

ABDOMINAL SYMPTOMS OF LEAD POISONING IN CHILDREN*

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In presenting a discussion of abdominal symptoms in children due to lead poisoning we will endeavor to bring forth two points:

1. That abdominal symptoms are frequently found.
2. That gastro-intestinal symptoms may be the only symptoms present.

In making a complete study of the literature, we found that from 1784, when the first case of lead poisoning in a child was reported by a Japanese clinician, until 10 years ago, the total number of cases reported was comparatively few. From that period to date, the number of cases reported have increased tremendously, due no doubt to more alert clinicians.

The manifestations of plumbism in children are manifold and may be roughly divided into three groups:

1. Signs of cerebral involvement.
2. Signs of gastro-intestinal involvement.
3. Those symptoms and signs due to blood changes.

Cerebral manifestations appear as irritability, fretfulness, nerve palsies and convulsions. Of these the most frequent are convulsions, usually generalized. Of the gastro-intestinal symptoms, vomiting, abdominal pains and constipation are most common. Blood changes are mainly the characteristic stippling of the red cells and a more or less severe secondary anemia. This may be progressive even after the ingestion of lead has ceased. Facial pallor is usually very marked. The lead line of the gums is rarely seen in children.

Within a period of two weeks, three cases of lead poisoning were diagnosed at the Kings County Hospital, all of which started with gastro-intestinal symptoms. The details of these cases were as follows.

CASE REPORTS

Case 1. M. D., age 21 months, was admitted to the hospital on August 7, 1935 with chief complaints of sore throat, fever, vomiting and abdominal pain. The present illness began three

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weeks prior to admission with daily vomiting, usually after each meal. No coffee ground material or bright red blood was found in the vomitus. Abdominal cramps also were present, usually before the vomiting. Associated with these complaints was an obstinate constipation requiring enema for bowel movement.

An examination revealed a very irritable child with a definite pallor of the skin. Abdominal examination revealed nothing of any significance. There was no lead line of the gums. The throat was slightly congested.

On August 8, 1935 the red blood count was 4,500,000 and the hemoglobin 55% (Sahli), with definite anisocytosis and marked basophilic stippling. Additional history at this time revealed that she had indulged in eating paint on toys and woodwork.

On August 11, 1935 the red blood cells were 4,250,000 and hemoglobin 51%. Stippling was very marked.

On August 12, 1935 a spinal tap was performed. The fluid was under 20 mm. of mercury pressure (in the prone position). The fluid was clear and positive for lead.

On August 14, 1935 the red blood cells were 4,000,000 and the hemoglobin 42%.

An x-ray of the long bones revealed a definite lead line at the lower end of the radius and ulna, the lower end of the femora, and the proximal and lower end of the tibia and fibula.

At present the child is gaining weight although the anemia and basophilic stippling are still marked.

Case 2. C. F., age three years, was admitted on August 25, 1935 with a history of vomiting for a period of two weeks, during, immediately after, and one hour after meals. There was no coffee ground or red blood in the vomitus. Patient also had vague abdominal pains in the left upper quadrant and was constipated.

Physical examination was essentially negative except for marked pallor. There was no lead line.

On August 25, 1935 the red blood cells were 4,310,000 and the hemoglobin 45%. There was marked basophilic stippling. An additional history of paint eating was again obtained.

On August 26, 1935 the hemoglobin was 42%. An x-ray revealed lead lines of the long bones.

On August 27, 1935 the temperature rose to 101°, and on August 28 the child had several generalized convulsions. A spinal

tap was performed. The fluid was clear, under 18mm. of mercury pressure and negative for lead.

Basophilic stippling at this time was 5 to 10 per high powered field.

On August 29 the child had several more convulsions.

On August 30, 1935 the patient expired.

Case 3. L. M. D., age 14 months, was admitted on August 9, 1935. The patient's chief complaints were vomiting and loss of 15 pounds of weight. Present illness began three weeks prior to admission with vomiting at the end of each feeding, especially if it was a milk feeding. There was no apparent abdominal pain and no constipation.

Physical examination revealed an underweight child with definite pallor; otherwise essentially negative.

On August 10, 1935 the red blood cells were 4,000,000 and the hemoglobin 65%. There was no basophilic stippling.

On August 14 the hemoglobin was 58%. On this date the child became apathetic and could not take any food at any time because of vomiting. The red blood cells showed many stippled cells with changes in size and shape. A spinal tap at this time showed a pressure of 33 mm. of mercury. The fluid was negative for lead. An x-ray demonstrated the positive line shadow of the long bones. Additional history at this time revealed the source of lead to be glue to eating paint from toys and woodwork.

On August 15, 1935 the temperature rose to 104°. On August 16, 1935 the patient developed a strabismus of both eyes. On August 18, 1935 the patient had several generalized convulsions and expired on the following day.

SUMMARY AND COMMENT

In presenting these cases for discussion we wish to bring out the fact that gastro-intestinal complaints, especially vomiting, may be the only symptoms present in early cases of lead poisoning. Colic is not very common. This is diametrically opposite to that which occurs in adults. As is generally known, lead colic is a very frequent symptom in adult life, while vomiting is rare. In none of these cases was there any suggestion of lead poisoning upon admission to the hospital. The chief complaints were certainly not specific enough to enable us to make or even suspect

the true diagnosis. In all of these cases, after the true diagnosis had been established, additional history showed that the lead poisoning had occurred following the ingestion of lead from sources such as toys having lead paint, window sills and the walls of homes. It usually takes weeks or months before symptoms are produced with the ingestion of lead from these sources.

When lead encephalopathy occurs as characterized by convulsions, the prognosis immediately becomes poor.

We compared our cases with those reported by others and found that by far the majority of the complaints found upon admission to the hospital were cerebral in nature. Of three cases reported by Littlejohn¹, in 1931, one had vomiting as the chief complaint. Mitchell², in 1934, reported a series of 12 cases. One had colic as the chief complaint. Five others had vomiting, but this was associated with convulsions, and the central nervous system was the important complaint. In a report of 89 cases by McKhann and Vogt, in 1933, it is stated that the early manifestations of plumbism are gastro-intestinal, namely vomiting, constipation and abdominal colic.

In a report of only three cases it would hardly be possible to state unequivocally that vomiting is an early sign of plumbism. However, we feel that perhaps many cases of vomiting, especially if of more than a few days duration and usually accompanied by an anemia, are not being diagnosed due to incomplete study and incomplete histories. We are now making it a point to question every admission as to whether the child eats paint from any source.

In every suspicious case a thorough search for basophilic stippling should be made, x-rays of the long bones taken, and a lead determination of urine and spinal fluid performed.

CONCLUSION

Plumbism in children is frequently the cause of abdominal symptoms, especially vomiting. Lead poisoning may present a very indefinite picture and be easily overlooked with the result that the correct diagnosis is far too often not made, especially in private practice. Three cases are reported all of which may have been reported as due to lesions of the abdominal tract had not lead poisoning been kept in mind.

BIBLIOGRAPHY

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STAPHYLOCOCCIC PNEUMONIA AMONG INFANTS. (*Lancet*, London, May 25, 1935). Smith reports the instances of four infants born in July in a maternity hospital who died of pneumonia within four days of one another. Three of the children became ill within 24 hours after leaving the institution, although no abnormality was observed at the time of dismissal, and the other one died in the hospital. The duration of illness in each case was about two days. At necropsy, which was held in two cases, the cause of death was shown to be staphylococcic pneumonia, and a pathologic feature was that in both instances consolidation was on macroscopic examination confined to a single lobe, thus simulating acute lobar pneumonia. From swabs taken from infants in the hospital, six of whom were suffering from catarrhal symptoms, profuse growths of *Staphylococcus aureus* were recovered from the nasal and faucial passages in practically all cases. Examination of a control group of infants in another institution demonstrated the unusual incidence of the staphylococcic infection among the children in the infected hospital. It was ascertained that within the previous fortnight an infant had died of a phlegmonous abscess, that three mothers and an infant had suffered from suppurative mastitis, and that among the infants there had been an unusual prevalence of minor septic skin lesions followed by a number of cases of mild catarrh of the upper respiratory tract. Further, six cases of mastitis after dismissal were discovered among 55 mothers who left the hospital during July and the first week of August. With the possible exception of the phlegmonous abscess, the author considers all the foregoing cases, including the four fatal pneumonia cases, to have been different manifestations of staphylococcic infection and to form one epidemiologic group. The spread of the disease was possibly facilitated by the nature of the temporary sleeping arrangements provided for the infants.—*Journal A. M. A.*

RECTAL STENOSIS IN INFANCY*

REPORT OF THREE CASES

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The subject of simple congenital anorectal stricture was brought to our attention by Joseph Brennemann about eight years ago (J.A.M.A., Aug. 27, 1927). His cases, however, presented the symptoms of marked abdominal distention, obstinate constipation and evidence of great distress. This syndrome is rather rare. He reported one case, however, in which this rectal constriction was present without abdominal enlargement. The next contribution to this subject was made in June 1933 (Am. Jour. Dis. Child., 45: 1221) by H. I. Kallet, of Detroit, who published certain observations on a rectal anomaly in young infants which may produce colic and constipation. He calls attention to the embryological condition of the intestinal tract: That the primitive hind gut ends in a closed pouch called the cloaca, which is the rudiment of certain genito-urinary as well as intestinal organs; that a plug of tissue, called the anal plate, separates the cloaca from the ectoderm; and that the latter dips inward forming a pit which is called the proctodeum. The plug is gradually absorbed as the embryo develops, and by the eighth week a union of the hind gut and proctodeum is established. When an arrest or distortion of this process occurs we have the familiar forms of rectal atresia. These malformations are comparatively rare.

However, the line of fusion of the proctodeum with the ectoderm in every infant represents a circle of natural stenosis. The internal sphincter is, as yet, undeveloped, and the rectal junction of rectum and anus is composed of a fibrous ring.

In the normal infant the lumen is sufficiently large, or the elasticity of the ring is such that the soft stool of the breast-fed infant is not obstructed in its passage. However, in many infants the opening is small, and the ring of tissue surrounding this opening is thick and inelastic and, consequently, the infant suffers from colic and constipation.

Symptoms: The infant has recurrent attacks of screaming paroxysms, and these attacks are similar to those well known under the name of flatulent colic or enterospasm. The symptoms are relieved for many hours after defecation. It is noticed that the

*Read before the St. Louis Meeting, Academy of Pediatrics, November 1935.