Genotyping demonstrated a reduction in the nosocomial transmission of Candida albicans and Candida parapsilosis after a campaign to control catheter-related infection

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Background: We previously reported that a high percentage of cases of candidemia were caused by clusters of Candida albicans and Candida parapsilosis. This finding suggests that transmission of the microorganisms is nosocomial. In January 2011, we implemented an antifungal stewardship program and a campaign to reduce catheter-related infections in the hospital. We subsequently observed a decrease in the number of candidemia episodes caused by C. albicans and C. parapsilosis. We analyzed whether this reduction was accompanied by a decrease in the percentage of patients involved in clusters.

Material/methods: We studied 434 patients admitted to Gregorio Marañón Hospital (Madrid, Spain) with candidemia caused by C. albicans (n=279) or C. parapsilosis (n=155) between January 2007 and December 2014. The incident isolates were identified using molecular methods and further genotyped using species-specific highly polymorphic microsatellite markers. Isolates were considered to be identical genotypes when they showed the same alleles for all loci. A cluster was defined as group of ≥2 patients infected by an identical genotype. The study period was divided into 2 periods (pre-campaign, 2007-2010; and post-campaign, 2011-2014), which we compared.

Results: We found 243 C. albicans genotypes and 108 C. parapsilosis genotypes. Twelve percent (28/2351) were in clusters. We did not find statistically significant differences in the percentage of clusters of C. albicans (n=22, 9%) or C. parapsilosis (n=16, 15%) (P=0.15). Of the 434 patients, 121 (28%) were involved in clusters; however, the percentage of patients in clusters infected by C. albicans (n=58/279, 21%) was significantly lower than that of patients in clusters infected by C. parapsilosis (n=63/155, 40%) (P<0.001). The number of patients involved in each cluster ranged from 2 to 6 (C. albicans) and from 2 to 14 (C. parapsilosis). The number of patients with candidemia per year ranged from 37 to 92, with the highest number detected in 2007. The number of patients in clusters per year ranged from 2 to 21 (C. albicans) and from 1 to 28 (C. parapsilosis), with the highest
number found in 2007. The number of episodes detected in the pre-campaign period was higher than in the post-campaign period (n=263 vs. n=171). Furthermore, the percentage of episodes caused by clusters was significantly higher in the pre-campaign period (39%) than in the post-campaign period (11%) ($P<0.001$). Linear regression analysis showed a positive correlation between the overall number of candidemia cases and the cases caused by clusters ($r^2=0.89$).

Conclusions: We found that the reduction in the percentage of episodes of candidemia caused by $C. albicans$ and $C. parapsilosis$ was accompanied by a decrease in the percentage of episodes caused by clusters. Our observations suggest that implementation of a campaign to reduce the number of catheter-related infections leads to better control of nosocomial candidemia.