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Candida species in the lower respiratory tract of healthy individuals

H.J. Salzer[1,*], R.B. Raggam[2], I. Zollner-Schwetz[1], M. Hoenigl[1], T. Valentin[1], R. Krause[1]

[1] *Medical University of Graz, Graz, Austria*
[2] *University Hospital Graz, Graz, Austria*

Background: *Candida* species (spp.) are frequently isolated from respiratory tract secretions such as endotracheal aspirates (EA) in patients with pulmonary infiltrates. Since the prevalence of *Candida* spp. in the lower respiratory tract is unknown in healthy individuals the pathogenetic relevance of *Candida* spp. in the lower respiratory tract is difficult to assess.

Methods: A total of 71 healthy individuals without clinical, laboratory or radiological evidence of respiratory tract infections (temperature >38 °C, elevated CRP >8 mg/dl, leukocytosis >11400, elevated neutrophiles) or any other lung diseases (e.g. COPD, asthma bronchiale, sarcoidosis, interstitial lung disease, malignant diseases of the lung) undergoing general anaesthesia due to elective surgery were enrolled. Exclusion criteria included antifungal therapy within 8 weeks and antimicrobial therapy within 4 weeks prior to study inclusion (with the exception of antimicrobial surgical prophylaxis), immunosuppressive therapy, active haematooncological diseases and HIV positivity. The presence of *Candida* spp. in the lower respiratory tract was investigated in EA samples cultivated on *Candida* CHROMagar. The *Candida* colonies were differentiated as *C. albicans*, *C. glabrata*, *C. krusei*, *C. tropicalis* or others according to the color of colonies and by API Aux test. For bacterial growth EA samples were further cultivated on selective agars. Bacterial cultures are counted and identified by routine microbiological procedures. In addition, oral swabs were obtained and cultured on *Candida* CHROMagar.

Results: A total of 88 microorganisms were isolated from 41 of the 71 EA samples containing 1 yeast (*C. krusei)*, 62 gram-positive and 25 gram-negative bacterial species including the indigenous oral flora. In 30 EA samples neither bacteria nor fungi were cultured. A total of 24 *Candida* spp. were isolated from 21 of the 71 oral swabs containing 18 *C. albicans,* 2 *C. glabrata* and 1 *C. krusei* isolates. In addition, *C. krusei* isolated from both EA sample and oral cavity was originated within the same patient.

Conclusion: The colonization of the lower respiratory tract with *Candida* spp. in healthy individuals seems to be uncommon, despite a relative frequent *Candida* spp. colonization of the oral cavity.

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influence of gender, age, previous hospitalization and hospital stay on *Candida*-colonization of patients in a non-surgical ICU

A. Gloeckner[1,*], P. Abel[2]

[1] *BDH-Klinik Greifswald, Greifswald, Germany*
[2] *University of Greifswald, Greifswald, Germany*

Background: The incidence of systemic fungal infections is increasing and their mortality remains high despite all advances in therapy. Accurate diagnostic measures are still difficult to obtain and evaluate in order to determine the need for antifungal treatment. Moreover, *Candida* species differ substantially in their antimycotic susceptibility. Thus knowledge of species to be expected is crucial for not missing the diagnosis and making the right decision how to treat.

Methods: In a prospective study over 30 month we analysed samples from 411 patients (160 women and 251 men, mean age 63.6 years, mean APACHE-II-Score 20.8) admitted to our ICU. Swabs from nostril, throat and anus and specimens of tracheal secretions and urine were taken and cultured on CHROM- or CandID- Agar at 36 °C. The hospitalization history of the patients was investigated.

Results: Positive results were found in 43% of all 1868 investigated samples. Concerning the distribution of species, we found *Candida albicans* in 69%, *Candida glabrata* in 35% and *Candida tropicalis* in 8% of all positive specimens. The colonization index was higher in women than in men (mean 0.47 vs. 0.39, $p < 0.01$) with no significant influence of age. This difference was due to a higher rate of colonization of anus and urine in women (both $p < 0.001$). The species distribution showed no difference between sexes, but the rate of nonalbicans species rises significantly with age (in females $p < 0.05$, in males $p < 0.01$). A hospital stay longer than 7 days before admission to the ICU was linked with a higher rate of colonization (52% vs. 38%) but not with a significant change in species distribution. Patients who had been hospitalized within two years before the current hospital admission, showed a higher rate of colonization (42% vs. 36%) and a higher proportion of non-albicans species (48% vs. 34%).

Conclusion: 1. Women are more frequently colonized with yeasts than men, particularly in urine and anal swabs. 2. With advancing age, the proportion of non-albicans species detected is increasing. 3. A longer duration of hospital stay is associated with a higher colonization rate. 4. Repeated hospitalizations are linked with a higher rate of non-albicans species.

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Mixed fungal colonization in non-surgical intensive care patients

A. Gloeckner[1,*], P. Abel[2], K. Zimmermann[2]

[1] *BDH-Klinik Greifswald, Greifswald, Germany*
[2] *University of Greifswald, Greifswald, Germany*

Background: Knowledge of risk factors is important for properly applying and evaluating diagnostic tests to derive