Vancomycin

Vancomycin is an antibiotic with similar action to the beta-lactam antibiotics. It is a very important, yet potentially toxic drug that is used in the treatment of serious infections. It is indicated for serious gram positive infections, but can lead to side effects such as ototoxicity, nephrotoxicity, thrombophlebitis and vancomycin infusion reaction.



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Mechanism of Action

Inhibits Bacterial Cell Wall Synthesis

Disrupted Bacterial Cell Wall

In addition, vancomycin alters bacterial cell membrane permeability and RNA synthesis. There is no cross-resistance between vancomycin and other antibiotics. It is active only against gram-positive bacteria. It is not active against gram-negative bacilli, mycobacteria, or fungi. It is poorly absorbed via the GI system, which is why it is given most often parenterally.

Indications

Serious Gram-Positive Infections

Serious Graham-cracker-Positive-angel

Vancomycin is used in the treatment of serious infections involving gram-positive organisms, including methicillin-resistant Staphylococcus aureus (MRSA) and patients with severe gram-positive infections who are allergic to penicillin. Oral vancomycin is specifically used for the treatment of Clostridioides difficile (C. difficile, C. diff) infection, whereas intravenous vancomycin does not treat C. difficile colitis.

Side Effects

Nephrotoxicity

Kidney with Toxic-green-glow

Vancomycin levels are monitored during therapy to reduce the risk of dose-related nephrotoxicity, with trough-based monitoring or AUC/MIC guided dosing preferred. Vancomycin-associated nephrotoxicity is more likely with high serum concentrations, prolonged therapy, concomitant use of other nephrotoxic agents (e.g., aminoglycosides, loop diuretics), and in patients with underlying renal dysfunction; routine peak level monitoring is not recommended.

Ototoxicity

Ear with Toxic-green-glow

While rare, ototoxicity is another possible side effect associated with Vancomycin administration and is usually reversible. Patients with ototoxicity often present first with tinnitus.

Vancomycin Flushing Reaction

Van-tank-mice Flashlight

If administered rapidly, patients may experience flushing, rash, pruritus, urticaria, tachycardia, and hypotension. Slow infusion, as well as prophylaxis with diphenhydramine avoids the release of histamine, which causes these symptoms.

Thrombophlebitis

Trombone-flamingo

This is a common side effect due to the irritating effect of the medication on the blood vessel wall. Diluting the IV solution, changing the IV site frequently, and administering the IV slowly can decrease the risk of thrombophlebitis.

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Nursing Considerations

Culture Samples First

Cultural-dish with First-place Ribbon

Prior to giving the first dose of the medication, a culture and sensitivity test should be performed to identify the infectious organism.

Infuse IV Over 60 Minutes

Infuser IV over 60-minute-clock

Slow, dose-appropriate infusion of vancomycin reduces the incidence of side effects such as vancomycin infusion reaction (Red Man Syndrome) and thrombophlebitis, with larger doses requiring longer infusion times (e.g., ?90–120 minutes for doses ?1 g).

Take Around the Clock

Circling Around the Clock

It is important to administer intravenous vancomycin at regular intervals to maintain therapeutic serum levels, while oral vancomycin is administered at scheduled intervals to maintain effective gastrointestinal lumen concentrations, not therapeutic blood levels.

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