

RESEARCH PAPER:

Protective effect of vitamins on lead induced reproductive toxicity in female swiss mice

NAZERA QURESHI, RAGINI SHARMA AND SHEETAL MOGRA

Asian Journal of Environmental Science, (June, 2010) Vol. 5 No. 1 : 44-48

See end of the article for authors' affiliations

Correspondence to :
NAZERA QURESHI
Environmental
Toxicology Research
Laboratory,
Department of
Zoology, University
College of Science,
M.L. Sukhadia
University, UDAIPUR
(RAJASTHAN)
INDIA

SUMMARY

In the present study, effects of lead toxicity on fertility of female Swiss mice has been investigated. Lead toxicity was induced by lead acetate given orally as a daily dose 160mg/kg and 320mg/kg for 3 months. The treatment of lead poisoning through chelating agents can remove essential elements, resulting in kidney damage. Oxidative damage associated with presence of lead has been illustrated as one possible mechanism involved in lead toxicity which suggests that antioxidant (vitamin C and E) might play a role in the treatment of lead induced fertility. The role of vitamins in treating/preventing chronic lead toxicity in animals is receiving wide attention. Therefore, along with above study, therapeutic effects of ascorbic acid and alpha tocopherol on lead induced toxicity have also been investigated. In low as well as high lead treated groups, there was decline in fertility. Supplementation of ascorbic acid along with lead did not provide successful beneficial results, but treatment of alpha tocopherol resulted in improved fertility outcomes.

Key words :

Lead, Ovary,
Alpha tocopherol,
Ascorbic acid,
Fertility

A number of heavy metals are still widely used in industry and lead, in particular, is generally considered as one of the most toxic metals to humans as well as animals (Yu, 2001). Lead has a long environmental persistence and never loses its toxic potential. Today, lead is still used in batteries and some insecticides and is found in cigarette smoke, varying with range of 0.017 and 0.98 μg per cigarette (Timbrell, 1995; Williams *et al.*, 1999). Lead is highly toxic to humans, with the deleterious effects on the hemopoietic, nervous, reproductive systems and the urinary tract. Lead has been shown to cross the placenta during pregnancy and has been associated with intrauterine death, prematurity and low birth weight (Papanikolaou *et al.*, 2005). Reproductive toxicity, which can be defined as the adverse effect of chemicals, lead being one that can affect the gonadal structure and functions, can cause alterations in fertility and impaired gamete function (British National Formulary, 1999; Hu, 1998; Timbrell, 1995). Lead poisoning causes reduced fertility, miscarriages and stillbirths since antiquity (Bell and Thomas, 1980). Gestational lead exposure has an adverse effect on development, with an effects that may be most pronounced during the first trimester (Mogra *et al.*, 2009).

The treatment of lead poisoning, especially

at subclinical level, is equally important. The prospects for successful chemical treatment of long term, low dose lead toxicity, are not promising. Chelating agents can remove essential elements, resulting in kidney damage (Mahaffey *et al.*, 2000). Hence, metal chelation therapy has not been more successful to treat lead poisoning (Bondy, 1988).

Oxidative damage associated with the presence of lead has been illustrated as one possible mechanism involved in lead toxicity (Adonoylo and Oteiza, 1999), which suggests that antioxidant (vitamin C and E) might play a role in the treatment of lead induced fertility (Gurer *et al.*, 2001). Naturally occurring antioxidants have been extensively studied for their capacity to protect organisms and cells from damage induced by oxygen reactive species (Cozzi *et al.*, 1997). The role of vitamins in treating/preventing chronic lead toxicity in animals is receiving wide attention (Anitra and Frei, 1999).

Ascorbic acid has long been associated with fertility (Luck *et al.*, 1995), is a definite antioxidant and plays protective role against metal toxicity (Rao *et al.*, 2001; Houston and Johnson, 2000). Vitamin E is known as the antisterility vitamin because it is found to be

Accepted :
April, 2010