Vancomycin

Vancomycin is a glycopeptide antibiotic medication.

Blood levels may be measured to determine the correct dose.

When taken by mouth, it is poorly absorbed.

Vancomycin combination therapy

Vancomycin combination therapy.

Dosage

Staphylococcal Enterocolitis Vancocin and Firvanq

Indicated for enterocolitis caused by Staphylococcus aureus (including methicillin-resistant strains)

Firvanq: Indicated for treatment of enterocolitis in adults and pediatric patients <18 years

0.5-2 g/day PO divided q6-8hr for 7-10 days

Clostridium difficile-associated Diarrhea Vancocin and Firvanq

Indicated for treatment of Clostridium difficile (C. difficile)-associated diarrhea

Firvanq: Indicated for treatment of C. difficile-associated diarrhea in adults and pediatric patients <18 years

125 mg PO q6hr for 10 days

Infective Endocarditis Indicated for treatment of infective endocarditis due to: susceptible isolates of MRSA, viridans group streptococci Streptococcus gallolyticus, Enterococcus species, and Corynebacterium species

For enterococcal endocarditis, use in combination with an aminoglycoside

Methicillin-susceptible staphylococci in penicillin-allergic patients, or those patients who cannot receive or who have failed to respond to other therapies

Indicated for treatment of early-onset prosthetic valve endocarditis caused by Staphylococcus epidermidis in combination with rifampin and an aminoglycoside

Usual dosage: 2 g divided either as 500 mg q6hr or 1 gram q12hr

Initial daily dose should be no less than 15 mg/kg

Septicemia Indicated for treatment of septicemia due to: susceptible isolates of methicillin-resistant

Staphylococcus aureus (MRSA) and coagulase negative staphylococci, methicillin-susceptible staphylococci in penicillin-allergic patients, or patients who cannot receive or who have failed to respond to other drugs, including penicillins or cephalosporins

Usual dosage: 2 g divided either as 500 mg q6hr or 1 gram q12hr

Initial daily dose should be no less than 15 mg/kg

Skin and Skin Structure Infections Indicated for treatment of skin and skin structure infections due to: susceptible isolates of MRSA and coagulase negative staphylococci, methicillin-susceptible staphylococci in penicillin-allergic patients, or those patients who cannot receive or have failed to respond to other therapies

Usual dosage: 2 g divided either as 500 mg q6hr or 1 g q12hr

Initial daily dose should be no less than 15 mg/kg

Bone Infections Indicated for treatment of bone infections due to: susceptible isolates of MRSA and coagulase negative staphylococci, methicillin-susceptible staphylococci in penicillin-allergic patients, or those patients who cannot receive or have failed to respond to other therapies

Usual dosage: 2 g divided either as 500 mg q6hr or 1 gram q12hr

Initial daily dose should be no less than 15 mg/kg

Lower Respiratory Tract Infections Indicated for treatment of lower respiratory tract infections due to: susceptible isolates of MRSA and coagulase negative staphylococci, methicillin-susceptible staphylococci in penicillin-allergic patients, or those patients who cannot receive or have failed to respond to other therapies

Usual dosage: 2 g divided either as 500 mg q6hr or 1 gram q12hr

Initial daily dose should be no less than 15 mg/kg

Preoperative Antimicrobial Prophylaxis (Off-label) Gastrointestinal [GI] and genitourinary [GU] procedures: 1 g IV by slow infusion over 1 hour, beginning 1-2 hours before procedure (with or without gentamicin 1.5 mg/kg; not to exceed 120 mg IV or IM <30 minutes before procedure)

Surgical Prophylaxis (Off-label) Prophylaxis of infection in cardiac, thoracic, and arterial procedures; craniotomy; joint replacement; amputation

15 mg/kg IV over 1-2 hr; begin administration within 2 hr before incision; duration of prophylaxis for most procedures should be <24 hr

Dosing Modifications Renal impairment Mild-to-severe: Initial dose should be no less than 15 mg/kg Functionally anephric patients: Initial dose of 15 mg/kg of body weight to achieve prompt therapeutic serum concentration; start at 1.9 mg/kg/24 hr after the initial dose of 15 mg/kg Dosing Considerations Peak values 18-26 mg/L; trough values 5-10 mg/L; however, Infectious Diseases Society of America and other guidelines urge troughs 15-20 mg/L

Only treat or prevent infections proven or strongly suspected to be caused by susceptible bacteria to reduce development of drug-resistant bacteria

Limitations of use Oral vancomycin: Not effective for other types of infections IV vancomycin: Not

effective for treatment of staphylococcal enterocolitis and C. difficile-associated diarrhea

Vancomycin in Neurosurgery

- Methicillin-Resistant Staphylococcus aureus Nasal Screening With Polymerase Chain Reaction for Early De-escalation of Empiric Vancomycin in the Treatment of Suspected/Confirmed Respiratory Infection in Critically Ill Patients
- Comparative effectiveness of monotherapy vs. combination therapy for postoperative central nervous system infections in neurosurgical patients: a retrospective cohort study
- RETRACTION: A Meta-Analysis Examined the Effect of Intrawound Vancomycin on Surgical Site Wound Infections in Non-Spinal Neurosurgical Operation
- Analysis of intracerebral abscesses in Deep Brain Stimulation and association with hardware-related wound complications
- RETRACTION: Effect of Powdered Vancomycin on Stopping Surgical Site Wound Infections in Neurosurgery: A Meta-Analysis
- Zwitterionic Molecularly Imprinted Hairy Cellulose Nanocrystals Enable Selective Vancomycin Removal
- The Conservative Treatment of a Rare Postoperative Complication of DBS-Brain Abscess: Case Series
- Ceftaroline + Rifampin Versus Vancomycin + Rifampin in the Treatment of Methicillin-Resistant Staphylococcus aureus Meningitis in an Experimental Rabbit Model

Vancomycin Cerebrospinal Fluid Pharmacokinetics

A study described the cerebrospinal fluid (CSF) exposure of vancomycin in 8 children prescribed intravenous vancomycin therapy for cerebral ventricular shunt infection. Vancomycin CSF concentrations ranged from 0.06 to 9.13 mg/L and the CSF: plasma ratio ranged from 0 to 0.66. Two of 3 children with a staphylococcal CSF infection had CSF concentrations greater than the minimal inhibitory concentration at the end of the dosing interval [1)].

Cerebrospinal fluid (CSF) penetration and the pharmacokinetics of vancomycin were studied after continuous infusion (50 to 60 mg/kg of body weight/day after a loading dose of 15 mg/kg) in 13 mechanically ventilated patients hospitalized in an intensive care unit. Seven patients were treated for sensitive bacterial meningitis and the other six patients, who had a severe concomitant neurologic disease with intracranial hypertension, were treated for various infections. Vancomycin CSF penetration was significantly higher ($P < 0.05$) in the meningitis group (serum/CSF ratio, 48%) than in the other group (serum/CSF ratio, 18%). Vancomycin pharmacokinetic parameters did not differ from those obtained with conventional dosing. No adverse effect was observed, in particular with regard to renal function [2)].

Ichinose et al. evaluated the concentration of Vancomycin in the plasma and CSF of postoperative neurosurgical patients with bacterial meningitis and evaluated the factors that affect the transferability of VCM to CSF. The concentrations of VCM in plasma (trough) and CSF were determined in eight patients (four males and four females) with bacterial meningitis who were treated with VCM

using High-performance liquid chromatography. The ratio of the VCM concentrations in CSF/plasma was also calculated by estimating the blood VCM concentration at the same time as the VCM concentration in CSF was measured. The results showed that the VCM concentration in CSF was 0.9-12.7 µg/mL and the CSF/plasma VCM concentration ratio was 0.02-0.62. They examined the effect of drainage on the transferability of VCM to CSF, which showed that the VCM concentration in CSF and the CSF/plasma VCM concentration ratio were significantly higher in patients not undergoing drainage than in patients who were undergoing drainage. The CSF protein and glucose concentrations, which are diagnostic indicators of meningitis, were positively correlated with the VCM concentration in CSF and the CSF/plasma VCM concentration ratio. Thus, VCM transferability to CSF may be affected by changes in the status of the blood-brain barrier and blood-cerebrospinal fluid barrier due to drainage or meningitis [3].

Indications

Vancomycin Indications.

Vancomycin powder

see Vancomycin powder.

Intraventricular Vancomycin

Intraventricular Vancomycin

[1]
Autmizguine J, Moran C, Gonzalez D, Capparelli EV, Smith PB, Grant GA, Benjamin DK Jr, Cohen-Wolkowiez M, Watt KM. Vancomycin cerebrospinal fluid pharmacokinetics in children with cerebral ventricular shunt infections. Pediatr Infect Dis J. 2014 Oct;33(10):e270-2. doi: 10.1097/INF.0000000000000385. PMID: 24776517; PMCID: PMC4209191.

[2]
Albanèse J, Léone M, Bruguerolle B, Ayem ML, Lacarelle B, Martin C. Cerebrospinal fluid penetration and pharmacokinetics of vancomycin administered by continuous infusion to mechanically ventilated patients in an intensive care unit. Antimicrob Agents Chemother. 2000 May;44(5):1356-8. doi: 10.1128/AAC.44.5.1356-1358.2000. PMID: 10770777; PMCID: PMC89870.

[3]
Ichinose N, Shinoda K, Yoshikawa G, Fukao E, Enoki Y, Taguchi K, Oda T, Tsutsumi K, Matsumoto K. Exploring the Factors Affecting the Transferability of Vancomycin to Cerebrospinal Fluid in Postoperative Neurosurgical Patients with Bacterial Meningitis. Biol Pharm Bull. 2022;45(9):1398-1402. doi: 10.1248/bpb.b22-00361. PMID: 36047211.