

The Behavior of *Candida spp.* Strains Isolated from Different Animal Species to Antifungal Drugs

Flore CHIRILĂ, Nicodim FIȚ, Sorin RĂPUNTEAN, George NADĂȘ,
Octavian NEGREA

University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Faculty of
Veterinary Medicine, 3-5 Mănăștur Street, 400372, Romania,
e-mail: nfit@usamvcluj.ro

Abstract. A total number of 28 *Candida spp.* strains isolated from: cow, man, dog and pigeon from a total of 29 samples processed during the years 2008-2011 in the Microbiology Laboratory of the FVM Cluj-Napoca were examined. *Candida spp.* strains isolated from dogs suffering from chronic otitis and pharyngeal exudates were sensitive to Ketoconazole, Miconazole and Nystatin. The dog with diffuse alopecia was observed resistance to miconazole. In humans, strains isolated from pharyngeal exudate were sensitive to Nystatin and Miconazole but resistant to Ketoconazole and Fluorocytosine, while in case of the strains isolated from cases of urinary infections antifungal sensitivity varied from case to case (case 1: Miconazole, Nystatin, Ketoconazole, Itraconazole = sensitive, Cotrimoxazole = resistant; case 2: Nystatin = sensitive, ketoconazole, Miconazole, Itraconazole and Cotrimoxazole = resistant. In case of *Candida spp.* chronic mastitis, sensitivity of the strains was variable from an outbreak of disease to another, in some outbreaks isolates were only sensitive to Nystatin but resistant to Miconazole, Cotrimoxazole, Fluorocytosine, Ketoconazole and Itraconazole, while the others were only sensitive to Miconazole and in others to both. In all cases studied the resistance to Cotrimoxazole, Fluorocytosine, Ketoconazole and Itraconazole was maintained.

Key words: *Candida spp.*, sensitivity, antimycotics.

INTRODUCTION

Candida albicans is an opportunistic pathogen yeast belonging to the phylogenetic class of hemiascomycets with about 200 other species of the genus *Candida*. Only a few of them are considered as pathogenic, and in addition only a small number is frequently diagnosed in clinical isolates (*C. dubliniensis*, *C. parapsilosis*, *C. krusei*, *C. glabrata*) (1; 4).

In humans, this yeast is a normal part of the commensal microbial flora of different areas of the body such as skin, mouth, vagina and gastrointestinal tract. It is on the other hand, the most important fungal pathogen and can cause various diseases in some cases divided into two main groups: superficial infections and systemic infections. Superficial infections involves skin lesions or oral or vaginal mucous membranes, being very common and relatively easy to diagnose without endangering the patient's life. In contrast, systemic infections are usually rare, but more dangerous, being responsible for a mortality amounting to about 30% in infected patients.

In the case of otitis in dogs, most commonly isolated yeast is *Malassezia pachydermatis* (from healthy or inflamed ear wax) and *Candida albicans*. In cattle, the strains

of yeasts belonging to genus *Candida* causes clinical mastitis of medium severity, which usually persists and worsens after treatment with antibiotics, being able to develop into chronic stages (2; 3).

MATERIALS AND METHODS

Sampling was performed using disposable cotton swabs, simple or containing transport medium and in the case of milk samples from cows with mastitis in sterile plastic containers of 20-50 ml.

In the laboratory, samples were sowed by wiping the swab on the surface of Petri dish with 2 % glucose agar followed by dispersion using a microbiological loop. From each milk sample were collected with a semi-automatic sterile pipette tip fitted 20-50 µl and deposited in a Petri dish with medium mentioned above, followed by dispersion. Incubation was done in thermostat at 37°C, examining the plates daily for 3 days.

Candida spp. strains were identified based on their morphological characters in smears stained by Gram method (round or oval shaped cells, the presence blastospores and pseudohyphae) and cultural characteristics on solid media.

In vitro antifungal drug sensitivity was established by diffusimetric technique, using the following antimycotics: Miconazole, Nystatin, Fluorocytosine, Ketokonazol, Cotrimoxazole and Itraconazole.

RESULTS AND DISCUSSIONS

Caracterele morfologice ale tulpinilor de *Candida* spp., în frotiurile colorate prin metoda Gram sunt prezentate în **fig.1**, în care se poate observa forma ovală a celulelor aşezarea sub formă de grămezi şi prezenţa blastosporilor.

Morphological characters of *Candida* spp. strains in smears stained by Gram method are shown in Figure 1, observing the oval shape of the cells grouped in piles and the presence of the blastospores.

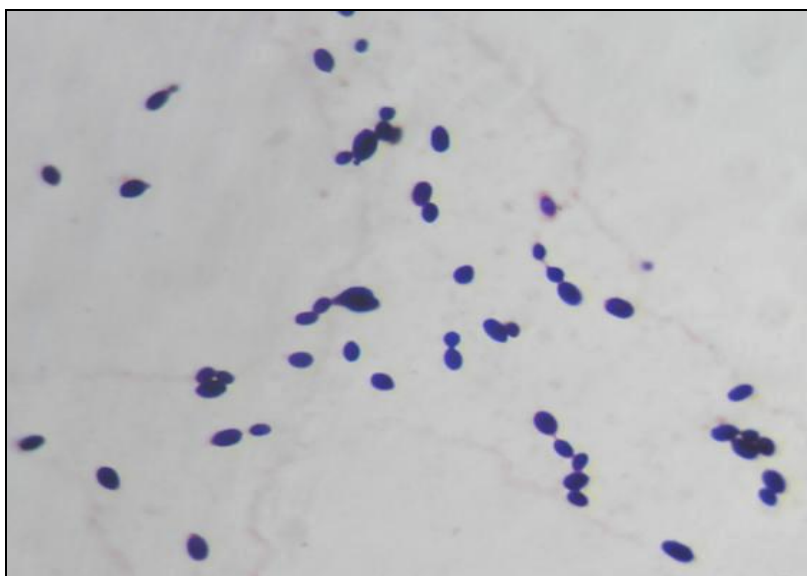


Fig. 1. Morphological characters for *Candida* spp., in a Gram stained smear

Species and diseases from which the strains were isolated in pure culture or in association with other organisms are presented in Table 1.

Table 1.

Yeast species isolated from samples

Nr.	Specie	Affection	<i>Candida spp.</i>	Samples number	Candida associated with other microorganisms	Sample s number	Total samples
1	Dog	Otitis	Pure culture	2	Malassezia + Staph. Staph. Micrococ + Gram -	1 1 2	6
		Pharyngeal exudate	Pure culture	1	Str. + E. coli	1	2
		Diffuse alopecia	-	-	Staph.	1	1
2	Human	Mouth candidosis	Pure culture	4	Str. β -hem.	1	5
		Mycotic vaginitis	Pure culture	1	Lactobacillus	1	2
		Postoperative fistula	-	-	Staph.	1	1
3	Bovine	Chronic mastitis	Pure culture	9	E. coli	1	10
4	Pigeon	Enteritis	-	-	Enterococcus	1	1

The strains of *Candida spp.* isolated from dogs suffering from chronic otitis and pharyngeal exudates were sensitive to ketoconazole, miconazole and Nystatin. For the dog with diffuse alopecia was observed that the strain of *Candida spp.* was resistant to miconazole.

In humans, strains isolated from pharyngeal exudate were sensitive to Nystatin and Miconazole but resistant to Ketoconazole and Fluorocytosine, while in case of the strains isolated from cases of urinary infections antifungal sensitivity varied from case to case (case 1: Miconazole, Nystatin, Ketoconazole, Itraconazole = sensitive, Cotrimoxazole = resistant; case 2: Nystatin = sensitive, ketoconazole, Miconazole, Itraconazole and Cotrimoxazole = resistant).

In case of *Candida spp.* chronic mastitis, sensitivity of the strains was variable from an outbreak of disease to another, in some outbreaks isolates were only sensitive to Nystatin but resistant to Miconazole, Cotrimoxazole, Fluorocytosine, Ketoconazole and Itraconazole, while the others were only sensitive to Miconazole and in others to both. In all cases studied the resistance to Cotrimoxazole, Fluorocytosine, Ketoconazole and Itraconazole was maintained.

CONCLUSIONS

- Strains of *Candida spp.* isolated from cases of disease in dogs were sensitive to Ketoconazole, Miconazole and Nystatin.
- In cases of oral candidiasis in human, isolates were sensitive to Miconazole and Nystatin but resistant to Fluorocytosine and Ketoconazole, while the sensitivity of isolates from urinary infections varied from case to case.
- In cattle with chronic mastitis with *Candida spp.*, isolates were sensitive in some outbreaks only to Miconazole, in others only to Nystatin and in others to both.

BIBLIOGRAPHY:

1. Dujon B. (2006) „Yeasts illustrate the molecular mechanisms of eukaryotic genome evolution”. *Trends Genet* 22(7):375-387.
2. Guerin P. et Véronique Guerin-Fauble: Les mammites de la vache laitière
www3.vet-lyon.fr/ens/path-mam/Mammmites-vache-laitiere-15-10-07.pdf
3. Hanzen Ch. (2009-2010) La pathologie infectieuse de la glande mammaire, Etiopathogénie et traitements, Approche individuelle et de troupeau
www.therioruminant.ulg.ac.be/notes/200910/R22
4. Odds, F.C., A.J. Brown și col. (2006). „Toward a molecular understanding of *Candida albicans* virulence” Chapter 22 in „Molecular Principles of Fungal Pathogenesis” (Eds. Heintman, J., Filler, S., Mitchell, A.) ASM Press.