

The Incidence of Different *Candida Albicans* Infections in Durres Area

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Abstract

Candida albicans is an opportunistic fungal pathogen that is responsible for candidiasis in human hosts. *C. albicans* grow in several different morphological forms, ranging from unicellular budding yeast to true hyphae with parallel-side wall. Its ability to transform from yeast to hyphae is considered as a virulence factor. The vast majority of *Candida* infections are mucosal, but in severe cases, the fungus can penetrate through epithelial layers into deeper tissues, reach the blood stream and, from there, may cause life-threatening systemic infections. Our study was carried out between July 2013 and June 2014. This study is part of a 3-year study related with *C. albicans* infections in Durres area. In previous studies we have found the relation of these infections by gender, age groups, seasons. In this study we wanted to show which of these *C. albicans* infections was the most prevalent for this period of time in Durres area. A number of 2641 persons suspected for *C. albicans* intestinal, cutaneous, throat or genital infections, came in the Laboratory of Microbiology, DRSH, Durres, Albania, from July 2013 till June 2014. 655 persons out of 2641 were suspected for *C. albicans* fecal infections, 97 persons out of 2641 were suspected for *C. albicans* cutaneous infections, 764 out of 2641 persons were suspected for *C. albicans* throat infections, 1125 out of 2641 persons were suspected for *C. albicans* genital infections. It has resulted that the most prevalent *C. albicans* infections in Durres area, for the period of time July 2013 - June 2014 were the cutaneous infections.

Keywords: *Candida albicans*, candidiasis, hyphae, mucosal infections, systemic infections

1. Introduction

Candida albicans taxonomy: Domain - Eukaryota, Phylum - Ascomycota, Class - Saccharomycetes, Order - Saccharomycetales, Family - Saccharomycetaceae, Genus - *Candida*, species= *albicans* (MicrobeWiki, 2014).

While almost all of us possess *Candida albicans* in our oral cavity, gastrointestinal tracts, genitourinary tracts, and on skin as a relatively harmless commensal organism, *C. albicans* is a major systemic fungal pathogen in humans (Gow N et. al., 2011). *C. albicans* is an opportunistic fungal pathogen that is responsible for candidiasis in human hosts. *C. albicans* grow in several different morphological forms, ranging from unicellular budding yeast to true hyphae with parallel-side wall (Sudbery P. et. al., 2004). Its ability to transform from yeast to hyphae is considered as a virulence factor. Hyphae formation from yeast cells is a virulence trait that enables the human opportunistic pathogen *C. albicans* to invade host tissues (Farahnaz Bineshian et. al., 2015). Hyphal differentiation in *C. albicans* results from an integration of signaling events from environmental cues that can act either alone or in combination. These include elevated temperature, pH or CO₂, limiting O₂, nitrogen or carbon, and exposure to serum, GlcNAc and other less well defined inducers. Signaling to Ras1, adenylate cyclase (Cdc35/Cyr1) and the APSES transcription factor Efg1 provides a link that integrates many of these disparate environmental signals (Michael L. Pendra et. al., 2015).

The vast majority of *Candida* infections are mucosal, manifesting as vaginal or oral candidiasis, which together account for an estimated 40 million infections per year (Julian R. Naglik et. al., 2014). In severe cases, the fungus can penetrate through epithelial layers into deeper tissues, reach the blood stream and, from there, may cause life-threatening systemic infections (Betty Wächler et. al., 2011).

The interaction between *C. albicans* and the host during infection is a complex and dynamic process. *C. albicans* utilizes different strategies to cope with the host's environmental cues for morphological change, proliferation, and escape from the host's immune defenses (Yan Yu Chen et. al., 2013). An important attribute of microbial adhesive proteins is the

presence of determinants that confer targeting to the yeast or hyphal cell surface. Als1p and Ala1p, encoded by members of the large ALS gene family were reported to adhere to endothelial and epithelial cells, and extracellular matrix proteins (Paula Sundstrom 2002).

In the routine diagnostic microbiology laboratory, *C. albicans* can be identified presumptively with simple, rapid, and inexpensive methods such as germ tube or colorimetric tests, as well as the use of selective chromogenic agar media (Jan Trnovsky et. al., 2008).

2. Materials and Methods

This study was carried out between July 2013 and June 2014. A collection of 2641 yeast strains was obtained by routine isolation from fecal, cutaneous, oral, spermatic and vaginal swabs in the Laboratory of Microbiology, DRSB, Durres, Albania.

All specimens have had a label completely filled with the patient's name, age, sex and specimen source. Swabs were immediately transferred to Sabouraud's Dextrose Agar (SDA). Then culture tubes were incubated at 30°C for 24-48 hours.

For *C. albicans* identification we used Microscopy Identification. The microscope is the best tool for a microbiologist. Distinct features of yeasts can be identified by observing their morphology. Microscopes can be used for fast identification and detection of possible yeasts in a clinical sample. When *C. albicans* was present, short, slender, tubelike structures (germ tube) were observed under the microscope.

3. Results and Discussions

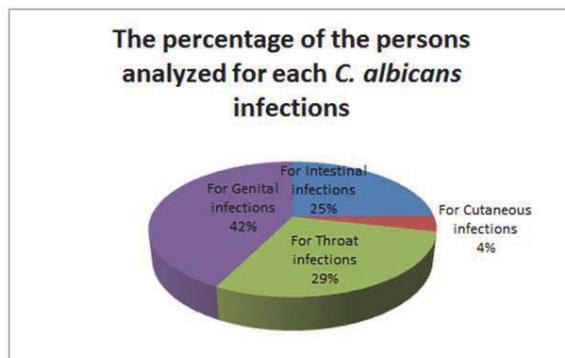
This study is part of a 3 -year study related with *C. albicans* infections in Durres area. In previous studies we have found the relation of these infections by gender, age groups, seasons. In this study we wanted to show which of these *C. albicans* infections was the most prevalent for this period of time in Durres area.

In this study we have analysed 2641 individuals suspected for some different *C. albicans* infections. The samples taken from these persons were obtained by routine isolation from fecal, cutaneous, oral, spermatic and vaginal swabs in the Laboratory of Microbiology, DRSB, Durres, Albania. The samples were taken from July 2013 till June 2014.

655 persons out of 2641 were suspected for *C. albicans* feceal infections, 97 persons out of 2641 were suspected for *C. albicans* cutaneous infections, 764 out of 2641 persons were suspected for *C. albicans* throat infections, 1125 out of 2641 persons were suspected for *C. albicans* genital infections.

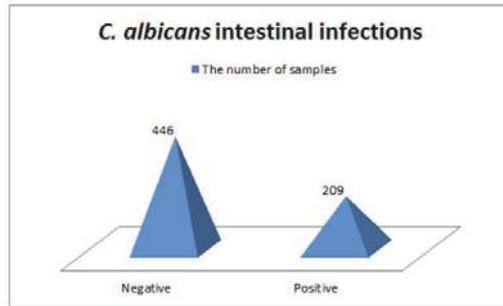
The chart below shows the percentage of the persons analyzed for each *C. albicans* infections.

Chart 1. The percentage of the persons analyzed for each *C. albicans* infections



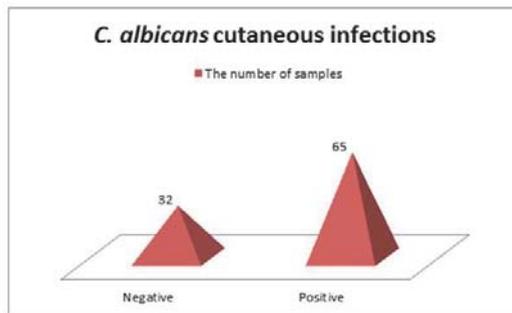
To analyze *C. albicans* intestinal infections, we have collected 655 samples from persons suspected, 446 of which resulted negative and 209 resulted positive. The number of positive and negative *C. albicans* intestinal infections is shown in the chart below.

Chart 2. The number of negative and positive *C. albicans* intestinal infections



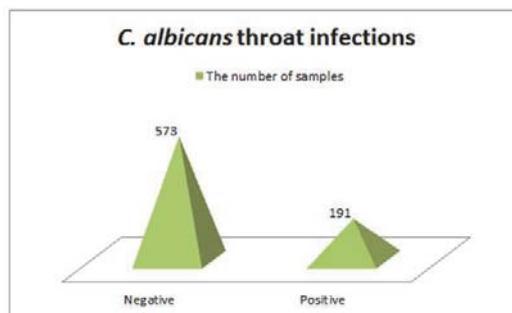
A collection of 97 cutaneous swabs from persons suspected for *C. albicans* cutaneous infections, was obtained to analyze the incidence of these infections. 32 out of 97 samples resulted negative, 65 out of 97 samples resulted positive. The number of positive and negative *C. albicans* cutaneous infections is shown in the chart below.

Chart 3. The number of negative and positive *C. albicans* cutaneous infections



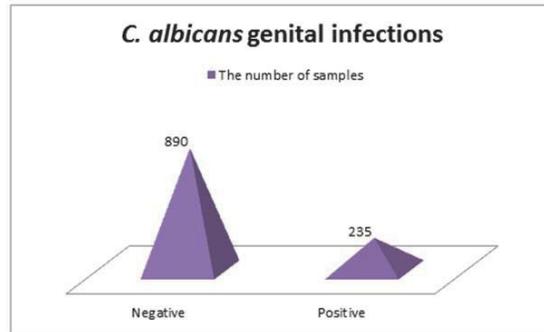
According to *C. albicans* throat infections, we have collected a total number of 764 samples. The analyzes showed that 573 out of 764 samples resulted negative and 191 out of 764 samples resulted positive. This incidence of *C. albicans* throat infections is shown in the chart below.

Chart 4. The incidence of of *C. albicans* throat infections



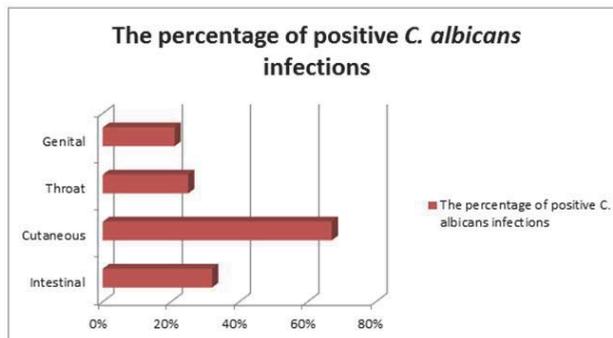
To analyze *C. albicans* genital infections, we have collected 1125 samples, 890 of which resulted negative and 235 resulted positive. The number of positive and negative *C. albicans* genital infections is shown in the chart below.

Chart 5. The number of negative and positive *C. albicans* genital infections



In this study we wanted to analyze the incidence of *C. albicans* infections, which of them are more prevalent in Durres area for this period of time. The processing of the data showed that only 32% of persons suspected for *C. albicans* intestinal infections resulted positive; 67% of persons suspected for *C. albicans* cutaneous infections resulted positive; only 25 % of persons suspected for *C. albicans* throat infections resulted positive; only 21% of persons suspected for *C. albicans* genital infections resulted positive. The chart below shows the incidence of *C. albicans* infections for the period of time July 2013 - June 2014, in Durres area.

Chart 6. The incidence *C. albicans* infections



As shown in the chart above, the most prevalent *C. albicans* infections in Durres area, for the period of time July 2013 - June 2014 are the cutaneous infections. Which are followed by intestinal infections and throat infections. The lowest number of *C. albicans* infections is occupied by *C. albicans* genital infections. The number of persons analyzed for *C. albicans* cutaneous infections is smaller than the others, but the percentage of positive cases resulted much higher. So we can say that may be clinical signs appeared in skin during *C. albicans* cutaneous infections are more specific, compared with *C. albicans* intestinal, throat and genital infections, whose symptoms can be confused with other microorganism infections.

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