



Vancomycin Intermediate Resistant *Staphylococcus Aureus* (VISA)

Cause/Epidemiology

Staphylococcus aureus is an aerobic or facultative anaerobic coagulase-positive organism. It appears as gram-positive clusters on gram stain. *S. aureus* colonizes the skin of humans, which leads to localized, superficial, self-limiting abscesses when the skin is disrupted.

The usual treatment for *S. aureus* infections is a group of antibiotics related to penicillin called methicillin. Included in this group are oxacillin and doxycillin. In the 1980's, methicillin-resistant *S. aureus* (MRSA) emerged and has become endemic in many hospitals. This led to increased use of vancomycin. While most *S. aureus* are susceptible to vancomycin, a few have developed resistance and cannot be successfully treated with vancomycin. These antimicrobial resistant *S. aureus* are classified as either vancomycin intermediate *Staphylococcus aureus* (VISA), or vancomycin resistant *Staphylococcus aureus* (VRSA) based on laboratory tests, which determine the degree of resistance. VISA cause similar infections to sensitive *S. aureus* strains but infections may be difficult to treat because of limited effective antibiotics. VISA can not be successfully treated with vancomycin because the organism is no longer susceptible to vancomycin.

A more general term for VISA in the literature is glycopeptide intermediate *S. aureus* (GISA) that reflects resistance to the whole class of glycopeptide antibiotics. However since not all VISA strains are intermediate resistance to teicoplanin, the term VISA is more accurate, and more widely used.

Reports in the 1990s suggested the susceptibility of *S. aureus* was changing. In May 1996, the first documented infection with VISA was reported in a person in Japan. Subsequently, infections with VISA strains have been reported in patients from the United States, Europe, and Asia. Although healthcare associated spread of VISA strains has not been observed in U.S. hospitals, reports from France and Denmark suggest transmission has occurred in a hospital and transmission of hetero-resistant *S. aureus* strains (i.e., vancomycin susceptible strains that contain vancomycin non-susceptible subpopulations) has occurred in Japan, Hong Kong, and elsewhere.

VISA infections are rare. Only sixteen cases of infection caused by VISA have been reported in the United States.

To date, VISA strains are characterized by a resistance mechanism that is not transferable to susceptible strains, and is usually associated with vancomycin



exposure. Therefore, the likelihood of transmission to contacts and the maintenance of the VISA phenotype in the absence of vancomycin pressure is presumed to be low. Colonization of healthcare workers or family members associated with the case patients has not been reported

Clinical Presentation

Risk factors are not well described except that all cases have received long courses of vancomycin or other glycopeptide antibiotic.

Persons that developed VISA infections had several underlying health conditions (such as diabetes and kidney disease), previous infections with methicillin-resistant *Staphylococcus aureus*, invasive catheters (e.g., intravenous catheters), recent hospitalizations, and recent exposure to vancomycin and other antimicrobial agents.

Incubation

The incubation period is variable and indefinite.

Transmission

VISA infections occur the same as Vancomycin Sensitive *Staphylococcus aureus* (VSSA) infections. Common bacterial infections include impetigo, folliculitis, furuncles, carbuncles, abscesses and infected lacerations.

Within institutions, healthcare workers' hands and the environment are the most common means of spreading VISA. In the case of staphylococcal pneumonia, droplet transmission can spread VISA. Healthcare workers who are colonized or infected are rarely the reservoir. VISA may invade the blood and cause potentially serious complications such as bacteremia, septic shock, and serious metastatic infections (endocarditis, pneumonia, osteomyelitis, and arthritis).

Infection Prevention and Control Practices

Routine Practices.

Notify Infection Prevention and Control immediately when a resident is positive for Vancomycin-Intermediate Resistant *Staphylococcus aureus* (VISA).

Refer to the Management of Communicable Diseases in Personal Care Homes Table for specific disease/microorganism information.



Occupational Health

Healthcare workers exposed to or infected with VISA shall be dealt with on a case-by-case basis and in consultation with Infection Prevention and Control /designate and Infectious Diseases.

Pregnant health care workers can work with residents who are colonized/infected with VISA provided they adhere to Routine Practices and Additional Precautions for the specific situation. Pregnant healthcare workers who have concerns regarding working with residents who are colonized/infected with VISA should be referred to Occupational health/designate for further management.