

Use

Vancomycin is widely used when staphylococcal infection is caused by an organism resistant to flucloxacillin and/or gentamicin. One alternative is teicoplanin (q.v.). Consider giving rifampicin (q.v.) as well. Empiric use is common when post-natally acquired infection is suspected and the organism is not yet known, but flucloxacillin (q.v.) has the bacterostatic potential needed to keep most 'resistant' coagulase-negative infection in check.

Pharmacology

The glycopeptide antibiotic vancomycin, first isolated in 1956, is bactericidal to most Gram-positive organisms, but inactive against Gram-negative organisms. It crosses the placenta and penetrates most body fluids reasonably well, but only enters the CSF to any extent when the meninges are inflamed. It is very poorly absorbed by mouth, and causes pain and tissue necrosis when given intramuscularly. Vancomycin is excreted virtually unchanged in the urine, and has to be given with caution in patients with poor renal function. The serum half life is 4–10 hours at birth, later falling to 2–4 hours (6–8 hours in adults). Rapid IV infusion causes erythema and intense pruritis due to histamine release (the so called 'red man syndrome'), and may cause a dangerous arrhythmia, but there is no evidence that continuous infusion is better than intermittent dosing (except possibly for CNS infection). There is no evidence of toxicity in animals, nephrotoxicity has not been seen with the product currently used, and most patients developing ototoxicity were also taking an aminoglycoside or diuretic (suggesting that damage was wrongly attributed, or that combined use increases the risk). Neutropenia is a rare complication of sustained use. Use during pregnancy or lactation does not seem hazardous to the baby. Giving both vancomycin and rifampicin minimises the risk of initially sensitive organisms becoming resistant, and is particularly useful in catheter and shunt-related coagulase-negative staphylococcal infection.

Prophylaxis

Oral: Giving 15 mg/kg by mouth once every 8 hours for 7 days can reduce the risk of necrotising enterocolitis (as can an oral aminoglycoside), but might encourage the proliferation of multi-resistant bacteria.

IV: Adding 25 micrograms of vancomycin to each ml of TPN makes catheter-related staphylococcal infection less likely, but such use may not be risk free. Teicoplanin (q.v.) has been used in the same way.

Treatment

Dose: Give 15 mg/kg (3 ml/kg of the dilute solution made up as described below) IV over one hour pick-backed onto an existing IV infusion of dextrose or dextrose saline.

Timing: Give every 24 hours in babies of less than 29 weeks gestation in the first week of life, every 12 hours in all other babies of less than 36 weeks postmenstrual age, every 8 hours in babies of 36–44 weeks, and every 6 hours in babies of over 44 weeks postmenstrual age. Treat proven CNS infection for two weeks.

Monitoring: Monitor the trough blood level if treatment needs to be started in the first week of life, if there is renal failure, or if treatment does not seem to be working, and adjust the dosage interval as necessary.

Continuous IV use: 30 mg/kg a day (50 mg/kg in babies over 3 months old) can be given as a continuous infusion, but a prompt therapeutic level will *only* be achieved if a first 10 mg/kg loading dose is given over 1 hour.

Intrathecal use: Give 2 mg/kg of the normal IV preparation once a day, or once every other day, into the ventricles if the CSF is not sterile within 48 hours. Two to four doses will usually suffice. Adjust the initial dose as necessary to achieve a trough CSF level of about 20 mg/l. Consider giving rifampicin as well.

Blood levels

A plasma trough level of 5–10 mg/l (1 mg/l = 0.67 μmol/l) usually suffices, but aim for 15–20 mg/l if endocarditis, a CNS, or a methicillin resistant staphylococcal infection is suspected. Submit 0.5 ml of blood.

Compatibility

Vancomycin may be added (terminally) to TPN with or without lipid, and mixed (terminally) with caffeine, insulin, midazolam, milrinone, morphine, remifentanil or ≤1 unit/ml heparin. Do not mix vancomycin with IV gelatin.

Supply

Stock 500 mg vials cost £8.70 each. Add 9.7 ml of sterile water for injections to the dry powder to get a solution containing 50 mg/ml. Because concentrated solutions cause thrombophlebitis, individual doses for IV or oral use are prepared by drawing 1 ml of this reconstituted (50 mg/ml) solution into a syringe and diluting to 10 ml with 10% dextrose or dextrose saline to provide a solution containing 5 mg/ml. The fluid has a pH of 2.8 – 4.5.

References

See also relevant Cochrane reviews ©

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