EVALUATION OF THE PROTECTIVE EFFECT OF AQUEOUS EXTRACT OF MATRICARIA CHAMOMILLA ON KIDNEY AND ACTH HORMONE IN MALE MICE

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Abstract

The protective impact of Matricaric Chamomilla in kidney tissue and adrenocorticotrophic hormone (ACTH) was the aim of this study. Thirty male mice were divided into three groups, control group administrated orally normal saline, first experimental group administrated orally (50)mg/kg of Matricaria chamomilla for one month, second experimental group was given orally (100) mg/kg of chamomile for the same period. There were no significant differences in total body weight between treated groups and control. The results indicated raise the level of (ACTH) hormone at high concentration, while there were diminished in level of hormone at low concentration of Matricaria chamomilla. Histological results showed moderate damage in renal tubules and congestion in blood vessels of mice kidney that treated with concentration of (100) mg/kg of Matricaria chamomilla.

Key words: Matricaria chamomilla, Kidney, ACTH, mice

Introduction

Matricaria chamomilla is one of the most popular herbal tea, prepared from dried flower. Chamomile has antioxidant and anti-microbial effects, it is fact that chamomile contains large number of active compounds such as, crucial oil and flavonoid that used as anti-inflammatory of skin and mucosa (Srivastava et al., 2010). Also, oil can be essential for treating the irritation of lung disease. There are numerous kinds of chamomile but the most popular are Roman chamomile and German chamomile (Amsterdam et al., 2009). German chamomile is called Matricia Chamimilla and it has scientific evaluation and its extract showed renal protective activity (Kovcik et al., 2008). The chamomile oil can be processed into pills, but the flower head can also be used as a whole to make use of the beneficial effect. It can be taken as a herbal tea, two teaspoons of dried flower per cup of tea, which should be steeped for 10 to 15 minutes while covered to avoid evaporation of the volatile oils (Srivastava et al., 2010). The whole plant, harvested when in flower, is used to make a homeopathic remedy. It is especially suited to teething children and those who have been in a highly emotional state over a long period of time (Sebai et al., 2014). For a sore stomach, some recommend taking a cup every morning without food for two to three months, commonly used to relieve inflammatory skin conditions and calm sensitive skin. Provides some antioxidant protection and can be used to soothe, moisturize and inhibit the growth of bacteria (Bhaskaran et al., 2010).

The aim of this study is to determine the protective effect of aqueous extract of Matricaria chamomilla in kidney and ACTH hormone.

Materials and Methods

Preparation of aqueous extract of chamomile

Dried flowers were obtained from medical herbal pharmacy, then they were crushed until they became powder to prepare aqueous extract of chamomile then weighed (10 and 20gm) for its powder then divided in glass with 100 ml of water and putting in oven for 60 minute (Kovacik et al., 2008). After that, nominate the extract to be gotten a pure extract. The extract will keep in black glass inside refrigerator until use (Newall et al., 2011).
Experimental design

30 albino male mice were used in this experiments, weighing (25-30) g were kept the animal house of Faculty of science /University of Kufa, at temperature (22-25ºC). Food (pellets) and tap water were provided to animals. Mice were weighted every week for recorded any changes in weight. the animals divided into three groups:

1- Control group : (10) mice administrated orally normal saline for one month.

2- First experimental group (E1) : (10) mice administrated orally with (50) mg/kg body weight of *Matricaria chamomilla* for one month.

3-second experimental group (E2): (10) mice administrated orally with (100) mg/kg body weight of *Matricaria chamomilla* for one month.

The animal weight were recorded at the beginning and the end of experiment.

Blood samples collection

At the end of experiment mice were sacrificed and anesthetized the with ketamine and xylene (AVMA Panel on Euthanasia, 2013), blood samples were collected in tubes and centrifugation for separate the serum and measure the levels of ACTH hormone. Kidney were removed then fixed with (10%) formalin for histological routine preparations.

Statistical analysis

The statistical analyses of the results with graphing were obtained by using Excel program (Cemek et al., 2008). These analyses include mean and standard error (SE) ANOVA and Independent test, comparisons between the data in results.

Results and Discussion

Results in Fig. 1 indicated that no significant differences (p>0.05) in weights of male mice between second and third group, also there were no significant differences (p<0.05) between control and (E1, E2) groups that treated with extract of *Matricaria chamomilla*, these results agreement with (Gupta & Misra 2006), that achieved the effect of extract of *Matricaria chamomilla* to maintain body weight and reduce the blood glucose (Anon, 2010). Fig. 2 observed significant increase (p<0.05) in levels of ACTH hormone in E2 group that treated with 100 mg/kg of *Matricaria chamomilla* as compared with control, while showed significant decrease (p<0.05) in the levels of ACTH hormone E1 group as compared with control. The reason of high value of hormone in concentration of 100mg/kg of *Matricaria chamomilla* which contain many natural compound like, flavonoids, mono terpens, coumarins and phenolic acid, these molecules may have action to induce secretion of ACTH Adrenocorticotrophic hormone from pituitary gland and raise its value in serum of mice (Soltani et al., 2017).

While, low concentrations of *Matricaria chamomilla* caused significant decrease in levels of hormone, because the effect of chemical compounds of chamomile that regulate the metabolism and prevent any disorder in the level of hormone (Roby et al., 2013). With decrease secretion of ACTH hormone from adrenal gland by administrated of extract *Matricaria chamomilla*, that caused decrease secretion of stress epinephrine hormone that release from adrenal gland in to blood stream, subsequently, the adrenal gland also, secrete extra cortisol, another stress hormone into blood stream (Janmejai et al., 2010). During the stress response, hypothalamus secrete corticotrophin -releasing factor which is stimulate the pituitary gland to release Adrenocorticotrophic hormone ACTH which stimulate releasing more cortisol. Stress may cause serious incident including myocardial fraction and cardiac arrest, all previous events will decrease and may not happened when administrated extract of *Matricaria chamomilla* (Ragaa et al., 2011).

Histological results

Histological results observed normal structure of mice renal tissue contains all comments of normal nephron that appeared Bowman’s capsule with distal and proximal
Protective effect of Aqueous Extract of *Matricaria chamomilla* on kidney and ACTH hormone in male mice

In the control group (image 1), the renal tissue showed normal Bowman’s capsule, distal tubules, and proximal tubules. Treatment with 50 mg/kg of *Matricaria chamomilla* (image 2) showed normal Bowman’s capsule, normal distal and proximal convoluted tubules, and congestion in the blood vessel. Treatment with 100 mg/kg (image 3) showed congestion in the blood vessel and swelling in some renal tubules, which can be attributed to high concentration and long period of administration. These results are consistent with previous studies (Johari et al., 2011). At a high concentration of 100 mg/kg for one month, there was moderate damage to the renal tubules and blood vessels, similar to previous findings (Johari et al., 2011).

Conclusions

Administration orally of *Matricaria chamomilla* at low concentration protects the kidney and considers anti-oxidant and anti-inflammatory by reducing the level of ACTH hormone, which plays a very important role in stimulating oxidative stress and lowering the concentration using lower doses of the extract. The results of this study suggest that the anti-oxidative effect of *Matricaria chamomilla* at 50 mg/kg for one month, rather than high concentrations that cause moderate damage to renal tubules and blood vessels in kidney mice.

References


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