Lead in Internationally Adopted Children

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Not long ago, it was a common occurrence in the United States to have a child admitted to hospital for lead poisoning. Over the past 30-40 years, lead levels in the children of developed countries have decreased dramatically, so much so that most physicians have never seen a case of lead poisoning. Unfortunately, lead is still an environmental health issue in children of developing countries.

Are children small adults?

Children and adults differ greatly in their exposure, absorption, and the ways in which lead toxicity occurs. A child's normal behaviour of putting multiple objects into his/her mouth increases the lead exposure. Additionally, lead is more readily absorbed by a child's gastrointestinal system than an adult's. This can be magnified in the setting of the nutrient deficiencies that can occur in internationally adopted children. Lead seems to affect the peripheral nerves in adults whereas it can affect the central nervous system (brain) in children. Most concerning, is the fact that a decrease in exposure, or a course of medical treatment in adults usually leads to reversal of symptoms, whereas in children this may not be the case. This likely reflects a critical window of exposure in which the changes are irreversible. Although the hypothesis of a critical window of exposure seems plausible, this window has yet to be determined. Complicating this area of research is the fact that different people with the same lead level will have very different symptoms, likely reflecting the fact that genetic susceptibility plays a role.

What is the source?

In developed countries, leaded paint, predominantly in older houses, remains the greatest source of lead. However, in developing countries the sources are: leaded gasoline, lead-glazed ceramics, mining and smelting, battery repair and recycling, flour mills, medication and cosmetics (including traditional/natural/herbal medications), and consumer products. Many medical articles have commented that the exposures of children to lead in developing countries are likely from not just one source, but multiple sources.

How do the children present?

It is important to understand that the long-term effects of lead in internationally adopted children have not been studied. Most of the knowledge on lead comes from studying inner city US children. It is impossible to tease out the role of socio-economic status and the fact that these children (mostly) were left in an environment containing lead, whereas in the setting of internationally adopted children, they are taken out of this environment at a young age.

Most children with elevated lead levels have no symptoms. However, lead can affect many organs of the body. Anemia (decreased amount of haemoglobin in the red blood cells), lines on bones, and kidney damage can occur. In terms of intellect, American studies of mostly inner city children have reported that there is a linear decrease in IQ with increasing lead levels. Not as well studied is the area of behaviour. There is increasing evidence from these American studies that aggression, inattentiveness, and antisocial behaviour may be related to high lead levels.

Management

The blood lead level is the standard way of determining whether lead exposure and accumulation has occurred. Unfortunately, this test is not widely available in developing countries and is not routinely determined in pre-adoption medical reports. There is no 'safe threshold' for lead. The level that the Centers for Disease Control (USA)

and the World Health Organization have determined as a screening action guideline (0.44 umol/L) is meant only as a public health guide.

Newer evidence suggests that there may be effects at levels lower than this screening level. Another blood test, the zinc portoporphyrin (ZPP) can also be used to determine lead exposure. In the absence of liver problems, it likely reflects long-term exposure to lead. There have not been any studies looking at what an elevated ZPP with a low lead level means, but experts feel that it is common and likely of no significance. In our experience, the ZPP level decreases over time.

In the great majority of situations in which the lead level is elevated, the management would entail the removal of the child from the lead environment, which has already been done in the case of the child adopted internationally. Your physician may consult an expert in the area of lead poisoning if he/she is not familiar with lead poisoning assessment and drug treatment.

Drug treatment, if required, is used to bring down the lead level in the blood by assisting-elimination through urine. The benefits of drug treatment at lower lead levels are controversial and must be weighed against the potential side effects of the drug, namely the risk of liver inflammation (hepatitis).

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(Lead continued...)

Internationally adopted children and lead

The largest study of internationally adopted children and lead was based out of international adopted clinics in the US. The Centers for Disease Control (CDC – public health agency in US) received information from selected US adoption practitioners that showed elevated lead levels in 1 to 13% of children from China and 1 to 5% of children from Russia. Although the vast majority of these children had only slightly elevated levels, some did require medical treatment (*MMWR* 2000 February 11;49 (5)).

The Canadian action guidelines for lead in children are:

Lead level (umol/L)	Action
0.30 – < 0.50	Take an exposure history
0.50 – 0.75	Repeat test in 3–6 mo
> 0.75 – 1.00	Lead poisoning assessment
> 1.00 – 2.10	Consider chelation therapy (drug treatment)
> 2.10	Urgent referral and individualized case management

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Conclusion

Screening for lead should be a part of post-adoption assessment. Elevated lead levels can be a problem in a minority of internationally adopted children although the long-term significance of elevated levels is not known. Of the children with elevated lead levels, it is very rare to have a situation in which aggressive medical treatment is required. Although some of the effects of elevated lead have been defined, further research needs to be done to determine all the risk factors, prognosis —and treatments in internationally adopted children.