

amphetamine

Pharmacology, Warnings, Pregnancy, Lactation, Side Effects, IV Compatibility, Dosage, Additional Dosage

Pharmacology (Top)

Pharmacology

Amphetamines are non-catecholamine sympathomimetic amines with CNS stimulant activity. Amphetamine is the parent compound of its own structural class, comprising a broad range of psychoactive derivatives. The d-isomer (dextroamphetamine) is the predominant form of the drug used. Other forms include MDMA (Ecstasy), N-methylated form (methamphetamine), and mixed amphetamine salts like in the product Adderall (three parts d-amphetamine and one part l-amphetamine).

Amphetamines are sympathetic amines that are known to stimulate the CNS by release of norepinephrine from central noradrenergic neurons. Higher levels of amphetamines may also cause dopamine to be released in the mesolimbic system. Peripheral effects of amphetamine-induced CNS stimulation include bronchodilation, respiratory stimulation, and AV and cardiac conduction enhancement.

Amphetamines are approved by the FDA for the treatment of patients with narcolepsy or attention deficit disorder with hyperactivity.

Amphetamines are listed as a Schedule II drug under the Federal Controlled Substances Act of 1970.

Pharmacokinetics

Routes of administration include oral, intravenous, vaporized, and insufflated. Amphetamines are well absorbed with an average bioavailability of 25%. The average T_{max} for d,l-amphetamine is 3 hours.

Plasma protein binding of amphetamine is approximately 20%.

The mean volume of distribution of amphetamine is 4 L/kg.

There are no data on the plasma clearance of amphetamine.

The average elimination half-life of amphetamine is 6 to 13 hours.

Hepatic metabolism of amphetamine is extensive. Excretion occurs primarily in the urine and is dependent on urine pH. A significant portion of amphetamines are excreted unchanged in the urine.

There are no data on the pharmacokinetic disposition of amphetamine in patients with renal and/or liver dysfunction.

There are no data on the hemodialysis or peritoneal dialysis clearance of amphetamine.

Warnings (Top)

(Severity: General Warning Exists)

Misuse of amphetamine may cause serious cardiovascular adverse events and sudden death.

Sudden death has been reported in association with amphetamine treatment at usual doses in children with structural cardiac abnormalities. Therefore, amphetamine use is not recommended for children or adults with structural cardiac abnormalities.

Amphetamines are contraindicated for use in patients with advanced arteriosclerosis, symptomatic cardiovascular disease, moderate to severe hypertension, hyperthyroidism, and glaucoma.

Use of amphetamines is also contraindicated in patients in agitated states or with a history of drug abuse. Administration of amphetamines to psychotic children has been reported to have exacerbated symptoms of behavior disturbance and thought disorder.

Caution is recommended if the drug is to be prescribed to a patient with mild hypertension.

In order to decrease the possibility of an overdose, it is recommended that the smallest practical quantities be prescribed.

Amphetamines have been reported to exacerbate motor and phonic tics and Tourette's syndrome.

Because of the potential for causing dependence, hypertension, angina, and myocardial infarction and because of CNS stimulant adverse effects, amphetamine meets the Beers criteria as a medication that is potentially inappropriate for use in older adults.

Pregnancy (Top)

(Severity: Major Female Pregnancy Warning)

Amphetamines have been assigned to pregnancy category C by the FDA. Animal studies have revealed evidence of embryotoxicity and teratogenicity. There are no controlled data in human pregnancy. There has been one report of a case of severe congenital bony deformity, tracheoesophageal fistula, and anal atresia (vater association) in a baby born to a woman using dextroamphetamine during the first trimester of pregnancy. Amphetamines should only be given during pregnancy when benefits outweigh risks.

Infants born to mothers dependent on amphetamines have an increased risk of premature delivery and low birth weight. These infants may experience symptoms of withdrawal including dysphoria, agitation, weakness, and exhaustion.

One study on the affects of methamphetamine abuse on pregnancy outcome reported that body weight, length, and head circumference were significantly decreased in neonates born to mothers who abused methamphetamines during pregnancy. The study also noted that the frequency of congenital anomalies was not significantly increased.

Lactation (Top)

(Severity: Major Lactation Warning)

Amphetamines are excreted into human milk. Amphetamines are considered contraindicated during breast-feeding by the manufacturer.

Side Effects (Top)

Cardiovascular

Cardiovascular side effects have included tachycardia, palpitations, and elevated blood pressure. Cardiomyopathy and myocardial infarction have been reported rarely.

Nervous system

Nervous system side effects have included depression, seizures, stroke, overstimulation, restlessness, dizziness, insomnia, euphoria, dyskinesia, dysphoria, tremor, headache, exacerbation of motor and phonic tics, and Tourette's syndrome. Psychotic episodes at recommended doses have been reported rarely.

Gastrointestinal

Gastrointestinal side effects have included dry mouth, unpleasant taste, diarrhea, constipation, anorexia, weight loss, and other disturbances.

Dermatologic

Dermatologic side effects have included urticaria.

Endocrine

Endocrine side effects have included impotence and changes in libido.

Other 1

Other side effects have included a significant elevation (highest in the evening) of the plasma corticosteroid levels. Amphetamines may interfere with urinary steroid determination.

General

General side effects including headache (26%) and asthenia (6%) have been reported.

IV Compatibility

Dosage

Additional Dosage