

Candy Flavoring as a Source of Salicylate Poisoning

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ABSTRACT. Methyl salicylate (oil of wintergreen) in the form of candy flavoring was ingested by a 21-month-old male infant who subsequently developed vomiting, lethargy, and hyperpnea. A "swallow" of the solution resulted in a serum salicylate concentration of 81 mg/dL six hours after ingestion. The infant was treated with parenteral fluids and sodium bicarbonate and he recovered rapidly. Hazards associated with salicylate use in this form include lack of parental awareness of the substance's toxic potential, the attractiveness of the candy-like odor, and the availability of the liquid in non-child-resistant packaging containing potentially lethal quantities. *Pediatrics* 1985;75:869-871; *salicylate poisoning, methyl salicylate, oil of wintergreen, poisoning prevention packaging.*

Methyl salicylate in the form of oil of wintergreen *United States Pharmacopeia* was a notorious source for severe, often fatal, poisoning which resulted from ingestion of the highly concentrated liquid salicylate.¹ Although still available in liquid form for topical use, methyl salicylate is more commonly found in topical products that have been infrequently associated with serious toxicity. However, a recent salicylate poisoning revealed a previously unappreciated source of methyl salicylate: oil of wintergreen sold as a flavoring agent for homemade candy.

CASE REPORT

A 21-month-old male infant was observed to open a kitchen cabinet containing baking supplies and to drink a "swallow" of oil of wintergreen, which was in a child-resistant bottle containing 7.5 mL (0.25 oz) of fluid. The

mother, in rinsing his mouth with water, induced vomiting. Upon contacting a poison control center, the mother was advised to give the infant milk and water and to observe him for the possible onset of any adverse symptoms. During the next five hours, the infant became lethargic and had several episodes of vomiting; he was brought to the emergency room when diaphoresis and "panting" respirations occurred.

The infant was hyperpneic and fussy, but findings on physical examination were within normal limits: temperature 37°C, pulse rate 172 beats per minute, respirations 36/min. Gastric lavage was performed and intravenous fluid hydration begun. Laboratory testing demonstrated normal serum electrolyte, renal function, glucose, and hematology values. A venous blood gas sample revealed a pH of 7.35, PCO₂ 35 mmHg, HCO₃ 19 mEq/L, and a serum salicylate concentration of 81 mg/dL (six hours after ingestion). Inspection of the oil of wintergreen container in the emergency room confirmed that approximately 4 mL of liquid was missing (presumably ingested).

A diagnosis of moderate salicylate intoxication was made using the Done nomogram,² and the infant was hospitalized for aggressive treatment with parenteral fluids containing dextrose 5% in water with 0.2% sodium chloride, potassium chloride, 30 mEq/L, and sodium bicarbonate, 40 mEq/L. Serum salicylate concentrations gradually decreased during therapy: 61 mg/dL (14 hours after ingestion), 45 mg/dL (25 hours), 13 mg/dL (44 hours). The infant did well and was discharged from the hospital (48 hours after ingestion).

DISCUSSION

In 1981, only 38 cases of methyl salicylate ingestion were reported to the Bureau of Poison Control, Food and Drug Administration; of these, there were signs of toxicity in 11 cases. Current sources of methyl salicylate include numerous topical liniments, rubs, lotions, and as demonstrated in this case, oil of wintergreen used for food flavoring.

Oil of wintergreen *USP* (oil of sweet birch, tea-berry oil) contains 98% to 100.5% methyl salicylate. One teaspoonful of oil of wintergreen, approxi-

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mately equal to one "swallow,"³ contains the equivalent of 5 g of salicylate or 21.7 adult aspirin tablets.⁴ Ingestion of as little as 4 mL in a child and 6 mL in an adult has been fatal,¹ although a lethal dose in an adult is usually estimated as 30 mL. The high mortality reported due to methyl salicylate suggests an inherently greater toxic potential when compared with other salicylates. However, the mortality is related more to the high salicylate concentration in the liquid than to any toxicologic differences.

The metabolic fate of methyl salicylate in the body remains controversial. Early reports of poisonings described a delayed rate of drug absorption (up to ten hours) based upon onset of symptoms and development of toxicity.⁵ However, although absorption of methyl salicylate may be slower when compared with more soluble salicylates (sodium salicylate), blood levels are detectable as early as 15 minutes after the dose is taken.⁶

Hydrolysis of methyl salicylate to liberate salicylate and methyl alcohol was believed to occur in the gastrointestinal tract, with absorption of salicylate in the form of sodium salicylate. However, demonstration of unaltered methyl salicylate in blood samples,⁶ the inability to produce hydrolysis under conditions simulating those in the alimentary

tract,⁵ and the demonstration of high activity for hydrolysis in rat liver⁶ suggest that drug hydrolysis occurs mostly in body tissues,¹ possibly the liver.⁶

Clinical manifestations of poisoning due to methyl salicylate are identical with those observed with other salicylates: acid-base disturbance, altered glucose metabolism, fluid and electrolyte imbalances, and CNS toxicity.^{1,2,4,7} Treatment is directed toward supportive care, correction of metabolic derangements, and drug removal via the gastrointestinal tract and kidney. As methyl salicylate may retard gastric emptying, gastric lavage or syrup of ipecac may be useful in removal up to 12 hours after ingestion.⁷ In select cases associated with severe poisoning, hemodialysis, peritoneal dialysis, or charcoal hemoperfusion techniques may be required to accelerate drug removal.⁷

Several aspects of this case are of great concern. First, there appears to be a lack of understanding and appreciation of the toxic potential of oil of wintergreen in the community. A substance that may be added to food is not generally perceived as a poisoning hazard. Thus, it is likely that a person who uses oil of wintergreen in a food preparation might show little concern when that material is accidentally ingested.

The packaging of oil of wintergreen as a candy

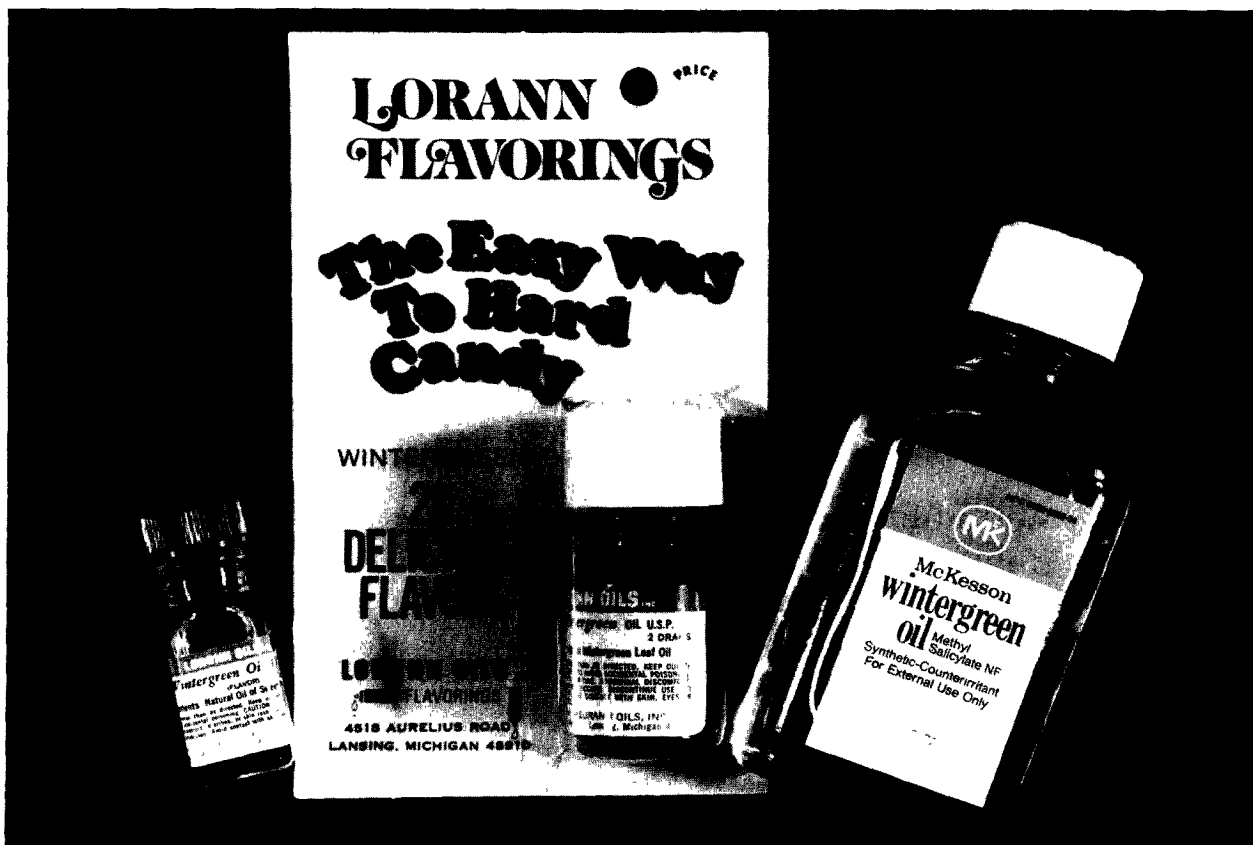


Figure. Commercially available oil of wintergreen products.

flavor is similar to the packaging used for less toxic oils, such as spearmint and clove, which are also used in candy-making. This can contribute to the confusion regarding the toxic potential of oil of wintergreen because, by packaging and labeling, the various oils appear identical.

Our patient's mother was unaware of the risks associated with her infant's actions. Furthermore, she remained uninformed even after examining the container because the product label does not provide any indication of the presence or the toxicity of methyl salicylate. The warning label states:

Do not use otherwise than as directed. Keep out of the reach of children to avoid accidental poisoning. CAUTION: If nausea, vomiting, abnormal discomfort, diarrhea or skin rash occurs, discontinue use and consult physician. Avoid contact with skin, eyes or mucous membranes.

It is also important to recognize that oil of wintergreen is sold in volumes that may be fatal to young children if part or all of the product is consumed. The use of child-resistant safety packaging is required by the Poison Prevention Packaging Act for liquid products containing more than 5% methyl salicylate by weight.⁸ However, as noted in this case, a young child may still defeat those safeguards. Also, as shown in the Figure, small vials (4 mL) of the products may not be child-resistant.

Although vomiting was inadvertently induced by rinsing of the mouth of this infant, syrup of ipecac could have been administered to maximize drug removal. Additionally, a delay in medical care until after onset of symptoms, as advised in this case, may be dangerous, when parents are less observant of signs of toxicity.

An unanswered question is the potential risk

associated with the ingestion of candy flavored with oil of wintergreen by patients with documented histories of aspirin hypersensitivity. The ingestion of commercial wintergreen-flavored products has precipitated hives and difficulty in breathing in a single patient with known aspirin allergy⁹; however, the frequency of this finding in the general population is unknown.

The pleasant odor of oil of wintergreen and its association with "candy" make this product attractive to children. We question the advisability of the marketing of oil of wintergreen for this purpose, particularly in inadequately safeguarded containers and in amounts known to be lethal in toddlers.

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