

## Chloroquine and Hydroxychloroquine Overdose

Chloroquine (Aralen®) is commonly used for the treatment and prevention of malaria. Hydroxychloroquine, a constituent of chloroquine, is sold in the U.S. as Plaquenil® and is also utilized for its anti-malarial activity. Hydroxychloroquine is also indicated for the treatment of lupus erythematosus and rheumatoid arthritis due to the drug's effects on mitigating the inflammatory process. Chloroquine has been used as a method of suicide advocated by assisted suicide and "right-to-die" societies, primarily in other countries.

Chloroquine and hydroxychloroquine toxicity and overdose are of concern because of a narrow therapeutic window and fast absorption time. Features of toxicity may develop within 1 to 2 hours of ingestion and death may occur abruptly, generally from myocardial depression and dysrhythmias. The chloroquine toxidrome also manifests itself with hyperexcitability, agitation, hypotension, seizures, hypokalemia, QRS and QT widening and cardiac arrest. As little as 2.25 grams to 3 grams of chloroquine may be fatal in an adult and about 2 to 3 times a therapeutic dose may be fatal in children. There is very limited data on pediatric hydroxychloroquine overdoses, but given its similarity to chloroquine, it also should be considered potentially toxic in small doses.

Treatment of a chloroquine overdose begins with GI decontamination with activated charcoal within 1-2 hours after ingestion. ECG and vital signs should be monitored carefully with aggressive treatment as signs of toxicity present. IV fluids and epinephrine are indicated in patients with hypotension, dysrhythmias, or circulatory collapse. Many studies have recommended the use of very high doses of diazepam to treat arrhythmias and hypotension as well as seizures in severe cases. Diazepam's actions on the GABA receptors in the central nervous system may play a part in the beneficial outcomes of patients, however, the exact mechanism is not completely understood. It is recommended that a diazepam infusion of 2 mg/kg over 30 minutes be used in these high risk patients. A continuous infusion of diazepam may be given at a dose of 1 to 2 milligrams/kilogram/day or more as needed over 2 to 4 days.

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### ***DID YOU KNOW THAT... Levamisole is a common adulterant in cocaine?***

Illicit drugs such as cocaine are often mixed with other drugs and chemicals before being sold on the street. Levamisole has been increasingly detected in cocaine since 2002. In July 2009, 70% of cocaine samples analyzed by the DEA contained levamisole. The Center for Substance Abuse Research (CESAR, [www.cesar.umd.edu](http://www.cesar.umd.edu)) reports that 45% of 75 random cocaine samples obtained from arrestees and analyzed by the District of Columbia Pretrial Services Agency tested positive for levamisole. Exposure to levamisole can cause agranulocytosis and serious infections. Health care providers should consider levamisole-contaminated cocaine as a possible cause of unexplained fever and agranulocytosis.



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