Vancomycin Side Effects & Toxicity

Vancomycin is a glycopeptide antibiotic used in the treatment of gram-positive bacterial infections. This antibiotic was originally indicated for the treatment of penicillin-resistant Staphylococcus aureus. Traditionally, it has been reserved as a drug of last resort, only after treatment with other antibiotics failed, and today, vancomycin resistant organisms are increasing and becoming more common. This antibiotic inhibits cell wall mucopeptide synthesis by forming hydrogen bond interactions with the terminal D-alanyl-D-alanine moieties of the cell wall peptides. This binding to the D-Ala-D-Ala prevents synthesis of long polymers of N-acetylmuramic acid and N-acetylglucosamine, which normally forms the backbone strands of the bacterial cell wall and also prevents the polymers from forming cross-links. Resistance to vancomycin develops when the D-Ala-D-Ala moiety changes to D-ala-D-lac, preventing binding of vancomycin. Because gram-negative bacteria produce their cell walls via a different mechanism, vancomycin is not active against gram-negative bacteria. This antibiotic is indicated for the treatment of serious life-threatening infections caused by susceptible organisms including methicillin-resistant Staph aureus (MRSA), treatment of pseudomembranous colitis caused by the bacteria Clostridium difficile, and enterococci infections resistant to other penicillin derivatives. Well-known adverse reactions associated with IV vancomycin include thrombophlebitis, nephrotoxicity, ototoxicity and diffuse flushing commonly called “red man syndrome.” Therefore, vancomycin must be administered slowly in a dilute solution. Red man syndrome typically appears within 10 minutes after infusion and is characterized by flushing or an erythematous rash of the face, neck, and torso, due to nonspecific mast cell degranulation. Because of this mechanism of presentation, symptoms may be treated or prevented with antihistamines and are less likely to occur with a slow infusion rate.

PLAY PICMONIC

Side Effects

Thrombophlebitis
Trombone-flamingo
Thrombophlebitis, which is a complication of IV vancomycin use, refers to swelling and inflammation of veins caused by a blood clot.

Nephrotoxicity
Kidney with Toxic-green-glow injured by van tank
Vancomycin has a strong association with nephrotoxicity, although the exact mechanism is poorly understood. To avoid nephrotoxicity in patients receiving vancomycin, serum levels should be kept within acceptable ranges, and other potentially nephrotoxic agents should be avoided.

Ototoxicity
Ear with Toxic-green-glow
Vancomycin has a strong association with ototoxicity, causing diminution of hearing, especially at higher frequencies. To avoid ototoxicity in patients receiving vancomycin, serum levels should be kept within acceptable ranges, and other potentially nephrotoxic agents should be avoided.

Diffuse Flushing Called Red Man Syndrome
Flashlight flushing on Red Man
Vancomycin can cause diffuse flushing, a phenomenon commonly called, “red man syndrome.” Red man syndrome typically appears within 10 minutes after vancomycin infusion and is characterized by flushing. This erythematous rash of the face, neck and torso occurs due to nonspecific mast cell degranulation.

Prevent with Antihistamine
Anti-history-book
Because red man syndrome is related to nonspecific mast cell degranulation, symptoms may be treated or prevented with antihistamine use.

Prevent with Slow Infusion
Snail IV
Red man syndrome is less likely to occur with a slow IV infusion rate when administering vancomycin.