Antibiotic & Antimicrobial Stewardship: Disinfectants are Ongoing Focus of Sensitivity, Resistance Debate

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ABSTRACT

Antibiotic resistance has become a significant topic of importance as antibiotic resistance threatens the effective prevention and treatment of an ever-increasing range of infections caused by bacteria. Given the growing problem of antibiotic resistance, environmental cleaning and disinfection can play an important role in helping to prevent the spread of antibiotic resistant bacteria. As such, there is a growing body of evidence to demonstrate the effectiveness of environmental cleaning and disinfection as part of multimodal strategies to reduce pathogen transmission, prevent healthcare associated infections (HAIs), and improve patient outcomes.

BAKGROUND

Effective antimicrobial drugs are prerequisites for both preventative and curative measures, protecting patients from potentially fatal diseases and ensuring that complex procedures can be provided at low risk. However, pharmaceutical companies are backing away from new antibiotic development for several reasons – the high cost of and high chance of failure in antibiotic research and development, the length of time it takes to develop new drugs, the slow approval process once a new antibiotic has been developed, and the low return on investment. This redirection means more emphasis will be placed on preventing illness, and that's where effective and environmentally responsible cleaning comes in.

DISINFECTANTS AND THE ISSUE OF RESISTANCE

Much less is known still about microorganisms' reduced sensitivity to germicides such as surface disinfectants. There have been some studies indicating that imprudent use of chemicals can encourage the beginning stages of resistance, but experts have not reached consensus on this issue. There is emerging research that suggests that the use of quaternary ammonium-based antimicrobial compounds may lead to decreased susceptibility in bacteria and cross-cross resistance to antibiotics. Studies have demonstrated that exposure of bacteria to sub-lethal concentrations of quaternary ammonium compounds in laboratory settings, which mimics disinfectant misuse over long time periods, can trigger resistant mechanisms. There is also evidence to support the position that the use of disinfectants does not contribute to antibiotic resistance, and some have cited studies demonstrating that both antibiotic resistant and antibiotic susceptible bacteria are still susceptible to surface disinfectants under normal usage conditions.

PREVENTION

Preventing the spread of resistant bacteria is a critical step in preventing infections from occurring and helps to preserve the efficacy of existing antibiotics by reducing the amount of antibiotics that have to be used and the likelihood that resistance will develop during therapy. Environmental hygiene plays a vital role as part of a horizontal approach to infection prevention and control and is especially important when it comes to resistant pathogens like MRSA and VRE. Antibiotic-resistant and nonresistant bacteria have the same level of

susceptibility to surface disinfectants approved by the Environmental Protection Agency (EPA) or Health Canada. The likelihood of bacteria developing resistance to surface disinfectants is low due to their rapid kill times. For this reason, facilities are increasingly coupling antibiotic stewardship initiatives with comprehensive environmental cleaning and disinfection programs. The main challenge for facilities is educating their staff on how to implement better protocols to achieve compliance. Education can help improve infection prevention practices to kill antibiotic-resistant organisms before infections can be spread, better protecting patients, staff and communities. Proper application of surface disinfectants - including ensuring contact times are achieved and disinfectants are accurately diluted - as well as following proper protocols for environmental hygiene, plays an essential role in preventing the spread of antibiotic-resistant pathogen because no matter what surface disinfectant a facility uses, if the product is not used correctly, it will not be as effective.

The following are some tips for facilities to consider when performing daily surface disinfection and terminal cleaning procedures:

- Use trusted EPA or Health Canada registered disinfectants with appropriate claims for daily and terminal cleaning to ensure pathogens of concern are killed

- When adopting semi-automatic technology (such as UV-C light devices), always start with routine manual cleaning and disinfection of environmental surfaces. Technology should be used as a supplement – not as a replacement – to disinfect rooms more effectively

- Routinely launder and clean privacy curtains, linens, employee uniforms and other soft surfaces in your facility. Consider using an EPA-registered product to kill bacteria on soft surfaces between laundering and on soft surfaces that cannot be laundered.

CONCLUSION

It cannot be overstated that environmental hygiene is a critical component of combating antibiotic-resistant pathogens. Daily environmental surface disinfection can reduce the amount of antibiotic resistant pathogens in the healthcare environment and help prevent their spread. Furthermore, environmental cleaning and disinfection is one component of a bundled horizontal approach to prevent the spread of infections. Other components include a focus on hand hygiene, the use of contact precautions, staff education and ongoing training. Al; of these steps, in conjunction with the prudent use of antibiotics, are critical and work together to help keep patients safe.

IMPLICATONS FOR AHP®

Accelerated Hydrogen Peroxide® (AHP®) is a patented oxidizing-based disinfectant chemistry with proven effectiveness against a number of antibiotic resistant organisms. AHP® is a leading innovative technology that has proven to reduce antibiotic resistant pathogens including VRE, MRSA and Clostridium difficile by as much as 23%.

REFERENCES

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