Introduction to methods of measuring blood lead

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Abstract

Background: Lead has been recognized as one of the most dangerous occupational exposures that have acute and chronic effects on major organs of the human body such as the effects on central and peripheral nervous system, hematopoietic, gastrointestinal, renal and cardiovascular systems. Blood lead measurement is an essential step for early detection and treatment of lead poisoning. There are different methods for blood lead level measurement. Each has advantages and disadvantages. In this paper, we compared the common methods for measuring blood lead level in terms of technique, accuracy, availability, and costs.

Methods: Based on the available literature, we evaluated various methods of lead measurement and compared from different aspects.

Results: Our studies have shown that "Inductively Coupled Plasma Mass Spectrometry" (ICP-MS) has the highest accuracy and the highest levels of costs among the available methods. After that, "Graphite furnace atomic absorption spectrometry" (GFAAS) method have the best accuracy and is the most common procedure that used for the blood lead measurement in laboratories. "Anodic stripping voltammetry" (ASV) is a newer method and have lower costs and ease of use, but its accuracy is at a lower level. This method can be used on site as well.

Conclusion: Comparison of different methods showed that we can apply any of these methods depending on desired accuracy, costs and existing facilities for lead measurement in occupational medicine. Using of new literatures in this field could help us to better evaluation of lead poisoning.

Key words: method of measurement, lead, blood

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