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Effect of maternal lead exposure on craniofacial ossification in rat fetuses and the role of antioxidant therapy.

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Source

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Abstract

Lead exposure during intrauterine life was found to result in reduced birth weight, impaired skeletal development and post-natal neurotoxic effects. In this study, the effect of pre-natal exposure to different doses of lead on the development of craniofacial skeleton in rat fetuses was investigated. Vitamin E was tested as a concomitant treatment, aiming to improve the fetotoxic effects of lead. Positively pregnant female rats were randomly divided into four groups; groups I and II (L250 and L500), exposed to lead acetate in doses of 250 and 500 mg/l respectively, group III (L500 + E), exposed to lead acetate (500 mg/l) with concomitant vitamin E and group IV (Control) which was given sodium acetate only. All the treatments started from the first day of gestation till the 20th day, where all rats were sacrificed and the fetuses were recovered. Fetuses were processed to alizarin red staining for ossified components. Twenty-seven bones of the craniofacial skeleton were studied in each fetus where the ossification was scored as being complete, delayed or absent. In all studied fetuses from all groups, changes were found only in eight bones while the remaining craniofacial bones were normally ossified. In affected bones there was a significant decrease in the number of completely ossified bones; associated with a significant increase of both partially ossified and absent bones in L(250) and L(500) treated groups when compared to the control group. These differences were more significant in the L(500) treated group. Giving vitamin E improved the percentage of completely ossified craniofacial bones and decreased the percentage of both partially ossified and absent bones. The most affected bone was presphenoid, then to a lesser extent supraoccipital, squamosal, parietal, interparietal and frontal bone respectively. In conclusion, lead exposure to rats during pregnancy led to varying degrees of fetal growth retardation

as well as delayed ossification of some craniofacial bones which were dose dependent and the concomitant supplementation with vitamin E greatly improved the deleterious effect of lead