



Review Article

Arsenic Toxicity and Neurobehaviors: A Review

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Abstract

Deterioration in public health due to arsenic toxicity is a worldwide concern for clinicians. The subject requires extensive and careful assessment of arsenic toxicity born symptoms, across the geographical boundaries. Arsenic induced deleterious effects have been documented in countries, including India, Bangladesh, Argentina, Australia, China, Hungary, Thailand, Mexico and United States of America, which cover the major part of world population. Arsenic found in soil and drinking water comes from geophysical as well as anthropogenic sources. Humans are exposed to arsenic through food, drinking water and or smelters. Nevertheless, newborns are most sensitive to arsenic insult and if mother is exposed to arsenic at gestational stage, irreversible postnatal cardiac, carcinogenic, behavioral, cognitive and motor disabilities are inevitable. Sufficient data from animal studies on hamsters, mice, rats and rabbits demonstrate arsenic to produce developmental toxicity, which includes malformation, growth retardation and even death. Developmental toxicity characteristically depends on route, dose and the period of gestational exposure. Arsenic exposure induce oxidative stress and decreases ATP production, putting structural and functional maturity of nerve cells at stake, leading to improper brain development and related behaviors.

Chronic exposure during pregnancy produces dose dependent increase in conceptus mortality and postnatal growth retardation. Also, pregnant females exposed to arsenic, express malformations and resorption of pups. Animal studies have not identified an effect of arsenic on fertility in males or females. Only few studies have been performed on human subjects and the data reports spontaneous abortion and stillbirth in more than one of these studies. Interpretation of observed outcome is complicated in human subjects, because they can be exposed to multiple chemicals at a given time.

There is no single drug to stop or minimize arsenic induced deleterious effects. Therefore, our newborns are and will be compelled to live behaviorally retarded and socially handicapped, if the issue is not properly addressed. The present review meticulously discusses the detrimental role of arsenic on postnatal neurobehavioral development. This attempt will add to the existing knowledge on the subject and help to design a better approach to culminate the lethal effects of arsenic.

Keywords: Arsenic, gestational exposure, postnatal exposure, developmental toxicity, CNS vulnerability, neurobehavioral assessment

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