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Management of two healthcare-associated infections outbreaks of *Serratia marcescens* and *Enterobacter cloacae* in a Veterinary University Hospital, and implementation of a surveillance system

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Healthcare-associated infections (HCAI) are considered an emerging problem in both human and veterinary medicine [1] [2], due to the multi-resistance pattern and the zoonotic potential of involved infectious agents. Veterinary University Hospitals (VUH) are high-risk places [3], and a surveillance plan is essential not only to control and restrict HCAI spread, but also to collect information about HCAI agents. This work aims at highlighting the effectiveness of a well-defined surveillance program by comparing two different nosocomial outbreaks at the VUH of Bologna. From April to September 2019, an unexpectedly high number of records of fever of unknown origin in small animals hospitalized at the VUH was associated with *Serratia marcescens* infection in twelve cases (4 isolates from blood culture, 3 from surgical implants, 2 from liver biopsies, 2 from urinary tract infection-UTI, 1 from surgical site infection-SSI). Three cases developed sepsis, and one case was euthanized due to progressive sepsis-induced organ dysfunction. A further environmental investigation was conducted, showing the presence of *S. marcescens* into soap dispensers and chlorhexidine dipped gauzes used for patient skin antisepsis. The VUH restricted admissions of dogs and cats for 7 days to stop the spread of infection and intervened with cleaning and a high-level of disinfection. Since November 2020, a surveillance program for bacterial HCAI has been developed in the VUH, focusing on two aspects: microbiological surveillance, that has been divided into passive and active surveillance, and tri-weekly reports to ensure an efficient information flow between microbiologists and hospital personnel. In February 2021, passive surveillance highlighted three cases of *Enterobacter cloacae* localized infections (2 from SSI, 1 from prostatic fine needle aspiration) in three dogs hospitalized in the VUH in the previous 15 days. Subsequent environmental sampling showed *E. cloacae* presence in a dog cage – both before and after routine cleaning - and in one staff member's hand. Three more cases of dogs hospitalized with *E. cloacae* infection (2 from SSI, 1 from UTI) were highlighted by passive surveillance in the following 11 days. This finding led to adopt restrictive measures for patient admissions for 3 days to control the outbreak and perform environmental disinfection. After that, the environmental sampling showed no *E. cloacae* detection in the UVH, and no more cases of *E. cloacae* infection were recorded in the following 4 weeks.

The two HCAI outbreaks reported in the present study suggest that a surveillance plan in UVHs could avoid more problematic consequences. Indeed, the second outbreak was better confined, and led to less severe clinical outcomes. Management of HCAI should be a priority for every hospital with high-level healthcare. A well-defined, written surveillance plan is one of the most useful and effective tools in terms of rapidity, proactivity and capacity to target efforts.

[1] Milton A.A.P. et al. Nosocomial infections and their surveillance in veterinary hospitals, Adv Anim Vet Sci., 3(2): 1-24, 2015.