Ticarcillin*

Class: β-lactam

Overview

Ticarcillin is one of the carboxypenicillins, a semisynthetic group of β-lactams. These carboxypenicillins, like ureidopenicillins, were developed for effectiveness against enterobacteriaceae (*Klebsiella* species, *Proteus* species, *Enterobacter* species and *Pseudomonas aeruginosa*). Carbenicillin was developed by adding a carboxyl group to the penicillin molecule. Ticarcillin was developed by adding additional substitutions to the carbenicillin carboxyl group. Ticarcillin exhibits greater antipseudomonal activity than carbenicillin. Ticarcillin is not acid-stable, therefore the drug is administered parenterally.

Resistance

Primary mechanisms of resistance against ticarcillin and other β-lactams are production of β-lactamases and alteration of penicillin binding proteins. Decreased permeability through the bacterial cell wall is another mechanism of resistance. Recent epidemiologic surveillance indicates that up to 50% of *Pseudomonas aeruginosa* isolates are resistant to ticarcillin.

Effectiveness

Ticarcillin was developed for increased effectiveness against Gram-negative bacteria, like *Klebsiella* species, *Proteus* species, *Enterobacter* species and especially *Pseudomonas aeruginos.* In fact, ticarcillin is often referred to as an anti-pseudomonal penicillin. This increased effectiveness against Gram-negative organisms is balanced by decreased effectiveness against Gram-positive organisms. These antibacterials can be combined with β-lactamase inhibitors to increase the spectrum of effectiveness against β-lactamase–producing bacteria, such as *H influenzae, M catarrhalis, Staphylococcus* species, *Neisseria gonorrhoeae*, *Escherichia coli*, *Klebsiella pneumoniae*, *Proteus* species, *Bacteroides fragilis* group, *Fusobacterium* species, *Prevotella* species and *Porphyromonas* species. In human medicine, ticarcillin/clavulanate combinations are used in the treatment of infected animal bite wounds and aspiration pneumonia. Ticarcillin is also used in infections caused by *Pseudomonas aeruginosa,* including osteomyelitis, and abdominal infections.

See the penicillin section for an explanation of uptake in body fluids and CSF.

***References available by request. Call the Infectious Disease Epidemiology Section, Office of Public Health, Louisiana Department of Health and Hospitals (504-219-4563)**