

# Mycotic Infections in Diabetic Patients in Casablanca

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## Abstract

**Introduction:** The diabetes constitutes the factor risk of mycotic infections. The pathogenic agents depend on the climate, geography and the migration. The objective of this study is to evaluate the prevalence of the mycotic infections within the hospitalized diabetic patients, to describe their localization and identify the responsible germs. **Patients and methods:** It is about a descriptive and retrospective study conducted from November 2015 to March 2016 in endocrinology office at CHU Ibn Roch of Casablanca. It was included all diabetic patients hospitalized with whom mycotic infection has been suspected. **Results:** In total 350 diabetic patients have been hospitalized during the period of research. A mycotic infection has been suspected in 138 patients corresponding to the prevalence of 39.4 percent. The means localizations of mycotic infections were feet (intertrigos: 38.4%), onychomycosis (29%), vulvovaginal (21.7%) and mouth (oral candidiasis: 13.3%). The most frequent pathogenic agents were dermatophytes (*Trichophyton rubrum*: 61%, *Trichophyton mentagrophytes*: 6.3%) and *Candida albicans* (23.1%). The direct test and the culture were negative in 7.3%. **Conclusion:** One-third of the diabetic patients showed a mycotic infection. The feet, constitute the predilection localization of mycotic infections in the diabetic. The dermatophytes and *Candida albicans* constitute the most frequent pathogenic agents found in our study.

## Keywords

Mycotic, Infection, Diabetes, Dermatophytes

## 1. Introduction

The diabetes constitutes a contributing factor to mycotic infections. This is due

to altered powers of phagocytosis and chemotaxis of white blood cells. The infections frequently described are the orodigestive candidiasis, the intertrigos, the onychomycosis, the perleches, the vulvovaginitis, the balanites and the paronychia [1]. Onychomycosis prevalence reaching 26 to 35 percent in the diabetic patients, higher than in non diabetics. An intertrigo is estimated to 32 percent in the diabetic population against 7 percent in non-diabetics [2]. The relative risk of onychomycosis is estimated between 1.5 and 2.8 according to the studies in the diabetics on relation with the general population and the risk of intertrigo at 2.3 [3]. The pathogenic agents depend on the climate, geography and the migration [4]. The objective of this study is to evaluate the prevalence of the mycotic infections within the hospitalized diabetic patients, to describe their localization and identify the responsible germs.

## 2. Patients and Methods

It is about a descriptive and retrospective study conducted from November 2015 to March 2016 in endocrinology office at CHU Ibn Roch of Casablanca.

It was included all diabetic patient hospitalized with whom mycotic infection has been suspected. The samples are taken in parasitology laboratory. The variable studied concerned the clinic signs, their localization, the paraclinics data. The data collection has been done with questionnaire and statistical analysis with software SPSS 20.0

## 3. Results

### Socio-demographic characteristic

In total 350 diabetic patients have been hospitalized during the period of research (6 months). A mycotic infection has been suspected in 138 patients corresponding to the prevalence of 39.4 percent. The average age was  $50 \pm 8$  years and a sex-ratio (H/F) of 0.64. Antecedent of mycotic infection has been found in 50 percent of patients. The mean duration of diabetes was  $13 \pm 5$  years (**Table 1**).

### Clinical aspects

In 138 patients the intertrigos were found in 53 patients (38.4 percent), the onychomycosis in 40 patients (29 percent), an association of intertrigos and onychomycosis in 23 patients (16.6), the oral candidiasis in 17 patients (13.3 percent), the vulvovaginitis in 12 female patients (21.7 percent), the mycosis of large folds (under breast and or inguinal) in 11 patients (7.99 percents), an association of vulvovaginitis and mycosis of the large folds in 10 female patients (7.2 percent), the urinary tract infection in three female patients (2.17 percents), digestive candidiasis revealed in the gastroscopy in two patients (1.4 percents) (**Table 2**).

The mycosis is not linked to the sex as it shows the value of chi carre = 0.2562 ( $p = 0.6128$ ), also the mycotic infection is not associated to a particular type of diabete ( $p = 0.2568$ ).

**Figure 1** shows a macerated intertrigo responsible of an erysipelas and **Figure 2** shows an oral candidiasis.

**Table 1.** Socio-demographic characteristic of diabetics patients suspected with mycotic infection.

	Diabete type 1	Diabete type 2	Total	P value
Total	20	118	138	
Age (years)	28 ± 6	54 ± 9	50 ± 8	
Sex-ratio H/F	11/9	43/75	0.64	0.6128
HbA1c	9.2 ± 1.5%	10.8 ± 2.1%	10.5 ± 2	0.2568
Duration of diabetes (years)	7	14	13 ± 5	
Antecedent of mycotic infection	5	65	50%	

**Table 2.** Localization of mycosis infection.

Localization of mycosis infection	Total	Frequence
Intertrigo	53	38.4%
Onychomycosis	40	29%
Oral candidiasis	17	13.3%
Vulvo-vaginitis	12	21.7%
mycosis of large folds	11	8.7%
urinary tract infection	3	2.17%
digestive candidiasis	2	1.4%
Association Vulvo-vaginitis and mycosis of large folds	10	7.2%
Association Onychomycosis and intertrigo	23	16.6%

**Figure 1.** Intertrigo macerated responsible of an erysipelas.**Figure 2.** Oral candidiasis.

### Paraclinic aspects

They were all in chronic imbalance glycecy with an average hemoglobin gly-cated of  $10.5 \pm 2$  percent.

By the lack of means, it is only in 95 patients that we have been able to realize a mycological test. The *Trichophyton rubrum* was identified in 58 patients (61 percents), the *Trichophyton mentagrophytes* in 6 patients (6.3 percents), the *Candida albicans* in 23 patients (23.1 percents) and the *Candida parapsilosis* in two patients (2.1 percents).

The direct test and the culture were negative in seven patients (7.3 percent). It therefore appears that the confirmation rate is 92.6 percent (**Table 3**).

## 4. Discussion

The mean age of our study population is  $50 \pm 8$  years and this is due to the pre-dominance of the type 2 diabetic patients. This mean age is inferior to what found by El Fékih N and al [5] and Gupta A.K *et al.* [3] which were respectively  $55 \pm 8$  years and  $56.1 \pm 7$  years.

J. Fergermann and al have estimated at least the third of diabetic patients who would present an onychomycosis which corroborate our results in which 29% of the patients show an onychomycosis [4].

In our study the mycosis is not linked to the sex whereas Eckhard M and al have found that foot mycosis infections are more frequent in males [6].

The mycotic infection is not associated to a particular diabete in our research.

The mean duration of diabetes was  $13 \pm 5$  years in our research which is similar to  $15.3 \pm 1.2$  years found by Gupta A.K and al [3].

The most frequent localizations of mycosis are the inter toe space and the nail which correspond with the results of El Fékih and al [5]. The intertrigo constitutes the veritable gaterway for the bacterial infections potentially serious such as the erysipelas, the cellulitis and the fasciitis.

Our research reveals the rate of suspicions of mycosis infection at 39.4percent, inferior to the rates of 46 percent and 53.7 percent found respectively by Gupta and al and El Fékih and al.

**Table 3.** Results of mycological test.

	Total	T rubrun	T mentagrophytes	C albicans	C parasilosis	Sterile
Intertrigo	39	34	3	-	-	2
Onychomycosis	27	24	1		1	1
Oral candidiasis	12			9	1	2
Vulvovaginitis	7			6		1
Mycosis of large folds	5		2	2		1
Urinary tract infection	3			3		
Digestive candidiasis	2			2		
<b>TOTAL</b>		<b>58 (61%)</b>	<b>6 (6.3%)</b>	<b>22 (23.1%)</b>	<b>2 (2.1%)</b>	<b>7 (7.3%)</b>

Abbreviation: T = trichophyton C = candida.

The rates of confirmation of mycotic infections in our study are 92.6 percent (88/95) comparable to that of El Fékih and al who have confirmed the mycotic infection in 81 patients over the 86 patients suspected of mycotic infection. Our rate is superior to that of Gupta A. K and al who have confirmed the mycotic infection in 144 patients over 253 patients suspected.

In our research the dermatophytes are the pathogenic agents most frequent in mycotic infection of feet. This is similar to results of a lot of authors [7] [8]. The *Trichophyton rubrum* is the most frequent dermatophyte [6] [9] [10].

*Candida albicans* appears to be more common in the mucosa in our study, which is comparable to the results of Jhugroo C *et al.*, who found that mycotic infections in the mouth of the diabetic were due mainly to *Candida albicans* [11].

The glycemic imbalance noticed in our patients could explain itself by the fact they have been hospitalized in the framework of glycemic imbalance or of a diabete decompensation. This glycemic imbalance is seen in most study [5] [11].

## 5. Conclusion

One third of the diabetic patients showed a mycotic infection. All the diabetics' patients presenting a mycotic infection were in chronic glycemic imbalance. The feet constitute the predilection localization of mycotic infections in the diabetic. The dermatophytes constitute the most frequent pathogenic agents found.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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