

Abstract

Introduction: Leukemia is one of the blood malignancies that refers to the neoplastic proliferation of lymphoid or myeloid progenitor cells into immature white blood cells and their accumulation in the bone marrow, circulation and various organs of the body. One of the risk factors for leukemia is N-Ethyl-N-nitrosourea, which is a strong mutagen and causes many adverse effects in cells by alkylating DNA and inducing oxidative stress.

Natural compounds are always prime choice for the treatment or prevention of various diseases. Natural polyphenols have been widely studied as chemopreventive agents that have bioactive compounds with anti-cancer properties. Vanillic acid is one of the phenolic compounds that can be found in various cereals, honey, green tea,...

Vanillic acid inhibits lipid peroxidation in cells and eliminates ROS radicals also several studies have confirmed its biological activities, including antioxidant, anti-inflammatory, hepatoprotective, antiapoptotic and anti-mutagenic activities. Vanillic acid inhibited angiogenesis and cell proliferation which are essential for cancer cells to adapt to the microenvironmental hypoxia and tumor progression. The aim of the current study is to establish the preventive effects of vanillic acid against leukemia induced by N-nitrosourea (ENU) and to determine the survival of mice, to examine weight changes and determine stress oxidative parameters and ROS content in isolated lymphocyte cells.

Materials and Methods: A total of 21 3-week-old female mice grouped into 3 groups with 7 mice each: Control group, ENU group and ENU + VA group

At first, mice were kept in library for two weeks to adapt to the environment then the third group was given IP administration of Vanillic acid (20 mg/kg) for 30 days. At day 31 the second and third groups were given single dose IP injection of 80 mg/kg of ENU. The mice were monitored for any signs of toxicity or mortality for 125 days.

Results: Our results demonstrated that vanillic acid significantly had a positive effect on the survival of the studied mice up to 57%, and on the other hand, it prevented the weight change caused by exposure to N-ethyl-N-nitrosourea. Also, vanillic acid improved lipid peroxidation caused by N-ethyl-n-nitrosourea and prevented ROS formation and damage to lysosome membrane and mitochondrial membrane potential and No significant change was seen in glutathione.

Discussion: Taken together, our results demonstrated that vanillic acid has a preventive effect on the toxicity and leukemia that caused by N-ethyl-N-nitrosourea.

Keywords: N-ethyl-N-nitrosourea, carcinogen, leukemia, Vanillic acid