

Research Paper:

Prevention of Lung Complications following Paraquat Poisoning by Silymarin, N-acetyl Cysteine and Hydrocortisone: An Experimental Study



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How to cite this paper Jamalian M, Solhi H, Ghasemi P, Rahbari A, Kazemifar AM. Prevention of Lung Complications following Paraquat Poisoning by Silymarin, N-acetyl Cysteine and Hydrocortisone: An Experimental Study. *Iranian Journal of Toxicology*. 2020; 14(4):193-200. <http://dx.doi.org/10.32598/ijt.14.4.710.1>

 <http://dx.doi.org/10.32598/ijt.14.4.710.1>



Article info:

Received: 05 Jun 2020

Accepted: 16 Aug 2020

Online Published: 01 Oct 2020

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ABSTRACT

Background: Paraquat poisoning results in multi-organ failure, primarily pulmonary fibrosis, acute renal failure, and hepatic impairment. The present study was designed to evaluate three treatment regimens, such as N-Acetyl cysteine (NAC), silymarin and hydrocortisone in the prevention of lung fibrosis after ingestion of toxic doses of paraquat in rats.

Methods: Male Sprague-Dawley rats (N=20) were randomly divided into four groups of five each. The drugs and paraquat were given to the rats orally. All rat groups received one oral dose of paraquat (10 mg/kg) once daily for 1 week. The first group received a daily oral dose of silymarin (600 mg/kg) for 2 weeks. The second group received a daily oral dose of NAC (500 mg/kg) for 2 weeks. The third group was given daily oral doses of NAC (500 mg/kg) and hydrocortisone (50 mg/kg) for 2 weeks. The fourth group (controls) received no drugs other than paraquat. The experiment continued for 4 weeks. After the experiment, autopsy was performed on all rats and the lungs were examined histopathologically.

Results: The results of histopathology examinations for peribronchial inflammation in the groups were shown that NAC plus hydrocortisone and silymarin had notable effects in the prevention of lung inflammation. Septal widening in the lungs was also observed in group three less than that in the other groups.

Conclusion: Based on the results, silymarin, NAC and hydrocortisone may be used as a palliative treatment in paraquat poisoning specifically aimed at preventing the acute and chronic lung injuries as the worst complication of the poisoning.

Keywords: Paraquat, Lung fibrosis, N-acetyl cysteine, Hydrocortisone, Silymarin

Introduction

Paraquat (1, 1'-dimethyl-4, 4'-bipyridinium dichloride) is one of the most popular bipyridylum herbicides with unusual toxicological properties. This herbicide is one of the most common

and active chemicals used in the Iranian agriculture [1]. Paraquat poisoning results in such multi-organ failures as pulmonary fibrosis, acute renal failure, and hepatic impairment, and is associated with high mortality [2]. Toxicological properties of paraquat are attributed to its ability to produce Reactive Oxygen Species (ROS), such as superoxide anion, which may directly or indirectly