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Ampicillin

Updated: March 30, 2016.

OVERVIEW

Ampicillin is considered a third generation or aminopenicillin and is used widely to treat mild-to-severe infections due to susceptible organisms. Ampicillin has been linked with idiosyncratic liver injury, but very rarely and in isolated case reports.

Background

Ampicillin (am" pi sil' in) is an oral, third generation penicillin that is one of the most commonly used antibiotics worldwide. Ampicillin has been available in the United States since the mid-1960s and continues to be widely used for bacterial infections in both children and adults. Ampicillin is indicated for mild-to-severe upper respiratory tract infections caused by susceptible agents, such as (but not limited to) Escherichia coli, Hemophilis influenzae, Listeria monocytogenesis, Neisseria gonorrhoeae, Proteus mirabilis, Salmonella, Shigella, Staphylococcus aureus (non-penicillinase producing), Staphyloccocus epidermidis, and Streptococcus pneumoniae. Ampicillin is also used for pneumonia, meningitis, endocarditis and uncomplicated gonorrhea. Ampicillin is available orally in multiple generic formulations as capsules of 250 and 500 mg and is usually given in doses of 250 to 500 mg every 6 to 8 hours for 7 to 14 days. Ampicillin is also available in parenteral form (intramuscular and intravenous) and recommended doses are 2 to 4 grams daily in divided doses given every 4 to 6 hours.

Hepatotoxicity

Rare instances of idiosyncratic liver injury have been reported in persons receiving the aminopenicillins. The incidence is far lower than occurs with amoxicillin and probably less than 1 in 100,000 exposured persons. Cases are characterized by a short latency period of a few days to as long as two weeks. The onset of liver injury can occur after the antibiotic is stopped. The serum enzyme pattern associated with aminopenicillin liver injury has included a hepatocellular pattern with marked elevations in ALT and AST, and minimal elevations in alkaline phosphatase and rapid recovery after withdrawal. In addition, cholestatic forms of hepatic injury with marked alkaline phosphatase elevations (as also seen with penicillin-induced liver injury) have also been described, some of which have been associated with prolonged cholestasis and, rarely, with vanishing bile duct syndrome. The onset of hepatic injury may be accompanied by skin rash, toxic epidermal necrolysis or Stevens Johnson syndrome. Autoantibodies are uncommon.

Likelihood score: C (probable but rare cause of clinically apparent liver injury).

Mechanism of Injury

The cause of the liver injury associated with ampicillin use is probably hypersensitivity or allergy. Few cases of rechallenge or reexposure have been reported.

Outcome and Management

In the few cases of aminopenicillin related acute liver injury that have been described, most patients have recovered, although recovery has been slow in some cholestatic instances (2 to 6 months). Rare instances of acute liver failure and several cases of vanishing bile duct syndrome have been reported with aminopenicillin induced liver injury. Corticosteroids have often been used to treat the allergic manifestations of penicillin related immunoallergic hepatitis; while corticosteroid therapy may improve fever and rash promptly, their efficacy in ameliorating the accompanying liver disease has not been shown. Instances of recurrence of liver injury with reexposure to the aminopenicillins and recurrence with exposure to cephalosporins have been reported. Patients with aminopenicillin induced hepatitis should avoid reexposure to other penicillins and should take cephalosporins with caution.

References to the hepatotoxicity and safety of ampicillin are provided in the Overview section on the aminopenicillins.

Drug Class: Antiinfective Agents, Aminopenicillins

Other Drugs in the Subclass, Aminopenicillins: Amoxicillin, Amoxicillin/Clavulanate, Ampicillin/Sulbactam, Bacampicillin, Pivampicillin

PRODUCT INFORMATION

REPRESENTATIVE TRADE NAMES

Ampicillin – Generic, Principen®

DRUG CLASS

Antiinfective Agents

COMPLETE LABELING

Product labeling at DailyMed, National Library of Medicine, NIH

CHEMICAL FORMULA AND STRUCTURE

DRUG	CAS REGISTRY NO	MOLECULAR FORMULA	STRUCTURE
Ampicillin	69-53-4	C16-H19-N3-O4-S