

Mixed species biofilms of *Candida albicans* isolated from vascular catheters at the university hospital center of Tlemcen-Algeria



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Keywords: mixed biofilms; *Candida* sp.; bacteria; venous catheters

a. Background and Purpose: *Candida albicans*, remains a pathogen commonly found in catheter-associated infections. This yeast provide adhesion sites for other species such bacteria and yeast resulting mixed biofilm formation. These structures represent a major threat to public health. it can ultimately influence disease severity by promoting intensified pathogenic phenotypes, including increased resistance to both host defenses and antimicrobial therapies

Based on these data, we conducted this study at Tlemcen hospital, which focused on the isolation of *Candida* yeasts cohabiting with bacteria and yeast on the same intravascular catheter removed from patients.

b. Methodology: Isolates were screened for their ability to form biofilms; both monospecies and multispecies combinations were tested. Biofilms, formed by co-isolates species were developed from standardized suspensions on 96-plates.

The metabolic activity were determined by XTT reduction assay. The structure of biofilms was evaluated by scanning electron microscopy.

c. Results and Discussions: This study revealed that *Candida albicans* co-exist with bacteria such *Bordetella* sp., *Enterobacter cloacae* and yeast of *Candida glabrata* on different catheters surfaces. The metabolic activity of mixed species biofilms increase whatever the proportion of the mixture from that found for single ones.

In mixed biofilms, both bacteria showed extensive interactions with *C. albicans*. *Candida albicans*/*Enterobacter cloacae* biofilms showed that the hyphae are fully covered by bacteria. In contrast, microphotographs of *Candida albicans*/*Bordetella* sp. showed bacteria are massively attached to yeasts.

Microphotographs obtained of peripheral venous catheter of *Candida albicans*/*Candida glabrata* reveals that the *Candida glabrata* cells are monomorphic, easily observable whereas those of *Candida albicans* occur in different morphological forms.

d. Conclusions: *C. albicans* is able to co-exist with bacteria and yeast on the same medical device and it is clear that the multi-species biofilms can cause serious health problems.

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Mycobacterial contamination of heater cooler units used in ECMO is not aerosolised into the environment: a single center experience



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Keywords: *Mycobacterium chimaera*; heater cooler units

Background: Heater-cooler units (HCUs) used in cardiopulmonary bypass and Extracorporeal Membrane Oxygenation (ECMO) can generate infectious aerosols containing *Mycobacterium chimaera*, a slow growing atypical mycobacterium associated with disseminated infection including endocarditis and vertebral osteomyelitis. Since the identification of *M. chimaera* infective endocarditis in 2013 in two cardiac surgical patients in Switzerland, many more cases of deep-seated infections with *M. chimaera* have been identified in patients across Europe and North America. The use of contaminated Stöckert 3T LivaNova (London, United Kingdom) HCUs has been implicated in these outbreaks of *M. chimaera* infections.

Aim: The aim of this study was to ascertain if HICO-Variotherm units (Chalice) used in ECMO were colonised with mycobacteria species and to assess the associated risk of aerosolisation into the critical care environment.

Methods: Water was sampled for routine microbiological culture from three ECMO HCUs in the Cardiothoracic Critical Care Unit of the Manchester University Foundation Trust (Wythenshawe Hospital). Air samples were obtained and aerobiological studies were performed. The presence of mycobacteria was detected via real-time qPCR.

Results: *Mycobacterium* spp were detected in water taken from two of the three ECMO units. All three ECMO units were colonised with *Ralstonia* spp, however aerosolisation from the machines into the environment was not demonstrated.

Conclusions: Aerosolization of infectious particles from the HICO-Variotherm HCU was not demonstrated. However, as an aerosolisation risk remains when ECMO machines are decontaminated, emptied or the circuits broken during use, ongoing microbiological surveillance is vital.

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Management of Resistant Gram-negative Infections; experience with the new agents from a tertiary referral center in the UK



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Background: Antibiotics are the only class of drug where inappropriate use in one patient may change the efficacy in another. Spread of antibiotic resistance is having devastating consequences globally, including increasing morbidity, increasing severity of illness and higher cost burdens. Treatment options are increasingly limited. New agents are being developed, however real life insitu clinical data is lacking.

Purpose: To share experience of the use of some of the new agents, targeted against resistant Gram negative infections, in the clinical setting.

Methodology: Using clinical case illustrations from a tertiary referral hospital in Manchester, UK, we aim to share our

clinical experience of use of two of the newer agents targeted against Gram negative bacteria, Ceftazidime-avibactam and Ceftolozane-tazobactam. These agents were used for the treatment of Carbapenemase Producing Enterobacteriaceae (CPE), in a post-op cardiothoracic patient with severe hospital acquired pneumonia and Multi Drug Resistant (MDR) *Pseudomonas* in a patient with severe burns airlifted to our specialist burns unit from a hospital in Pakistan.

Conclusions: Antibiotic resistance is a global problem. Resistance mechanisms are becoming increasingly complex to understand and detect, and are highly mobile via genes on plasmids spread through bacterial populations, augmented by air travel and migration. Collaboration between countries is now more essential than ever. We feel that this should include the sharing of real life clinical data and experience of the newer agents, in order to build up clinicians confidence to use them in the clinical setting, thereby increasing treatment options globally.

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Fungal diseases in Taiwan – National Insurance Data and Estimation



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Background & Purpose: Almost all the Taiwanese population of 23.6 million people are registered on the National Health Insurance Research Database (NHIRD), yet no national analysis of fungal diseases has been undertaken using the NHIRD.

Methods: Using one-in-three sampling ratio, the NHIRD was queried using ICD-9 fungal disease codes to estimate the disease burden in 2013. Documented numbers were compared with modelling as previously undertaken for total and at-risk populations.

Results: Estimates for the annual incidence of HIV-related life-threatening fungal disease include cryptococcal meningitis (243 cases, 51 in HIV), *Pneumocystis pneumonia* (1251 cases, 630 in HIV) and histoplasmosis (54 cases, 3 in HIV). We estimate 4,798 cases of invasive aspergillosis annually, whereas NHIRD had 567 and a prevalence of 7,646 chronic pulmonary aspergillosis cases, compared to NHIRD's 531. Sixty-three mucormycosis cases were documented by NHIRD (0.27/100,000). The annual burden of candidaemia and *Candida peritonitis* is recorded at 861 (3.65/100,000) and 27 cases, respectively. Fungal asthma, including allergic bronchopulmonary aspergillosis (ABPA), probably affects over 100,000 adults, yet 63 cases were captured by NHIRD. Over 20,000 oral candidiasis cases were documented by NHIRD and 1,440 oesophageal candidiasis (6.1/100,000). Over 350,000 women are estimated to be affected by recurrent vulvovaginal candidiasis each year (2,758/100,000 females). Fungal keratitis is found in 8.2% of microbial keratitis, but no total caseload recorded. A small number of tinea capitis, chromoblastomycosis and sporotrichosis cases are seen each year.

Conclusions: About 2% of the Taiwanese population have a serious fungal infection each year, and the NHIRD database documents most of these, with some notable gaps, especially invasive, chronic and allergic aspergillosis, probably a function of limited awareness and diagnosis use.

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The estimated burden of fungal diseases in South Africa



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Background & Purpose: With a population of 57.7 million, over 7 million persons living with HIV and very diverse ecology and human genetics, South Africa's serious fungal disease burden is probably substantial and diverse. We sought to estimate the burden of serious fungal disease in South Africa.

Methods: Using total and at-risk populations and national, regional, and occasionally global data, we estimated the incidence and prevalence of the majority of serious fungal diseases in South Africa.

Results: Estimates for the annual incidence of HIV-related life-threatening fungal disease include cryptococcal meningitis (23,676 cases), *Pneumocystis pneumonia* (40,587 cases), and endemic mycoses (emerging mycosis [100 cases] and histoplasmosis [60 cases]). We estimate 6,676 cases of invasive aspergillosis annually, of which 4,607 are estimated to be involved in AIDS-related mortality. The annual burden of candidaemia and *Candida peritonitis* is estimated at 8,257 and 2,972 cases, respectively. The epidemic of pulmonary tuberculosis has probably driven up the prevalence of chronic pulmonary aspergillosis to 99,351 (175.8/100,000), the highest in the world. Fungal asthma probably affects over 100,000 adults. Mucosal candidiasis is common with an annual prevalence estimated at 1,150,000 and 623,600 oral and oesophageal cases complicating HIV infection alone (estimates in other conditions not made), and over a million women are estimated to be affected by recurrent vulvovaginal candidiasis each year. Tinea capitis in children is common and conservatively estimated at >1,000,000 cases. Sporotrichosis occurs occasionally (an estimated 40 cases), but data were absent for the other inoculation mycoses, chromoblastomycosis and mycetoma. Approximately 10 cases of blastomycosis are estimated each year. Overall, over 4.1 million South Africans are estimated to have a serious fungal disease each year (7.26% of the population).

Conclusions: Significant numbers of South Africans are affected each year by serious fungal infections, emphasising the need for improving diagnosis and management of these diseases.

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The burden of serious fungal infections in Ghana



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Background and Purpose: Serious fungal infections are believed to be increasing alongside rise in the number of immunocompromised patients and yet often neglected in developing countries. In Ghana, morbidity and mortality from these infections are high due to insufficient clinical expertise and unavailability of diagnostic tools and antifungals. Estimating their burden is important for increased attention. We aim to estimate the burden of serious fungal infections in Ghana.

Methods: Using local, regional and global data reporting fungal infection rates and population estimates for general and specific