Study of Lycium Shawii Phenolic Compounds in Treatment of Hyperlipidemia

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ABSTRACT

The objective of study was detecting the phenolic compounds role in treatment of hyperlipidemia. 20 male rats were utilized and divided to the following groups; the first group was given standard pellet diet. The second group was administered (100mg/kg) triton for one time. The third group (rats with hyperlipidemia) was gaven (100ug/kg) phenolic compounds for 7 days. Fourth group (rats with hyperlipidemia) was given (10mg/kg) Simvastatin for 7 days. The outcomes exhibit significant (P < 0.05) elevated in levels ALT, and AST in triton and simvastatin groups compared with control group. While in fourth group show non-significant (P < 0.05) changes in levels ALT, and AST compare with control group. About the Hydroxyethylmethylglutaryl-CoA (HMG-CoA) reductase and aorta diameter, exhibit significant (P < 0.05) elevated in triton group compared with control group. After treatment, HMG CoA reductase and aorta diameter exhibit non-significant (P < 0.05) changes in third and fourth groups compare with control group. It was concluded from current study that L. shawii phenolic compounds has been role in treatment of hyperlipidemia.

Keywords: Phenolic Compounds, Hyperlipidemia, HMG-reductase, Liver Functions.

INTRODUCTION

Hyperlipidemia disorder is describe as situations in which the levels of total cholesterol or total lipoproteins in plasma elevated over an normal limit (Verma 2017), the hyperlipidemia disorder is an elevate in one type or more one type of lipids in plasma, inclusive total triglycerides, total cholesterol, levels of phospholipids and lipoproteins which including low-density lipoprotein (LDL) and very low density lipoprotein (VLDL), and decreased the high-density lipoprotein (HDL) concentration (Mishra et al. 2011; Shattat 2014). The reason of disorder of hyperlipidemia inclusive changes in lifestyle behavior that consider a very risk factor is poor diet (meat) with a lipid intake more than 40% of total calories for body, saturated lipid intake more than 10% of total calories required; and cholesterol form intake more than 300mg per day. Lifestyle risk factors comprise increased the body weight and persons with no sports or any exercising. Other risk factors comprise diabetes mellitus, kidney problems, pregnancy condition and hypothyroidism (Durrington 1995; Gupta et al. 2011). Lycium (family: Solanaceae) consist of nifty types of thorny shrubs spread throughout different areas especially tropical areas (Rehman et al. 2018). A proximately more than 200 natural products of Lycium have been reported, inclusive: alkaloid compounds, cyclopentapyrrolidine (C7H8N), imidazole (C3N2H4), piperidine (heterocyclic amine), nortropane (nitrogenous bicyclic compound), tropea (nitrogenous bicyclic compound), spermine (polyamine), also peptides, flavonoid compounds, ethnauquinones (aromatic organic compound), polysaccharide forms, Ceramides (waxy lipid molecules), coumarins (aromatic organic compound), steroids, organic acids, carotenoids (plant pigments), cinnamic acid amides, lignans (large group of polyphenols) (Yao et al. 2011). So, the aim is detect role of Lycium shawii phenolic compounds against hyperlipidemia.

MATERIALS AND METHODS

Animal Model

24 adult male rats, (wt 150-200 gm with age 4-6 month) which utilized in study obtain from College of Science / University of Kirkuk.

Extraction and Purification of Phenolics

L. shawii 10gm was extracted for 30 min. The mixture was purified by using three layers of gauze, and the residue part was extracted by two additional (100 ml each) of similar solution of extraction. The filtrate mixture was centrifuged by using centrifuge device at 7000 rpm for 15 min. Ethanol in supernatant was removed by using rotary evaporator device. After addition of 20% ammonium sulphate ((NH4)2SO4) and 2% metaphosphoric (HPO3) acid to the aqueous extract, to extracted the compounds, extraction process done by using three times of ethyl acetate (CH3COOC2H5) to obtained phenolic compounds (Mohammed 2016).

Chemicals

Triton X-100 (a nonionic detergent) was procured from Merck specialties Private Limited, Mumbai.

Experimental Groups

Hyperlipidemia disorder was done in rats by using a single intra-peritoneal of Triton-X-100 solution (Hicham et al. 2007) rats were divided as follow: first group was feeding on normal diet. Second group was injected (100 mg/kg) triton one time to induce hyperlipidemia. Third group (rats with hyperlipidemia) was received (100ug/kg) phenolic compounds for 7 days. Fourth group (rats with hyperlipidemia) was received (10mg/kg) Simvastatin for 7 days.
MEASUREMENTS

ALT and AST

The measuring of ALT (Alanine aminotransferase) and AST (Aspartate aminotransferase) levels by using Mini-Vidas technique according to procedure of kit.

3-hydroxy-3-methylglutaryl Coenzyme Reductase

The measuring of HMG CoA reductase concentration was done by using ELISA technique according procedure of kit.

Histology Processing

Aorta were collected and fixed with 10% formalin, processed by paraffin method, cut at 7 micrometers in thickness by using microtome device and sections were stained by using Hematoxylin and Eosin stains (Vacca 1985). Sections were examined with olumpis Microscope (japan). Daimater of aorta was performed by using ocular lenses.

Statistical Analysis

The Data of study were analyzed by using a program known as statistical Minitab. A statistical significant change between the group means was analyzed by using method called one-way analysis of variance.

RESULTS

Liver Functions

ALT and AST levels show significant (P<0.05) increase in Tritone and Simvastatin groups compare with control group as shown in figure (1). In phenolic compounds group, ALT and AST levels show non-significant (P<0.05) changes compare with control group as shown in figure (1).

![Figure 1: Levels of ALT and AST](image1)

HMG-reductase

HMG-reductase levels show non-significant (P<0.05) increase in Tritone group compare with control group as shown in figure (2). In Simvastatin and phenolic compounds groups, ALT and AST levels show significant (P<0.05) decrease compare with control group as shown in figure (2).

![Figure 2: levels of HMG-reductase](image2)

Aorta Diameter

Aorta diameters show significant (P<0.05) increase in Tritone group compare with control group as shown in figure (3). In Simvastatin and phenolic compounds groups, Aorta diameters show non-significant (P<0.05) changes compare with control group as shown in figure (3).
DISCUSSION
The outcomes of study demonstrate different effect of hyperlipidemia on liver enzymes, HMG-CoA reductase and aorta diameter. Treatment by using simvastatin lead to increased liver enzymes, Al-Jubori and Isam (2007) referred that there is a little increase in the concentrations of liver enzymes (ALT, AST and ALP) and levels of bilirubin more the normal limit ranges in a number of participants receiving therapy of simvastatin that is in agreement with our outcomes. to simvastatin acts on HMG-CoA, Statins play important role by inhibiting enzyme of HMG-CoA reductase through convert the HMG-CoA to mevalonate compound (Corsini et al. 1995), that explain the decreased of HMG-CoA levels after using simvastatin. Phenolic compounds show potential role in treatment of hyperlipidemia on liver and aorta and act as anti-hyperlipidemia. Different flavonoid compounds possess antioxidant proprieties (Bors et al. 1990), ant-inflammatory activity, antiallergic properties and anticancer features (Das 1994). Flavonoid compound have attracted elevating attention for its antioxidant features that may assist to demonstrate the protective effect of diets that contain vegetable on coronary heart disease (CHD) (Pearson et al. 2001), that demonstrate phenols role in this study. genistein and daidzein compounds of grapefruit peels demonstrated inhibition effect to activity of HMG-CoA reductase competitively against HMG-CoA as substrate (Ademosun et al. 2015). Flavonoids compounds are referred by Lee et al. (1999) possess the ability to prevent and inhibit HMG-CoA reductase enzyme activity. The study carried out by Anggraeni (2017) who referred that at the similar concentration of (10 μg/ml) quercetin and rutin compound are able to prevent and inhibit HMG-CoA reductase enzyme activity 41.10% and 60.17 % respectively also support this study.

CONFLICT OF INTEREST
None

REFERENCES
10. Hicham H. The hypolipidemic activity of aqueous Erica multiflora flowers extract in Triton WR-1339