Candida Species Carriage in Diabetic Patients in Misrata, Libya

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Abstract

Background: There is a paucity of studies describing the prevalence and antimicrobial profiles of *Candida* in Libya. Limited treatment choices in the antifungal armamentarium in public healthcare settings in Africa require a study of the prevalence and susceptibility of *Candida* species in Libya, where antifungals are not routinely prescribed in public healthcare settings.

Methods: In this study, 170 diabetes mellitus type 2 (T2DM) patients were examined for *Candida* carriage in the oral mucosa, using differential Fluka and Oxoid chromogenic media and API 32 ID C biochemical testing. Fluconazole susceptibility was investigated by disk diffusion on YNBG agar. Isolates were graded as susceptible, intermediate or resistant according to their inhibition zone measurements and microcolony scores.

Results: Thirteen species were identified from 182 isolates with a frequency of 68 *C. albicans*, 42 *C. dubliniensis*, 26 *C. humicola*, 20 *C. glabrata* , 5 isolates of each *C. krusei*, *C. tropicalis* and *C. kefyr*, 4 *C. sake*, 2 *C. parapsilopsis*, 2 *C. magnoliae* and 1 isolate each of *C. guilliermondii*, *C. globosa* and *C. membranifaciens*. Although largely susceptible to fluconazole, *C. albicans*, *C. dubliniensis*, *C. humicola* and *C. sake* demonstrated an emerging resistance with intermediate to total resistance observed in all the other species except for *C. magnolia* and *C. globosa* which were both susceptible to fluconazole.

Conclusion: Early recognition and treatment of rare or resistant *Candida* species which may be contributing to patient morbidity and mortality in Libya is imperative.

Introduction

Type 2 diabetes mellitus (T2DM), a metabolic disease that is primarily characterized by abnormal regulation of metabolism, afflicts over 190 million people worldwide [1,2].

T2DM patients are more vulnerable to fungal infection, particularly *Candida* infections of the oral cavity [3-5] due to the increased salivary glucose [6] and the heightened availability of *Candida* receptors in these subjects [7].

It has been established that most diabetic patients show at least one lesion or abnormality in the oral mucosa, such as angular cheilitis, fissured tongue, xerostomia and erythematous candidiasis [8].

Aim of study

The aim of this study was to explore the prevalence, species distribution and antifungal sensitivity profile among oral cavity isolates of *Candida* spp. from T2DM Libyan patients.

Material and methods

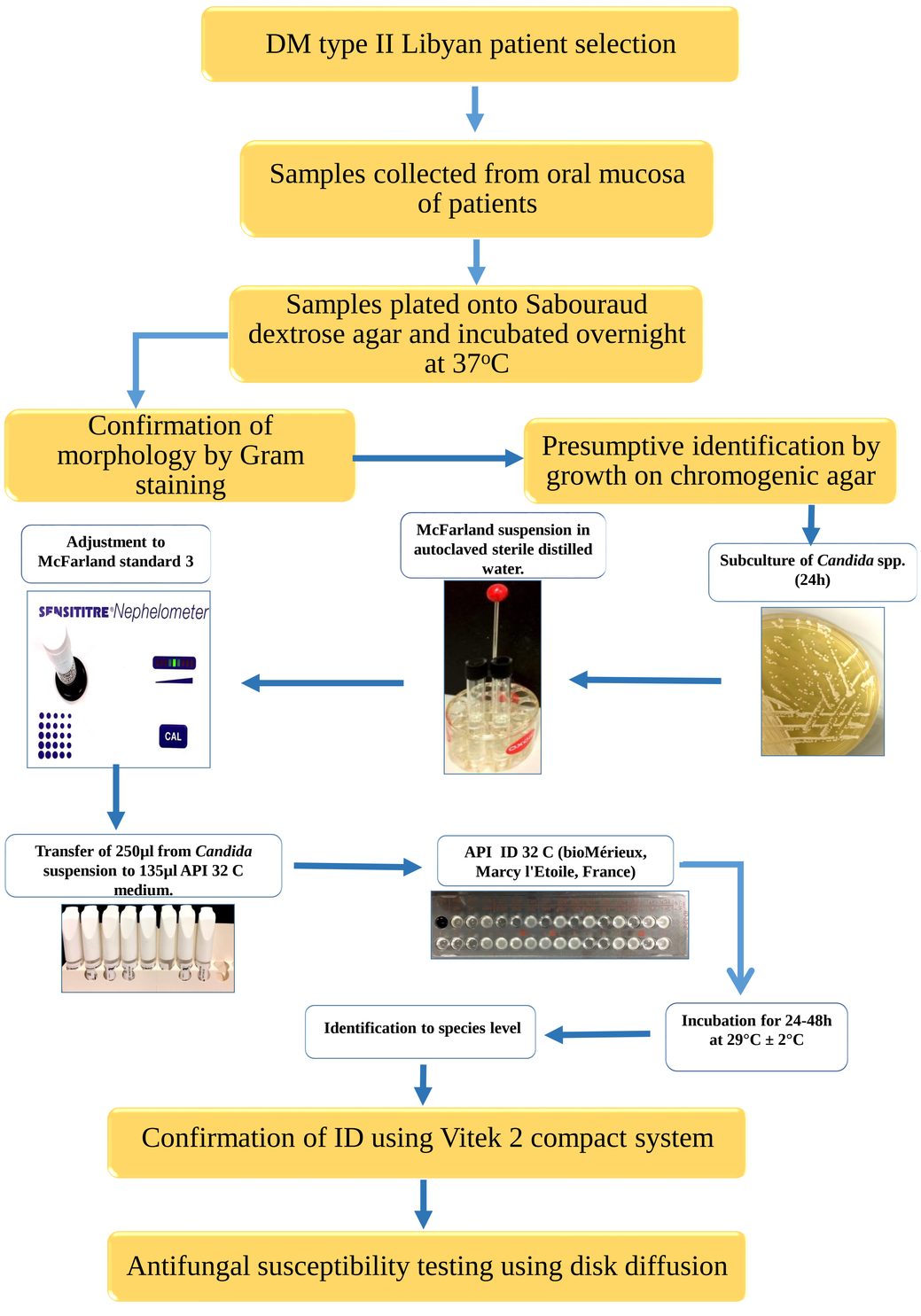

Figure 1: Sample collection, characterization and AST steps used in this study

Results

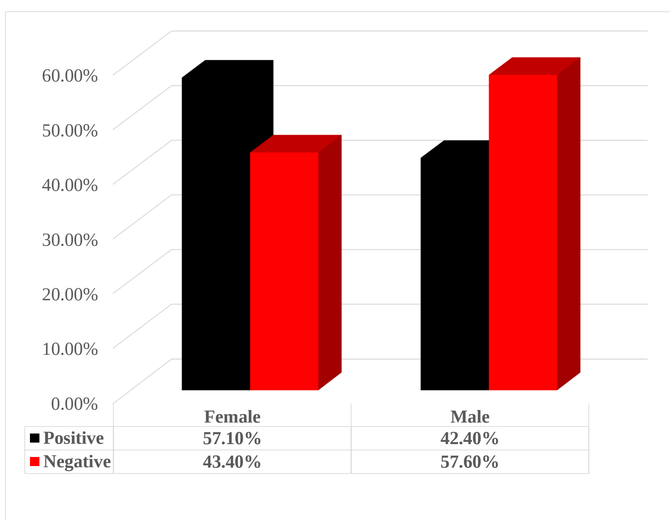

Figure 2: *Candida* carriage according to gender in the oral mucosa of T2DM Libyan patients

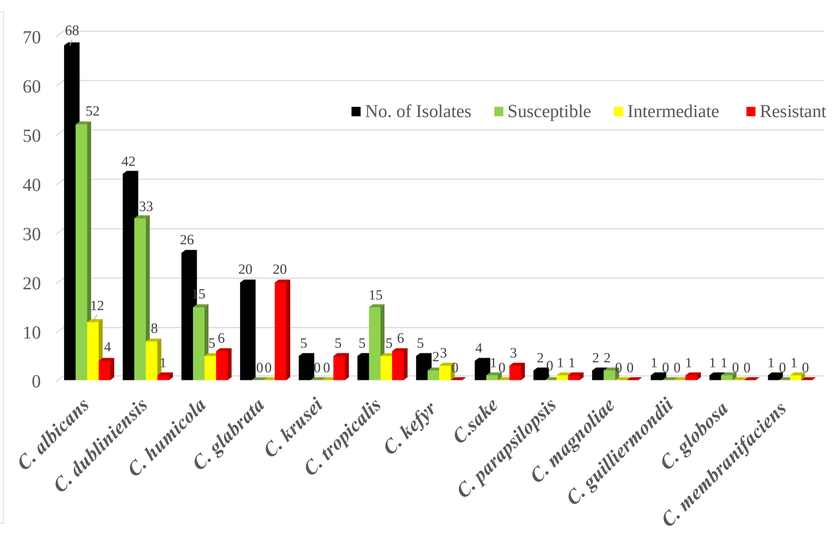

Figure 3: Distribution of *Candida* species Isolated from Libyan T2DM patients and results of disk diffusion assays with fluconazole

The findings of this study constitute the first report on the prevalence of *Candida* species epidemiology in Misrata, Libya. As in other regions, *C. albicans* is the most prevalent among all *Candida* spp. as the cause of oral candidiasis in Libya. Non-*albicans* *Candida* spp., including fluconazole-resistant *C. krusei*, *C. humicola*, *C. sake*, *C. tropicalis* and *C. glabrata* were also commonly isolated.

Conclusions

- ✓ Further attention should be given to fungal infections, by addressing the need to better understand the etiological reasons for the emergence of rarer species, heightened awareness among medical and public health professionals about these infections and attention to methods that can be used to prevent and control them.
- ✓ Further investigations using molecular microbiology techniques are currently underway in our laboratories to better understand the mechanisms of drug resistance of these organisms.

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