

CASE REPORT

OIL OF WINTERGREEN (METHYL SALICYLATE) POISONING TREATED BY EXCHANGE TRANSFUSION*

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OIL OF WINTERGREEN, because of its pleasant odour and its warming effect when applied to the skin, has enjoyed a certain degree of popularity as a household remedy in the treatment of muscular aches and pains. Although the name of the product is well recognized as a commonly used counter-irritant, it is not well known that this material is highly toxic when ingested. Oil of wintergreen contains a very high (90-98%) concentration of methyl salicylate.¹ One teaspoon of this preparation is equal to approximately 45 grains of free salicylate.² It is not surprising, then, that as little as 4-8 ml. has been reported to be a fatal dose in young children.³ An indication of the magnitude of the problem of methyl salicylate poisoning may be obtained from the statistics of the United States Bureau of Census.⁴ In the ten-year period 1933-1943, there were 526 fatal cases of salicylate poisoning. Of these, 62% were due to methyl salicylate.

The purpose of this paper is to present the case history of a child with severe methyl salicylate intoxication and to report the results of treatment by exchange transfusion. This procedure, for many years used almost exclusively for the treatment of hemolytic disease of the newborn, has in recent years been used with beneficial results in a variety of poisonings. These include the treatment of poisoning due to boric acid,⁵ ferrous sulfate,⁶ isoniazid,⁷ and barbiturates.⁸ There have been four previous reports of the use of exchange transfusion in the management of methyl salicylate poisoning.^{1, 3, 9}

A boy, aged 3 years 2 months, was admitted to the Winnipeg Children's Hospital on November 21, 1960, at 2 p.m., with a history of having swallowed approximately one-half ounce of oil of wintergreen at 7 p.m. the previous evening. At the time of ingestion the parents had contacted first one and then a second physician, both of whom reassured them that nothing need be done. During the night the child was noted to be breathing very heavily and was difficult to rouse. He vomited several times. In the morning he was seen by a third physician and was referred immediately to hospital.

On arrival at the hospital (19 hours after ingestion of the drug) the child was very drowsy but could be aroused to full consciousness. He showed an extreme degree of hyperventilation with a rate of 40 per minute.

He was dehydrated to the extent of approximately 5% of his body weight. His blood pressure was 95/60 mm. Hg. All reflexes were hyperactive. Initial laboratory findings showed a serum salicylate level of 69 mg. %, blood urea nitrogen of 20 mg. %, sodium of 137 mEq./l., potassium 3.4 mEq./l., chlorides 110 mEq./l., a blood pCO₂ of 14, and pH of 7.38.

Intravenous fluids were started immediately with ½ lactated Ringer's solution, at 100 c.c. per hour. After two and one-half hours of intravenous fluids the salicylate level remained at 70 mg. % and the urine output was 20 ml. Four hours after admission the child's condition had deteriorated and he had become disoriented. The total urine output had been only 60 ml. It was decided at this time to proceed with an exchange transfusion.

The exchange was begun through a saphenous-femoral vein cutdown seven hours after admission and was completed in exactly three hours: 2430 ml. of fresh blood was exchanged, this representing approximately twice the child's blood volume. After each 500 ml. of exchanged blood, 4 ml. of calcium gluconate was injected and a sample of blood was taken for serum salicylate determination. All the removed blood was saved in order to calculate the total salicylate return. At the end of the exchange the serum salicylate level was 37 mg. %, the serum potassium concentration was 3.0 mEq./l. and the total salicylate removed was calculated to be 852 mg.

During the procedure the child improved considerably. His hyperventilation decreased and his state of consciousness improved. Intravenous fluids were continued with added potassium after the exchange. The urine output increased markedly. Nine hours after the procedure the salicylate level was 32 mg. % and he was able to tolerate oral fluids. Recovery from this point was uneventful.

DISCUSSION

The indications for exchange transfusion in salicylate poisoning are not clearly defined. The decision as to when to undertake this procedure still lies in the area of clinical judgment supported by laboratory measurements. The serum salicylate level is of value only when considered in relation to the time elapsed since ingestion. A high serum level within the first few hours of ingestion may occur in mild intoxications and if followed carefully may be found to fall rapidly to safe levels. A high level later in the course of events may well indicate a serious intoxication and should be managed accordingly. Recently, Done¹¹ has compiled a nomogram in an attempt to classify the severity of salicylate poisoning by the serum salicylate levels at various time intervals.

In the case presented here the decision regarding the need for emergency treatment was not a difficult one. With a salicylate level of 70 mg. % twenty hours after ingestion and in the face of poor renal function there was no question of the need for

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removal of salicylate by a route other than by urinary excretion. Under these circumstances there are two and possibly three methods of treatment available. Hemodialysis by artificial kidney has been found to be one effective method.^{12, 13} It is, however, a difficult procedure in small children and exceptional experience is needed by the operators. Recently, peritoneal dialysis has been suggested as a form of therapy on the basis of experiments on dogs.¹⁴ One report of this method in humans suggests that it may have something to offer, but more experience is needed in this technique. In a hospital for children where exchange transfusion is a familiar procedure and can be accomplished with minimal risk to the patient, it must be considered the treatment of choice. Objections by some that this method is an inefficient method of removing salicylate is contradicted by the return of 852 mg. of salicylate in this patient and by similar results in other reported cases.^{1, 3, 9, 10}

SUMMARY

The potential danger of oil of wintergreen as a highly toxic material is not generally recognized. A case of methyl salicylate poisoning treated by exchange transfusion is reported. This procedure resulted in the rapid removal of a large amount of salicylate and in marked clinical improvement of the patient. In young children this would appear to be a relatively efficient and safe method when emergency treatment is indicated.

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SHORT COMMUNICATION

EXFOLIATIVE CYTOLOGY IN ORTHOPEDICS

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ALTHOUGH aspiration biopsy and histological techniques have been amply used in the diagnosis of bone and joint diseases, to our knowledge the specific methodology of exfoliative cytology has not been applied before in this field. The purpose of this communication is to report our experience with the use of the cytologic method as applied to orthopedics.

Any collection of fluid in the organism tends to pool a representative selection of cells that exfoliate from normal or altered adjacent structures. Exfoliative cytology takes advantage of the fact that malignant tumours desquamate cells in much greater quantities than normal tissues. Malignant cells found in body fluids may permit an early diagnosis of an invasive tumour. This has proved effective in many sites of the human body.

Synovial fluid is in close contact with the articular surfaces of joints and may contain cells exfoliated from the synovial membrane—histiocytes, monocytes, lymphocytes and polymorphonuclear leukocytes. Malignant cells stand out clearly and are as easily recognized as in pleural and peritoneal fluids.

In view of the fact that synovial fluid is easily obtained and the cytologic technique is simple in experienced hands, it was thought that this method could prove of value as a diagnostic aid.

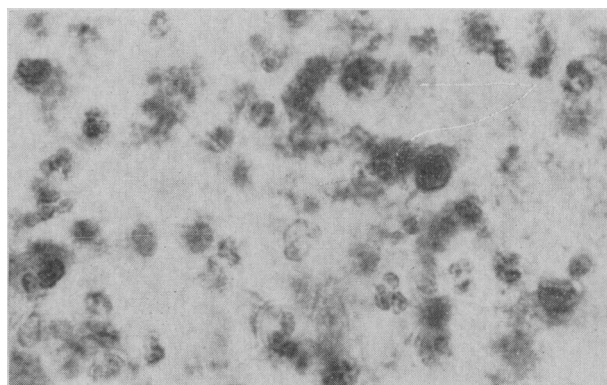


Fig. 1.—Synovial fluid showing acute inflammation. Polymorphonuclear leukocytes predominate.

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