ICU
MANAGEMENT & PRACTICE

Vancomycin Still Useful For Staph Infections

A new study published in *JAMA* has determined that vancomycin, an antibiotic that came out more than 50 years ago, remains effective in treating *Staphylococcus aureus* bloodstream infections. The study's authors said doctors should continue to use the drug even as newer antibiotics can now be bought in the market.

Staphylococcus aureus is amongst the most common causes of healthcare-associated infection around the world. This Gram-positive coccal bacterium causes a wide range of infections, with bloodstream infections — S aureus bacteremia (SAB) – amongst the most common and lethal. The primary therapy for staph infections has been either vancomycin or semisynthetic penicillins in the past 50 years or so.

Researchers from the University of Nebraska Medical Center (UNMC) aimed to evaluate the effectiveness of vancomycin and other newer antibiotics used to treat *Staphylococcus aureus*. They analysed almost 8,300 episodes of *Staphylococcus aureus* bloodstream infections from patients around the United States and in several other countries.

In recent years, the UNMC team said, doctors treating staph infections with vancomycin have observed an increase in the minimum inhibitory concentration (MIC) – i.e., the lowest concentration of an antimicrobial agent that inhibits the growth of a microorganism. MIC values lower than 4 mg/L indicate that the staphylococcus is susceptible to vancomycin. However, when the MIC value exceeds 1.5 mg/L, some physicians have taken it as an indication that the vancomycin may not be working at maximum effectiveness.

Thus, the UNMC team conducted a two-year systematic analysis of the evidence regarding the association of vancomycin MIC elevation with mortality in SAB patients. Of the 8,291 episodes of SAB studied, overall mortality rate was 26.1 percent, the research team pointed out. The adjusted absolute risk of mortality among patients with SAB with high-vancomycin MIC was not statistically different from patients with SAB with low-vancomycin MIC.

The research team also cited findings of studies that involved only methicillin-resistant *Staphylococcus aureus* (MRSA) infections:

- Mortality rate of 27.6 percent amongst SAB episodes in patients with high-vancomycin MIC; and
- Mortality rate of 27.4 percent amongst patients with low-vancomycin MIC.

There also have been reports suggesting that elevations in vancomycin MIC values may be associated with increased treatment failure and death. However, the UNMC study has provided strong evidence that vancomycin remains effective in treating staph infections. “Even though vancomycin is an older drug, it is still killing staph very efficiently," said lead author Andre Kalil, MD, professor in the UNMC Department of Internal Medicine and an infectious diseases specialist.

Although newer antibiotics are available to treat *Staphylococcus aureus* infections, the UNMC study shows that physicians do not necessarily have to switch to these new drugs when the MIC is elevated but still within the susceptible range. As Dr. Kalil pointed out: “The prevention of a rapid switch to newer drugs has another great benefit to our patients — less unnecessary exposure to these drugs, which will translate into less development of antibiotic resistance.”

Dr. Kalil said the UNMC study may have implications for clinical practice and public health, including:

- That standards for vancomycin MIC most likely do not need to be lowered;
- Routine differentiation of MIC values between 1mg/L and 2 mg/L appears unnecessary; and
- The use of alternative antistaphylococcal agents may not be required for *Staphylococcus aureus* isolates with elevated but susceptible vancomycin MIC values.

“These conclusions are consistent with current IDSA treatment guidelines that recommend use of vancomycin for treatment of MRSA bacteremia with consideration for alternative agents based on the patient’s clinical response and not the MIC,” Dr. Kalil noted. The UNMC research team also included infectious diseases specialists Mark Rupp, MD, professor, and Trevor VanSchooneveld, MD, assistant professor, as well as Paul Fey, PhD, professor, pathology and microbiology.

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