

The potential protective effect of both honey and olive oil against the methotrexate induced hepatotoxicity in rats: Biochemical, histological and immunohistological study

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Background: Both honey and olive oil are natural products that are exhibited a good reputation not only because of their high nutritional values but also for their therapeutic properties. A lot of cytotoxic drugs are widely used in the treatment of different types of malignancies, which targeting the proliferation ability of the tumor cells. However, their use leads to injury of the normal cells. Among these drugs is the methotrexate (MTX), which is used in the treatment of a wide range of malignancies and autoimmune diseases. However, it produces many side effects that may even threaten the patient's life e.g. hepatotoxicity.

The aim of the work: Is to evaluate the potential effectiveness of single and combined administration of honey and olive oil in the protection from the MTX-induced hepatotoxicity in rats.

Method: Eighty four adult male albino rats were used in the present study. They were divided into 7 equal groups; group I was a negative control group, group II was given freshly prepared honey orally by gavage daily at a dose of 1.2 g/kg b.wt, group III was given olive oil (2 ml/day), group IV was given a single intraperitoneal injection of MTX (20 mg/kg bwt), group V was given MTX + freshly prepared honey orally, group VI was given MTX as above + olive oil, group VII was given MTX as above + honey + olive oil. At the end of the experiment (3 weeks), the rats of different groups were sacrificed and blood samples were collected for the determination of the liver function parameters (liver enzymes, protein profile and bilirubin). Then, the abdomen of rats of different groups was opened where pieces of the liver were excised. Half of these pieces were homogenized to measure the oxidative (malondialdehyde [MDA]) and antioxidative parameters (superoxide dismutase [SOD], Catalase [CAT] and glutathione peroxidase [GP-x]); while the other pieces were processed for different histological and immunohistochemical techniques.

Result: Administration of honey and olive oil exerted a protective effect against MTX-induced hepatotoxicity as demonstrated by normalization of the liver enzymes, proteins and total bilirubin and histopathological and immunohistological changes observed in the liver. In addition, both agents also reverse the oxidative damage of the liver by decreasing MDA level and increasing activities of the antioxidant enzymes in the liver homogenates, as compared with control rats. These effects were more evident when the two agents were given together.

Conclusion: These results provide new evidences of the hepatoprotective effect of combined intake of honey and olive oil on the biochemical and structural MTX-induced liver damage indicating synergistic effect between them. Consequently, co-administration of these agents might be an effective adjuvant therapy in cancerous patients given chemotherapy to alleviate its side effects. Furthermore, we believe that E2 (estrogen) is a protective agent against MTX-induced hepatotoxicity.

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