PRIVATE PRACTITIONER, YOU'VE MISSED THE DIAGNOSIS

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This morning I would like to discuss with you a heavy subject against which you can test your mettle. I am not mainly addressing my remarks to those physicians who care for children in the ghetto areas of large urban areas--be they private physicians in these areas or those who work in public health clinics or those who work in county type hospitals serving the medically indigent. For it is almost inexcusable these days for such physicians not to think constantly of lead poisoning every time they seek a sick child--especially the preschool child. For the vast amount of recent communications in all media, both professional and popular, makes the omission of such a disease in the differential diagnosis of a sick child almost unforgivable. It is estimated that in the United States there are at least 250,000-400,000 children walking around with significantly elevated blood lead levels.

No, I would talk to those doctors who say they never saw a case or don't believe they will ever see one in his own practice because he mistakenly believes that his middle-class patients wouldn't allow themselves to contract such a disease. I submit that maybe some of you have some patients in your practice with subclinical lead poisoning and have probably had some in the past and have lost them and didn't know it. I believe you may have not only had some, but will certainly see some--if you look for them and think of the diagnosis. You will certainly not see dozens of them in your practice, and that is one of the reasons why it is difficult

to make the diagnosis. There are many reasons why I believe you will see lead poisoning cases in your own practices.

Here are just some of them:

(1) People are quite mobile and are becoming more so. According to the recent book, Future Shock, they change dwellings frequently. In 1968, 36,600,000 Americans changed their place of residence. In each year since 1968, one out of every five Americans changed his address. What if a family with young children moves into an old house with old paint where active pre-school children never lived before?

(2) What if hospitals like the Cook County Hospital do close down? Where will these needy people go? They will possibly go to your hospital or clinic, and you had better prepare yourself for the problems of the underprivileged child, only one of which is lead poisoning.

(3) If the use of improperly glazed ceramics continues and increases, you will see more children as well as adults with this disease.

(4) If we don't do something about the ever-increasing air contamination due to lead from auto exhaust fumes, we will all see more cases, especially in children, as this air contamination can possibly increase the total body lead burden of children who have only small or marginal lead levels due to ingestion.

(5) It is true that the majority of cases at present involve inner city children from ghetto areas--but the results of the lead detection program as performed by the State of Illinois Department of Public Health identifies the problem as existing in many small communities. This type of program should

ultimately be done in all states for it cannot be possible that lead poisoning in children only occurs in Chicago, New York, Baltimore, Cleveland, Boston, etc. According to a recent article in Pediatrics[1] (vol. 49, #4, April 1972, Dr. Michael E. Osband, Albert Einstein College of Medicine) there is another high risk group of children that have not been properly studied and these are the children of migrant laborers.

I would like to address myself now to the big problem of chronic lead poisoning in childhood. The symptoms of this disease can best be described as nonspecific, protean, vague, ill defined, nebulous, insidious, not pathognomonic. This rather obviously makes diagnosis extremely difficult in the young child who cannot communicate his feeling and who does not enter your office or hospital emergency room wearing a sign, "I have lead poisoning." There are, however, a number of signs and symptoms that should at least arouse your suspicions enough to obtain proper lab tests to rule out this disease. That is what this is all about--to raise your index of suspicion.

The signs and symptoms of increased lead accumulation in the body chiefly involve three major organ systems in children--the gastrointestinal, the hematopoetic, and the central nervous system.

Usually the disease begins in a slow and subtle fashion with the child first exhibiting a diminution in appetite. He becomes progressively less playful and less alert. Associated with this

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[1]Osband, Michael E., Tobin, J. R. Lead Paint Exposure in Migrant Labor Camps. Pediatrics, 49:604, 1972.

is the gradual development of hyperirritability. Parents frequently state that the child has undergone personality changes, without being able to define these changes. If the mother is particularly observant, she may note that the child has undergone developmental regression; that he has lost his most recently acquired skills--he becomes clumsy and progresses to ataxia. These symptoms develop over a period of three to six weeks. During this phase, vomiting may occur intermittently and also brief self limited seizures occur. If lead ingestion continues, acute fuminant lead encephalopathy can occur.

It is rather fundamental to realize that we are primarily referring here to children 12 to 36 months of age--the age at which ingestion is high, and the age at which the child's curiosity is at its peak, particularly in exploring the environment with hands and mouth. Older children with this disease are usually retarded and have retained more infantile behavior patterns. Exceptions to these generalizations obviously do occur--such as the older child who becomes lead intoxicated from drinking fruit juice from an improperly glazed earthenware vessel or older children such as occurred in the Queensland, Australia epidemic who amused themselves during the frequent rains by catching the raindrops dripping from the colonial verandahs on their tongues. These drops contained lead from the white lead paint on the roofs which was pulverized by the intense tropical heat and then washed down by the rains.

The gastrointestinal symptoms are those which are most likely to be noticed first by the parents and consist primarily of vomiting, vague abdominal pains, anorexia, and constipation.

These GI symptoms are very non-specific and are among the most common complaints in any group of pre-school children, as those of us in practice know so well. However, just for a minute or two when you hear this from a mother, think of plumbism no matter how remote the diagnosis seems.

Parents are often not of much help in your efforts to obtain definitive information. One survey of 300 children with confirmed lead poisoning showed that 76% had no presenting complaints, but when specific and detailed inquiry was made it was found that 58% had anorexia and 9% had vomiting. In another study of 22 children who had severe lead encephalopathy, it was found that 18 had been treated symptomatically for gastroenteritis for different periods of time before symptoms of central nervous system involvement became apparent.

I believe it is pertinent here to speak about pica, for the oral route is the major avenue of introducing lead into the body in children. There is an extremely high association of lead poisoning with pica--best described as a perverted appetite for dirt or other non food substances. As many as 50% of otherwise normal children, however, between one to three years of age eat non food substances, but some studies show that 70-90% of children with plumbism had a history of pica. Parents often deny this symptom, however. A careful questioning of the parents or their surrogates concerning pica must be made part of the routine questions asked in the development history of any pre-school child--sick or well.

The exact cause for pica is unknown. Many theories have been offered, some psychiatric, some instinctual, some physiological.

For instance, it is believed by some that pica for lead containing substances is an attempt to replenish deficient body stores of iron. Although 90% of children with lead poisoning are iron-deficient, only one-third of the children with lead poisoning displaying pica cease the habit when given iron orally. I believe, as do many others, that excessive pica is probably a method of relieving anxiety by oral gratification caused ultimately by a disturbed mother-child relationship.

The hemotologic findings will not be apparent to the parents, of course, and are less dramatic as initial complaints. Iron deficiency anemia is almost always present in young children with plumbism. This type of anemia is so common anyway in toddlers, especially in deprived children, that it is certainly nonspecific. Basophilic stippling of the red blood cells, as mentioned in all books and articles on lead poisoning, is apparently not that common in childhood as the spleen removes all the damaged cells rapidly. It does show well, however, on bone marrow examination of normoblasts. In the absence of an anemic due to an abnormal hemoglobinopathy or in such diseases as Cooley's anemia, the presence of basophilic stippling is thought by many to be pathognomonic of lead poisonings. The anemic is usually hypochromic and microcytic with a moderate reticylocytosis, polychromatophilia, poikilocytosis and an increased number of target cells. The anemia is brought about by the toxic effect of lead upon heme synthesis and by an increased hemolysis of circulating red blood cells.

The most serious manifestation of chronic or subacute childhood lead poisoning are those that result from brain involvement. The symptoms and signs vary tremendously and may range from

drowsiness and lethargy to repeated grand mal seizures to coma and death. In some cases the first clues may be ataxia with repeated falling, also clumsiness and loss of coordination. Irritability, headache and insomnia occur. Persistent vomiting is usually an ominous sign of CNS involvement with cerebral edema. Acute encephalopathy is most common in children 15 to 30 months of age, while lead intoxication without encephalopathy in this age range and older can result in hyperirritability or aggressive behavior disturbances. The two to five-year-old with unrecognized plumbism may present with a convulsive disorder indistinguishable from idiopathic epilepsy or even a picture suggestive of a degenerative cerebral disease.

Acute encephalopathy is not usually seen after five years of age, but on the other hand the typical wrist drop, lead colic of the abdomen and lead line on the gums as seen in adults are not seen in young children. The neurological signs and symptoms are quite varied, quite nonspecific and often bizarre, and can mimic several acute and chronic brain syndromes, especially tuberculous meningitis, any aseptic meningitis, brain tumor, poliomyelitis, hypertonic dehydration, traumatic subdural hematoma, and acute toxic encephalopathy from any cause.

There are a number of other peculiar ways that plumbism can present to the practicing physician, only to confuse and to delay proper treatment and recovery. One such presentation is lead myocarditis--not too many cases reported in children. Lead poisoning can also cause cardiac arrhythmias. Chronic renal syndromes can occur in children--not as many cases have been reported in the United States, however, as have been seen in

other countries, especially Australia. Apparently it requires the ingestion of high concentrations of lead over a long period of time. Lead can also produce a Fanconi syndrome with hypophosphatemia, amino aciduria and glycosuria, much like the syndrome associated with outdated tetracyclines. Hyperuricemia and secondary gout have been reported in many cases of lead poisoning with chronic nephropathy. The nephropathy takes a long time to develop and the secondary gout comes even later.

Eighty to eight-five per cent of cases of lead poisoning present themselves in the summer months although undoubtedly the lead has been ingested during the previous winter months. The reasons offered for this seasonal variation are not definite but suggest that the lead being a divalent cation acts like calcium and its absorption is enhanced by vitamin D, such as occurs with increased exposure to the ultraviolet rays of the sun. The increased heat and humidity in the summer can also enhance absorption and help to mobilize this heavy metal into the blood stream.

In summary, I would re-emphasize that all of us in the "front lines" of pediatrics think about plumbism during the course of our daily activities in our offices and in our clinics and hospitals. Learn to be very suspicious, especially in the summer months, especially in pre-school children who present with anemia and vomiting or lethargy or abdomen pain. Ask questions, especially during well baby exams, concerning present dwelling site, recent moves, who cares for the child during the day. For instance, does the mother work and is the child cared for in a different home, an older home, possibly with chipped paint and falling plaster?

Above all, ask specific questions concerning pica. Don't wait until you see a case of lead poisoning before you act. Practice preventive medicine. So much of what the office pediatrician does is preventative medicine anyway; why not include this? Finally, doctors, let us all get the lead out of the soft tissues of our buttocks and fight this man-made socio-cultural, technico-logical disease--or else, private practitioner, you have inexcusably missed the diagnosis.