
Protective effect of turmeric extract on ethotrexate-induced intestinal damage and oxidative stress

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Available online 20 Sept. 2013

[ABSTRACT] AIM: The most important side effect of methotrexate (MTX) is mucositis. The purpose of this study was to evaluate the effect of turmeric extract on intestinal damage and oxidative stress in rats receiving methotrexate. METHODS: Experiments were performed on male Wistar albino rats divided into six groups. First group received normal saline orally, the second group received turmeric extract (100 mg·kg⁻¹) orally for 30 days, the third group received turmeric extract (200 mg·kg⁻¹) orally for 30 days, the fourth group received a single dose of methotrexate (20 mg·kg⁻¹) i.p. at day 30, the fifth group received turmeric extract (100 mg·kg⁻¹) orally for 30 days and a single dose of methotrexate (20 mg·kg⁻¹) i.p. at day 30, and the sixth group received turmeric extract (200 mg·kg⁻¹) orally for 30 days and single dose of methotrexate (20 mg·kg⁻¹) i.p. at day 30. Four days after methotrexate injection, animals were anesthetized, blood samples were taken to determine total antioxidant status (TAS) and jejunum samples were taken for glutathione peroxidase (GPx), superoxide dismutase (SOD), catalase (CAT), aldehyde malondialdehyde (MDA), and histopathological assessment. RESULTS: Microscopic evaluation from intestinal tissues of the MTX treated group, showed severe villus shortening and blunting, inflammatory cell infiltration and hemorrhage in lamina propria, along with epithelial cell necrosis. Levels of SOD, GSH-Px and CAT decreased in the MTX received group, but increased significantly (P<0.05) in the turmeric + MTX groups. MTX increased lipid peroxidation, however, turmeric decreased peroxidation significantly (P<0.05). CONCLUSION: These results suggest that turmeric extract may protect the small intestine of rats from methotrexate-induced damage. Turmeric effects could result from its antioxidant properties.

[KEY WORDS] Turmeric; Methotrexate; Intestinal damage; Oxidative stress


1 Introduction

Cancer chemotherapy is a complicated process with lots of difficulties and a prolonged period. Unlike cancer surgical treatment, it incurs multiple side effects such as hair loss, nausea, vomiting and diarrhea. Methotrexate (MTX), an analogue of folic acid, is widely using as a cancer chemotherapeutic agent in the treatment of various malignancies [1]. However, in addition to cancer cells being affected by MTX, rapid proliferating cells such as bone marrow and gastrointestinal cells are also affected. One of the most important side effects of MTX is related to the gastrointestinal tract. Mucositis, nausea, diarrhea, vomiting and enterocolitis are the most important side effects observed following the use of MTX [1]. Recently, it has been demonstrated that MTX reduces the levels of oxidative enzymes and causes cells to be susceptible to react with oxygen [2]. Because of the MTX side effects, recent studies have focused on antioxidants. Some reports indicate a positive impact of MTX used in combination with antioxidants such as: vitamin A, garlic extract, N-acetyl cysteine, sodium tungstate and proanthocyanidins [3-5], but still

[Received on] 12-Aug.-2012 [Research funding] The project was supported by the Research Fund of Ardabil University of Medical Sciences. [Corresponding author] Mohammad Mazani: Tel: 98-914-4547394; Fax: 98-451-5510057; E-mail: m.mazani@arums.ac.ir These authors have no conflict of interest to declare. Published by Elsevier B.V. All rights reserved