SYNOPSIS

KEY POINT SUMMARY

OBJECTIVES

The two main objectives of this study were:

- To evaluate the efficacy of copper alloys when incorporated into a wide range of furnishings and fittings in reducing surface microbial loads in a busy clinical environment.
- To evaluate the copper susceptibility of methicillin-resistant Staphylococcus aureus (MRSA), methicillin-susceptible S. aureus (MSSA), vancomycin-resistant enterococci (VRE), and coli forms recovered from the clinical environment.

The Antimicrobial Efficacy of Copper Alloy Furnishing in the Clinical Environment: A Crossover Study

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Key Concepts/Context

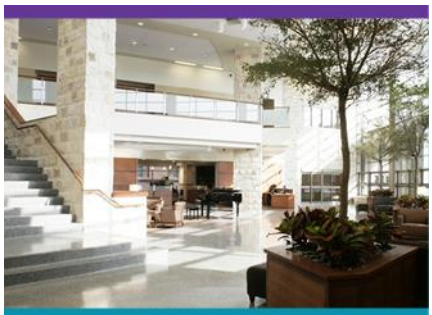
Environmental hygiene has been regarded as one of the key areas in the prevention of HCAIs (healthcare associated infections) in hospital and acute care settings. Copper and its alloys have recently been considered for use in the healthcare environment as an antimicrobial surface material, and in 2008, the U.S. Environmental Protection Agency approved the registration of copper and its alloys as antimicrobial materials. The main aim of this study was to determine whether copper incorporated into hospital ward furnishings and equipment can reduce their surface microbial load.

Methods

The study setting was a 19-bed acute care medical ward at a large university hospital. Some 14 types of frequent-touch items made of copper alloy, such as door handles, push plates, toilet seats and flush handles, grab rails, light switches and pull cord toggles, sockets, overbed tables, dressing trolleys, commodes, taps, and sink fittings, were installed in various locations on an acute care medical ward. Their surfaces and those of equivalent standard items on the same ward were sampled once weekly for 24 weeks. The copper and standard items were switched after 12 weeks of sampling to reduce bias in usage patterns. The research then examined total aerobic microbial counts and the presence of indicator microorganisms.

Findings

In the study, microorganisms, including hospital-associated pathogens such as MSSA and MRSA, were recovered from the ward furnishings and fittings despite



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rigorous application of standard hospital cleaning and a relatively high level of hand hygiene. The highest total aerobic counts were detected in the bathroom areas and included toilet seats, tap handles, and light pull cord toggles. Eight of the 14 copper item types had microbial counts on their surfaces that were significantly lower than counts on standard materials. The other six copper item types had reduced microbial numbers on their surfaces, compared with microbial counts on standard items, but the reduction did not reach statistical significance. Indicator microorganisms were recovered from both types of surfaces; however, significantly fewer copper surfaces were contaminated with vancomycin-resistant enterococci, methicillin-susceptible Staphylococcus aureus, and coliforms, compared with standard surfaces.

Limitations

The main limitation of this study was that it was conducted in just one ward of a large university hospital. So any findings should be generalized to other wards or other hospital settings, with strict caution, as the culture of hand-washing and the frequency and practice of disinfection of surfaces might differ in different settings.

Design Implications

Copper-containing surfaces may be a beneficial addition to commonly applied cleaning practices, because they provide continuous and persistent antimicrobial action with surface wear and oxidation. In our study, when copper was incorporated into various fomites, it resulted in a reduction in the microbial load on associated surfaces on a busy acute care medical ward. Most importantly, the surfaces that were frequently touched by the staff, visitors, and patients, such as door push plates, pull handles, and tap handles on the ward, were less contaminated when copper fittings were used than when standard fittings were used. Copper alloys, when incorporated into various hospital furnishings and fittings, reduce the surface microorganisms. The use of copper in combination with optimal infection-prevention strategies may therefore further reduce the risk that patients will acquire infection in healthcare environments.