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Antimicrobial coating is associated with significantly lower aerobic colony counts in high-touch areas in an orthopedic ward environment.

Lars Ejerhed[1,2], Leyla Roshani[1], Jüri Kartus[1,2,3]

Hospital acquired infections (HAI) are the most common complication found in the hospital environment and they result in significant patient morbidity and mortality. Despite careful hygiene routines and the more restrictive use of antibiotics, there is an increasing problem with serious infections and resistance to antibiotics. The aim of the study was to examine whether the use of an antimicrobial coating in high-touch areas in an orthopedic ward could reduce bacterial growth and HAI.

[1]Department of Research and Development, NU-Hospital Group, Trollhättan, Sweden, [2]Institute of Clinical Sciences, Sahlgrenska Academy, University of Gothenburg, Sweden, [3]Department of Orthopaedics, NU-Hospital Group, Trollhättan/Uddevalla, Sweden

Methods

From December 2017 to February 2018, HAIs were registered on two orthopedic wards in a non-randomized controlled trial. A second registration was performed from December 2018 to February 2019. At the second occasion, an antimicrobial organosilane coating was applied just before the study period and thereafter a weekly hand spraying of the high-touch areas was performed in one ward, while the other ward served as a control. Twenty defined high-touch areas on each ward were cultured before treatment and after 1, 2, 4, 8, 12, 14 and 16 weeks. All high-touch areas on both wards underwent standard alcohol wiping during the study period. Samples were cultured for aerobic colony counts, staphylococcus aureus and E. coli using Petrifilm™ plates.

Initial treatment of the ward with the organosilane compound using the electrostatic sprayers.

Results

In Table 1 the total number of aerobic colony counts are reported and in Table 2 the incidence of HAI. The total aerobic colony counts were 47% lower in the treated ward compared with the untreated ward over the study period (p=0.02). The colony counts for staphylococcus aureus and E.coli were low in both wards. During the first registration period the incidence of HAI in the wards was 21.3% and 20.7 % in the non-treated and treated ward respectively. At the second occasion, after treatment, the incidence was 23.7% in the untreated ward and 11.2% in the treated ward respectively (p=0.0001).

Total arobic colony counts (ACC) CFU/cm²

Table 1

Ward	Before Treatment Week 0	After Treatment Week 1	Week 2	Week 4	Week 8	Week 12	Week 14	Week 16	Total CFU/cm²
Untreated	3507	5595	2860	3788	1335	3735	2496	4013	27329
Treated	1218	1704	2373	3198	2336	1776	796	1041	**14442**

Incidence of HAI during 3-month period, 2017/2018 and 2018/2019

Table 2

Ward	2017/2018	Ward	2018/2019
Untreated	21.3%	Untreated	23.7%
Untreated	20.7%	Treated	**11.2%**

Conclusions

The use of a long-lasting antimicrobial organosilane coating appears to reduce the bioburden and reduce HAI. Since the incidence of HAI varies substantially over time, longer observation times are needed.

Contact: lars.ejerhed@vgregion.se

UNIVERSITY OF GOTHENBURG

VÄSTRA GÖTALANDSREGIONEN
NU-SJUKVÅRDEN