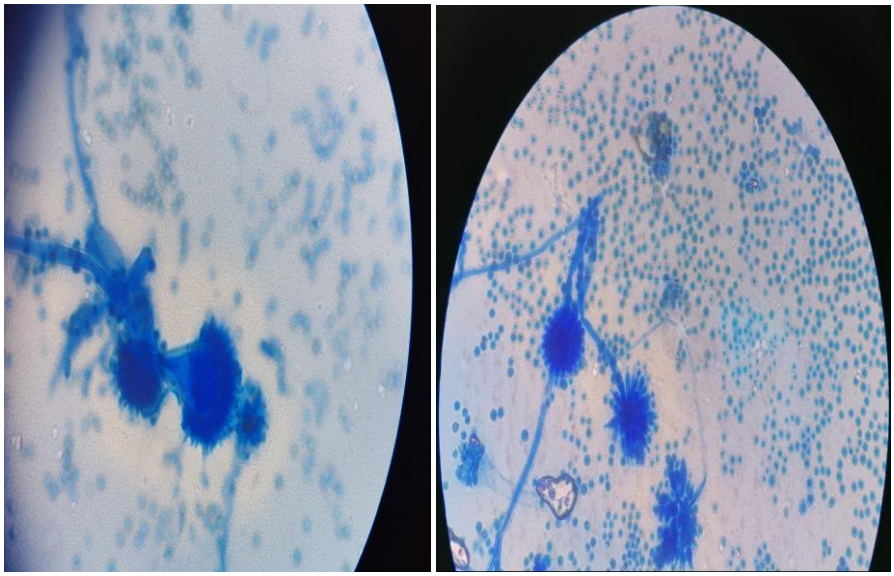

Figure 2: *Aspergillus* heads, with lactophenol blue, evoking the *Aspergillus fumigatus.*
(Parasitology -Mycology laboratory of the University Hospital HASSAN II of Fez)

IV. DISCUSSION

4.1 EPIDEMIOLOGICAL DATA

Over a period of 5 years, an average of about 2.8 cases/year. This may seem low but studies conducted in regions with a temperate climate (such as ours) have found similar frequencies, as in the Poland study, where an average of 3 cases/year was reported [7].

This average is also consistent with that found in other countries such as France with 2.4 cases/year, 3 cases/year in the United States, and 1,74 cases/year in Tunis [8; 9].

Fungal keratitis is more frequent in hot and humid areas, where fungi may be implicated in more than 50% of all corneal ulcers; but its incidence has been increasing in temperate areas compared to previous years [10; 11; 12]. This difference can be explained by several factors such as climate, age, gender and socioeconomic conditions [13].

The mean age in our study was 55.7 years with extremes ranging from 22 to 77 years, which is consistent with Katarzyna's study where the mean age is 51,5 years, and higher than other studies, with 48,9 years in Tunisian study by W.Zbiba [7; 14; 15].

In our study the incidence rate is higher in men than in women, which is consistent with the Tunisian study by W.Zbiba [15]. This male predominance may be due to greater exposure to injuries and accidents in the field than in women.

Keratitis due to filamentous fungi was generally diagnosed in younger patients (mean age 47.7 years) than keratitis due to *Candida sp* (mean age 57.7 years) [7]. This is due to the high proportion of patients with a history of ophthalmologic surgery whose predisposing pathology occurs with age: yeasts exert their pathogenic power in the presence of a local predisposing factor (surgical act, corneal lesion, local corticotherapy) which facilitates their multiplication, the colonization of the lesion and adjacent tissues [16; 17].

The dreaded complication is endophthalmitis, or even perforation. This was the case for two of our patients, three patients in the study of S. Anane [9].

4.2 MYCOLOGICAL DATA

The definite diagnosis of fungal keratitis is based on mycological examination. It consists on deep corneal scraping of the edges and bottom of the ulcer with a Desmare curette, immersed in a few drops of sterile physiological water and rapidly transported to the laboratory. [18] It should be performed before the administration of an antifungal or local anesthetic that will have an inhibiting effect on the growth of fungi culture [9].

In our study, yeasts are the most frequently isolated fungi (85.7%), which is frequently found in studies from temperate countries, such as Danemark, France and United States [8; 18; 19].

In contrast, in tropical countries such as India, China, and Australia, filamentous fungi, especially *Fusarium sp*, represent the principal cause of ocular mycosis [12; 18].

Similarly, Hon Shing Ong, et al (London), Farell et al. (Ireland) and Walther et al. (Germany) indicated that filamentous fungi (*Fusarium sp*) were the main infectious agent of fungal keratitis [12; 20; 21]. In the Polish study. *Fusarium sp*. was often associated with ocular trauma and contact lens wear [7].

Yeasts are found in 71,4% of pathological or previously operated corneas. This is in agreement with the results of Hon Shing et al. in a British population, Nielsen et al. in a Danish population and Farell et al. in an Irish population [12; 19; 20]. Filamentous fungi were found in 62.5% of traumatized corneas [22].

In our study, *Candida albicans* was isolated in one case (7.1%), a lower rate than that found in the Tunisian study by S. Anane (31.6%) and in other studies conducted in temperate countries [9]. *Candida parapsilosis* appeared in a patient after wearing a bandage lens.

Aspergillus is the second most common genus found. It remains the most frequent and virulent fungal agent in all regions of Saudi Arabia, especially *Aspergillus flavus* who had the worst prognosis among cases of keratitis and endophthalmitis [1; 23]. *Aspergillus* can tolerate very hot temperatures; Changing of seasons and sandstorms contribute to the spread of its spores, which explains why *Aspergillus* related cases are more prevalent in spring and summer [1].

V. CONCLUSION

The epidemiologic distribution of fungal keratitis is closely related to geographic conditions. They remain an important cause of visual morbidity, especially in underdeveloped countries. The genera *Candida* and *Aspergillus* were the most frequently isolated pathogens. The value of smears on initial corneal scrapings, good direct examination and culture on appropriate media remains essential for the early diagnosis and proper management of fungal keratitis.

REFERENCES

[1]. Jastaneiah SS, Al-Rajhi AA, Abbott D. Ocular mycosis at a referral center in Saudi Arabia: A 20-year study. Saudi J Ophthalmol. 2011 Jul;25(3):231-8.

[2]. Firacative C. Invasive fungal disease in humans: are we aware of the real impact? Mem Inst Oswaldo Cruz. 2020 Oct 9;115:e200430.

[3]. Mukherjee B, Raichura ND, Alam MS. Fungal infections of the orbit. Indian J Ophthalmol. 2016 May;64(5):337-45.

[4]. Köhler JR, Hube B, Puccia R, Casadevall A, Perfect JR. Fungi that Infect Humans. Microbiol Spectr. 2017 Jun;5(3)

[5]. Bongomin F, Gago S, Oladele RO, Denning DW. Global and Multi-National Prevalence of Fungal Diseases-Estimate Precision. J Fungi (Basel). 2017 Oct 18;3(4):57.

[6]. McCarty TP, Pappas PG. Invasive Candidiasis. Infect Dis Clin North Am. 2016 Mar;30(1):103-24.

[7]. Nowik KE, Wylęgała A, Nowik K, Wylęgała E. A single-centre retrospective observational study of fungal keratitis in Poland with a review of findings in Europe. Ann Agric Environ Med. 2020 Sep 11;27(3):343-347.

[8]. Rondeau N, Bourcier T, Chaumeil C, Borderie V, Touzeau O, Scat Y, et al. Les kératomycoses au centre hospitalier national d'ophtalmologie des quinze-Vingts. JFr Ophtalmol 2002 ; 25 : 890-6.

[9]. Anane S, Ben Ayed N, Malek I, Chebbi A, Lejri S, Bouguila H, et al; Keratomycosis in the area of Tunis: epidemiological data, diagnostic and therapeutic modalities; Ann Biol Clin 2010;68 (4) :441-7.

[10]. Thomas PA, Kaliamurthy J. Mycotic keratitis: epidemiology, diagnosis and management. Clin Microbiol Infect. 2013 Mar;19(3):210-20.

[11]. Tilak R, Singh A, Maurya OP, Chandra A, Tilak V, Gulati AK. Mycotic keratitis in India: a five-year retrospective study. J Infect Dev Ctries. 2010 Mar 29;4(3):171-4.

[12]. Gopinathan U, Sharma S, Garg P, Rao GN. Review of epidemiological features, microbiological diagnosis and treatment outcome of microbial keratitis: experience of over a decade. Indian J Ophthalmol. 2009 Jul-Aug;57(4):273-9.

[13]. Ferrer C, Alió JL. Evaluation of molecular diagnosis in fungal keratitis. Ten years of experience. J Ophthalmic Inflamm Infect. 2011 Feb 23;1(1):15-22.

[14]. Basak SK, Basak S, Mohanta A, Bhowmick A. Epidemiological and microbiological diagnosis of suppurative keratitis in Gangetic West Bengal, eastern India. Indian J Ophthalmol. 2005 Mar;53(1):17-22.
[15]. Zbiba W, Baba A, Bouayed E, Abdessalem N, Daldoul A. A 5-year retrospective review of fungal keratitis in the region of Cap Bon. Journal français d'ophtalmologie .2016;39(10): 843—848.
[16]. Sun RL, Jones DB, Wilhelmus KR. Clinical characteristics and outcome of Candida keratitis. Am J Ophthalmol. 2007 Jun;143(6):1043-1045.
[17]. Chaumeil C, Bourcier T, Rostane H, Goldschmidt P, Nourry H, Dromer F, et al. Diagnostic et traitement des endophtalmies fongiques et des kératomycoses. J Mycol Med 2007;17:89-108.
[18]. Ritterband DC, Seedor JA, Shah MK, Koplin RS, McCormick SA. Fungal keratitis at the new york eye and ear infirmary. Cornea. 2006 Apr;25(3):264-7.
[19]. Nielsen SE, Nielsen E, Julian HO, Lindegaard J, Højgaard K, Ivarsen A, et all. Incidence and clinical characteristics of fungal keratitis in a Danish population from 2000 to 2013. Acta Ophthalmol. 2015 Feb;93(1):54-8.
[20]. Farrell S, McElnea E, Moran S, Knowles S, Murphy CC. Fungal keratitis in the Republic of Ireland. Eye (Lond). 2017 Oct;31(10):1427-1434.
[21]. Walther G, Stasch S, Kaerger K, Hamprecht A, Roth M, Cornely OA, et al. Fusarium Keratitis in Germany. J Clin Microbiol. 2017 Oct;55(10):2983-2995.
[22]. Rautaraya B, Sharma S, Kar S, Das S, Sahu SK. Diagnosis and treatment outcome of mycotic keratitis at a tertiary eye care center in eastern India. BMC Ophthalmol. 2011 Dec 22;11:39.
[23]. Khairallah SH, Byrne KA, Tabbara KF. Fungal keratitis in Saudi Arabia. Doc Ophthalmol. 1992;79(3):269-76.