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ePoster Viewing

Disinfection & biocides

Evaluation of hydrogen peroxide and silver cations vs. active chloride disinfection procedures for eradication of multidrug-resistant organisms

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Background: Multidrug-resistant organisms (MDROs) can survive for prolonged periods of time on a variety of surfaces of hospital environment. Contacts with contaminated surfaces previously occupied by infected/colonised patient increases the risk for transmitting infections. The objective of this study was to evaluate the effectiveness of two disinfection procedures based on a micro-nebulization of hydrogen peroxide and silver cations vs. active chloride, by evaluating the reduction of microbial contamination of room surfaces and operating theatres areas.

Material/methods: Active chloride (5.000 ppm) and saturated steam vapor (180 C°), vs. decontamination system based on a solution of 5-8% hydrogen peroxide and 60 ppm active silver ions (1mL/m³ intensity of treatment) were compared. Two beds rooms located in different wards in the Departments of Medicine, Surgery and Rehabilitation of the Hospital of Lodi (Italy), were previously occupied by patients infected with: MRSA (5 cases); VRE (3); XDR-A. *baumannii* (5); MBL-*P. aeruginosa* (3); KPC-*K. pneumoniae* (8); ESBL-*K. pneumoniae* (2), ESBL-*E. coli* (2), *S. maltophilia* (2); in six operating rooms patients colonized with KPC-*K pneumoniae* were submitted to surgery. The rate of CFU/cm² was assessed immediately before and after cleaning and the disinfection procedures.

Results: 1140 samples from swabs were collected from rooms surfaces as follows: 600 from hospital rooms treated with hydrogen peroxide and 180 with active chloride plus steam vapor, 360 from operating rooms treated with hydrogen peroxide. Before cleaning, the average density of mesophile organisms resulted up to 85 CFU/57 cm² (range 3-320). MDROs were isolated from samples collected in 20/30 rooms respectively. After manual cleaning with detergent followed by active chloride disinfection, the average density of organisms resulted 35 CFU/57 cm². In two rooms MDROs grew only after enrichment. A range of 0 and 5 CFU/57 cm² was observed following the hydrogen peroxide disinfection procedure without any MDRO growth. After heated saturated steam vapor disinfection, an average density of organisms of 15 CFU/57 cm² (range 1-30) was observed. MRSA were found from samples collected in 2 rooms. Before cleaning an average density of mesophile organisms up to 50 CFU/57 cm² was found in the operating rooms and *K. pneumoniae*-KPC was detected in one of them. PFGE analysis of the *K. pneumoniae* strains isolated from patient stools and from surfaces identified one clonal type A. After hydrogen peroxide disinfection, a density of bacteria in the range of 0 and 2 CFU/57 cm² was observed and no MDROs were found.

Conclusions: Our data indicate that the hydrogen peroxide and active silver ions disinfection system, together with the manual cleaning procedures, is non inferior vs. active chloride based procedure.

Hydrogen peroxide resulted effective in minimizing the overall microbial load and eradicating MDROs on the hospital's wards and operating room surfaces.