

ACUTE SODIUM FLUORIDE  
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The recent accidental ingestion of sodium fluoride at the Oregon State Hospital at Salem, Ore., resulted in the highest morbidity and mortality thus far reported in the medical literature from this particular poison. There were 263 cases, of which 47 terminated fatally following a meal of scrambled eggs. The identity of the poison was not established until approximately twenty-two hours had elapsed except that preliminary tests performed by Drs. F. R. Menne, N. A. David and H. J. Sears of the University of Oregon Medical School indicated a virulent poison in the stomach of some of the victims and in the scrambled eggs. When toxicologic examination revealed the presence of sodium fluoride, it was apparent that roach powder had been placed in the scrambled eggs served at the evening meal. Subsequent investigation disclosed that a patient helper had unwittingly mistaken roach powder for powdered milk and had added approximately 17 pounds of the compound to a 10 gallon mixture of scrambled eggs. Fortunately the eggs were not generally distributed throughout the hospital but were served to only five of the working wards.

## CLINICAL FINDINGS

The food was rejected by many of the patients because of a salty or soapy taste, while others complained of numbness of the mouth. Extremely severe nausea, vomiting and diarrhea occurred abruptly and at times simultaneously, and blood was noted in the vomitus and stools in many instances. Soon after the meal there were complaints of abdominal burning and cramplike pains. General collapse developed in most instances but at variable periods of time, apparently depending on the concentration of the poison. This was characterized by pallor, weakness, absent or thready pulse, shallow unlabored respiration, weak heart tones, wet cold skin, cyanosis and equally dilated pupils. When this picture was pronounced death almost invariably occurred. Local or generalized urticaria occurred in some instances while in others there was a thick, mucoid discharge from the mouth and nose. When death was delayed, and in some cases in which recovery occurred, there were paralysis of the muscles of deglutition, carpopedal spasm and spasm of the extremities. Convulsions and abdominal tenderness and rigidity were absent. In the majority of cases death occurred between two and four hours after ingestion of the food, although in a few instances death was delayed for eighteen or twenty hours.

With the explosive occurrence of 263 acute and violent cases, amid inadequate surroundings, treatment was of necessity on an empiric basis. A teaspoon of salt and sodium bicarbonate in a glass of water served as a gastric lavage. Shock was combated with respira-

tory and cardiac stimulants, and the following were used alone or in combination, depending on the individual case: nikethamide, epinephrine, caffeine with sodium benzoate, neosynephrin subcutaneously, 50 per cent dextrose intravenously, whisky by mouth and external heat. Magnesium sulfate was used as a purge and was probably of more specific value than was appreciated at the time.

Through the office of the district attorney and the coroner examination of 6 bodies was authorized, and on 3 of these a complete autopsy was performed. The essential findings are grouped as follows: In the most acute deaths the mucosa of the stomach, duodenum and first portion of the jejunum was edematous and hyperemic. The stomach contents were mucinous and contained large amounts of undigested egg. The colon was empty except for portions of undigested food, indicating the ferocity of the diarrhea; the mucosa here was unchanged. There was a general increased wetness and acute congestion of the abdominal viscera, and the liver and kidneys were swollen. The lungs were ballooned at their edges, with occasional interlobar petechial hemorrhages. There was no aspiration of the stomach contents. The heart showed decided dilatation of the right chambers, which contained fluid blood. The brain revealed only slight edema and hyperemia. When death was delayed the only other changes consisted of petechial hemorrhages of the gastric and duodenal mucosa. In no case was increased fat noted in the liver. Microscopic examination of the various organs confirmed these gross findings.

## TOXICOLOGIC EXAMINATION

The cooked eggs contained from 3.2 per cent to 13 per cent sodium fluoride in analyses made on different portions of the same sample, indicating a spotted distribution of the poison. One patient dying fifteen minutes after ingestion of the eggs showed an estimated 17.2 Gm. of sodium fluoride present in the stomach contents; when death occurred one hour after ingestion of the eggs an estimated 3.7 Gm. of sodium fluoride remained in the stomach contents; when death was delayed four hours, the stomach was empty but the entire liver contained an estimated 0.85 Gm. of sodium fluoride and both kidneys an estimated 0.21 Gm. of sodium fluoride; when death was delayed for eighteen hours only 0.18 Gm. of sodium fluoride was found in the stomach contents. In all cases fluorides were easily identified by the etch test on glass from the ash in 10 Gm. samples of kidney and liver and by the presence of calcium fluoride bands on spectrographic analysis.

Roach powder contains anywhere from 30 to 90 per cent sodium fluoride, depending on the manufacturer. The powder in question contained 90 per cent of the commercial salt. Sodium fluoride is a white powder with a salty, alkaline taste, odorless, very soluble in water and appearing grossly similar to sodium bicarbonate or flour. The fatal dose is given by Baldwin<sup>1</sup> as from 5 to 10 Gm. for human beings. This figure is the one most commonly accepted. Thienes<sup>2</sup> states that 0.25 Gm. has caused nausea and 4 Gm. has caused death.

The majority of reported poisonings by sodium fluoride have been mass poisonings due to the use of the compound in place of sodium bicarbonate, flour

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1. Baldwin, H. D.: *J. Am. Chem. Soc.* 21: 517, 1899.

2. Thienes, C. H.: *Clinical Toxicology*, Philadelphia, Lea & Febiger, 1940, p. 167.

or epsom salt (magnesium sulfate). In Pittsburgh on Nov. 11, 1940 sodium fluoride was mistaken for flour and added to pancakes at a Salvation Army service center, resulting in the poisoning of 40 persons and 12 deaths.<sup>3</sup> Wirthlin<sup>4</sup> reported a death by suicide following the ingestion of ½ pound of sodium fluoride in two hours. Geiger<sup>5</sup> reported 3 deaths when sodium fluoride was mixed with sodium bicarbonate, and in the same outbreak Carr<sup>6</sup> reported 3 additional fatalities and 2 suicides. Bell<sup>7</sup> reported the recovery of 1 patient who was seriously stricken after ingesting an estimated 5½ grains (0.33 Gm.) of sodium fluoride. Maletz<sup>8</sup> reported 1 case of fatal poisoning and 1 recovery, in which the amount of fluoride taken was small. Sharkey and Simpson<sup>9</sup> reported 1 case of fatal and 7 of nonfatal poisoning in which sodium fluoride was mistaken for epsom salt. Their paper also contains an excellent review of the literature up to that time.

COMMENT

The medical and nursing staff of the hospital found themselves confronted with an enormous task in caring for such a number of acutely ill patients. The difficulty was further aggravated by the obscure nature of the poison, which excluded the use of a specific antidote. It is interesting to speculate as to the reasons underlying the severity of the reaction in the different cases. On the basis of the toxicologic examination it is apparent that the sodium fluoride was unevenly mixed in the eggs, with consequent variation in the concentration. It was also apparent that the older patients, because of their generally poor physical condition, withstood the effects of the poison less readily than younger ones. The amount of food eaten naturally varied considerably, but it appeared that the more demented patients, who would be less discriminating in their food habits, suffered more than others. When there was prompt and copious vomiting, the effects were less severe.

Roach powder is commonly used around institutions, and our experience indicates that sodium fluoride is a more potent poison than has been generally recognized. It would seem that the same precautions concerning the packaging, labeling and distribution of this compound should be taken as with other well known poisons. That this danger is not apparent is indicated by the absence of a poison label on the container and failure of the manufacturer to color this substance so that it would be less easily mistaken for certain food substances to which it bears a close resemblance.

3. Food and Drug Review, January 1941.  
4. Wirthlin, M. R.: U. S. Nav. M. Bull. **35**:255 (April) 1937.  
5. Geiger, J. C.: California & West. Med **44**:81 (Feb) 1936.  
6. Carr, J. L.: California & West. Med. **44**:84 (Feb.) 1936.  
7. Bell, R. D.: Brit. M. J. **1**:886 (May 2) 1936.  
8. Maletz, Leo: New England J. Med. **213**:370 (Aug. 22) 1935.  
9. Sharkey, T. P., and Simpson, W. M.: Accidental Sodium Fluoride Poisoning, J. A. M. A. **100**:97 (Jan. 14) 1912.

**Medical Slang.**—There is not sufficient distinction in the medical mind between the spoken and the written word. Certain medical slang is highly descriptive and emotionally and intellectually suited to the purpose of professional discussion; when, however, such idiom is transferred to print it produces a different effect. There are too many examples of words and phrases incorporated and accepted into the medical press which offend against rules of style and grammar. Textbooks on 'the acute abdomen' are numerous: disease may be acute, but an abdomen, never. Exactness and dignity are the two essential qualities of good medical expression. The surgeon who 'laparotomises' his patient and the physician who diagnoses 'P. T. B.' achieve neither.—The Decay of Medical Language, editorial, *New Zealand M. J.* **41**:236 (Dec.) 1942.

THE ORAL USE OF SULFATHIAZOLE  
AS A PROPHYLAXIS FOR  
GONORRHEA

PRELIMINARY REPORT

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Our purpose in this study is to determine whether the prophylactic administration of sulfathiazole prevents the development of gonorrhea. The existence of an inordinately high gonorrhea rate among certain troops makes the development of an easily administered chemical prophylaxis particularly important. The following incomplete experimental data are published as

*Venereal Disease Rates in Control and Sulfathiazole Test Group at Fort Benning*  
(All rates per thousand per annum)

Month	Number in Group	Gonorrhea		Chancroid		Syphilis		Total	
		Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
1. Control Group (No Sulfathiazole)									
March	3,771	68	216	38	121	15	48	121	385
April	1,883	51	325	19	121	13	83	83	529
May	3,975	48	145	22	66	17	51	87	262
June	4,101	60	176	15	44	13	38	88	258
July	4,395	80	218	30	82	39	106	149	406
August	5,100	63	148	10	24	25	59	98	231
September	5,069	43	102	13	31	16	38	72	170
2. Test Group, Including All "Failures"									
March	1,200	18	180	6	60	5	50	29	290
April	1,560	28	216	15	115	4	31	47	362
May	1,565	5	38	7	54	3	23	15	115
June	1,555	5	38	2	15	8	62	15	115
July	1,440	4	33	6	50	7	58	17	141
August	1,200	7	70	3	30	1	10	11	110
September	1,223	1	10	4	39	4	39	9	88
3. Test Group, Omitting "Failures" Not Under the Sulfathiazole Medication as Prescribed									
March	1,200	18	180	7	60	5	50	29	290
April	1,560	28	216	15	115	4	31	47	362
May	1,565	1	8	1	8	3	23	5	39
June	1,555	1	8	0	0	8	62	9	70
July	1,440	1	8	1	8	7	58	9	74
August	1,200	1	10	1	10	1	10	3	30
September	1,223	0	0	0	0	4	39	4	39

a preliminary report because of the encouraging results already achieved.

Joses<sup>1</sup> and Kline and Ryan<sup>2</sup> have published articles on the subject of sulfathiazole prophylaxis. In both studies sulfathiazole was given in divided doses after exposure. In the former study gonorrhea did not develop in any of 350 men who received sulfathiazole; in the latter, of 1,000 who received the drug 3 developed gonorrhea.

METHOD OF STUDY

The test group consisted of a company of approximately 1,400 Negroes. The control group consisted of approximately 4,000 Negro troops from the same post.

The method of administering sulfathiazole was as follows: All soldiers in the test group were required to "sign out" and "sign in" through the noncommissioned officer in charge of quarters. On signing out, each soldier was given 2 Gm. of sulfathiazole and was observed to swallow it in the presence of the noncommissioned officer. During the first few weeks of the study all soldiers who did not have in their possession a copy of form 77 MD (station prophylaxis slip) on signing in were given 2 more Gm. of sulfathiazole and an additional 2 Gm. the following morning under the

Captain Loveless is venereal disease control officer and Colonel Denton is post surgeon at Fort Benning, Georgia.

1. Joses, Maurice: Sulfathiazole Prophylaxis of Gonorrhea and Chancroid, U. S. Nav. M. Bull. **40**:113 (Jan.) 1942.  
2. Kline, E. F., and Ryan, T. C.: Sulfathiazole Prophylaxis in Prevention of Gonococcus Infections, U. S. Nav. M. Bull. **40**:360 (April) 1942.