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Indian Journal of Public Health Research & Development

Year : 2019, Volume : 10, Issue : 8

First page : (145) Last page : (149)

Print ISSN : 0976-0245. Online ISSN : 0976-5506.

 Article DOI : [10.5958/0976-5506.2019.01867.9](http://dx.doi.org/10.5958/0976-5506.2019.01867.9) (<http://dx.doi.org/10.5958/0976-5506.2019.01867.9>)

Nickel Induced Alteration of Pathophysiology of Lungs in Experiments in Rats

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Online published on 26 September, 2019.

Abstract

Background

Nickel and its compounds are known lung carcinogens, hypoxia mimicking effect of divalent nickel (Ni (II)) plays a crucial role in the transformation of cells and the progression of tumours. In this study we aimed to evaluate the possible pathophysiological alterations in lung tissues of rats exposed to nickel sulphate.

Materials & Method

 For this study 12 male albino rats were randomly divided into two groups: control (placebo), NiSO₄ and given respective intervention for 21 days. % body weight gain, pulmonary somatic index was calculated. In lung tissue homogenates of all groups of animals, control and NiSO₄ treated group showed eosinophilic oedema fluid filled alveoli, cystic macrophages, thickened interstitial septa, leucocytic infiltration, haemorrhage and acute bronchiolitis.

Results

 Our results show significantly decreased % body weight gain, elevated lung tissue MDA, NO and concomitant decrease of I-ascorbic acid concentration in NiSO₄ treated groups when compared to control group. Histopathological observations of lung tissue sections of NiSO₄ treated group showed eosinophilic oedema fluid filled alveoli, cystic macrophages, thickened interstitial septa, leucocytic infiltration, haemorrhage and acute bronchiolitis.

Conclusion

Our results demonstrate that heavy metal nickel exposure leads to increased pulmonary oxidative and nitrosative stress, decreased concentrations of antioxidants like I-ascorbic acid and histopathological alterations in lungs. So we can conclude that people exposed to heavy metals like nickel may be more prone for lung disorders irrespective of the route of exposure.

Keywords

Nickel, lungs, histopathology, malondialdehyde, nitric oxide, I-ascorbic acid, lipid peroxidation.

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