

clamps. The removal of the spleen was followed by a gush of blood from the organ. In Case 2, practically no blood escaped from the spleen, as it acted much like a large sponge. No difficulty was experienced with the cardiac end of the stomach, or the tail of the pancreas.

The splenic space was closed with continuous catgut on a small needle. There was very little blood lost, except from the back-flow of the fibrosed spleen in the case of Banti's disease. The wound was closed without drainage.

In regard to the pre-operative treatment of the Banti's case by radium, and of the splenomegalia lymphatica hyperplastica by x-ray, the reports received from Dr. Roberts and Dr. Kirkland showed that the results were about the same in both; the spleens were reduced to about one-third the former size. The reaction from the x-ray was quite severe; there was none from the radium. After separation of adhesions, the cutting of the suspensory ligament

allowed the spleen to come down so that ligaturing of the vessels was a simple matter.

I have recently examined patient No. 2, the case of splenomegalia lymphatica hyperplastica, and found him in the best of health and spirits. Palpation of the abdomen does not reveal any tender points or enlarged glands. The case of Banti's disease I have not seen, as she lives in the neighbouring province, but I have learned from her friends that she has gone through a very severe attack of grippe, but is now feeling very well.

A differentiation between splenomegalia lymphatica hyperplastica and Gaucher's disease might be questioned. Gaucher's disease is a disease of childhood; this man was 43 years of age. In Gaucher's disease there are no enlarged glands; this patient had general enlargement of the mesenteric glands only.

REFERENCES

1. BRILL, BACHÉ, AND ROSENTHAL, *J. Am. M. Ass.*, Feb. 28, 1925, lxxxiv, 9.

TWO FATAL CASES OF POISONING BY METHYL SALICYLATE

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CASES of poisoning by methyl salicylate appear to be excessively rare, judging from the scanty references to the matter which appear in medical literature. Not more than thirteen have been reported to date, six of them being fatal, and not all of these are fully corroborated by post-mortem examination or chemical tests. We, therefore, think it desirable to place on record two instances which have been investigated by us, coming more especially before one of us (F. V. W.), in his capacity as Examining Physician for the city of Halifax.

CASE 1

W. J. McD., male, aged 25 years. This man was a bottler in a soda water and soft drink factory, and had had access in the course of his work to a bottle purporting to contain true oil of wintergreen. He was a discharged soldier, and since the war had suffered from a severe cough and shortness of breath, for which he received treatment from time to time. He was somewhat addicted to drink.

During the night of March 1, 1927, his wife woke to find him sitting on the edge of the bed vomiting. He said he thought he was going to die. She did not regard the matter as serious, but she woke up later to

find him dead. There was no history of any convulsion. The authorities were notified, and an examination ordered.

An odour of wintergreen, or of some similar substance, was noticed in the room and about the body. An autopsy was performed by one of us (F. V. W.) at 11 a.m., March 2nd. The body was cold and rigid. All the blood was fluid, there being no clot detected at any point. The heart contained very little blood and the left ventricle was found to be in systole. The left lung was bound down to the pleura by numerous firm fibrous adhesions. The lungs were greatly engorged with blood and œdematous throughout, but even the most congested portions floated in water. The urine was removed by means of a clean catheter. The stomach was tied off carefully with its contents, and this organ, together with the kidneys and left lung, were put aside for fuller examination, which was conducted by one of us (A. G. N.).

The stomach was of average size, and the contents had been removed for chemical examination. The mucosa was swollen, glassy in appearance, with some adherent mucus, and was intensely congested throughout. There were no erosions. The colour was striking and unlike that of ordinary congestion, whether acute or chronic, being of an intense reddish purple tint. There was no smell of wintergreen noted about the organ. Microscopically, the superficial cells of the mucosa stained badly, and the blood vessels were greatly injected. The tubules were catarrhal.

The left lung was heavy, intensely congested, and œdematous throughout, but without any evidences of consolidation. It presented the same glassy character and the same peculiar reddish purple colour found in the

mucosa of the stomach. The chief features, microscopically, were congestion and œdema, with slight desquamation of the lining alveolar cells.

The kidneys were swollen and soft. On section, the cut surface was glassy and presented a deep reddish purple colour. There was little distinction in colour between the cortex and medulla. Microscopically, the cells of the contorted tubules were very cloudy, often necrotic; the vessels, particularly of the glomeruli, were much injected. The picture was that of an acute parenchymatous degeneration.

For the result of the chemical examination we are greatly indebted to Dr. Owen S. Gibbs, Professor of Pharmacology in Dalhousie University, who kindly undertook this part of the work.

The stomach contained 60 c.c. of a thick homogeneous fluid, resembling "Cream of Tomato Soup." The reaction of this fluid was acid, but not abnormally so. There was no volatile poison present, at least in sufficient amount to recognize by the odour. Tests for lead, arsenic, mercury, and antimony were negative. There was a very slight reaction for salicylates. Blood cells were not evident, but the material was coloured with blood pigment.

The urine found in the bladder measured 405 c.c., approximately. It was clear, pale yellow, and acid in reaction. There were some small deposits of cellular debris. Tests for albumin and blood were negative. There was a slight reduction of copper solution. There was no unusual odour. Distillation revealed no volatile bodies.

Forty-five c.c. of the urine, extracted with ether, gave 55 mgrms. of a crystalline body, having the appearance of, and responding to the chemical tests for, salicylates. This would give as the total amount of salicylate in the urine (calculated as the acid) about 0.5 gramme. This is the minimum, as the extraction was not quite complete.

CASE 2

S. A. R., a male child, well-developed, about twenty-two months old. The history was that sometime during the morning of July 2, 1927, the baby had found a bottle of oil of wintergreen, which was intended for external application. The bottle was broken, and an unknown amount was, presumably, swallowed. The parents, however, did not know positively if any of the drug had been swallowed, and there were no signs about the child's mouth. The bottle in question was of two or three ounces' capacity, and had been nearly full.

No symptoms were noted till late in the morning, when the child vomited an orange that he had eaten. In the afternoon he became troublesome, but was not thought to be ill. About ten o'clock p.m. a physician was summoned, who found the baby in tonic convulsions. The patient was sent to the Children's Hospital. Brandy, bismuth, camphorated oil, morphine, and calcium lactate were used. The child remained in a tetanic condition until death, which took place at 3 o'clock a.m., July 3rd.

An autopsy was performed by F. V. W. The findings, briefly, were as follows. The blood was dark and fluid. The lungs were deeply engorged and œdematous. The stomach was nearly empty (castor oil had been used, and there had been some vomiting). The greater part of the gastric mucosa was pale, yellowish in colour, with a few congested areas about the greater curvature and the pylorus. An aromatic odour, but not suggestive of wintergreen, was noted. Tests for salicylates in the material from the stomach were negative.

About one ounce of clear urine was found in the bladder, which had a strong odour of wintergreen. Chemical tests showed the presence of a considerable quantity of methyl salicylate. No gross disease was found in the other organs. The cause of death was considered to be accidental poisoning with oil of wintergreen.

Before summing up what is known in regard to poisoning by methyl salicylate, we may be permitted to outline the latest case reported, that of Pincus and Handley,⁷ inasmuch as, while there was unfortunately no autopsy, the case was carefully studied from the clinical side, and some points are brought out in connection with the examination of the blood which have not been referred to in the earlier cases.

The patient was a child, twenty-two months old, who had swallowed not more than 60 c.c. of oil of wintergreen. Five minutes after ingestion a considerable portion of it was vomited. The urine possessed the odour of wintergreen, and the same could be said of a stool passed 5½ hours after the oil had been taken. On admission to hospital, there was a slight elevation of temperature (99.6°), flushing of the cheeks, redness of the lips, but no cyanosis. The scleræ and conjunctivæ were injected. The extremities were cold. The breath smelled of acetone. About an hour after admission, convulsions began, and were repeated at short intervals for two hours. Cyanosis gradually developed and became general. The respirations assumed the Biot type. The pulse gradually became weaker, more rapid, and irregular. Ten or eleven hours after admission the urine had lost the odour of wintergreen. Death occurred fourteen hours after the drug had been taken. Rigor mortis and post-mortem lividity set in almost immediately.

The chief feature in the blood picture was a polymorphonuclear leucocytosis amounting to 81 per cent. (In infants lymphocytosis is the normal condition.) The blood chemistry tests showed acidosis, retention of phosphates and chlorides, and increase in the non-protein nitrogen, which would indicate severe damage to the kidneys.

REMARKS

Oil of wintergreen has been taken accidentally, with a view to suicide, and as an abortifacient. The amount usually stated to be a fatal dose is one ounce (Sollman), though recovery has taken place after the ingestion of this quantity. On the other hand, less than 15 c.c. has more than once caused death. Nerthney's case,⁸ a child of three years, died after taking 12 c.c. The smallest fatal dose was 10 c.c. in a

child of 21 months.⁹ Accidents from the therapeutic use of the drug seem to be unknown. This is due, no doubt, to the fact that oil of wintergreen is prescribed for external application only. At one time, years ago, it was a common practice to paint oil of wintergreen, and its congener guaiacol, on the skin in cases of rheumatism and even in tuberculosis. This practice has been discontinued, since it was realized that it was not free from danger, inasmuch as a great reduction in temperature, together with weakness, and even collapse, sometimes supervened. Sodium salicylate has also been known to produce untoward effects, when given internally, though no fatalities have been reported.

Where recovery has taken place, the following symptoms and physical signs have been noted: vomiting, purging, vertigo, general weakness, excessive appetite and thirst; rapid pulse, slow and laboured respiration; drowsiness and air hunger, acetone and diacetic acid in the urine; fever; contracted pupils, amblyopia; tremors, hemiparesis, and mania.

In the fatal cases, in addition, convulsions, tonic spasms, and opisthotonos may develop, followed by cyanosis, and collapse. The various authors lay stress upon epileptiform convulsions as the cardinal feature, clinically, in these cases. Pathologically-speaking, the outstanding features are, acute degenerative parenchymatous nephritis, acute gastritis, intense congestion and œdema of the lungs, and multiple small hæmorrhages in the pericardial

membrane, the pleuræ, and sub-durally. The convulsions and the parietic manifestations would appear to be explained by vascular disturbances in the cerebral cortex.

We would draw attention also to the fluidity of the blood, and to the extraordinary colour of the gastric mucosa, lungs, and kidneys, (Case 1), which strike us as characteristic. This is probably due to hæmolysis, and would harmonize with the intense cyanosis that has been observed during life, and the marked lividity after death.

Oil of wintergreen is a drug in rather common use, and it does not seem to be appreciated that it may be highly dangerous. More than thirty years ago, Laborde, on the basis of experiments conducted on animals, noted the toxic action of aromatic beverages made from natural and artificial essences, and showed that methyl salicylate must be classed among the poisons that produce epileptiform convulsions.

BIBLIOGRAPHY

1. GALLAGHER, *Phila. Med. Examiner*, 1852, viii, 347.
2. JEWETT, *New York Med. Gaz.*, 1868, viii, 380.
3. HAMILTON, *New York Med. J.*, 1875, xxi, 602.
4. PINKHAM, *Trans. Mass. Med. Soc.*, 1887, i, 379.
5. ———, *Boston M. & S. J.*, 1887, cxvii, 549.
6. NERTHNEY, (1903), quoted by Sollman in his *Manual of Pharmacology*, 1926.
7. BAUM, *Clin. Ophth.*, 1904, p. 3.
8. LEGRAIN AND BADONNEL, *J. Am. M. Ass.*, (Paris letter), 1922, lxxviii, 1140.
9. WETZEL, N. C., AND NOURSE, J. D., *Arch. Path. & Lab. Med.*, 1926, i, 182.
10. PINCUS, J. B., AND HANDLEY, H. E., *Johns Hopkins Hosp. Bull.*, 1927, xli, 163.

ALSO

See Beck's Medical Jurisprudence; Stillé's *Materia Medica*; and, Mann and Brend's *Forensic Medicine and Toxicology*.

Primary Carcinoma of Bronchi.—Thomas McCrae, Elmer H. Funk and Chevalier Jackson, Philadelphia, analyzed 187 collected cases, including their own. The evidence obtained suggests that carcinoma of the lung, which in the great majority of cases originates in a bronchus, is increasing in frequency. These bronchial tumours appear to have a relatively low malignancy, and hence the hope that early diagnosis and intensive roentgen-ray therapy may be effectual in at least prolonging life. Early diagnosis should be made if the possibility of bronchial neoplasm is considered and careful studies are made. The early symptoms are usually those of bronchial irritation and the

early signs those of bronchial obstruction. By bronchoscopy a positive diagnosis can almost always be made promptly and proper treatment instituted. Patients with obscure pulmonary and bronchial symptoms have a right to the benefit of bronchoscopy. Only in a very rare case is removal possible by the bronchoscope. Dependence must be on intensive roentgen-ray therapy, the details of administration of this depending on the judgment of the roentgenologist. With greater perfection in lung surgery, it is not too much to hope that removal of the lobe concerned may be possible. In any case, early diagnosis is essential.—*J. Am. M. Ass.*, Oct. 1, 1927.