

Salicylate Poisoning

Salicylates (aspirin, methyl salicylate, salicylic acid and others) are found in many over-the-counter and prescription medicines. Poisonings often occur as a result of unintentional ingestions by children, dermal absorption from the extensive application of topical products, chronic therapeutic intoxications, and intentional overdoses. In 2004, there were more than 37,000 exposures to salicylates reported to U.S. poison centers.

Salicylate poisonings are characterized by acid-base disturbances, electrolyte abnormalities, and central nervous system effects. The early clinical effects include nausea, vomiting, diaphoresis, confusion, tinnitus and hyperventilation. Dehydration, hypokalemia and hypoglycemia often occur. A mixed respiratory alkalosis (from direct respiratory stimulation) and anion gap metabolic acidosis is often present. Patients who are severely toxic may develop seizures, coma, dysrhythmias, hypotension and noncardiogenic pulmonary edema. The mortality rate in acute overdoses is estimated to be less than 2%. Chronic overdoses are often not diagnosed until after the onset of severe effects and have a mortality rate as high as 25%.

Peak serum salicylate levels do not occur until approximately 6 hours after an acute ingestion. Because factors such as the presence of enteric coated tablets, the formation of concretions in the GI tract, and pyloric stenosis might be present, peak levels may be delayed even longer. Serial salicylate levels should be obtained every 2-4 hours until a decreasing trend is evident, and then should be repeated every 4-6 hours until less than 30 mg/dL. Although it is important to follow the trend of salicylate levels, they do not reliably correlate with severity of toxicity. Levels as low as 30-40 mg/dL can be associated with life-threatening symptoms.

Initial treatment of salicylate overdoses consists of activated charcoal, fluid resuscitation, and electrolyte replacement. Alkalinizing the blood to a pH of 7.45-7.55 with sodium bicarbonate results in "ion trapping", keeping salicylate in the blood and out of the brain. Sodium bicarbonate administration also alkalinizes the urine, increasing the excretion of salicylates. Mechanical ventilation should be used cautiously (see below). Hemodialysis may be used to remove salicylate in cases where there is a high salicylate blood level, severe fluid or electrolyte disturbances or inability to excrete the salicylate.

DID YOU KNOW THAT... Intubating and ventilating a patient with salicylate toxicity can result in worsening of toxic effects and death?

Once intubated, patients usually cannot be ventilated rapidly enough to maintain an alkaline pH. Because salicylates are nonionized in an acidic environment, acidemia results in rapid distribution of salicylate into the brain, lung and heart. This can result in worsening symptoms and death. Should intubation and ventilation be required, alkalization should be maintained with sodium bicarbonate.



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