J. Cardiovasc Disease Res., 2020; 11(4): 196 – 199
A Multifaceted Peer Reviewed Journal in the field of Cardiology
www.jcdronline.org | www.journalonweb.com/jcdr
P – ISSN: 0975 – 3583 Online: 0976 – 2833

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 gaven (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 Hydroxymethylglutaryl-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.

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Submitted: 23-09-2020
Revision: 22-10-2020
Accepted Date: 20-11-2020

DOI: 10.31838/jcdr.2020.11.04.34

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 lipo protein (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 (meet) 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 ninty types of thorny shrubs spread throughout different areas especially tropical areas (Rehman et al. 2018). Aproximatily more than 200 natural products of Lycium have been reported, inclusive: alkaloid compounds, cyclopentapyrrolidine (C7H9N), imidazole (C3N2H4), piperidine (heterocyclic amine), nortropane (nitrogenous bicyclic compound), tropane (nitrogenous bicyclic compound), spermine (polyamine), also peptides, flavonoid compounds, anthraquinones (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 l0gm 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-Vidis 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).

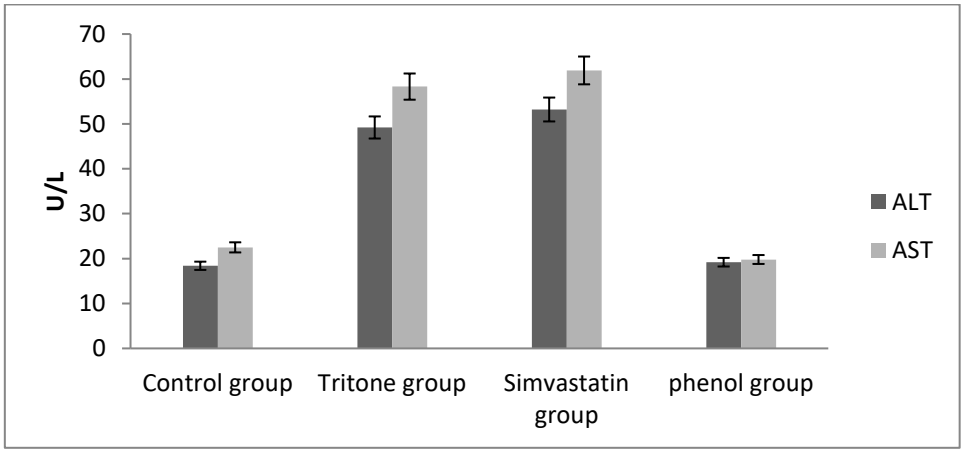

Figure 1: Levels of ALT and AST

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).

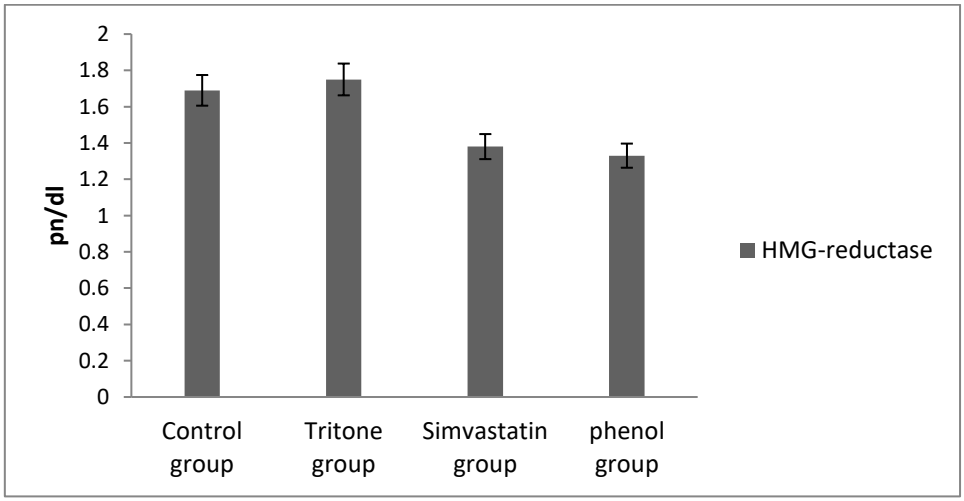

Figure 2: levels of HMG-reductase

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).

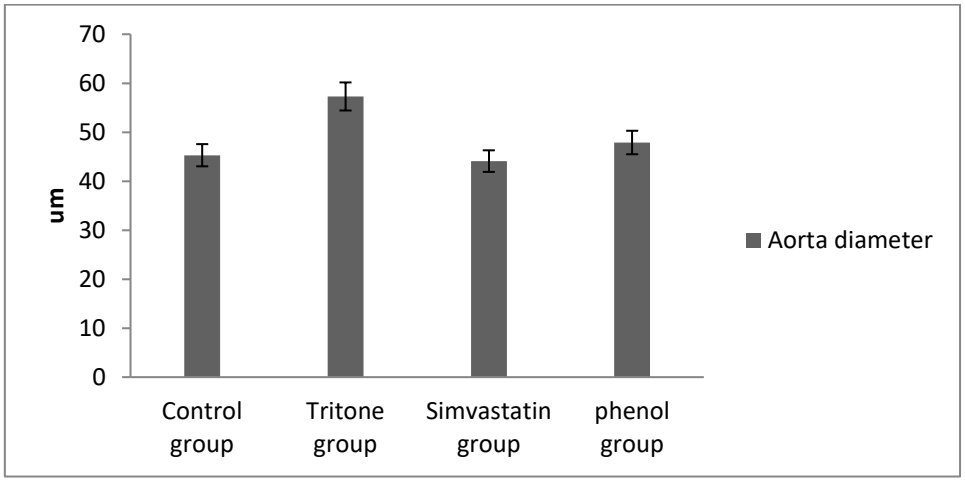

Figure 3: **Diameter of aorta**

DISCUSSION

The outcomes of study demonstrate different effect of hyperlipidemia on liver enzymes, HMG-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-iinflammatory 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 carrid 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

1. Ademosun AO, Oboh G, Passamonti S, Tramer F, Ziberna L, Boligon AA, Athayde ML. Phenolics from grapefruit peels inhibit HMG-CoA reductase and angiotensin-I converting enzyme and show antioxidative properties in endothelial EA. Hy 926 cells. *Food Science and Human Wellness* 2015; 4(2): 80-85.
2. Al-Jubori ZSH, Mahmood IH. Comparative Effects of Lovastatin and Simvastatin on Liver Function Tests in Hyperlipidaemic Patients. *The Medical Journal of Basrah University*, 2007; 25(1): 19-24.
3. Anggraeni K. Inhibition of HMG-CoA Reductase by Mixture of Flavonoid Extract Based on Jati Belanda Leaves (Guazuma ulmifolia) in Vitro, Skripsi Institut Pertanian Bogor, Bogor, (original version in Indonesian) 2017.
4. Bok SH, Lee SH, Park YB, Bae KH, Son KH, Jeong TS, Choi MS. Plasma and hepatic cholesterol and hepatic activities of 3-hydroxy-3-methyl-glutaryl-CoA reductase and acyl CoA: cholesterol transferase are lower in rats fed citrus peel extract or a mixture of citrus bioflavonoids. *The Journal of nutrition* 1999; 129(6): 1182-1185.
5. Bors W, Heller W, Michel C, Saran M. [36] Flavonoids as antioxidants: determination of radical-scavenging efficiencies. *Methods in enzymology* 1990; 186: 343-355.
6. Corsini A, Maggi FM, Catapano AL. Pharmacology of competitive inhibitors of HMG-CoA reductase. *Pharmacological Research* 1995; 31(1): 9-27.
7. Das DK. [40] Naturally occurring flavonoids: Structure, chemistry, and high-performance liquid chromatography methods for separation and characterization. *In Methods in enzymology*, *Academic Press* 1994; 234: 410-420.
8. Durrington PN. *Hyperlipidaemia.* Cambridge: Butterworth-Heinemann, Ltd 1995.
9. Gupta A, Sehgal V, Mehan S. Hyperlipidemia: An updated review. *International journal of biopharmaceutical & toxicological research* 2011; 1(1): 81-89.
10. Hicham H. The hypolipidaemic activity of aqueous Erica multiflora flowers extract in Triton WR-1339

induced hyperlipidaemic rats: a comparison with fenofibrate. *Journal of Ethnopharmacology* 2007; 109: 156-160.
11. Mishra PR, Panda PK, Apanna KC, Panigrahi S. Evaluation of acute hypolipidemic activity of different plant extracts in Triton WR-1339 induced hyperlipidemia in albino rats. *Pharmacologyonline* 2011; 3: 925-934.
12. Mohammed ST. Role of kefir milk on the pathogenesis of Entamoeba histolytica. *Iraqi Journal of Science* 2016; 57(2B): 1116-1124.
13. Pearson DA, Schmitz HH, Lazarus SA, Keen CL. Inhibition of in vitro low-density lipoprotein oxidation by oligomeric procyanidins present in chocolate and cocoas. In *Methods in enzymology*, *Academic Press* 2001; 335: 350-360.
14. Rehman NU, Hidayat H, Samia A, Ivan RG, Ahmed H. Chemical Constituents Isolated from Lycium shawii and their Chemotaxonomic Significance. *Records of Natural Products* 2018; 12(4): 380-384.
15. Shattat GF. A Review Article on Hyperlipidemia: Types, Treatments and New Drug Targets. *Biomedical and Pharmacology Journal* 2014; 7(2): 399-409.
16. Vacca L. *Laboratory Manual of Histochemistry (1st ed.)*. Raven Press: New York, USA 1985.
17. Verma N. Introduction to hyperlipidemia and its treatment: A review. *International Journal of Current Pharmaceutical Research* 2016; 9(1): 6-14.
18. Yao X, Peng Y, Xu LJ, Li L, Wu QL, Xiao PG. Phytochemical and biological studies of Lycium medicinal plants. *Chemistry & Biodiversity* 2011; 8(6): 976-1010.

Cite this article: Mohammed Ahmed Mustafa Study of Lycium Shawii Phenolic Compounds in Treatment of Hyperlipidemia. J. Cardiovascular Disease Res., 2020; 11 (4): 196 – 199