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Young vs Old Patients: Nosocomial Infections and Fungal Biofilms Severity

Short title: Nosocomial Infection in Young and Old Patients

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Keywords

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In the hospital, the care of patients changes with several parameters (immunosuppression, antibiotics, invasive procedure ...). However, are nosocomial infections and fungal biofilms severity varying between young and old patients? is that true for the different age bracket? According to many researches, the extreme age (lower than one year and over 65) exposes more patients to the risk of nosocomial infections. Our study showed that there is no difference between these infections and fungal biofilms formation on the surfaces of implanted catheters to both categories of patients, young and old.

Introduction

Catheters are mainly used for driving physiological fluid inside the body of the patient or vice versa [1]. However, these medical devices constitute an ideal surface to form fungal biofilms [2, 3]. That it is known; these structures are a significant medical problem because they are frequently formed on catheters and are difficult to eliminate [4]. On the other hand, age and gender of the patients are involved in the aggravation of nosocomial infections; these infections are more brutal in elderly patients, especially women [7, 8, 9].

To assess the relationship between the age and the gender of patients and the fungal biofilms formation on the catheters' surfaces, we conducted our study at the University Hospital of Sidi Bel Abbes (Algeria) for one year.

Main Body

According to their ages, adult patients were classified in two different groups: young patients (18 – 39) and old patients (40 and more). In addition to the patients' age and gender, more parameters (immunosupression, antibiotic therapy, invasive chirurgical act, implanted catheters used…), related to nosocomial infections were assessed.

Catheters' infections were evaluated using the method of Seddiki et al (2015). To reveal the biofilms structures, the segments of different catheters were observed in the scanning electron microscope (SEM). The results obtained from different types of fungal infectivities are discussed statistically. The values of the variances (P) less than 0,05 were considered significant.

Results revealed that more than 7% of catheters were altered by *Candida sp*. According to their age bracket, there was no significant difference between nosocomial infections in young patients and the oldest since the p-value was greater than 0,05 ($P > 0,05$). They have roughly the same rates of infection with a slight increase for elderly patients (Figure 1A). According to [7, 8, 9], age over 65 years is a factor predisposing to infection. However, younger patients with penetrating trauma have the greatest risks [10].

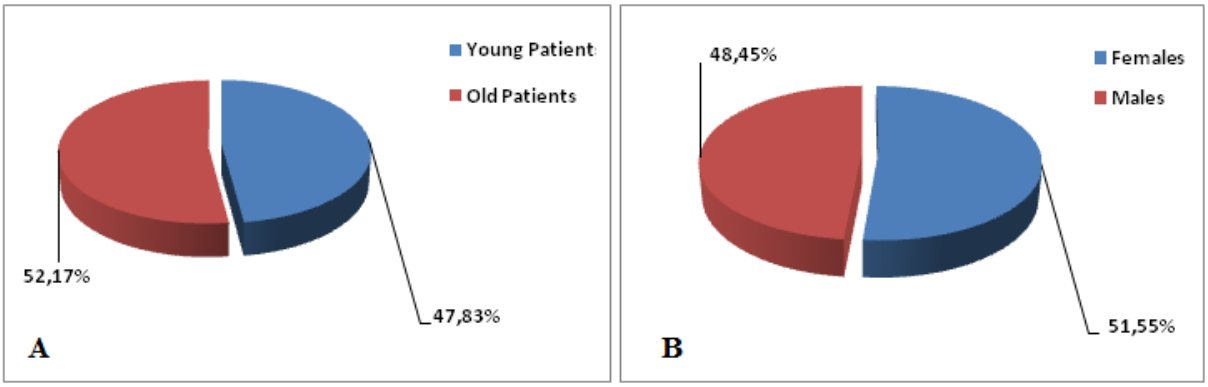

Figure 1. *Rates of catheters infections according the patient's age bracket (A) and the patient's gender (B).*

Similarly to the age bracket, the patients' gender appears not to have any effect (Figure 1B), there was no significant difference regarding the sex of patients ($P > 0,05$). Our results are in agreement with those of Chow et al., (2008), these authors have found no significant difference in patients' gender [11]. Conversely, Paulitsch et al., (2009) reported that the isolates of *Candida sp*. from catheters are significantly positive in men than women [12].

On the other hand, the SEM images showed different structures of biofilms, but no difference was observed in regard to the gender or age of patients. According to the species of *Candida sp*, blastospores and filamentous forms were observed on the catheters' surfaces implanted in the both groups of patients; young and old (Figure 2).

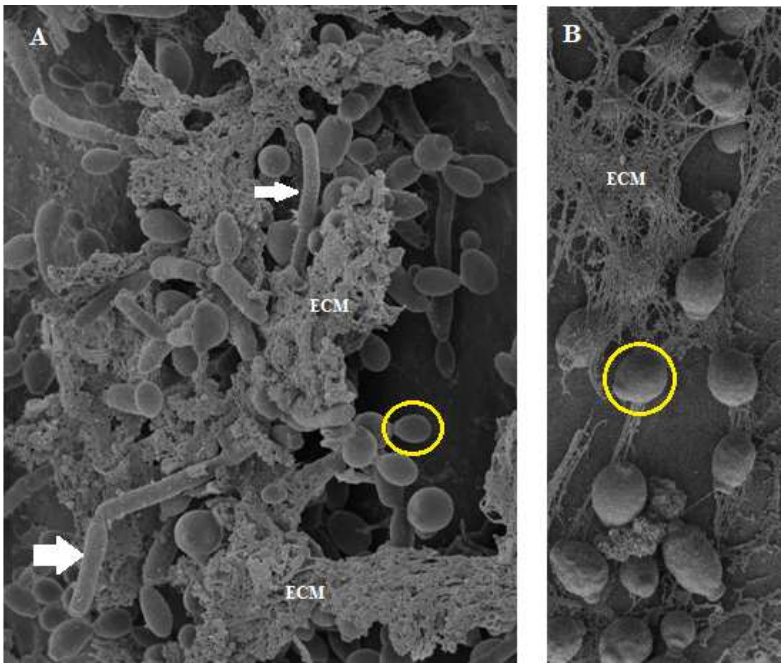

Figure 2. *Biofilms' structure of Candida albicans (A) and Candida glabrata (B). Blastospores (circle) and filamentous forms (arrows) are surrounded by extracellular matrix (ECM), (Magnitude: A x 2500, B x 2800).*

Conclusion

As conclusion, patient age and gender does not necessarily constitute a fundamental parameter of the severity of nosocomial infections; in particular, fungal biofilms formed on catheters' surface. As a final point, further researches are necessary to confirm these results and to analyze the predisposing factors. ■

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S.M.L. Seddiki is a lecturer at University Center of Naâma. He had these degrees of undergraduate and graduate at the University of Tlemcen - Algeria. Seddiki's research contributes to the struggle against fungal nosocomial infections, particularly those caused by *Candida sp*, he proposed the term: INFECTIVITY to distinguish fungal infections from simple contamination.
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D. Kunkel

D. Kunkel is an award-winning photomicrographer and research scientist whose images appear worldwide in print, film, and electronic media. Dennis received technical training in specialized microscopies while earning his undergraduate and graduate degrees at the University of Washington (Seattle, Washington USA). In the course of his studies, and during the research career that followed, Dennis's skill as a microscopist allowed him to make significant contributions in the fields of botany, microbiology and neurobiology. Collaborative efforts with fellow researchers produced results in other disciplines of science (including zoology, microbiology, and materials science). Fifty-eight research papers authored or co-authored by Dennis Kunkel appear in scientific journals between 1973 and 2015.

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