

I know Dr. Fort does this. I can't see his results and know they are excellent, and the last X-ray of course is a peach. But I don't think that X-rays ever do justice to a man's work when he has worked out competent fracture work.

I am very anxious to have Dr. Teeter put in the files of the case that came under my observation that Dr. Fort so excellently handled. There are a few points I would like to bring out that made a very wonderful impression on my mind.

When we went in and took the plate out, we got some displacement. I believe that if we had put traction on we would probably have been able to get the same result that Dr. Fort had. I want to commend Dr. Fort, because this is one case that I watched almost through, and I must say the results are wonderful from a traction standpoint.

Dr. F. L. Fort, Jacksonville:

Never use a plaster cast in the beginning as there is too much swelling. There are other methods by which you can immobilize fractures.

I wish to thank Dr. Waas for explaining his case, also.

L. W. HOLLOWAY, M.D.,
Jacksonville.

This condition is known as pica or parorexia. Riddock¹ in a very illuminating article has called attention to the hazard of lead poisoning to children who suffer from pica.

All painted objects such as certain toys, white furniture, rails of kiddie-coops, porch railings, window sills and powder cans may afford the means by which little children become the subjects of chronic lead poisoning.

* Holt,² in 1923, reported a case of lead poisoning due to the inhalation of dust containing lead.

Aub.³ Minor, Fairhall and Reznikoff, in a report of studies, made in the laboratory of physiology at Harvard University, on the absorption and excretion of lead, state "that lead given to cats by stomach tube is soon recovered in large amounts from the feces. Later it became clear that this occurs partly because most of the in-

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"Infection in the lungs, of the kind which leads to similar infection elsewhere, may be absorbed by the respiratory tract, and the intensity of the exposure of the respiratory tract may be estimated only by the amount of the material inhaled by the animal, and not by the rapidity of the infection or other characteristics."

I will read a
lead paragraph of
Five patients a
The ages range
years.

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Every case of
secondary anemia.
Five per cent. of
total red count
million cells. The
pling of the red
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All the patients' periodic attacks

Colic was a common
disease.

Five had been
to lead had been
objects- ranged
months.

poisoned by the breathing of lead dust. It is a greater portion of the inhaled dust is absorbed than in the case of lead poisoning by the ingestion of lead dust.

The preparation in the respiratory tract of lead dust is very rapid and dangerous. It is a fact, working in this laboratory, that in a single twenty-four hour period a relatively large amount of lead could be absorbed by the organism even the only path of entry was through the nose and mouth. This he did by tying off the esophagus in cats, and by inserting a cannula into the trachea, through which the animal breathed. In such a preparation there is no connection between the naso-pharynx and the lungs or the stomach, and inhaled substances cannot enter the gastro-intestinal tract. Large amounts of lead dust, even though it is quite insoluble, is rapidly absorbed when started into the organism under these conditions. Edmunds determined this by analyzing the various organs of the body for lead.

Injection of lead into the trachea and sealing the lungs of the animals prepared in this way leads to similar results. Indeed, as much lead can be absorbed from one injection into the respiratory tract in one day as from the gastro-intestinal tract in four months. The degree of respiratory absorption is dependent not only on the quantity of lead absorbed, but also on the most appearance of the lead, time of exposure, and the character of the symptoms.

I will report here later from a study of lead poisoning which have been observed in man. Five patients were looked at.

The ages ranged from eleven months to four years.

All gave histories of being in contact with lead.

Each case presented a clinical picture of secondary anemia. The hemoglobin averaged fifty per cent. There was a reduction in the total red count ranging from one-half to one million cells. Three of the cases showed stippling of the red blood cells. One case showed between twenty stippled cells to each field.

All the patients were constipated and two had periodic attacks of diarrhea.

Edema was a prominent feature in each of these cases.

Five had vomited and in three exposure to lead had begun. The exposure to painted objects ranged from four months to sixteen months.

The lead was found in the urine in three cases and five in the blood in the same three cases.

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There were four series of cases of acute poisoning from inhalation of lead superimposed on the chronic intoxication. These cases were of the nature of lead encephalopathy or involvement of the nervous system.

The first case of this type had slept for two nights in a room freshly painted. This occurred during January. There was very little ventilation and consequently the child inhaled a lead-laden atmosphere. He became violently nauseated and had severe cramps in the abdomen followed by sharp cries. Vomiting ensued and continued for eight to ten hours. This was followed by generalized convulsions which lasted for about sixteen hours.

The second case inhaled lead dust while in a room where paint was being scraped and sand-blasted from lumber which had been previously used. This child had generalized convulsions for thirty-six hours and in the intervals between seizures would remain in a state of coma. Double Babinski's reflexes were present in this case.

Lumbar puncture was done in these cases and the fluid was under great pressure. The puncture relieved the convulsions.

The history of exposure to lead helps to differentiate this condition from brain tumor, encephalitis, cerebral hemorrhage and tuberculous meningitis. The finding of lead in the urine and blood and the presence of stippled red blood cells aid in the diagnosis. The spinal fluid of the last case was injected into a guinea pig to differentiate this case from tuberculous meningitis. The guinea pig lived.

TREATMENT

There are three phases to the treatment.

1. The most important is prophylaxis by informing parents of the hazard of painted articles of little children. Varnishing all articles with which they come in contact will prevent poisoning.

2. For the convulsions lumbar puncture has relieved the situation in our cases. For the anemia tonics and fresh air are indicated.

3. Melsor in 1840 first used potassium iodide to promote the elimination of lead from the organism. This is now believed to be dangerous

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in some cases by causing an aggravation of symptoms as the lead deposits are released from the hard portions of the skeleton. Aub et al recommend the use of ammonium chloride in a dose of eight to twelve grams a day or twenty to twenty-three c.c. of dilute phosphoric acid sweetened like lemonade as the best eliminant of lead, they also recommend the use of sodium bicarbonate in a dose of forty grams in twenty-four hours to hasten the elimination of lead. They state that twice as much lead is eliminated with the use of the acid as when the alkali is used. A diet with a low calcium content furthers the release of the deposited lead. Milk is contraindicated owing to its high calcium content. A diet such as meat, potatoes, rice, macaroni, apples, bananas, sugar, salt and milk-free bread is recommended for these cases. Milk and eggs and other articles not included in this list should not be considered in the dietary.

CONCLUSIONS.

1. Lead is a hazard to small children.
2. Many cases of lead poisoning are overlooked.
3. Education of parents through public health agencies as to the likelihood of lead poisoning in children is suggested.

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- ²L. E. Holt, Jr.: Lead Poisoning in Infancy. Am. Jr. Diseases of Children, March, 1923.
- ³J. C. Aub, M.D.; A. S. Minot, P.H.D.; L. F. Fairhall, P.H.D., and Paul Reznikoff, M.D., Boston: Absorption and Secretion of Lead. J. A. M. A., August 23, 1924.

TEST FOR LEAD.

Considerable urine is evaporated to dryness, and 50 c.c. of fuming nitric acid is added; after the reaction has subsided, it is allowed to simmer over the free flame for one-half hour, and then 25 c.c. more acid is added three times each fifteen minutes. The fluid is then evaporated to a small volume, neutralized with sodium hydroxide, filtered and the lead tested with hydrogen sulphid, which will give a brown precipitate.

DISCUSSION

Dr. W. W. Kirk, Jacksonville:

I think that Dr. Holloway is to be commended for bringing to the attention, as Dr. Osineup remarked, of the profession to this condition of lead poisoning in children.

In the larger industrial centers it is a very common thing to find lead poisoning in adults—

so common that all the hygienic precautions taken against it are apparently ignored by the laborers in the plants that often very little attention is paid to it by them.

I think that lead poisoning in children is a condition that is sporadic everywhere, because the supply is ever present. Lead in very small quantities can give trouble to susceptible individuals.

Regarding the laboratory end of this lead poisoning proposition: As you probably know, the man who is associated with the laboratory, and is given a number of different specimens to give some definite and reliable answer on to the awaiting surgeon or internist is called on sometimes to do a great deal. And we are called on to give very definite answers as a rule. I feel if the condition, lead poisoning, is suspected, that this is one of the conditions in which the pathologist can render real service, because the test for lead is not difficult. It is present both in the feces and the urine. The blood picture, although not absolutely distinctive, is quite characteristic.

There is a good deal of talk about stippling of the red cells in lead poisoning. Stippling of the red cells is found in practically any severe blood disturbance, particularly in severe pernicious anemia cases and at times in leukemic conditions. It is one of the commonest things that is found in lead poisoning. The red cells easily become stippled and we quite often find fifteen or twenty points to each cell. The red cell count is not particularly helpful as you hardly ever have less than four million, hemoglobin from 50 to 70 per cent. In our malaria districts in Florida, where the resistance is quite low, I think we often find routinely hemoglobins of 50 to 70 per cent.

The point of coming to a final diagnosis: This would rest more upon the demonstration of lead oxide in the urine and feces. The lead salt is also found in the bony substance. Sometime the lead deposit is distinct; however, the lead is only eliminated from the bone when it is a great deal in excess and natural hardening of the salt takes a long time for elimination.

It is not necessary to go into technical detail as to localizing and detecting of the lead salt. That is a very technical thing. I want to emphasize one thing: If you are just going to test the urine or feces once, you will probably get a negative report in these cases. It is more or less like a tubercular condition in this regard.

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